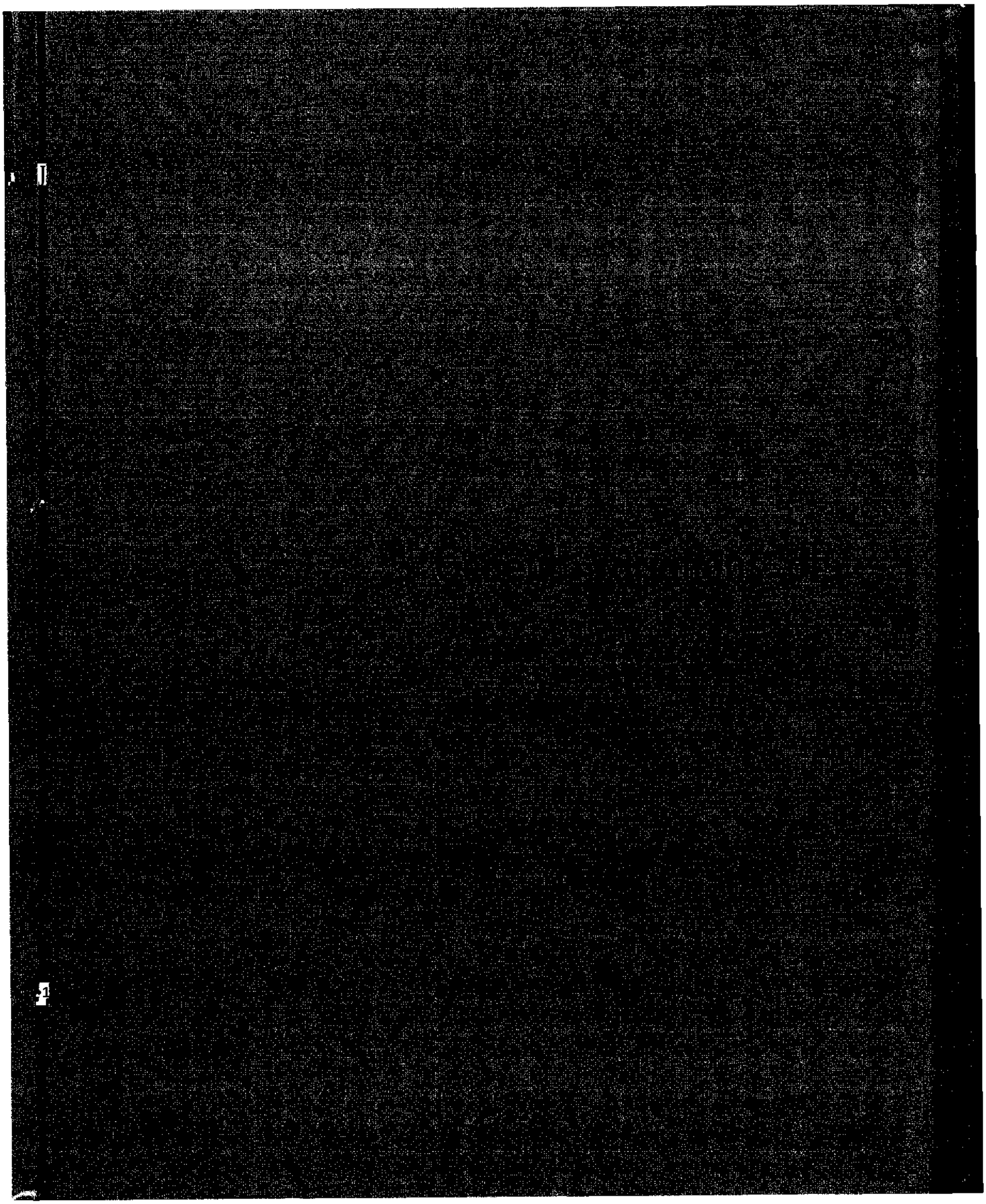

Genetic Variations of *Drosophila melanogaster*

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and

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operated by
UNION CARBIDE CORPORATION
for the
UNITED STATES ATOMIC ENERGY COMMISSION

Carnegie Institution of Washington Publication No. 627

Library of Congress Catalog Card Number 68-15915

ISBN 0-87279-S38-8

First Printing-1968
Second Printing-1972
revised from

THE MUTANTS OF DROSOPHILA MELANOGASTER

Calvin B. Bridges and Katherine F. Brehme

Carnegie Institution of Washington Publication 552, 1944

We dedicate this book to Alexander Hollaender on his retirement as director of the Biology Division of the Oak Ridge National Laboratory and in recognition of his continuous encouragement and support-

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PREFACE

The last exhaustive compilation of genetic variations of *Drosophila melanogaster* was "The Mutants of *Drosophila melanogaster"* prepared by Calvin B. Bridges and Katherine S. Brehme; it was published in 1944 and was complete through 1942. This volume is a revision of their work; it contains new information on variants already described and descriptions of variants discovered since 1942; it is reasonably complete through 1966. The new material was extracted from the literature, from Drosophila Information Service, and from voluminous contributions of unpublished material supplied by Drosophila geneticists throughout the world. The revision describes genetic material currently available to Drosophila geneticists and extinct material that may be encountered in earlier literature on the subject.

The work of Bridges and Brehme was divided into two sections, one describing wild-type stocks and the other describing the known departures from the normal genotype. Our revision is divided into seven sections: (1) mutants, with about 3000 entries; (2) chromosome aberrations, more than 1500 entries; (3) special chromosomes, i.e., multiply marked chromosomes, balancers, compound chromosomes, *Y* derivatives, and *X-Y* combinations; (4) cytological markers; (5) departures from diploidy; (6) nonchromosomal inheritance; and (7) wild-type stocks. All except the first two groups have relatively few entries.

Several new categories of effects unknown or nearly so in 1942 are included here. (1) Pseudoalleles: the intensive investigations into pseudoallelism and complementation dating from the pioneering work of E. B. Lewis on Star and astroid (1945, Genetics 30: 137-66) have produced information on the genetic fine structure of many loci. (2) Isozymes: a series of genetically controlled enzyme polymorphisms and deficiencies described mostly in the last decade; their discovery was made possible by the development of gel electrophoresis. (3) Compound chromosomes: formed by the attachment of two doses of one chromosome arm to a single centromere; represented by only the attached-^ chromosome in the original edition, the various classes of compound chromosomes now available occupy an entire subsection. (4) Marked *Y* chromosomes: *Y* chromosomes marked by the genes carried on small attached euchromatic segments derived from the *X* or an autosome. (5) Reciprocal translocations between the *X* and *Y* chromosomes. (6) Attached *XY* chromosomes: chromosomes with the portions of the *X* and *Y* chromosomes necessary for male viability and fertility attached to a single centromere.

Development of the system of nomenclature designating genetic variations of *Drosophila melanogaster* has been rather haphazard; consequently, the system is not a logical structure but is replete with relics, redundancies, and inconsistencies. Revision into a consistent scheme is not practicable, creating as it would a chaotic discontinuity in the literature. Even were such a revamping considered desirable, design of such a system is not obvious, since a change proposed to obviate one inconsistency would likely create more conflicts than it alleviated. Therefore, with few exceptions, we have adhered to the conventions established by Bridges and Brehme in the original volume. Some changes were made to correct glaring inconsistencies and others to facilitate automatic handling of Drosophila symbols.

The conventions adopted fdr naming and symbolizing different types of genetic changes are discussed at the beginning of the different sections of the book. Symbols of all genetic variants both normal and abnormal are always italicized but their names in text are printed in roman.

We are grateful to our colleagues throughout the world for their cooperation in making available to us their unpublished observations and in responding to our numerous queries. Special thanks are due Doctors E. B. Lewis, the late H. J. Muller, J. Schultz, and A. H. Sturtevant, who served as an informal board of consultants. They have contributed a measure of success to this effort but bear no responsibility for its shortcomings.

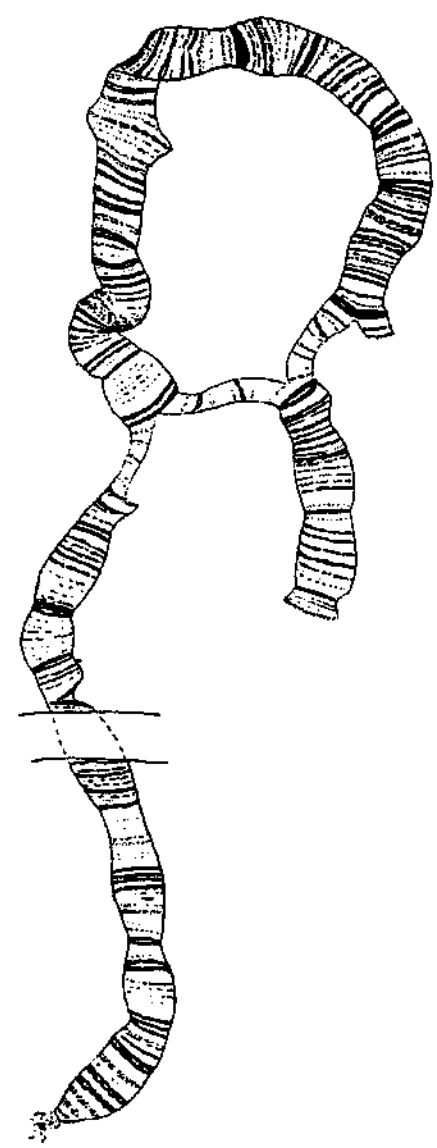
D. L. L.

E. H. G.

July 1967

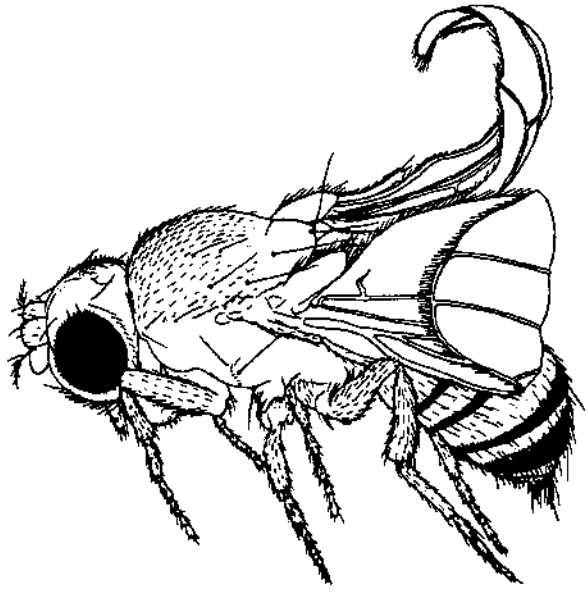
guide to

Genetic Variations of *Drosophila melanogaster*



Df(3L) Vn/T(Y;3)1

Mohr *nd Mossige, 1943, Norske Vldenskaps-Akad. 7: 1—51.



MUTATIONS

A variant exists when there are two or more alternative phenotypes. Usually, one is designated as normal or wild-type because it is the phenotype characteristic of wild-type flies; the other or others are considered mutant alternatives because they represent departures from normal. Distinction between normal and mutant may become blurred or disappear where both alternatives are characteristic of wild-type strains, as in isoalleles. The pair or group of alternatives defines a locus, which is given a name that suggests the main diagnostic features of the mutant form of the locus without regard to secondary characters. The name is concise and is preferably a simple adjective such as black or a noun such as Bar. When the main character is recognized in the heterozygote, the mutant is considered dominant and its name begins with an upper-case letter; when it is recognized in the homozygote, the mutant is considered recessive and its name begins with a lower-case letter.

For convenience, a symbol is assigned to each mutant type. This symbol is an abbreviation of the name that uniquely designates the mutant in question; it combines brevity with information. It usually begins with the same letter as the name, is always italicized, and never contains Greek letters, subscripts, or spaces; e.g., r for rudimentary, *R* for Roughened, *ro* for rough, *rs* for rose, and *ry* for rosy. In designations of genotypes with several mutant genes, symbols of genes on the same chromosome are separated by spaces (e.g., y *w i B);* symbols of genes on homologous chromosomes are separated by a slash bar (e.g., y H- / *B);* symbols of genes on noohomologous chromosomes are separated by semicolons and spaces (e.g., *bw; v;* ey). Names are not italicized in text.

MULTIPLE ALLELES. The alternatives or alleles at a particular genetic locus are designated by the same name and symbol and are differentiated by distinguishing superscripts. At publication of the original volume, heterozygotes for allelic mutants were thought always to show a mutant phenotype and segregation of the mutants at meiosis. Since that time, however, discoveries of complementation and intra-allelic recombination have revealed the widespread existence of complex pseudoallelic series, with consequent complications in the definition of allelism. By the criteria that they occupy virtually identical positions on the genetic map and have similar phenotypic effects, mutants formerly thought to be at different loci may now be considered changes in the same pseudoallelic complex; e.g., *(a* and *spl, Iz* and *amx,* and *m* and *dy.* The locus will probably be defined ultimately as the unit of transcription or, more likely, of translation; but in the current state of knowledge, we have been content to adhere to the historic terminology. One school of thought names every recombinationally separable element; another gives all members of the same complex a single name with arbitrary superscripts. The latter is our preference.

The superscript notation designating alleles has a number of different forms. A common device is an abbreviation that further characterizes the particular allele or that was used as the locus symbol before allelism was established. This practice is avoided because it has the disadvantage of preempting useful symbols and names from use as locus designations. Another unacceptable device is the use, as superscripts, of elements of the genotype in which the allele arose, since such a designation implies something more than a trivial connection between allele and element. More-acceptable superscripts for allelic designations are arbitrary numbers, experiment numbers, capitalized initials of the finder or laboratory, or the date of discovery. The numeral 1 is the implied superscript of nonsuperscripted symbols. Whereas genes in the same allelic series are designated by the same symbol but with different superscripts, mutants with similar phenotypes at different loci are not given the same symbol and differentiated only by a superscript; this was done extensively in the past; for example, for genes causing formation of melanotic pseudotumors.

For a recessive allele of a preponderantly dominant series or a dominant allele of a predominantly recessive series, the superscripts used are r and *D,* respectively; e.g., Hn^{r}, Hn^{r2}, and hw^{D}. Finally, for the normal allele in a series, a superscript plus sign may be used; e.g., 6^{+} or B^{+}. The plus symbol alone implies the normal (wild-type) allele in any context, such as *y/+* or *y m //+*. Absence of a particular locus may be noted by use of a superscript minus sign with the symbol; e.g., *bb~.*

Loci controlling electrophoretic mobility of enzymes and other proteins require special conventions. Since electrophoretic variants can be scored equally well in heterozygotes and homozygotes, the genes controlling them are considered dominant; e.g., *Adh.* Alleles specifying the variants are differentiated by arbitrary superscripts; e.g., Adh^{F}, Adh^{D}, and those specifying the absence of a particular enzyme or other protein by an appropriate superscript, such as n (negative), a zero, or a minus sign, rather than by a lower-case symbol; e.g., Adh^{nl}. The sole exceptions to the rule that the genetic determinants of electrophoretic protein variants be symbolized as dominant genes are loci originally recognized by recessive phenotypes and so named; e.g., *v* and *ry.* For proteins with undetermined activity, we use the symbol *Pt-* followed by an arbitrary designation specifying the particular protein; e.g., *Pt-1.* Abbreviations for the protein and the gene are frequently identical, and both are used in most discussions. The gene symbol may be differentiated from the protein symbol by having only its initial letter capitalized and by being italicized, whereas the protein symbol is in roman capitals; e.g., ADH.

In several instances where two members of the same allelic series were formerly given different locus names, both are here included under one name; e.g., $Pm = bw^{vl}$. In other cases, we assume allelism of mutants with similar phenotypes and genetic positions even though they have not been tested for phenotypic interaction. In such instances, the basis for the assumption is usually noted. Since the practice has not been consistent, some alleles may be described as different genes. We make special effort to infer allelism for Minute loci and for factors causing production of melanotic pseudotumors. Bridges and Brehme made few such inferences. Except in special cases, investigation of allelic interaction of sex-linked recessive lethals is not possible; consequently, they are often given distinctive symbols where allelism may actually exist.

MIMICS. Mutants at different loci sometimes have similar phenotypic effects. Such loci may be handled in several ways. The simplest is to give each a distinctive name (e.g., vermilion, cinnabar, scarlet, karmoisin, cardinal); this method has the effect of scattering such mimics throughout the alphabetical listing. Or a common symbol separated by a hyphen from a dis-

tinguishing symbol may be used (e.g., *tu-la, tu-lb, tu-2* for genes controlling production of melanotic pseudotumors). Distinctive suffixes are also useful (e.g., rough, roughoid, roughish, roughex; plexus, Plexate; dachs, dachsous; maroon, maroonlike). The latter two schemes frequently have the virtue of placing like phenotypes in sequence in an alphabetical listing. Some phenotypes result from mutation at many loci in all chromosomes; these are given a common symbol followed by a parenthetical designation of the chromosome and then by a distinguishing designation. Examples of this type of mutant are the female steriles, the lethals, the Minutes, and the male steriles [e.g., *fs(2)B, 1(1)Jl, M(l)n, ms(2)E4,* respectively]. Conventions for formulating distinguishing symbols are similar to those for superscripts; use of information about the cytological or genetic location is avoided to allow updating such information without changing the symbol.

MODIFIERS. The primary effect of some mutants is to cause another mutant to exhibit a more-extreme departure from normal (enhancer) or a more nearly normal phenotype (suppressor). Such mutants are symbolized e or *E* and sti or *Su,* followed in parentheses by the gene modified. Designation of the particular allele modified appears as a superscript within the parentheses and alleles of the modifier gene as superscripts outside the parentheses; e.g., $su(lz^{34})$ and $su(Hw)^{2}$. Terms such as dilutor, exaggerator, inhibitor, intensifies and modifier were also formerly used, but we have usually attempted to classify such genes as enhancers or suppressors.

FORMAT. Mutants with their descriptions are now listed alphabetically according to symbol and cross-indexed according to name. Current terminology is listed in bold face. All cases of synonymy are also listed in body type with cross-references to current usage. Mutants no longer existing in published stock lists or in private stock lists that we have examined are considered lost and are preceded in the list by a star. Each mutant is described according to the following format:

symbol: name

location: The location is indicated by the chromosome number, separated by a hyphen from the genetic position on the chromosome. Two levels of accuracy of the genetic location are indicated, those carried to tenths of a unit being the more accurately determined; e.g., 3.0 represents a more accurate location than 3. Map units are not computed to the second decimal place. Accuracy of a map position determination is of course dependent on the accuracy of the positions assigned to the reference markers; i.e., on the accuracy of the map. We treat the map as a rough guide to the relative positions of loci but, considered on a refined level, it may be inaccurate with respect to both position and order of genes. (We have abandoned the ± used by Bridges and Brehme to indicate a particularly low level of reliability.)

origin: For induced mutants, the agent is given; mutants recovered from untreated parents or a wild population are listed as spontaneous. Isoallelic variants found as major components of stocks or populations are listed as naturally occurring alleles. The stock or chromosome in which each mutant arose was listed by Bridges and Brehme; unless the new mutant is virtually inseparable from some element of the stock of origin (e.g., y^{31d} in $In(l)sc^{8}$), we omit mention of the original stock.

discoverer: Name, date of discovery.

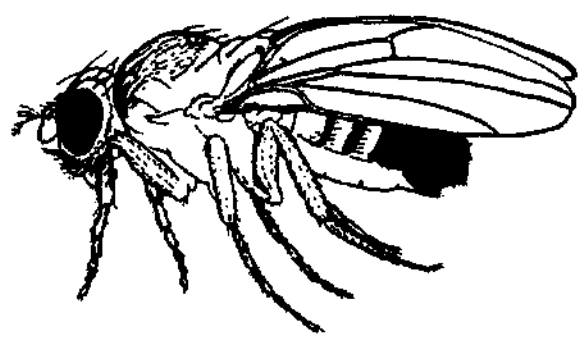
synonym: Alternative symbol or name or both, mostly obsolete terminology.

references: Sources of the major descriptive material are listed, but bibliographic material may also appear in some of the other categories.

phenotype: The most important departures from normal, which are usually those suggested by the name, are described first. Other information about the phenotype follows, and finally there may be data on viability and fertility. The last item in the phenotypic description is the rank, abbreviated RK. Mutants are classified into three different ranks according to their utility in experiments in which counts are made: RK1 mutants are easily scored; RK2 mutants are usable but less convenient; RK3 mutants have limited usefulness. An RK3 mutant may be one with good expression and viability but simply not convenient to use in counting experiments; e.g., enzyme polymorphisms. The letter A follows the rank of mutants associated with chromosome aberrations.

other information: This category contains miscellaneous information that does not fit into one of the other categories.

a: arc
location: 2-99.2.
discoverer: Bridges, 12e24.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 202 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.).
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Wings broader, bent downward in slight, even arc, and edges drawn down to diamond shape. Sometimes in stock, wings are bent upward instead of downward. Crossveins closer together. RK2.
cytology: Placed between 57F11 and 58E4 on the basis of its inclusion within *Df(2R)M-l = Df(2R)57Fll-58Al;58F8-59Al* but not *Dp(2;3)P = Dp(2;3)58E3-4;60D14-E2;96B5-Cl* (Bridges, 1937). Likely in band 58D6 or 7 based on $Df(2R)a^{b"2}$ = *Df(2R)58D5-6;58D7-8.*



a: arc
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 148.

aba: arc-broad angular
origin: Spontaneous.
discoverer: Goldschmidt, 1934.
synonym: Always referred to as *bran: broad angular* by Goldschmidt, but shown by him to be an allele of arc.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 351-56, 388-89, 519.
phenotype: Wings broader and shorter than wild type, blunt at the tip. Frequently shows upturned posterior scutellar bristles. In combination with $svrP^{oi}$, produces soft blistered wing. Other interactions described by Goldschmidt, 1945, table 74. Wing grows in pupal stage to full length and then retracts, possibly with histolysis [Goldschmidt, 1935, Z. Induktive Abstammungs- Vererbungslehre 69: 38-131 (fig.)J. RK2.
cytology: Salivary chromosomes normal (Kodani).
other information: Claimed to recur repeatedly in certain lines (Goldschmidt, 1945).

origin: Spontaneous,
discoverer: Goldschmidt.
synonym: *bran*.*
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 364-69, 388-89.
phenotype: Nearly normal; distinguished by its interaction with certain *svr* alleles (see Goldschmidt, 1945, table 74). RK3.
cytology: Salivary chromosomes normal (Kodani).

*a£>a2
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $bran^2$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 363-73, 388-89.
phenotype: Wings somewhat more angular than a^{ba}. Interactions with other genes shown in table 74 of Goldschmidt (1945). RK2A.
cytology: Associated with $Df(2R)a^{ba2}$ = *Df(2R)58D5-6;58D7-8* (Goldschmidt, 1945).

*aba3
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: *bran^.*
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 386-89.
phenotype: Normal; distinguished by its interaction with certain *svr* alleles (see Goldschmidt, 1945, table 74). RK3.
cytology: Salivary chromosomes normal (Kodani).

*aba4
origin: Spontaneous. Probably a derivative of a^{ba3}.
discoverer: Goldschmidt.
synonym: $bran^4$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 389-90, 490.
phenotype: Like a^{ba}; distinguished by its interaction with certain svr alleles (see Goldschmidt, 1945, table 74). RK2.
cytology: Salivary chromosomes normal (Kodani).

**abadb: arc-broad angular dumpy blistered*
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $bran^{db}$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 370-71, 388-89.
phenotype: Like a^{ba}; distinguished by its interaction with certain *svr* alleles (see Goldschmidt, 1945, table 74). RK2.
cytology: Salivary chromosomes normal (Kodani).

**abadp; arc-broad angular dumpy*
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $bran^dP$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 373-86, 388-89.
phenotype: Normal; distinguished by its interaction with certain svr alleles (see Goldschmidt, 1945, table 74). RK3.
cytology: Salivary chromosomes normal (Kodani).
other information: Claimed by Goldschmidt to recur repeatedly in certain lines.

*ai>or: *arc-broad angular rudimentary*
origin: Spontaneous derivative of $a^{bad}P$.
discoverer: Goldschmidt.
synonym: $bran^r$.

references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 378-79, 388-89.
phenotype: Wing broad, round and dp-like. Interacts with certain *svr* alleles (see Goldschmidt, 1945, table 74). RK2.

$_0$Bo**; ***arc-Broad angular Dominant
origin: Spontaneous derivative of a^{ba}.
discoverer: Goldschmidt.
synonym: *Bran.*
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 360-63, 388-89.
phenotype: a^{Ba}/+ resembles a^{ba}/a^{ba}. a^{Ba}/a^{ba} shows Minute bristles. RK2.

$_0$8oC**: ***arc-Broad Angular in Canton
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $Bran^{\wedge a}$.
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: a^{BaC}/+ is normal; *aBaC/$_a$ba* ig broad angular, but overlaps wild type. $a^{Ba\wedge}$ is dominant in its interaction with certain svr alleles. RK3..
cytology: Salivary chromosomes normal (Hannah-Alava).

$_a$Bapl**: ***arc-Broad angular in silver-pointed
origin: Spontaneous.
discoverer: Goldschmidt, 1947.
synonym: $BranP^{0*47\,n1}$.
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: $a^{13\wedge 1}$/+ resembles a^{ba}/a^{b}*. RK2.
cytology: Salivary chromosomes normal (Hannah-Alava).

*$_a$*Bop2*
origin: Spontaneous.
discoverer: Goldschmidt, 1947.
synonym: $BranP^{oi47\text{-}2}$.
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: Phenotype normal in combination with a^{ba} and +; homozygous lethal. Dominant in interactions with certain svr alleles. RK2 as lethal.
cytology: Salivary chromosomes normal (Hannah-Alava).

$_0$BoX**; ***arc-Broad angular from X irradiation
origin: X ray induced.
discoverer: Goldschmidt.
synonym: $Bran^{x}$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 521-22.
phenotype: Resembles a^{bo2} and a^{badb}, but more or less dominant. Homozygote never obtained. Interactions listed by Goldschmidt (1945, table 153). RK2.

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: *Brany P*^{bl}.
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: Homozygotes usually lethal; rare survivors have short, folded wings and are sterile. $_a$*Bay*/+ is broad-angular, with occasional truncate-like wings. In combination with $svrP^{oi}$ resembles rudimentary and blistered. RK2 as lethal.
cytology: Salivary chromosomes normal (Hannah-Alava).

$_a$M60**: ***$_{arc}$ of Meyer
origin: X ray induced.
discoverer: Meyer, 60f.
references: 1963, DIS 37: 50.
phenotype: Homozygous lethal. RK3A.
cytology: Associated with $In(2LR)a^{M6\circ}$; breakpoints unknown.

A: Abnormal abdomen
location: 1-4.5.
discoverer: Morgan, 11g.
synonym: *Abnormal.*
references: 1915, Am. Naturalist 49: 384-429 (fig.)-Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 27 (fig.).
phenotype: Tergites and sternites raggedly incomplete, exposing a thin crinkled cuticle; bristles and hairs on abdomen correspondingly eliminated. Highly variable, wild phenotype in old dry cultures. *A*/+ less extreme than *A/A* and *A* male; homozygous female fully viable and fertile. RK2 in well-fed cultures.
other information: Lost by reversion to wild type.

A: see bw^A

A53g
location: 1- (just to the right of *w;* judged to be allelic to .4).
origin: Spontaneous.
discoverer: Hillman, 53g.
references: 1953, DIS 27: 56.
Hillman and Barbour, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 170.
phenotype: Highly variable; ranging from extreme expression in young cultures to normal in old cultures. Expression in $A^{S3}6/A^{S3}6$ females > $A^{53}6/Y$ males > A^{S3}&/+ females. Expression varies from loss of tergites 2—8 in extreme cases to loss of lateral part of tergite in one or more segments. RK2A in young cultures.
cytology: Associated with rearrangement of 2-5 bands in 3C-D.

a-3: seea(3)26

A-p; *Abnormal abdomen-polygenic
location: Polygenic.
discoverer: Sobels, 49j.
references: 1950, DIS 24: 62.
1951, DIS 25: 75-76.
1952, Genetica 26: 117-279 (fig.).
1952, Trans. Intern. Congr. Entomol., 9th. Vol. 1: 225-30.
synonym: *AA; Aay: Asymmetric.*
phenotype: Incomplete mediodorsal fusion and one-sided reduction of tergites. When more than one tergite is abnormal, spiral segmentation types are most frequent. Expression strongly dependent on environment. Penetrance and expressivity correlated (Bezem and Sobels, 1953, Konixikl. Ned. Akad. Wetenschap., Proc. Ser. C 56: 48-61). In strains selected for penetrance of *A-p,* mediodorsal fusion or asymmetrical reduction of head and thorax also occur. RK3.

a(1)48: abnormal abdomen in chromosome 1
location: 1- (not located).
origin: Spontaneous.
discoverer: Zimmerman, 1948.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 327-72 (fig.).
phenotype: Has no phenotype of its own but increases the incidence of abdominal malformations in *a(2)48* and *a(3)48* and in progeny of such flies. Viability and fertility good. RK3.

a(1)50
location: 1- (not located).
origin: Spontaneous.
discoverer: Zimmerman, 1950.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 327-72 (fig.).
phenotype: Irregularities in abdomen most frequently involving the anterior segments. Penetrance 1 percent. Enhances maternal effects of *a(2)48* and *a(3)48.* Viability and fertility good. RK3.

o(l)Sl
location: 1- (not located).
origin: Spontaneous.
discoverer: Zimmerman, 1951.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs-Vererbungslehre 86: 327-72 (fig.).
phenotype: Shows maternal effect only, with 2 percent of progeny affected. Abnormalities more anterior than those of *a(2)4S* and *a(l)50.* Viability and fertility good. RK3.

o(2)48
location: 2- (not located),
origin: Spontaneous.
discoverer: Zimmerman, 1948.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 327-72 (fig.),
phenotype: Abdominal irregularities most frequently involve anterior segments. Penetrance 7 percent. Also shows maternal effect. Viability and fertility good. RK3.

o(2)50
location: 2- (not located),
origin: Spontaneous.
discoverer: Zimmerman, 1950.
references: 1952, DIS 26: 69.
1954, Z. Inductive Abstammungs- Vererbungslehre 86: 327-72 (fig.),
phenotype: None. Six percent progeny affected, i.e., only maternal effect. RK3.

o(2)51
location: 2- (not located),
origin: Spontaneous,
discoverer: Zimmerman, 1951.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 327-72 (fig.).
phenotype: Penetrance 50 percent. Also shows maternal effect. RK3.

A(2)51
location: 2- (not located).
origin: Spontaneous.
discoverer: Zimmerman, 1951.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstrammungs- Vererbungslehre 86: 327-72 (fig.).
phenotype: None. Enhances *a(2)48* and *a(3)48.* RK3.

o(3)26
location: 3-27 (to the right of se).
origin: Spontaneous.
discoverer: H. A. and N. W. Timoféeff-Ressovsky.
synonym: *a-3.*
references: 1927, Arch. Entwicklungsmech. Organ. 109: 70-109.
Schäffer, 1935, Z. Induktive Abstammungs- Vererbungslehre 68: 336—60 (fig.).
phenotype: Irregular reduction of abdominal tergites, sternites, pigmentation, and bristles; more marked in females and increased by crowding and dry food (Braun, 1938, Am. Naturalist 72: 189-92).
Schäffer's data (1935) suggest irregular dominance in heterozygote, overlapping of wild type in homozygote, and genetic modifiers. RK3.

a(3)48
location: 3- (not located).
origin: Spontaneous.
discoverer: Zimmerman, 1948.
references: 1952, DIS 26: 69.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 327-72 (fig.).
phenotype: Only a maternal effect affecting 2.5 percent of progeny. Irregularities most frequently involve posterior segments of abdomen. Viability and fertility good. RK3.

A34:* see *bw^{V6}

aa: anarista
location: 3-0.
discoverer: Bridges, 23dlO.
synonym: *al~b: aristaless-b.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218.
phenotype: Aristae bare or tufted. Wings somewhat broader than wild type. Expression variable, overlaps wild type often in female and sometimes in male. RK3.
cytology: Placed between 61E2 and 62A6, on basis of its inclusion in *Df(3L)D = Dt(3L)61E2-Fl;62A4-6* from *T(Y;2;3)D.*

Aa: Altered abdomen
location: 1- (not located).
origin: X ray induced in the *In(l)dl-49, y w t* component of *C(1)DX, y i* of Muller.
discoverer: Cicak, 56f.
references: Cicak and Oster, 1957, DIS 31: 80.
phenotype: Heavy deposition of melanin in tergites of females and males. Males sterile, therefore homozygous females not produced. RK2A.
cytology: Probably associated with a rearrangement in addition to *ln(l)dl-49.*

AA:* see *A-p

ab:abrupt

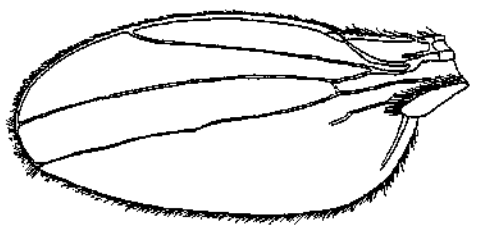
location: 2-44.0.

origin: Spontaneous.

discoverer: Bridges, 16jl6.

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218 (fig.).

phenotype: Vein L5 usually stops after posterior crossvein. Scutellar bristles usually fewer. Wing effect probably ^acts during contraction period (Waddington). Overlaps wild type. RK2.



ab: abrupt

Edith M. Wallace, unpublished.

ab²

origin: Spontaneous.

discoverer: Bridges, 23gl6.

synonym: *pt: parted.*

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 232.

phenotype: Vein L5 does not reach margin. Scutellar bristles always fewer than wild type. Hairs parted down midline of thorax and abdomen. Supra-alar bristles sometimes absent. Coxae tend to be thickened. Males sterile and have rotated genitalia. *ab/ab²* resembles *ab/ab* but has a stronger bristle effect. RK2.

ab⁵¹g

origin: Spontaneous in *In(2L)Cy + In(2R)Cy.*

discoverer: Edmonds on, 51g.

references: 1952, DIS 26: 60.

phenotype: A strong allele like *ab²*. RK2A.

****abt-60h: abrupt-lethal***

origin: Spontaneous.

discoverer: Hall, 60h.

references: 1960, Meyer, DIS 34: 52.

phenotype: Homozygote rarely survives. *ab^1,60ll/ab²* has shortened vein L5, but no scutellar bristles missing, and there is no part down midline of thorax and abdomen. *ab^1,60fl/ab²* males are fertile. RK2.

abb: abbreviated

location: 2-105.5.

discoverer: Bridges, 28d6.

references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.

phenotype: Bristles smaller; especially posterior scutellars. Developmental time slightly longer than normal. Viability only slightly reduced. Classification difficult, especially in early eclosions; improves with age of culture. Enhanced by shrunken (2-2.3), making classification easy. RK3; RK2 with *shr.*

cytology: Placed in region between 59E2 and 60B10 by Bridges (1937) on basis of its being to the right of *In(2R)bv/V^r>»¹ = In(2R)41B2-Cl;59E2-4* and to the left of *Df(2R)Px = Df(2R)60B8-10;60Dl-2.*

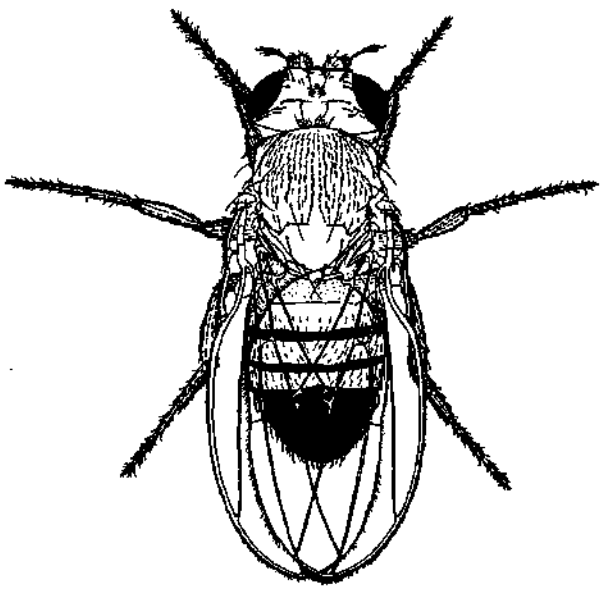


abb: abbreviated

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 11.

abd: abdominal

location: 3-27 (close to the right of *se).*

origin: Spontaneous.

discoverer: Gottschewski, 1935.

phenotype: Abdominal bands broken and etched. Overlaps wild type in test crosses but not in homozygous stock. Slightly semidominant. More extreme at 19°C. *abd/a(3)26* shows slight *abd* effect. RK3.

abdomen rotatum:* see *ar

abdominal:* see *abd

****abe:** abnormal eye*

location: 1-1.2.

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).

discoverer: Fahmy, 1955.

references: 1959, DIS 33: 82-83.

phenotype: Eyes rough; either small or deformed. Wings slightly atypical; inner margin frequently removed by large irregular incisions; L4 frequently stops well short of the wing edge. Flies slightly smaller than normal. Males about 50 percent as viable as wild type and fertile. Females highly infertile. RK2.

abero: see *abr*

Abnormal: see *A*

abnormal abdomen: **see** *a( )*

Abnormal abdomen: **see** A

abnormal eye: **see** *abe*

abnormal tergites: **see** *abt*

abnormal wings: **see** *abw*

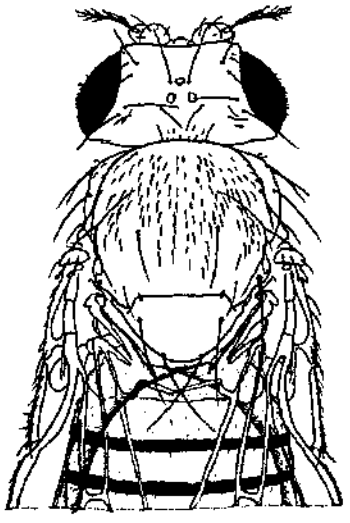
abr: abero
location: 2-83.
origin: Spontaneous.
discoverer: Bridges, 33blO.
phenotype: Abdominal banding etched and irregular. Wing margins irregular. Eyes rough. Bristles and hairs sparse and disarranged. *abr/+* sometimes lacks anterior dorsocentrals. Viability usually poor. RK3.
other information: Not allelic to *fr* or *nw*.

abrupt: **see *ab***

Abruptex: **see Ax**

abt: *abnormal tergites
location: 1-45.6.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 83.
phenotype: Abdomen affected to various degrees, from extreme deformation of tergites to slight abnormalities in distribution of pigment and hairs. Eyes also deformed to various degrees from gross alterations in shape to slight derangement of ommatidia. Wings vary from alterations in size, outline, and venation to small incisions of the inner margin. Most-extreme effects not always positively correlated, and all flies show several atypical characters. Males viable, fertility severly reduced. RK3.

abw: abnormal wings
location: 1-60.
origin: X ray induced.
discoverer: Halfer, 1963.
phenotype: Wing size reduced; wings upturned; L5 and crossveins absent. Plexus of veins between L3andL4.RK1.



ac: achaete
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 12.

ac: *achaete*
location: 1-0.0.
origin: Spontaneous in *X* chromosome carrying *y*.
discoverer: Weinstern, 16b3.
synonym: Called ac^{11} by Serebrovsky.
references: 1918, Genetics 3: 133—72.
Dubinin, 1930, Zh. Eksperim. Biol. 6: 325—46.
1933, J. Genet. 27: 443-64.
phenotype: Posterior dorsocentral bristles missing, anteriors rarely; hairs usually fewer near posterior dorsocentrals; intraocellar hairs invariably fewer, typically absent. Eyes partly devoid of hairs. *ac/ac* or *ac/+* partially suppresses *h* (Sturtevant). *Hw/ac = Hw/+* (Sturtevant). RK1.
cytology: Placed in region 1A5-8 on basis of its inclusion in the X^D3^P element of $T(l;3)sc^260\text{-}20 = T(l;3)lA8\text{-}B1^{\wedge}61Al\text{-}2$ and in $Dp(l;f)sc2\ 6\ 0\text{-}2\ 7 = Dp(l;t)lA8\text{-}Bl;l9F$, but not being lost from $Df(l)260\text{-}5 = Dt(l)lA4\text{-}5$ (Sutton, 1943, Genetics 28: 210-17).

***ac2**
origin: X ray induced simultaneously with sc^3.
discoverer: Dubinin, 1928.
references: 1929, Biol. Zentr. 49: 328-39.
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65.
phenotype: Since ac^2 and sc^3 are for practical purposes inseparable by crossing over, the effect of ac^2 alone cannot be assessed. The double mutant removes all bristles except scutellars and postdorsocentrals. ac^2/ac^2 or $ac^2/+$ suppresses *h* (Sturtevant). Viability of males low; females nearly inviable. RK2.
cytology: Salivary chromosomes normal (Schultz).

ac^2: see ac^3

ac^3
origin: X ray induced.
discoverer: Dubinin, 1929.
synonym: Called ac^2 by Dubinin, the earlier ac^2 with sc^3 having been omitted from the series. sc^{i0}. sc-'-' (Sturtevant and Schultz, 1931, Proc. Natl. Acad. Sci. U.S. 17: 265-70).
references: 1930, Zh. Eksperim. Biol. 6: 300—24.
1932, J. Genet. 25: 163-81.
1933, J. Genet. 27: 443-64.
phenotype: Posterior and usually anterior dorsocentrals lacking; other bristles wild type. Hairs removed from areas across rear and front edges of thorax, through mid-dorsal area, and between ocelli. RK2A.
cytology: Inseparable from $In(l)ac^3 = In(l)lB2\text{-}3;lB14\text{-}Cl$ (Muller, Prokofyeva, and Raffel, 1935, Nature 135: 253-55).
other information: Judged to be an allele of ac but not sc; it is mutant in combination with ac but not with sc alleles except for sc^s which may also show ac variegation and sc^3, now lost, which is thought to be a *sc ac* double mutant (Sturtevant).

ac^3: see *ac**

$*_{QC}4$
origin: X ray induced in *X* chromosome carrying sc.
discoverer: Dubinin, 1929.
synonym: Called ac^3 by Dubinin.
references: 1930, Zh. Eksperim. Biol. 6: 300—24.
1932, J. Genet. 26: 37-58.
1933, J. Genet. 27: 443-64.

phenotype: Anterior and posterior dorsocentrals removed; also thoracic hairs. A change also apparently induced in expression of *sc;* called sc^{13}. The sc component also removes scutellars and often ocellars, postverticals, and first and second orbital bristles. Viability low. RK2.

$*_{ac}$*260-28*

origin: X ray induced simultaneously with $y260\text{-}28_m$
discoverer: Sutton, 39126.
references: 1943, Genetics 28: 210—17.
cytology: Salivary chromosomes appear normal.

Ac:* see *Cu^A

occ: *acclinal wing*

location: 1-54.5.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 67.
phenotype: Wings upheld but slope backward at 45° angle from abdomen. Viability and fertility good in both sexes. RK1.
other information: One allele each induced by CB. 3007 and by CB. 3026.

achaete;* see *ac

Acpfi-7^A: *Acid phosphatase-1-A*

location: 3-101.4.
origin: Naturally occurring allele.
discoverer: Maclntyre, 1964.
references: 1966, DIS 41: 61.
1966, Genetics 53: 461-74.
phenotype: $Acph\text{-}1^A/Acph\text{-}1^A$ produces acid phosphatase-1 enzyme that migrates slowly in starch gel electrophoresis. Enzyme found in larva, pupa, and adult. RK3.

Acpfi-JB

origin: Naturally occurring allele.
discoverer: Maclntyre, 1964.
references: 1966, DIS 41: 61.
1966, Genetics 53: 461-74.
phenotype: $Acph\text{-}1^B/Acph\text{-}1^B$ produces more rapidly migrating acid phosphatase-1 than $Acph\text{-}1^A/Acph\text{-}1^A$. $Acph\text{-}1^A/Acph\text{-}1^B$ produces the two parental enzymes as well as a hybrid enzyme of intermediate mobility. A hybrid enzyme is also formed in *simulans* X *melanogaster* hybrids. RK3.

ad: arcoid

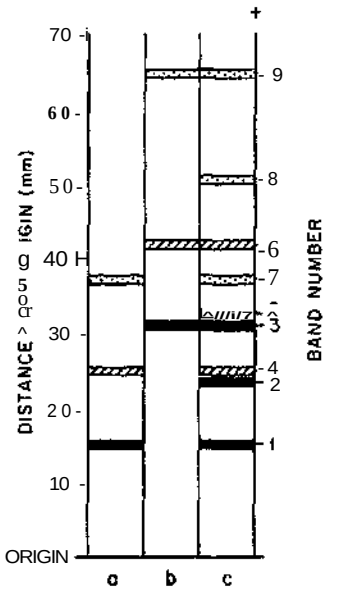
location: 2-60.7.
origin: Spontaneous.
discoverer: Curry, 38a2.
references: 1939, DIS 12: 45.
phenotype: Wings arched, broad, and somewhat shortened; crossveins close; scutellar groove shallow. Legs may be slightly shorter than wild type. RK3.

Adh^D: Alcohol dehydrogenase-D

location: 2-50.1 (one-tenth the distance from *el* between *el* and *rd).*
origin: Ethyl rnethanesulfonate-induced derivative of *Adh^* of Samarkand.
discoverer: E. H. Grell, 65k8.
phenotype: Specifies isozymes of alcohol dehydrogenase that migrate [in the system of Grell, Jacobson, and Murphy (1965, Science 149: 80-82)] toward the anode more rapidly than those specified by Adh^F. As with Adh^F and Adh^s, three isozymes are specified by Adh^D. RK3.
cytology: Placed in region between 34E5 and 33D1, on the basis of its inclusion in *Df(2L)64j = Dt(2L)34E5-Fl;35C3-Dl* (E. H. Grell).

Adh^F; Alcohol dehydrogenase-Fast

origin: Naturally occurring allele.
discoverer: Johnson and Denniston, 1964.
references: 1964, Nature 204: 906—7.
Grell, Jacobson, and Murphy, 1965, Science 149: 80-82.
Ursprung and Leone, 1965, J. Exptl. Zool. 160: 147-54.
phenotype: Specifies isozymes of alcohol dehydrogenase that migrate [in the system of Grell, Jacobson, and Murphy (1965)] toward the anode more rapidly than the isozyme's specified by Adh^s. Homozygote contains three electrophoretically separable isozymes. The one moving most rapidly toward the anode is often not detected in zymograms of single adults but is nearly always detectable in zymograms of single larvae. The faster isozymes more reliably detected with use of sec-butanol than with ethanol as a substrate. Adh^F/Adh^s heterozygote contains the parental isozymes plus three hybrid isozymes. Hybrid enzymes also formed in *melanogaster* X *simulans* hybrids. RK3.



Alcohol dehydrogenase alleles

a = Adh^S/Adh^*; b = $AdhF/Adh^F$; c = Adh^F/Adh^S.
From Grell, Jacobsen, and Murphy, 2 July 1965, Science 149: 80-82.

Adh^{n1}: Alcohol dehydrogenase-negative

origin: Ethyl methanesulfonate-induced derivative of Adh^s of Canton-S.
discoverer: E. H. Grell, 66elO.
phenotype: Homozygote shows no alcohol dehydrogenase activity. Sensitive to alcohol, showing

evidence of intoxication within 1 hr of being placed on substrate containing 15 percent ethanol; death invariably follows within 24 hr. Heterozygote with allele producing active enzyme shows evidence of formation of a hybrid enzyme with one active and one mutant polypeptide subunit. RK3.

Adh»2

origin: Ethyl methanesulfonate-induced derivative of *Adh*^{s}.

discoverer: E. H. Grell, 66elO.

phenotype: Like *Adh*^{nl} except no evidence of hybrid enzyme in heterozygote with active allele. RK3.

***Adh*^{n3}**

origin: Ethyl methanesulfonate-induced derivative of *Adh*^{s}.

discoverer: E. H. Grell, 66f.

phenotype: Like *Adh*^{n}2. RK3.

Adh"4

origin: Ethyl methanesulfonate-induced derivative of *Adh*^{D}.

discoverer: E. H. Grell, 66g.

phenotype: Like *Adh*^2. RK3.

***Adh*^{n5}**

origin: Ethyl methanesulfonate-induced derivative of *Adh*^{D}.

discoverer: E. H. Grell, 66g.

phenotype: Small amount of alcohol dehydrogenase activity in homozygote but ethanol sensitive. Electrophoretic migration of enzyme like that of *Adh*^{D}. Heterozygote with fully active allele has hybrid enzyme, presumably with one active and one *Adh*^{n}$ subunit. RK3.

Adh*^{s}: *Alcohol dehydrogenase-Slow

origin: Naturally occurring allele.

discoverer: Johnson and Denniston, 1964.

references: 1954, Nature 204: 906—7.
Grell, Jacobson, and Murphy, 1965, Science 149: 80-82.
Ursprung and Leone, 1965, J. Exptl. Zool. 160: 147-54.

phenotype: Specifies isozymes of alcohol dehydrogenase that [with the methods of Greil, Jacobson, and Murphy (1965)] migrate more slowly to the anode than those specified by *Adh*^{F}. There are also three isozymes in *Adh*^{s} homozygote. RK3.

adp^{60}: *adipose*

location: 2-83.4.

origin: Spontaneous.

discoverer: Doane, 1960.

references: 1961, DIS 35: 78.
1963, DIS 38: 32.

phenotype: Adult fat body hypertrophies as cells become distorted by enormous oil globules. Abnormal fat bodies visible through body wall of 6-day-old and older adults when submerged in 95 percent alcohol and then water. Adult corpus allatum of mated females hypertrophies. Females fertile but egg hatchability reduced to 45—90 percent, depending on residual genome; adult emergence lowered to 33—85 percent. Males viable and fertile. RK3.

adp^{fs}: *adipose-female sterile*

origin: Spontaneous.

discoverer: Counce, 1956.

synonym: *fs(2)adp: female sterile(2) adipose.*

references: Doane, 1959, Genetics 44: 506.
1960, J. Exptl. Zool. 145: 1-42 (fig.).
1961, J. Exptl. Zool. 146: 275-98.

phenotype: Adult fat body phenotype like *adp*^{60}; corpus allatum hypertrophies in mated females to same degree as in *adp6*°. Females completely sterile; sterility autonomous. Eggs laid by homozygotes show meiotic or mitotic abnormalities, or both, never develop beyond early cleavage stages. Males 78 percent fertile. Heterozygotes fertile but females become sterile with age. Viability generally good, but longevity reduced; horaozygotes with selective advantage under starvation; heterozygotes superior under desiccation. Average water content of well-fed adults reduced; percentage of lipids, as a function of dry body weight, almost double that of wild type. Iodine numbers show greater degree of saturation of mutant lipid extracts than of wild type. RK3.

ae: aeroplane

location: 2-55.8.

origin: Spontaneous.

discoverer: Mohr, 26k24.

references: Quelprud, 1931, Hereditas 15: 97-119 (fig.),

phenotype: Wings spread, balancers drooping. Overlaps wild type. RK3.

Ae; *Aechna

location: 3- (rearrangement).

origin: X ray induced.

discoverer: Belgovsky, 45al4.

references: 1946, DIS 20: 63.

phenotype: Wings spread at right angles to body axis. Homozygous lethal. RK1A.

other information: Reduced crossing over in the *th-e* region suggests presence of pericentric inversion.

aeroplane:* see *ae

agl: angle winglike

location: 1- (not located).

origin: Recovered among descendants of flies treated with natural gas.

discoverer: Mickey, 49c7.

synonym: Originally called *angle wing,* but this name preoccupied by *ang.*

references: 1950, DIS 24: 60.

phenotype: Wing bent upward in middle. Overlaps wild type. RK3.

ah aristaless

location: 2-0.01 (to the right of *net).*

origin: Spontaneous.

discoverer: Bridges, 17k7.

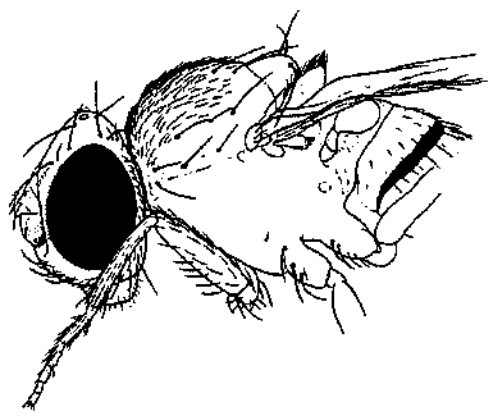
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 213 (fig.).
Stern and Bridges, 1926, Genetics 11: 510 (fig.).

phenotype: Aristae strongly reduced. Postscutellars widely separated, erect but strongly divergent. Scutellum shortened; sternopleurals irregular in size, position, and number; wings slightly bowed

downward, narrowed, pointed; first longitudinal vein raised and thickened. RK1.
cytology: Placed in 21C1-2 doublet on the basis of its inclusion in *Df(2L)al = Df(2L)21B8-Cl;21C8-Dl* but not in *Df(2L)S5 = Df(2L)21C2-3;22A3-4* (Lewis, 1945, Genetics 30: 137-166).

0/2
origin: Spontaneous.
discoverer: Stern, 26a.
references: Stern and Bridges, 1926, Genetics 11: 511.
phenotype: Slightly less extreme than *at,* but viability poorer. RK2.

*$_0$/3
origin: Spontaneous.
discoverer: Bridges, 33g2.
phenotype: Aristae absent or much reduced. Thorax has wide bare area or groove down midline with divergent hairs and bristles; sternopleurals absent. Wings have weakened L2 vein and delta at tip of L3. Female sterile. Viability about 10 percent of wild type. RK3.



al^3*: arrstaless-3*
Edith M. Wallace, unpublished.

ah
origin: Spontaneous in *In(2LR)bw*^{vl}.
discoverer: Bridges, 33127.
references: 1935, DIS 3: 5.
phenotype: Slight allele of *al* in some or all stocks of *bw*^{v}*l.* RK2A.

*$_a$/3<5
origin: X ray induced,
discoverer: Glass, 36c.
references: 1939, DIS 12: 47.
phenotype: Like *al.* RK1.

***a/AU0: *artstaless* of Meyer**
origin: X ray induced,
discoverer: Meyer, 60f.
references: 1963, DIS 37: 50.
phenotype: Homozygous lethal. May be variegated position effect. RK3A.
cytology: Associated with *In(2LR)al*^{M60}, inferred from suppression of crossing over in most of *2L* and some of *2R.*

*o/^{v}: *arista!ess-variegated*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 137—66.
phenotype: *al*^{v}*/al* variegated for *al.* Homozygous lethal. RK2A.
cytology: Associated with *In(2LR)al*^{v} *=In(2LR)21B-C1.-41.*

al-b: see *aa*
ala: see *dy*^{aJa}
ala parvae: see *dy*^{ata}
alarless: see *air*
Alcohol dehydrogenase: see *Adh*

A/i^n: *Aliesterase-negative*
location: 3- (not located).
origin: Spontaneous.
discoverer: Ogita.
synonym: *ali: aliesteraseless.*
references: 1961, Botyu-Kagaku 26: 93—97. 1962, DIS 36: 103.
phenotype: Homozygotes practically unable to hydrolyze methyl butyrate, whereas wild type shows high activity; *Ali*^{n}/+ exhibits intermediate activity. Homozygotes shown by Beckman and Johnson to lack a normally present esterase that migrates slowly on starch gel (their band F). RK3.

Alkaline phosphatase: see *Aph*
aliesteraseless: see *Ali*^{n}
almond: see *Did*^{r}
almondex: see *amx*
almondex-55: see *lz*^{K}
*o/o; *alopecia*
location: 1-38.3.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 67.
phenotype: Abdominal hairs much reduced in number; pigmentation frequently lighter and patchy. Effect very pronounced in females reared at 25°C, but overlaps wild type in both sexes when reared at a low temperature. Viability and fertility good in males but reduced in females. RK3.

alpha: see *tyr-1*
**alr: alarless*
location: 3- (not located).
origin: Spontaneous,
discoverer: Steinberg, 40b.
references: 1940, DIS 13: 51.
phenotype: Outer postalar bristle always missing; posterior supra-alar missing in about 80 percent of the flies. Anterior scutellars, humerals, and notopleurals frequently duplicated. Never overlaps. Viability and fertility excellent. RK3.

Altered abdomen: see *Aa*
Alu: Alula
location: 2-54.9 (Muller places *Alu* to the left of *pr* and spindle attachment).

origin: Spontaneous.
discoverer: Bridges, 38al2.
references: Curry, 1939, DIS 12: 45.
phenotype: Heterozygote has alula fused to main wing; wings often bent, broader. May overlap wild type, but intensified by cold and by heterozygous *ds,* with buckling effect increased. Homozygote at 19°C shows extreme buckling owing to rotation of wing and alula. Homozygote viable and resembles heterozygote. RK2.

AluS6c

origin: Spontaneous (arose with lt^{S6c}).
discoverer: Meyer, 56c.
references: 1956, DIS 30: 77.
phenotype: Similar to *Alu.* RK2.

*o/w: *arclike wing*

location: 2- (near 6).
discoverer: Sturtevant, 1948.
references: 1948, DIS 22: 55.
phenotype: Wings evenly bent downward at tips. Overlaps wild type. RK2.

***am:* see *Did*^{r}**

amb: amber

location: 1-6.8.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1950.
references: 1958, DIS 32: 67.
phenotype: Pale yellow body color; bristles very thin and short; hairs less affected. Eyes slightly brighter red. Males sterile. Viability 10—50 percent wild type. RK2.
other information: One allele each induced by CB, 1246, CB. 3007, CB. 1506, CB. 1414. Two alleles induced by CB. 3034.

***amb*^{2}**

origin: Induced by L~p-NN-di(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 67.
phenotype: Pale yellow body color; bristles slender and only slightly shortened. Male viability and fertility good; females viable but sterile. RK2.

amethyst:* see *amy

amx: almondex

location: 1-27.7 [to the left of *lz* (Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708-21)].
origin: X ray induced.
discoverer: Ball, 32k20.
phenotype: Eyes slightly reduced, narrower below. Trident pattern stronger than in *lz.* Homozygous females highly infertile; all progeny that do occur are daughters. Infertility does not resemble that of *lz* females, since *amx* has no effect on the genitalia [Anderson, 1945, Genetics 30: 280-96 (fig.)]. *Iz-'mmx* is wild type. RK2.
cytology: Located in 8D (region 8D4 through 8E2) by Green *mnd* Green (1956).

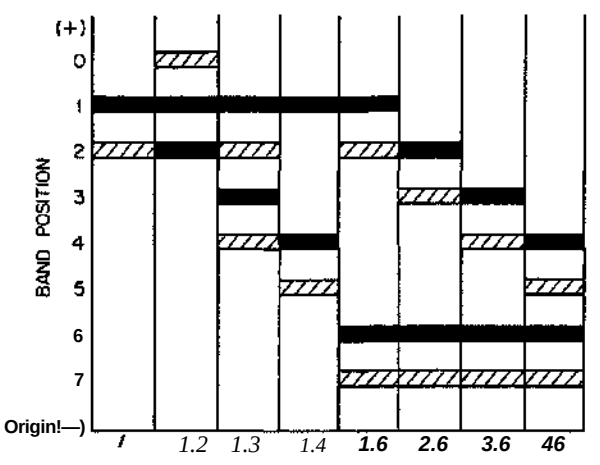
***amx*^{59}: see *lz*^{K}**

amy: amethyst

location: 2- (not located).
discoverer: Bridges.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218.
phenotype: Transparent light-purplish eye color. RK3.

Amy*^{1}: *Amylase-1

location: 2-77.3 (Doane, 1963, DIS 38: 32).
origin: Naturally occurring allele.
discoverer: Kikkawa, 1957.
synonym: *Amy*$^{+}$.
references: Kikkawa and Abe, 1960, Annotationes Zool. Japon. 33: 14—23.
Kikkawa, I960, Japan. J. Genet. 35: 382—87.
Kikkawa and Ogita, 1962, Japan.J. Genet. 37: 394-95.
Kikkawa, 1963, DIS 37: 94.
1964, Japan J. Genet. 39: 401-11 (fig.).
phenotype: Specifies amylase isozyme system having, in agar gel electrophoresis, one major and one minor component. The major isozyme moves rapidly toward the anode and occupies position 1. The minor component migrates immediately behind it to position 2. Heterozygotes of *Amy* alleles contain isozymes of both parents. RK3.



Amylase Alleles

Electrophoretic patterns of homozygotes for the various alleles of *Amy. Amy'2 is on acrylamide gel and the rest are on agar gel.**

Amy*^{1}-*2

origin: Naturally occurring allele.
discoverer: Doane, 64e6.
phenotype: Major Ot-amylase isozymes occupy positions 1 and 2 in acrylamide gel disc electrophoresis (corresponding to positions on agar gel). A minor component is present at position 0. (In acrylamide gels, minor components migrate more rapidly to the anode than major isozymes. In agar gels they migrate less rapidly). The total a-amylase activity is quite high, being intermediate between $Amy^{4.6}$ and $Amy^{1.3}$. RK3.

***Amy*$^{1.3}$**

origin: Naturally occurring allele.

discoverer: Kikkawa.
references: 1964, Japan. J. Genet. 39: 401—11 (fig.).
phenotype: Specifies major amylase isozymes that occupy positions 1 and 3 after agar gel electrophoresis and minor components at positions 2 and 7. RK3.

origin: Naturally occurring allele.
discoverer: Kikkawa.
synonym: *Amy^{wh}; Amy^{4}*.
references: 1963, DIS 37: 94.
1964, Japan.J. Genet. *39:* 401-11 (fig.).
Doane, 1966, DIS 41: 93.
phenotype: Specifies major amylase isozymes that occupy positions 1 and 4 and a minor component at position 5 after agar gel electrophoresis. The isozyme at position 1 was originally considered to be minor, but Doane considers it major; most pronounced in young flies. RK3.

Amyl-6
origin: Naturally occurring allele.
discoverer: Kikkawa.
references: 1964, Japan. J. Genet. 39: 401-11 (fig.).
phenotype: Specifies major amylase isozymes that occupy positions 1 and 6 and minor components at positions 2 and 7 after agar gel electrophoresis. RK3.

Amy* &
origin: Naturally occurring allele.
discoverer: Kikkawa.
synonym: *Amy^{B}*.
references: Kikkawa and Abe, 1960, Annotationes Zool. Japon. 33: 14-23.
Kikkawa, 1960, Japan.J. Genet. 35: 382-87.
Kikkawa and Ogita, 1962, Japan. J. Genet. 37: 394-95.
Kikkawa, 1963, DIS 37: 94.
Kikkawa, 1964, Japan. J. Genet. 39: 401-11 (fig.).
phenotype: Specifies major amylase isozymes that occupy positions 2 and 6 and minor components at positions 3 and 7 after agar gel electrophoresis. RK3.

Amy -6*
origin: Naturally occurring allele.
discoverer: Kikkawa.
references: 1964, Japan. J. Genet. 39: 401-11 (fig.).
phenotype: Specifies major amylase isozymes that occupy positions 3 and 6 and minor components that occupy positions 4 and 7 after agar gel electrophoresis. RK3.

Amy^{4}: see *Amy^{1}-'**

Amy$^{4.6}$
origin: Naturally occurring allele.
discoverer: Kikkawa.
synonym: *Amy^{ad}*.
references: 1963, DIS 37: 94.
1964, Japan.J. Genet. 39: 401-11 (fig.),
phenotype: Specifies major amylase isozymes that occupy positions 4 and 6 and minor components at positions 5 and 7. RK3.

Amy:* see *Amy^{1}*
Amy^{ad}: see *Amy^{4}-^{6}*
Amy^{s}: see *Amy^{2}-^{6}*
Amy^{wh}: see *Amy^{1}-^{4}*

an: ancon
location: 2-44 (34-54).
discoverer: Bridges, 30e3.
phenotype: Wings and legs somewhat short. Overlaps wild type. RK3.

an^{2}
discoverer: Bridges 30c25.
phenotype: Wings broad and short. Legs short and gnarled. Bristles on abdomen straggly; sclerites etched. Eyes small and roughish. *an^{2}'/an* is like *an^{2}*. Overlaps wild type. RK3.

anarista: see era
oncon: see *an*

ang: angle wing
location: 2-10.5.
origin: Spontaneous.
discoverer: Mittler and Goldberg, 48il6.
references: Mittler, 1950, DIS 24: 61.
phenotype: Wings held up from dorsal surfaces and extended outward 15—90° from the mid-dorsal line. Longitudinal dorsal median muscles 5 and 6 fused (Goldberg, 1954, Ph.D. Thesis, 111. Inst. Technol.). No increase in expressivity with temperature. Does not overlap wild type. RK2.

ang: see ano
*angle **wing:*** see *ang*
angle wing: see *agl*
*angle **winglike:*** see *agl*

****ano: anomogenitals***
location: 1-35.7.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
synonym: Originally symbolized *ang*, but this symbol was preoccupied.
references: 1958, DIS 32: 67.
phenotype: Many bristles on head and thorax either reduced in size or absent. Thoracic and abdominal hairs appreciably fewer. External male genitalia invariably abnormal, sometimes completely absent. Melanized exudate frequently present in furrow between mesonotum and scutellum near anterior scutellar bristles. Males sterile; viability less than 10 percent wild type. RK3.

ant: antennaless
location: 2- (not located).
origin: Spontaneous.
discoverer: Gordon, 1936.
references: 1941, DIS 14: 39.
1941, Proc. Intern. Congr. Genet., 7th. p. 131.
Gordon and Sang, 1941, Proc. Roy. Soc. (London), Ser. B 130: 151-84 (fig.).
Vogt, 1947, Biol. Zentr. 66: 388-95 (fig.).
phenotype: Antennae missing on one or both sides. Expression affected by residual genotype, nutritional environment, and temperature. Time of action about 70 hours after hatching [Begg and Sang, 1945, J. Exptl. Biol. 21: 1-4 (fig.)]. Used in experiments to locate chemoreceptors [Begg and Hogben, 1946, Proc. Roy. Soc. (London), Ser.

B 133: 1—19j and in studies of mating behavior (Begg and Packman, 1951, Nature 168: 953). RK3.

Antp^{49}: Antennapedia

location: 3- (to the left of p; probably to the right of *st;* determined for *Antp^{50}* by Hannah).
origin: X ray induced.
discoverer: Piternick, 1949.
synonym: *Antp^{4703}*.
phenotype: Antennae transformed into second legs plus some differentiation toward first legs (Hannah-Alava). Lethal in combination with *Antp^{Yu}*, *Antp^{B}*, *Antp^{50}*, and *Sex*. Possibly lethal with Pc but semilethal with Pc^{2} (Hannah-Alava). Quite variable. Homozygous lethal. RK3A.
cytology: Probably in region 84A (or 83F), based on Lewis's analysis of *AntpB and Antp^{Yu}*. *Ant^{49}* associated with small cytological abnormality of undetermined nature in 83EF-84AB (Hannah-Alava).

AntpSO
origin: X ray induced.
discoverer: Piternick, 1950.
synonym: *Antp^{4715}*.
phenotype: Variable transformation of entire antenna into a leg may occur, but effect is often limited to slight elongation of third antennal segment. In compounds with Pc and *Pc^{2}*, the rather well developed antennal second legs show some transformation into first legs (Hannah-Alava). Homozygous lethal and lethal in combination with *Antp^{B}*, *Antp^{Ya}*, *Antp^{49}*, and *Sex* (Hannah-Alava). RK3A.

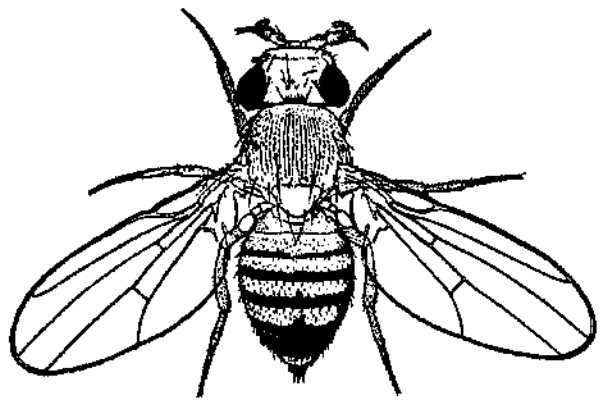
Antp$^{4?0}$: see Antp^{49}*
Antp$^{4?15}$: see Antpso

Antp^{B}: Antennapedia of Bacon

origin: X ray induced.
discoverer: Bacon, 50g.
references: Lewis, 1956, DIS 30: 76.
phenotype: Antenna partially leg-like, but less extreme than *Antp^{Yu}* and may overlap wild type. Enhanced by Pc (and *Pc^{2}"). Antp^{B} ss^{a}*/+ *ss^{a}* has virtually complete antennal leg including coxa, tibia, femur, and tarsus, but no sex comb in the male (B. Holloway). The antennal second leg with some transformation into a first leg completely developed only in *Pc* (or *Pc^{2}*) *ss^{a}/Antp^{B}* ss^{a} compounds. Lethal with *Antp^{Yu}*, *Antp^{49}*, *Antp^{50}*, and *Sex* (Hannah and Strömnaes, 1955, DIS 29: 121-23 and Hannah-Alava). RK3A.
cytology: Associated with *In(3R)Antp^{B} = ln(3R)84A;85E,* but apparently mutant and inversion are separable (Hannah-Alava).

**AntpL-C; Antennapedia of Le Calvez*

origin: Neutron induced.
discoverer: Le Calvez.
synonym: *Ar: Aristapedia; SS^T.*
references: 1948, Compt. Rend. 226: 123-24.
1948, Bull. Biol. France Belg. 82: 97-113 (fig.).
1948, Arch. Anat. Microscop. Morphol. Exptl. 37: 50-72.
phenotype: Arista tends to be transformed into tarsus; third antennal segment hypertrophied and deformed. Ocelli reduced in size and number. Cephalic capsule deformed. Head bristles reduced in number. Wings held at 45° angle from midline. Expression variable. Homozygous lethal. RK3A.
cytology: Associated with *In(3R)Antp$^{L>c}$ = In(3R)84A5-6; 92A5-6.*



Antp^{LC}: Antennapedia of Le Calvez
From Le Calvez, 1948, Bull. Biol. France Belg. 82: 97-113.

Antp^{R}: Antennapedia of Rappaport

origin: X ray induced.
discoverer: Rappaport, 1963.
synonym: ss^: *spineless-Aristapedia Dominant.*
references: Falk, 1964, DIS 39: 60.
phenotype: Segments added to antennae, usually distal to aristae. Claw occasionally at end of antenna. Asymmetry pronounced. Rarely an antennalike organ on sternopleura. Variable expression, but expressivity 100 percent in combination with *D.* Homozygous lethal; lethal in combination *withAntp^{B}* (Von Halle). RK3A.
cytology: Associated with *In(3R)Antp^{R} = ln(3R)83F;86C* (Ben-Zeev).

Antp^{Yu}: Antennapedia of Yu

origin: X ray induced.
discoverer: Yu, 1948.
reference: 1949, Ph.D. Thesis Calif. Inst. Technol. Lewis, 1956, DIS 30: 76.
phenotype: Antenna transformed into second leg plus some differentiation toward a first leg but with recognizable arista usually present; not like *ss^{a}*, in which main effect is that the arista becomes tarsus-like. Strongly enhanced by *Pc* and *Pc^{2}*. *Pc* +/+ *Antp^{Ytl}* has a pair of excellent antennal legs complete with tarsae and with sex combs in the male. Lethal with *Antp^{B}*, *Antp^{49}*, *Antp^{50}*, and *Sex* (Hannah and Strömnaes, 1955, DIS 29: 121—23; Hannah-Alava). RK3A.
cytology: Associated with *T(2;3)Antp^{Yu} = T(2;3)22B;83E-F + T(2;3)38E;98A.*

*'*ap: apterous*

locotion: 2-55.2.
origin: Spontaneous.
discoverer: E. M. Wallace, 13h.

references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 236 (fig.).
Metz, 1914, Am. Naturalist 48: 675-92.
phenotype: Wings and halteres reduced to traces. Bristles eliminated from area around wing base (including posterior notopleurals, anterior, and posterior supra-alars, anterior postalars); posterior scutellars erect when present, but missing in first counts; dorsocentrals smaller and fewer; hairs on thorax sparse and irregular. Sutural furrow reduced; thorax disproportionately small. Flies small, pale, weak, and very short-lived. Viability about 70 percent that of wild type, but erratic. Both sexes sterile. RK2.
cytology: Placed in salivary region 41B-C (Schultz).

***ap^2**

origin: Spontaneous.
discoverer: Bridges, 16j20.
synonym: *ap-c.*
references: 1919, J. Exptl. Zool. 28: 370.
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 237.
Medvedev and Bridges, 1935, Tr. Inst. Genet. Akad. NaukSSSR 10: 199-209.
phenotype: Like *ap* but less viable. RK2.

***ap^3**

origin: Spontaneous.
discoverer: Morgan, 23a.
synonym: *no-wings;* later, *ap~c.*
references: 1929, Carnegie Inst. Wash. Publ. No. 399: 183.
phenotype: Like *ap.* RK2.

ap^4

discoverer: Medvedev, 32al5.
references: Medvedev and Bridges, 1935, Tr. Inst. Genet. Akad. Nauk SSSR 10: 199-209.
Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70 (fig.).
King and Sang, 1958, DIS 32: 133.
synonym: ***ap-d.***
phenotype: Wings mostly less than 10 percent normal length and lacking veins and specific hairs. Halteres less than 25 percent normal length, and frequently absent. Scutellar and dorsocentral bristles sometimes missing (Butterworth and King). Adults become paralyzed with age and die within 4 days. Larval adipose cells persist in imago, and adult adipose tissue fails to develop. Female sterile with underdeveloped ovaries; nurse cell nuclei become pycnotic after stage 7, and yolk formation is never initiated (King and Burnett, 1957, Growth 21: 263—80). *ap^4* ovaries develop normally when transplanted into a normal host (King and Bodenstein, 1965, Z. Naturforsch. 20b: 292-97). Male sterile, but testes appear normal with motile sperm (King and Sang, 1958). *ap^4/M(2)S2^4* adult has nearly normal complement of bristles but otherwise resembles *ap^4* homozygote (Butterworth and King). RK2.

ap^5

origin: Ultraviolet induced.
discoverer: Byers, 49f.
references: Meyer, Edmondson, Byers, and Erickson, 1950, DIS 24: 59.
phenotype: Compared with *ap^4* and very similar. Almost lethal. RK2.

ap^6

origin: Spontaneous.
discoverer: Faulhaber.
references: 1963, DIS 37: 48.
phenotype: Wings vary from clublike to straplike; seldom exceed 30 percent of normal length; lack veins and specific bristles. Halteres 25—50 percent normal length. Postalar, scutellar, and dorsocentral bristles missing. Hind legs sometimes deformed. Few *ap^6/ap^6* or *ap^4/ap^6* females survive past 5 days; those that do are slightly fertile, the remainder are not (Butterworth and King), *ap^6/M(2)S2^4* more extreme than *ap^6/ap^6* but some females fertile and thoracic chaetotaxy more nearly normal. RK2.

ap^{49}

origin: Spontaneous.
discoverer: Ritterhoff, 49j.
references: Glass, 1951, DIS 25: 76-77.
phenotype: Appears to be somewhat less extreme than *ap^4,* with which it was compared. Wings and halteres reduced to vestiges. Bristles and hairs on sides absent, including posterior notopleurals, anterior and posterior supra-alars, and anterior postalars, but dorsocentrals not reduced in size and number, and one or a pair of pre-anterior dorsocentrals may be present. Posterior scutellars not erect when present. Sutural furrow normal; thorax of normal size. No adults live longer than 3 days; larval adipose cells persist in adult, and adult adipose tissue fails to develop. *ap^{49}i/M(2)S2^4* adult sterile, short lived, and has abnormal adipose tissue and short wing rudiments (Butterworth and King). Both sexes sterile. RK2.
other information: Interacts with *ap^{Xa}* but not tested in combination with *ap^4* or *ap^{blt}.*

apSSf

origin: Spontaneous.
discoverer: Thompson, 56f.
references: Burdick, 1956, DIS 30: 69.
phenotype: Wings club-shaped, 10—30 percent normal length, and lack veins and certain types of hairs. Scutellar and dorsocentral bristles missing (Butterworth and King). Rear and middle legs occasionally twisted, more frequently in female than in male. Both sexes fertile when homozygous and in combination with other *ap* alleles. *ap^{56l}/M(2)S2^4* have normal complement of dorsocentral and scutellar bristles (Butterworth and King). RK2.

apbh; *apterous-blot*

origin: Spontaneous.
discoverer: Groscurth, 31bl.
synonym: *bit.*
phenotype: Wings blistered, inflated, often dark because of dried blood. In extreme cases, a small mirror image wing forms by partial twinning of wing in third posterior wing cell. According to

Waddington (1939, Proc. Natl. Acad. Sci. U.S. 25: 299—307), the fundamental effect is partial twinning of wing blade, which leads to difficulties in clearance of heraolymph after inflated stage. Much overlapping with wild type. RK3.

*$_{ap}$*btt2*

origin: Spontaneous.
discoverer: Whittinghill, 44h.
synonyms: *bit*^{2}.
references: 1947, DIS 21: 71.
phenotype: More extreme than *ap*^{blt}. Wings always shorter than normal and inflated. Strong tendency for unequal bifurcation of wing. Wings often break off and remain attached to pupa cases, hence a wingless phenotype. Viability about 20 percent of wild type in both sexes. Males fertile but females sterile. RK2.

ap*blt3*

origin: Spontaneous,
discoverer: Semenza, 49k.
synonym: *blt*^{S49k}.
references: Barigozzi, 1950, DIS 24: 54.
phenotype: Wings uniformly inflated, more extreme than *ap*^{btt}. Does not overlap wild type. RK2.

apT60*: *apterous* of *Thomas

origin: X ray induced.
discoverer: Thomas, 60g.
references: Meyer, 1963, DIS 37: 50.
phenotype: Wings straplike; about 30 percent normal length. Adult survives past fifth day. *ap*^{T6G}/ *M(2)S2*^{4} female lays eggs (Butterworth and King). RK2.

apXo; *apterous-Xasta*

origin: X ray induced in *In(2R)Cy; In(3R)P.* (The first X-ray-induced mutation recovered in the USSR.)
discoverer: Serebrovsky, 28a.
synonym: *Xa.*
references: Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65.
phenotype: Wings reduced in length to about 70 percent normal; irregular in outline with a V-shaped incision with apex at L2, uniformly present, giving wing a mittenlike shape with the thumb between marginal vein and L2. Excellent dominant with no overlap. Fertile and fully viable in heterozygote. Usually lethal in homozygous conditions, but occasionally ecloses very late as pale dwarf with wings and balancers like *vg.* Waddington reports deep notch visible in tip of wing fold in prepupa (1939, Proc. Natl. Acad. Sci. U.S. 25: 299-307; 1940, J. Genet. 41: 75-139 (fig.)]. In homozygotes and in combination with *ap*^{4}, ®*p*^{6}, or *M(2)S2*^{4} wings are straplike and 30—70 percent normal length, and hattere length is 25—50 percent normal; longevity, fertility like *ap*^{4}/*ap*^{4} except for an occasional long-lived *ap*^{x}*/*M(2)S2*^{4} female that may be fertile (Schultz; Butterworth and King). *ap*^{Xa}'*ap*^{btt} has combined pbenoiypes of *ap*^*,-+ and *apblt/apbit* (Schultr). RK1A.

cytology: Shown by Sturtevant (1934, DIS 2: 19) to be associated with *T(2;3)ap*^{Xa} = *T(2;3)41F; 89E8-F1* which is superimposed on *In(2R)Cy* and *In(3R)P* (Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 294; Lewis, 1951, DIS 25: 109).

op*^{0}; *apterous-Xasfa*

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 228.

ap-c: see ***ap***^{2}
ap-c: see ***ap***^{3}
ap-d: see ***ap***^{4}
Apart: see ***Apt***

apb: apterblister

location: 2-44.7.
origin: Ultraviolet induced.
discoverer: Edmondson, 49K.
references: Meyer, Edmondson, Byers, and Erickson, 1950, DIS 24: 59-60.
phenotype: Wings always notched, nearly always spread and usually blistered, but expression somewhat variable. Homozygous imagos live less than 24 hours, owing to intestinal constrictions that prevent defecation. Abdomens characteristically turn dark grey before death, because of accumulation of digested food products. Although not at same locus as *ap, apb* +/+ *ap*^{4} flies show slight notching of wings and many die within a day; those that survive are fertile, *ap*^{5} gives a similar heterozygous effect. RK2.

apexless: see ***apx***

Aph°: Alkaline phosphatase deficient

location: 3-46.3 (Maclntyre).
origin: Spontaneous.
discoverer: Johnson.
references: 1966, DIS 41: 157-58.
1966, Science 152: 361-62.
phenotype: Homozygous larva has no detectable alkaline phosphatase activity. *Aph°/Aph*^{p} larva has alkaline phosphatase, which migrates in starch gel electrophoresis to same position as the band in *Aph*^{F} homozygote. *Aph°/Aph*^{s} larva has bands of activity at the *Aph*^{s} position and at a position slightly faster than the *Aph*^{F}/*Aph*^{s} hybrid band. RK3.

Aph*^{F}: Alkaline phosphatase-Fast

origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Nature 201: 321 (fig.).
1964, Genetics 49: 829-35 (fig.).

phenotype: Aph^F/Aph^F larvae produce an alkaline phosphatase that migrates rapidly in starch gel electrophoresis under conditions described by Beckman and Johnson (1964). Alkaline phosphatase produced by pupae migrates faster than larval enzyme. No enzyme demonstrable in adults. RK3.

Aph^s: Alkaline phosphatase-Slow

origin: Naturally occurring allele.
discoverer: Beckman and Johnson,
references: 1964, Nature 201: 321 *(fig.).*
1964, Genetics 49: 829-35 (fig-)-
phenotype: Alkaline phosphatase of *Aph^/Aph^* migrates more slowly in starch gel electrophoresis than that of Aph^F/Aph^F. Aph^F/Aph^s larvae produce a hybrid enzyme of intermediate mobility as well as the fast and slow forms. RK3.

opp: approximated

location: 3-37.5.
discoverer: Curry, 34a25.
references: 1935, DIS 3: 6.
phenotype: Crossveins close together; veins diverge at greater angle than wild type; effect visible in prepupal wing [Waddington, 1940, J. Genet. 41: 75—139 (fig.)J. Legs short, with four-jointed tarsi; the penultimate joint characteristically swollen [Waddington, 1939, Growth Suppl. 37—44 (fig.)J. Thickset body. Posterior scutellars farther apart than normal. Eyes smaller and flatter than normal, also bumpy. Spread wings and thickened veins. RK1.

**app61»*

origin: X ray induced.
discoverer: Puro, 61e.
references: 1964, DIS 39: 64.
phenotype: Slightly more extreme than *app.* RK1.

apr: see w^a

**Apt: Apart*

location: 3- (between *h* and p).
origin: X ray induced.
discoverer: Belgovsky, 34e23.
references: 1935, DIS 3: 27.
phenotype: Wings spread widely. Viability, fertility, and separability good. Homozygous lethal. RK2A.
cytology: Associated with *In(3L)Apt* — no salivary analysis,
other Information: *Apt/D* survive; therefore not an allele of *D.*

apterblister: see *apb*
apterous: see ap
**apx:* opex/ess

location: 1-11.3.
origin: Induced by DL-p-NN-di(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 83.
phenotype: Slightly larger fly with large eyes containing various numbers of deranged ommatidia. Wings broad and blunt and in many flies margin removed to various degrees, from a small incision of inner margin to removal of entire inner margin, costal vein, and parts of the membrane, as far as L3. Region from L3 to costal cell unaffected. Rarely L4 and 5 are interrupted. Males viable and fertile; female fertility reduced. RK3.

err; *abdomen rotatum*

location: 4- (proximal to *bt;* Fung and Stern, 1951, Proc. Natl. Acad. Sci. U.S. 37: 403-4).
origin: Spontaneous.
discoverer: Beliajeff, 1926.
references: 1931, Biol. Zentr. 51: 701-8 (fig.).
Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
Marengo and Howland, 1942, Genetics 27: 604—11 (fig-)-
phenotype: Abdomen twisted clockwise through 45° to 60°. No overlapping with wild type. Male external genitalia often missing. Males usually sterile; females partially fertile. Puparia not so smooth as normal; larval segmentation remains. Puparia have deep constriction near posterior end just anterior to spiracles. Existing chromosomes marked *ar* also carry *1(4)* and in combination with *Df(4)M* show counterclockwise rotation of male abdomen (Hochman). RK2.
cytology: Placed in salivary chromosome region 101E through 102B16, on basis of its inclusion in *Di(4)M =Di(4)101E-F;l02B6-17.*

$*_{ar}2$

origin: Spontaneous.
discoverer: Nichols-Skoog, 34el7.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Abdomen twisted; male genitalia often missing. RK2.

$_{ar}S7d$

origin: X ray induced,
discoverer: Gloor, 57d.
phenotype: Abdomen twisted counterclockwise as viewed from behind. RK2.

$*_{ar}57g$

origin: X ray induced.
discoverer: Gloor, 57g.
phenotype: Abdomen twisted counterclockwise as viewed from behind. RK2.

At:* see *$Antp^1$*c

arc: see a

arch: arch

location: 2-60.5.
origin: Spontaneous.
discoverer: Curry, 36g3.
references: 1937, DIS 7: 5.
phenotype: Wings curved evenly downward both longitudinally and transversely, sometimes shorter and blunter, rarely divergent. RK2.

arclike wing: see c*/w
arcoid: see *ad*
arctops: see *at*
arctus ocu/us: see *at*
Argentine Curly: see Cu^A
Arista: see *Ata*
aristaless: see *al*
aristaless-h: see aa
Aristapedia: see $Antp^{LC}$
arp-1: see *$ss^a$$P*

as: as cute
location: 3-46.
origin: Spontaneous.
discoverer: Bridges, 16J21.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 170.
phenotype: Front of scutellum elevated, with partial obliteration of transverse furrow; deep chested. Bubble in scutellum or midline of thorax; dried black exudate often at each side of scutellum, may appear at any of the sutures of head and thorax; black deformed lump behind cheek. Wings droop at sides. Overlaps wild type. RK3.

as
origin: Spontaneous.
discoverer: Bridges, 18116.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 172.
phenotype: Same as *as.* RK3.

as^9: ascute-hUngende
origin: Spontaneous,
discoverer: Franke.
references: 1934, DIS 2: 9.
Geottschewski, 1935, DIS 4: 15.
phenotype: Wings held laterally downward, ends occasionally resting on legs; eyes small and knobby. RK2.

ascutex: **see *asx***

ast: asteroid
location: 2-1.3 (0.02 unit to right of S).
origin: Spontaneous.
discoverer: E. B. Lewis, 38b.
synonym: *S^r: Star-recessive.*
references: 1938, DIS 10: 55.
1942, Genetics 27: 153-54.
1945, Genetics 30: 137-66.
1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (fig.).
phenotype: Eyes small and rough. Veins L2, L3, L4, and L5 do not always extend to margin. Overlaps wild type rarely. S +/+ *ast* has very small eyes with fused facets; veins L2 to L5 incomplete at tip. S *ast*/+ *ast* has slightly larger eye than S +/+ *ast. S ast*/+ + resembles S +/+ +. S +/+ *ast* and *ast/ast* partially suppress *px* and *net.* Eyes of *ast/E(S)* rough. RK2.
cytology: Placed in the 21E1-2 doublet on the basis of its being included in the synthetic deficiency derived by combining the Y-centric portion of *T(Y;2)21E = T(Y;2)21D4-E1* and the 2-centric portion of $T(2;4)ast^{v}$ = *T(2;4)2lE2-3;101* (E. B. Lewis, 1945).

ast^2
origin: Spontaneous in *ln(2L)Cy.*
discoverer: E. B. Lewis.
references: 1945, Genetics 30: 137-66.
phenotype: Similar to *ast,* but wing veins normal. S/ast^{2} lethal. Heterozygote strongly enhanced by *E(S).* RK2A.
cytology: Normal except for presence of *In(2L)Cy = In(2L)22Dl-2;33F5-34Al.*

ast^3
origin: Spontaneous in *[n(2L)Cy.*
discoverer: E. B. Lewis.
references: 1945, Genetics 30: 137-66.
phenotype: Similar to *ast,* but wing veins normal. S/ast^{3} hatches late; has normal wing veins and small eyes similar to but slightly larger than *S/ast.* **RK1A.**
cytology: Same as *ast?,*

ast*
origin: Spontaneous recombinational derivative of *ast/ast.*
discoverer: E. B. Lewis.
references: 1945, Genetics 30: 137-66.
phenotype: ast^{4}/ast^{4} is usually wild type. S/ast^{4} has smaller eye than S/+; resembles *ast/ast* in wing phenotype. RK3.
cytology: Salivary chromosomes normal.
other information: Recovered as an ast^{4} *ho* single recombinant from an *al ast ho/ast* female.

ast5
origin: Spontaneous nonrecombinational derivative of *ast/ast.*
discoverer: E. B. Lewis,
references: 1945, Genetics 30: 137—66.
phenotype: Resembles ast^{4}. RK3.

ast^rv1: astero id- re verted
origin: X ray induced in a/ *ast ho.*
discoverer: E. B. Lewis, 1942.
references: 1945, Genetics 30: 158.
phenotype: Wild type in most combinations, except that *Df(2L)S4/ast^rvl* slightly more extreme than *Df(2L)S4/+; S*** and *SM* slightly less extreme when heterozygous with ast^{rvl} than with wild type. Homozygous lethal. RK3A.
cytology: Associated with $T(2;3)ast^{rvl}$ = *T(2;3)21E2-3;68C2-3;88D8-9.*

ast^ry2
origin: X ray induced in *al ast ho.*
discoverer: E. B. Lewis, 1942.
references: 1945, Genetics 30: 158.
phenotype: Like ast^{rvl}; ast^{rv2}/S^{M} overlaps wild type. RK3A.
cytology: Associated with $ln(2L)ast^{rv3}$ = *In(2L)21E2-3;31.*

asfv3
origin: X ray induced in *net ast dp* c/.
discoverer: E. B. Lewis, 1942.
references: 1945, Genetics 30: 158.
phenotype: Wild type in all combinations, except that S/ast^{rv3} is slightly more extreme than *S/+,* Lethal homozygous and in combination with *Dt(2L)S4 = Dt(2L)21C3-4;22B2-3.* RK3A.
cytology: Associated with $T(2;3)ast^{rv3}$ = *T(2;3)21E2-3;61C2-3.*

ast^v: asteroid-variegated
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 137—66.
phenotype: ast^{v}/ast and ast^{v}/S more variable than but similar to *ast/ast* and *ast/S,* respectively;

suppressed in *X/X/Y* female. Homozygous lethal. $ast^{v}/Df(2L)S2$ lethal, RK1A.
cytology: Associated with *T(2;4)ast^ = T(2;4)21E2-3; 101.*

ast^{x}: asteroid from X irradiation
origin: X ray induced simultaneously with S^{x}.
discoverer: E. B. Lewis.
references: 1945, Genetics 30: 137—66.
phenotype: ast^{x}/ast^{x} is wild type, but behaves as a very slight *ast* allele in compounds with S and S^{x} ast^{x}. RK3.
other information: Separated from S^{x} by crossing over in a S^{x} ast^{x}/ast^{4} *ho* female.

osx: *ascutex
location: 1-26.
origin: Spontaneous.
discoverer: Bridges, 24bl4.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218.
phenotype: Furrow between scutellum and thorax much shallower, scutellum inflated. Body color pale. Legs have blackened leaky joints. Character less extreme in old dry cultures. Viability 60 percent wild type. RK3.

Asy: see *A-p*

Asymmettid: see *A-p*

at: *arctus oculus
location: 2-60.1.
origin: Spontaneous.
discoverer: Fernandez Gianotti, 42g28.
synonym: *bar eye; arctops.*
references: 1943, DIS 17: 48.
1944, DIS 18: 45.
1945, Rev. Inst. Genet. Fac. Agron. Vet. Univ. Buenos Aires 2(14): 171-77.
1948, DIS 22: 53.
phenotype: Eyes similar to *B* but with more facets. Classification, fertility, and viability excellent. RK1.

At: Attenuated
location: 1- (in the *B* region).
origin: Induced with soft X rays in *In(l)sc^{SiL}-sc^{8R}+dl-49, sc^{si} $sc^{s}B$;* associated with loss of *B* phenotype.
discoverer: Valencia and Valencia, 1949.
references: 1949, DIS 23: 64.
phenotype: In *A t/+* females, wings incised medially and laterally; usually have one large central blister. *At/At* females have badly crumpled, blistered, and sometimes poorly developed wings. Wings of *At* males tend to be more like those of *At/+* females, although many fall somewhere between Af/~~s~~ and *At/At* in phenotype. Thus there is evidence for only slight dosage compensation for *At.* This mutant is similar to some Beadex alleles, but allelism with *Bx* difficult to determine and has not been tested for. Both males and homozygous females viable and fertile. RK1A.
cytology: Associated with *ln(l)At ~In(l)16A4-5;18C4-6;20A2-3.*

Ata: *Arista
location: Not located.
origin: X ray induced.
discoverer: Krivshenko, 1949.
synonym: *At* (symbol preoccupied).
references: 1954, DIS 28: 74-75.
1955, DIS 29: 73.
phenotype: Lateral branches of aristae reduced, especially branches extending upward from central axis and situated at base of arista. Axis of arista often abnormal. Wings have small transparent spots distally. Homozygous lethal. Heterozygous viability and fertility comparatively high. RK2A.
cytology: Associated with *T(2;3)Ata = T(2;3)40;66F-67A+T(2;3)47;81.*

Attenuated: see ***At***

augenwulst: see ***awu***

aw: *awry
location: 1-32 (not allelic to *wy).*
origin: Induced by ingested radiophosphorus.
discoverer: Bateman, 1949.
references: 1950, DIS 24: 54.
1951, DIS 25: 77.
phenotype: Wings upcurled, slightly wavy, convex, opaque, or vestigial-like. Variable; overlaps wild type. Viability about 50 percent wild type. Not enhanced in presence of *y* as is *dvr* (1-28.1). RK3.

aw-b: *awry-b
location: 1-38 to 39.
origin: Induced by ingested radiophosphorus.
discoverer: Bateman, 1950.
synonym: aw^{2}.
references: 1950, DIS 24: 54.
1951, DIS 25: 77.
phenotype: Like aw. Good expression at 25°C. Viability 10 percent that of wild type. Most males fail to eclose. RK3.

awry: see **aw**

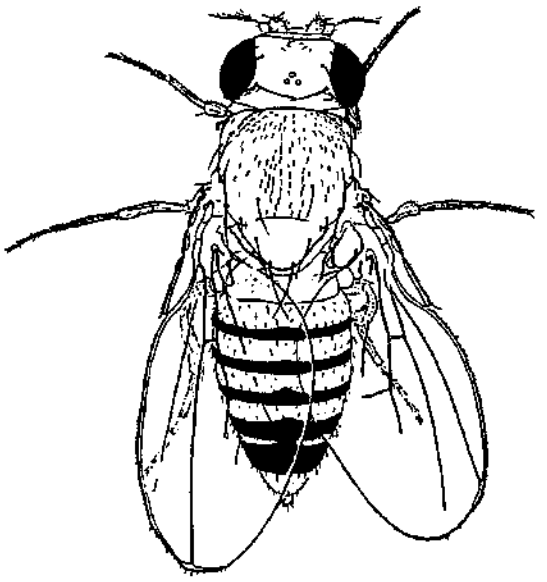
awu: *augenwulst
location: 2-57.
origin: Spontaneous.
discoverer: Rosin, 1951.
references: Volkart, 1959, DIS 33: 100.
phenotype: Eyes deformed; in most extreme expression, deeply indented at middle of anterior margin, where invaginating integument forms a padlike swelling with bristles. Expression variable, often asymmetrical. Overlaps wild type. Heterozygote occasionally has minor effects. Good viability. RK3.

Ax; *Abruptex*
location: 1-3.0.
origin: Spontaneous.
discoverer: Nazarenko, 28a.
references: 1930, Biol. Zentr. 50: 385-92 (fig.)-Mohr, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212 (fig.).
phenotype: Homozygous female and male show shortened L5 vein, usually also L4, L2, and sometimes L3. Wings shortened, arched, thin. Costal bristles clumped and frayed; costal veins thickened. Thorax shows midfurrow with rearranged hair directions; hairs on thorax and head fewer, with clear patches and streaks. Male genitalia

often rotated. *Ax/+* female shows short L5 in half of the flies and sparse hair pattern on thorax. Lower temperature (19°C) markedly decreases expression, and higher temperature enhances it. *Ax/N*^{8} approaches wild type in all characteristics. Enhanced by *H* so that *Ax/Y; H/+* and *Ax/Ax; H/+* are nearly lethal at 26° (House, 1959, Anat. Record 134: 581-82). RK2 in males.

cytology: A single-band duplication, presumably for 3C7 (Schultz in Morgan, Schultz, and Curry, 1941, Carnegie Inst. Wash. Year Book 40: 283).

other information: Probably a member of the Notch pseudoallelic complex.



Ax; *Abruptex*

From Mohr, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212.

***Ax^{42g}**

origin: X ray induced.
discoverer: Green, 42gl.
references: Oliver, 1944, DIS 18: 44.
phenotype: Similar to *Ax*, except male lethal. RK2.

b: black

location: 2-48.5.
origin: Spontaneous.
discoverer: Morgan, lOj.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 144 (fig.).
phenotype: Black pigment on body and tarsi and along wing veins, darkening with age. Heterozygote shows somewhat darker trident, but is never confused with homozygote. Puparium usually somewhat lighter than wild type and newly emerged flies not clearly distinguishable from wild type (Waddington, 1941, Proc. Zool. Soc. London, Ser. A 111: 173-80). Tyrosinase formed in adult (Horowitz). RK1 in aged flies.

cytology: Salivary chromosomes apparently normal. Placed in region between 34E5 and 35D1, on basis of its inclusion in *Df(2L)64j* ➛ *Df(2L)34E5-F1:35C3-D1* (E. H. Grell).

b^{36f}

discoverer: Nichols-Skoog, 36fl.
references: 1937, DIS 7: 5.
phenotype: Like *b*. RK1A in aged flies.
cytology: Inseparable from *T(2;3)'dp*, possibly position effect or deficiency caused by break distal to 34D. Leads to some ambiguity regarding cytological location of *b*.

***b^{50d}**

origin: Ultraviolet induced.
discoverer: Meyer, 50d.
references: Meyer and Edmondson, 1951, DIS 25: 71.
phenotype: Somewhat lighter than *b*. RK2.

***b^{51f}**

origin: Ultraviolet induced.
discoverer: Meyer, 51f.
references: Meyer and Edmondson, 1951, DIS 25: 71.
phenotype: Like *b^{50d}*. RK2.

b&: *black-Dominant

origin: Spontaneous.
discoverer: Goldschmidt, 1945.
synonym: 6^.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 504, 520.
phenotype: *bP/b* darker than *tP/+* or e/e. Homozygous lethal. RK2A.
cytology: Associated with *Df(2L)b^{D} = Df(2L)35C;35D.*
Figured in Goldschmidt (1945, p. 520).

B: Bar

location: 1-57.0.
origin: Spontaneous in a female.
discoverer: Tice, 13b.
references: 1914, Biol. Bull. 26: 221-30 (fig.).
Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 66 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 29-33.
phenotype: Eye restricted to narrow vertical bar of about 90 facets in the male and 70 facets in the female as contrasted with normal numbers of about 740 for males and 780 for females [Sturtevant, 1925, Genetics 10: 117-47 (fig)]. Homozygous female fully viable. *B/+* female has about 360 facets and shows indentation terminating in horizontal fissure on anterior margin of eye, producing a kidney-shaped eye. *B/B* and *B/+* completely separable from wild type, but in some genetic backgrounds *B/B* overlaps J5/+ slightly. Classifiable in single dose in triploids by slight anterior nick in eye (Schultz, 1934, DIS 1: 55); is useful in the recognition of triploids. Eyes of female heterozygous for a deficiency for *B* and a normal *X* are normal (Sutton, 1943, Genetics 28: 97-107). Log of facet number inversely proportional to temperature of development (Hersh, 1930, J. Exptl. Zool. 57: 283-306).

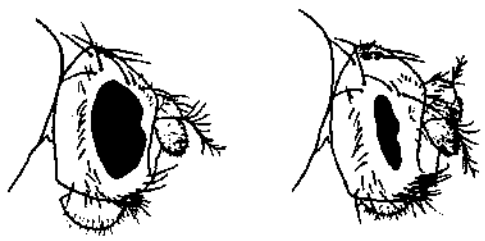
Nonautonomous over short distances (Sturtevant, 1932, Proc. Intern. Congr. Genet., 6th, Vol. 1: 304—7). Facet development enhanced in organ culture by addition of wild type cephalic complexes [Kuroda and Yamaguchi, 1956, Japan J.

Genet. 31: 97-102 (fig.)]- Facet number can be increased by addition of a number of compounds to the medium; probably not a specific inhibition of effect of *B* (see work of Chevais, Khouvine, Kaji, Abd-El-Wahab, and DeMarinis).

Embryological studies [Chen, 1929, J. Morphol. 47: 135-99 (fig.); Steinberg, 1941, Genetics 26: 325-46 (fig.); 1942, Genetics 27: 171-72; Power, 1942, Genetics 27: 161, DeMarinis, 1952, Genetics 37: 75—89 (fig.)] indicate that phenotype results from reduced number of cells in optic disk and reduced rate of cell division in anterior part of eye. Facet development responds strongly to environmental factors around 60 hr after oviposition (Luce, Quastler, and Chase, 1951, Genetics 36: 488—99). Pigmented but nonfaceted part of eye shows retinulae and dioptic apparatus lacking, but rudimentary ommatidia present, consisting of hypertrophied accessory cells (Wolsky and Huxley, 1936, Proc. Zool. Soc. London 485-89). RK1A.

cytology: Located in 16A1-2. Associated with *Dp(l;l)B = Dp(l;l)15F9-16Al;16A7-Bl.*

other information: Since *B* is a tandem duplication, *B* homozygotes may give rise to a nonduplicated chromosome (reversal to normal phenotype) and a triplicated chromosome (i.e., double Bar = *BB)* as reciprocal products of unequal crossing over (Sturtevant and Morgan, 1923, Science 57: 746—47). From successive unequal crossovers in attached *X's,* Rapoport (1940, Zh. Obshch. Biol. 1: 235-70; 194.1, DIS 15: 36-37) has been able to accumulate as many as 7 or 9 Bar regions in a single chromosome. Bar is the first recorded instance of position effect. Presumably results from the new band association 16A7-16A1 and can be reversed by rearrangements that separate these bands. Also the first case of *cis-trans* position effect, two 16A7-16A1 associations in the same chromosome producing greater facet reduction than two associations in homologous chromosomes; e.g., facet number in *B/B* is greater than in *BB/+* (Sturtevant, 1925).



B: Bar

Left: heterozygous female. Right: hemizygous male. From Sturtevant and Beadle, 1939. An Introduction to Genetics. Sounders, p. 24.

B3

origin: Spontaneous partial reversion of *B.*
discoverer: Stern, 1926.
phenotype: Eye reduced less than in *B* and eye surface rougher. RK1(A).

***B4**

origin: Spontaneous partial reversion of *B* in a male.
discoverer: Bridges, 31al5.
references: Dobzhansky, 1932, Genetics 17: 369-92.
phenotype: Very slight Bar; merely nick in anterior margin of eye in males (no overlap) and in homozygous females. B^4/+ shows slight nick in 10 percent of cases only. RK2(A).

B36b

origin: Spontaneous as BB^{36b} in *BB* chromosome of *BB/ln(l)AM* female.
discoverer: Bridges, 36b2.
phenotype: Male resembles standard *B;* BB^{36b}/+ female has smaller eye than *B*/+ but larger and of different shape than *BB*/+. Poor fertility both sexes. RK2A.
other information: Homozygous females produce wild type and extreme Bar unequal recombinants.

B36d

origin: Spontaneous derivative of *B* in *ClB.*
discoverer: Dempster, 36d9.
references: 1937, DIS 8: 8.
phenotype: Narrow Bar resembling *BB.* B^{36d}/+ easy to separate with unaided eye. RK1A.

***B36l**

origin: Spontaneous in B^+.
discoverer: L. V. Morgan, 36j20.
references: 1937, DIS 7: 5.
phenotype: Slight *B;* usually stronger than B^4, but shows greater fluctuation and may overlap wild type. RK3.

*$B^{48}9$

origin: X ray induced in $In(l)sc^4$.
discoverer: Yu, 48g.
references: 1949, DIS 23: 65.
phenotype: Eyes wider and more variable in width than *B.* Male sterile. RK2A.
cytology: Associated with $T(1;2)B^{48}6$ = *T(1;2)15F-16A1;33B* superimposed on $In(l)sc^4$ =*In(l)lB3-4;19F-2OC1.*

***B581**

origin: X ray induced.
discoverer: E. B. Lewis, 5814.
references: Ogaki, 1960, DIS 34: 97.
1960, Japan. J. Genet. 35: 282.
phenotype: At 25°C, male eyes have about five facets fused into a vertical strip; B^{sst}/+ female eyes have about 35. Higher temperature decreases facet number. Addition of 2.5 percent lactamide to medium increases facet number to almost 540 in heterozygous female. Male sterile. RK1A,
cytology: Associated with $T(1;3)B^{5S1}$ = *T(1;3)16A;88F.*

***B263-28**

origin: X-ray-induced partial reversion of B'fl' in male.
discoverer: Demerec, 34b.
references: Sutton, 1943, Genetics 28: 97—107.
phenofype: Resembles B^l. Viable. RK1A.
cytology: Associated with *Dp(l;l)B263-28 = Dp(l;l)15F9-16Al;16A3-4;16A6-7;16A7-Bl,* which was derived by deletion of 16A4 of leftmost region through 16A6 of middle region of $B^{\Lambda l}$ triplication.

other information: May be considered to be B^1 derived by deletion of one of the regions in the BlB^1 tandem triplication.

**B263-34*

origin: X-ray-induced reversion of B*B* in male.
discoverer: Demerec, 34c.
references: Demerec, 1934, Cold Spring Harbor Symp. Quant, Biol. 2: 110—17.
Sutton, 1943, Genetics 28: 97-107.
phenotype: Eyes wild type. Lethal and cell lethal. RK2A as lethal.
cytology: $B^{263,34}$/+ resembles *B*B'*/+ (Sutton, 1943).

**B263-38*

origin: X-ray-induced reversion of *BtB** in male,
discoverer: Demerec, 34f.
references: Sutton, 1943, Genetics 28: 97-107.
phenotype: Eyes wild type. Lethal. RK2A as lethal,
cytology: $B^{263,38}$/+ resembles BiB^l/+ (Sutton, 1943).

**B263-47*

origin: X ray induced in B^+male.
discoverer: Demerec, 38d.
references: Sutton, 1943, Genetics 28: 97-107.
phenotype: Eyes Bar-Mke but larger than Bar. Not lethal. RK1A.
cytology: Associated with $ln(l)B^{263,47}$ = *ln(l)16A2-4;20A2-3.*

***B263-48**

origin: X ray induced in B^+ male.
discoverer: Bishop, 39i26.
references: 1939, DIS 12: 61.
1940, DIS 13: 48.
phenotype: Eye reduction in male and heterozygous female between *B* and B^1; size constant in males, variable in females. Homozygous females viable and fertile; show a distinct *bb* effect. Wings usually leathery and warped at 19°C; normal at 25°. RK2A.
cytology: Associated with $Tp(l)B^{263,48}$ = *Tp(l)3E2-3;15F9-16Al;20A2-3.*

**Q263-49*

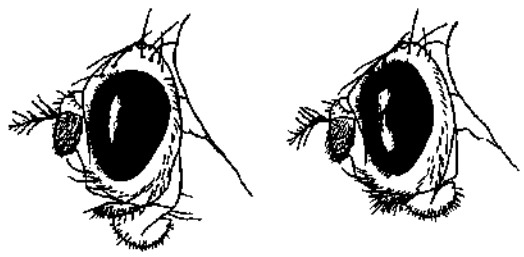
origin: X ray induced in *BB* male.
discoverer: Sutton, 41b.
references: 1943, Genetics 28: 97—107.
phenotype: Eyes vary in male from *BB* to wild type, in homozygous female from *BB* to *B*/+. RK2A.
cytology: No change in the *BB* triplication detectable in salivaries. (Sutton, 1943).

***B263-51**

origin: X-ray-induced reversion of *BB* in male.
discoverer: Sutton, 1940.
references: 1943, Genetics 28: 97-107.
phenotype: Eyes wild type. Viable.
cytology: $B^{263,51}$/+ resembles *BB*/+ (Sutton, 1943).

B^{bd}; *Bar-baroid*

origin: X ray induced in B^+male.
discoverer: Dobzhansky, 31bS.
references: 1932, Genetics 17: 369-92.
phenotype: Recessive. Eye of male has slight indentation of anterior margin, with some reduction in size and roughening of remainder. Male sterile; heterozygous female fertile. Interpreted as position effect (Dobzhansky, 1936, Biol. Rev. Cambridge Phil. Soc. 11: 364-84). RK3A.
cytology: Associated with $T(l;2)B^{bd}$ = *T(l;2)16Al-2;48C2-3 + In(2R)41A;47A.*



B^{bd}: *Baroid*

Edith M. Wallace, unpublished.

**B^{DG}: Bar of Dubinin and Goldat*

origin: X ray induced in B* chromosome in male.
discoverer: Dubinin and Goldat, 1936.
references: 1936, Biol. Zh. (Moscow) 5: 881—84.
phenotype: Eye not described. Lethal when hemizygous and homozygous (seems likely that latter claim inferred from former). RK2A as lethal.
cytology: Associated with $T(1;2)B^D$<* = *T(1;2)4;15F-16A;20;40-41.*

B^1: Bar-infrabar

origin: Spontaneous partial reversion of *B* that occurred in a male.
discoverer: Sturtevant, 1923.
references: 1925, Genetics 10: 117-47 (fig.).
phenotype: Eye reduction about halfway between B and +: B^1 male has 478 facets, $B^{\wedge}B^1$ has 320, and Bty+ has 716. Facet development inversely proportional to temperature; effective period for temperature treatment is 60 percent through larval life or about 60 hr at 25°C (Luce, 1935, J. Exptl. Zool. 71: 125-47). RK1A.
cytology: Apparently no change in *Dp(l;l)B* in which B^1 arose.

**Bl40b*

origin: Spontaneous in *BB* male.
discoverer: Steinberg, 40b.
references: 1940, DIS 13: 51.
phenotype: Similar to B^1 both in male and B^f/+ female. RK1A.
cytology: No change from original *BB* triplication (Sutton, 1943, Genetics 28: 97-107).

BMl: Bar of Mullet

origin: X ray induced in B* chromosome.
discoverer: Muller, 34e.
references: 1935, DIS 3: 29.
phenotype: Weak allele of B; always has at least a derangement of facets on anterior margin of eye. RK2A.
cytology: Associated with $ln(l)B^{M1}$ = *In(l)16A2-5;20A3-B* (Sutton, 1943, Genetics 28: 97-107).

B^{M2}
origin: X ray induced in B^+ chromosome. Occurred simultaneously with a reverse mutation of v.
discoverer: Muller, 34e.
references: 1935, DIS 3: 29.
phenotype: Weak allele of *B.* RK2A.
cytology: Associated with *In(l)B^2 = In(l)16A2-5;20E* button, 1943, Genetics 28: 97-107).

***BP^{ar}: Bar-partial**
origin: X-ray-induced partial reversal of *B* in male.
discoverer: Bishop, 1940.
references: Sutton, 1943, Genetics 28: 97—107.
phenotype: Eyes intermediate between *B* and +. RK2A.
cytology: B duplication unchanged (Sutton, 1943).
other information: Six independent partial reversions fitting this description found by Bishop.

*S^R: *Bar of Rapoport*
origin: X ray induced in normal chromosome.
discoverer: Rapoport, 1935.
synonym: *B^z: Bar of Zuitin.*
references: Zuitin, 1935, DIS 4: 6, 16.
1936, DIS 5: 6.
phenotype: More extreme than *B.* B^R/+ resembles *BB/+.* RK1(A).
other information: Shows normal crossing over and reverts to wild type.

**Brev-1*: *Bar-reversed*
origin: X ray induced in *B* male.
discoverer: Bishop, 1940.
references: Sutton, 1943, Genetics 28: 97—107.
phenotype: Eyes and viability normal.
cytology: *B***-^{1}/+ resembles *B/+* (Sutton, 1943).

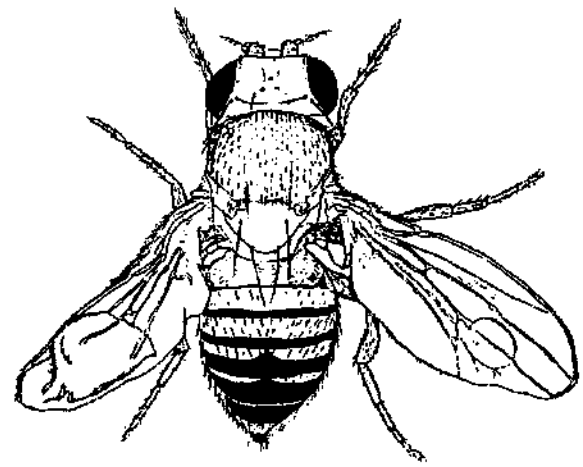
B*: *Bar of Sfone*
origin: X-ray-induced derivative of *B.*
discoverer: Stone, 1931.
phenotype: Extreme Bar; produces narrower eye than *B,* both in males and heterozygous females. RK1A.
cytology: Associated with *T(1;4)BS = T(1;4)15F9-16A1;16A7-B1;1O2F* (Griffen, 1940, Genetics 26: 154-55; Lewis, 1956, DIS 30: 130).

***B^{S31}: Bar-Super inserted in chromosome 3**
origin: Neutron induced in *X'Y^S, sc w B* chromosome.
discoverer: Norby.
synonym: *B^{S2}; Super-Bar.*
references: Muller and Norby, 1949, DIS 23: 61.
phenotype: Extreme Bar resembling *B^s.* RK1A.
cytology: Associated with *T(l;3)B^s3i = T(1;3)1SF9-16A1;16A7-B1;19-2O;Y;66B13-C1* (Muller; Lindsley).

B:* see *B**

b-l3 3gis; see *tri*

ba: balloon
location: 2-107.4.
origin: Spontaneous.
discoverer: Morgan, 10k.
references: Marshall and Muller, 1917, J. Exptl. Zool. 22: 457-70 (fig.).
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 148 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.). 218.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Wings at first inflated with hemolymph to produce blisters and vesicles; venation weak, plexus-like; wings smaller, warped, discolored, divergent. Effect caused by inadequate contraction of epithelium after inflated stage of pupal wing [Waddington, 1940, J. Genet. 41: 75—139 (fig.)]. Sensitive to temperature. RK3 above 25°C; RK2 at 19° or below.
cytology: Located between 60C5 and 60D2 based on inclusion within *Df(2R)Px = Df(2R)60B8-10;6QDl-2* and within *Df(2R)Px^2 = Df(2R)60C5-6;60D9-10* (Bridges, 1937).
other information: May be part of a pseudoallelic complex with 6s and Px.



ba: balloon
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 148.

***ba^2**
origin: Spontaneous.
discoverer: Banerjee, 58i30.
references: Ray-Chaudkuri, 1959, DIS 33: 99.
phenotype: Wings blistered at one or two places, affecting quite a broad area either on the inner margin or centrally; both wings usually affected. Wings generally glossy and contracted. Classification good; viability slightly reduced. RK2.

ba^2*: see *bio
ba^{33f26}*: see *bio
Bag:* see *Bg

**bal: bandy legged*
location: 2- (not located),
origin: Spontaneous.
discoverer: Ströher, 1958.
references: Mainx, 1958, DIS 32: 82.
phenotype: Legs extremely shortened and crippled. All parts of legs from femur to tarsi shortened,

broadened, and irregularly curved. Tarsal number not reduced. Deformities most extreme in metathoracic legs. Movement unsteady and tottering. Manifestation increased by selection. Viability poor, especially in males; fertility good. RK2.

bald: see *ra*^{2}

ballet: see ***bit***

balloon: see ***ba***

Balloon: see *Bb*

balloon wing: see *bs3*

band: see ***bn***

bandy legged: see *bal*

Bar: see *B*

Bar + Bar: see *BB*

***Bar** double:* see *BB*

bar eye: see *at*

bar-3: bar on chromosome 3

location: 3-79.1 (not an allele of ro).

origin: Spontaneous.

discoverer: Ives, 49J20.

references: 1950, DIS 24: 58.

phenotype: Like *B/B,* without significant variation under standard conditions. Viability good. RK1.

Bat-infra double: see **2*'5***

Barlike eye: **see *Ble***

baroid: **see *B*^{bd}**

bat: bat

location: 2-71.0.

discoverer: Bridges, 22J26.

synonym: *ext-b: extended-b,*

phenotype: Wings extended and bent backward. RK2.

**baton: baton*

location: 2-52.

phenotype: Abdomen elongated, with defective plates; eye resembles *L*^{4}. Extremely inviable; most homozygotes die in larval and pupal stages, appearing as elongated corpses. Heterozygote shows some eye effect. RK3.

bb: bobbed

location: 1-66.0 (Bridges).

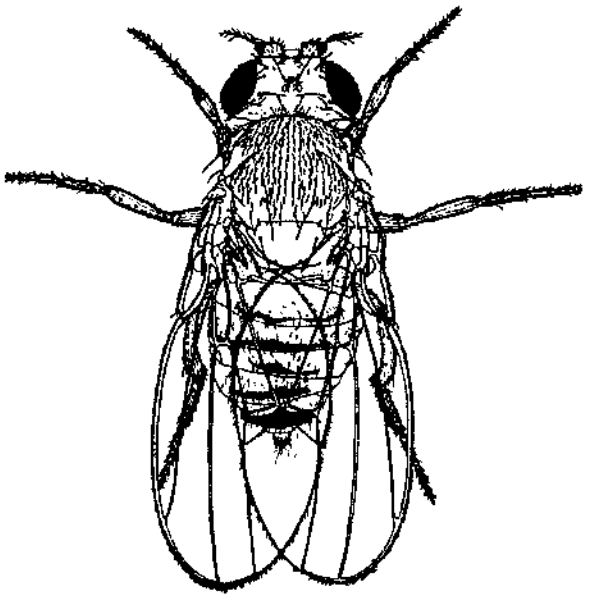
discoverer: Sturtevant, 20b.

synonym: 66*. What is now referred to as 6b was derived from fifth finding of *bb.* First allele found was lost and is here omitted from consideration.

phenotype: Bristles of homozygous females decreased in both length and thickness. Tergites etched at sides. Considerable variability of bristle character, with some overlapping; abdominal character extremely erratic. *X/0* male has phenotype similar to but more extreme than homozygous female. *X/Y* male is wild type, owing to presence of normal allele of 66 in *Y*^{s}*; X/X/Y* female similarly normal *in* phenotype. 66/66' is extreme 66 in phenotype. Viability variable. Ritossa, Atwood, and Spiegelman (1966, Genetics 54: 819-34) showed that 66 contains about half as much ribosomal RNA-complementary DNA as 66$^+$. They conclude that the 66 locus is the site of ribosomal RNA synthesis. On the basis of calculations that suggest that there is enough DNA in 66$^+$ to specify approximately 130 molecules each of 28S and 18S ribosomal RNA, these authors view the 66 locus as highly redundant and perhaps composed of a very large series of tandem duplications. They interpret *bb* mutations as partial deletions of the locus. They postulate that in 66 flies the rate of protein synthesis is limited by the amount of ribosomal RNA and the 66 phenotype results in part because normal bristle production represents maximum protein synthesis on the part of the trichogen cells during a particular interval in development. RK2.

cytology: Judged to be in 20C2 (or 20C1) by Cooper (1959, Chromosoma 10: 535—88) based on extensive consideration of published cytology of base of *X* chromosome. The 66 locus lies in proximal heterochromatin of *X,* probably proximal to and very close to nucieolus organizer in heterochromatic region *hB* (Cooper, 1959). Ritossa, Atwood, and Spiegelman (1966), on the other hand, postulate that the nucieolus organizer is the cytological counterpart of the 66 locus. Presence of a normal allele of 66 on *Y* chromosome postulated by Burlingame and demonstrated by Stern [l927, Z. Induktive Abstammungs- Vererbungslehre 44: 187—231 (fig.)]. This 66$^+$ allele almost certainly in *Y*^{s} (see Cooper, 1959).

other information: 66 stocks show marked tendency to accumulate modifiers that suppress the phenotype. Outcrossing generally brings about return of 66 phenotype. Ritossa, Atwood, and Spiegelman (1966), however, doubt that this is the case and postulate that the level of tandem redundancy of the locus is subject to frequent stepwise increases or decreases by unequal crossover types of events. Many laboratory stocks can be shown by crossing to 6b* to carry 66 alleles of unknown origin.



an extreme bobbed

Edith M. Wallace, unpublished.

bb$:* see *bb

bb[11]

origin: Spontaneous in attached *X's.*
discoverer: Gabritschevsky, 1926.
phenotype: When first found, this was a very extreme 66 with small bristles and very scaly abdomen; it gradually became a weak 6b. Enhances expression of *gt.* RK3.

***bb[20]**

origin: Spontaneous,
discoverer: Bridges, 30b24.
phenotype: bb^{20}/bb is strong *bb.* bb^{20} is homozygous lethal. RK2.

***bb[281]**

origin: Spontaneous,
discoverer: Stern, 28110.
synonym: bb^{x}.
references: 1935, DIS 3: 29.
phenotype: Like 6b. RK2.

bb':* see *bb[ds]

origin: Thought by Stern and Ogura to be an extreme 66 allele normally occurring on Y^{L} in addition to the normal allele occurring on *Y$.*
discoverer: Stern.
references: Stern and Ogura, 1931, Z. Induktive Abstammungs- Vererbungslehre 58: 81—121.
phenotype: Only observable evidence of existence of 66"is that, when added to other 66 genotypes, it apparently causes them to become slightly less extreme. This could be simply a suppressing effect of Y^{L} rather than a dosage effect attributable to a mutant allele of 66. RK3.
other information: Inviability of *bb*/R(Y)L* renders existence of 6'' unlikely.

bb[a] P[x] [S]P:* see *bb[G1]

bb[a] P[x] [S]P [h]':* see *bb[G2]

****bb[D]:* *bobbed-Dominant***

origin: X ray induced.
discoverer: Lefevre, 48g28.
references: 1949, DIS 23: 58.
phenotype: Pronounced etching of abdominal tergites; bristles only slightly reduced. Male genitalia directed posteriorly rather than ventrally. Viable in both sexes; fertility of females fair, but of males extremely low. Homozygous females not produced. Viability and classification good in combination with 66 and bb^{Y}. RK2-
other information: Allelism with 66 not definitely established.

bb[d]*:* *bobbed-deficiency sensitive

origin: The allele present in some stocks marked 66.
synonym: 66'.
phenotype: Females homozygous for $bb^{\wedge s}$ or heterozygous for bb^{da} and a mutant allele of 66 are 66 in phenotype. bb^{d}*/Df(l)bb* females are lethal. 66^{cfs}-like alleles have been reported by Stern and Ogura (1931, Z. Induktive Abstammungs-Vererbungslehre 58: 81—121) and by Lindsley, Edington, and Von Halle (I960, Genetics 45: 1649—70). Presumably, this difference between 66 and bb^{da} is a property of the 66 locus and *bb }4* *bb<t*>*. RK2.

****bbG 7:* *bobbed of Goldschmidt***

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: 66^{s} P* *P.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 391-93.
phenotype: Homozygote normal; bb^{G1}/bb^{G2} shows extreme bristle reduction and abdominal etching. For interaction with other 66 alleles, see Goldschmidt, 1945, table 75. RK2 in some combinations.
other information: Claimed by Goldschmidt to recur in both *X* and *Y* chromosomes of certain lines.

***bbG 2**

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: bb^{0} P^{x} ^{a}P ^{hi}.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 391-93.
phenotype: Almost completely lethal homozygous. Shows extreme bristle shortening and abdominal etching in combination with bb^{G3}. RK2.
other information: Claimed by Goldschmidt to recur frequently in certain lines.

***bbG 3**

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $bt>P^{oi}$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 390-93.
phenotype: Weak bobbed allele. Extreme in combination with bb^{G2}. RK2 in some combinations*
other information: Claimed by Goldschmidt to recur repeatedly in certain *X*- chromosomes.

***bbG 4**

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: *bbP°i *?.*
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: Bristle effect irregular; no abdominal etching. RK3.
cytology: Salivary chromosomes normal (Hannah-Alava).

***bbG 5**

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: $bbP^{oi\ hi}$.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 387, 390-93.
phenotype: Homozygous lethal. bb^{G5}/bb produces shortening of bristles and abdominal etching. RK2 as lethal.

bb-': *bobbed-lethal*

origin: Spontaneous.
discoverer: Bridges, 1926.
references: Morgan, Bridges, and Sturtevant, 1926, Carnegie Inst. Wash. Year Book 25: 308-12. Stern, 1929, Biol. Zentr. 49: 261-90.
phenotype: Homozygous lethal. 66^{J}/66 is extreme *bb,* very late hatching, and invariably classifiable.

bbtybb'/Y = bbl/Y = normal. 66*/0 is lethal. Shown by Ritossa, Atwood, and Spiegelman (1966, Genetics 54: 819-34) to contain approximately one-fourth as much ribosomal RNA-complementary DNA as 66^{+}. RK2A.

other information: Segregation from *Y* chromosome normal. Crossing over reduced in right end of *X* in 6b'/+ females.

***bb1-2**

origin: Spontaneous in $X\text{-}Y^{L}$, *bb* ($X\text{-}Y^{L}$, *bb-bb"* produced $X\text{-}Y^{L}$, $bb^{l\sim 2}$*'bb"*according to Stern and Ogura).

discoverer: Stern, 28k.

references: Stern and Ogura, 1931, Z. Induktive Abstammungs-Vererbungslehre 58: 81—121.

phenotype: Homozygous lethal. $bb^{1\cdot 2}/bb$ is bobbed. RK3A.

bb1-3a

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649—70,

phenotype: Lethal as *X/0* male and in combination with $In(l)sc^{4L}sc8R$ and with bb^{ds}. $bb^{1}\text{-}^{3a}/bb$ is bobbed. RK2A.

cytology: Association with $Df(l)bb^{t}\text{-}^{3a}$ inferred from its irregular segregation from $y^{+}Y$ in males.

bbl-74

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle,

references: 1960, Genetics 45: 1649—70.

phenotype: Like 66'-3a, RK2A.

cytology: Association with $Dt(l)bb^{1\sim\prime\prime 4}$ inferred from irregular segregation from $y^{+}Y$ in males.

bb1-158

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649—70.

phenotype: Like 66*-3a. RK2A.

cytology: Association with $Df(l)bbt\sim^{iss}$ inferred from irregular segregation from $y^{+}Y$ in males.

bb1-452

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649—70.

phenotype: Like 66'-3«. RK2A.

cytology: Association with $Di(l)bb^{im4S2}$ inferred from slightly irregular segregation from $y^{+}F$ in male.

***bb1-456**

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649—70.

phenotype: Like *bb*-3**. RK2A.

cytology: Association with $Dl(l)bb^{l}\text{-}^{4S6}$ inferred from irregular segregation from *y*Y* in male.

bl

origin: X ray induced.

discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649-70.

phenotype: Like *bb'S*®. RK2A.

cytology: Association with $Dffl)hb^{l\prime\prime}$*8** inferred from grossly abnormal segregation from *y*Y* in males. *In(l)481* = *In(l)12E-F;14B* induced simultaneously.

bbOf: bobbed of Offermann

origin: X ray induced in *T(1;4)A1*.

discoverer: Offermann, 1935.

references: 1935, DIS 3: 27.

phenotype: Like 6b. RK2A.

***bbOf-2**

origin: X ray induced in $In(l)sc^{8}$.

discoverer: Offermann.

references: 1935, DIS 3: 28.

phenotype: Like 6b. RK2A.

bbP^{oi}: see bb^{o3}

bbP^{oi47}: see bb^{G4}

bpoi hi: see bbG5

bb^x: see bb281

bb^Y: bobbed on the Y chromosome

origin: Spontaneous.

discoverer: Bridges, 1926.

synonym: Y^{bb}.

phenotype: bb/bb^{Y} male has slight 6b phenotype; usually separable in crosses, but stock 66/66*' male tends to change to nearly normal phenotype. $bb^{l}/btiY$ male is good 66; always separable and fertile. RK2 as 66*/66^.

other information: Chromosome with 66^ described as Y66 in subsection on *Y* derivatives.

**bbY-20*

origin: Spontaneous. Arose in combination with 6620.

discoverer: Bridges, 30b24.

synonym: $ybb\text{-}20_{t}$

phenotype: Slightly less extreme but otherwise like bb^{Y}. RK2.

***bbY-21**

origin: Spontaneous. Arose in combination with bb^{21}.

discoverer: Sturtevant, 31c26.

synonym: $Y^{bb\prime\prime 21}$<.

phenotype: Like 66*\ RK2.

**bbY-22*

origin: Spontaneous. Arose in combination with 66".

discoverer: Curry, 37118.

synonym: $Y^{bb\sim 22}$.

phenotype: Like 66^. RK2.

Bb: Bubble

location: 1- (not located) or 3-48.

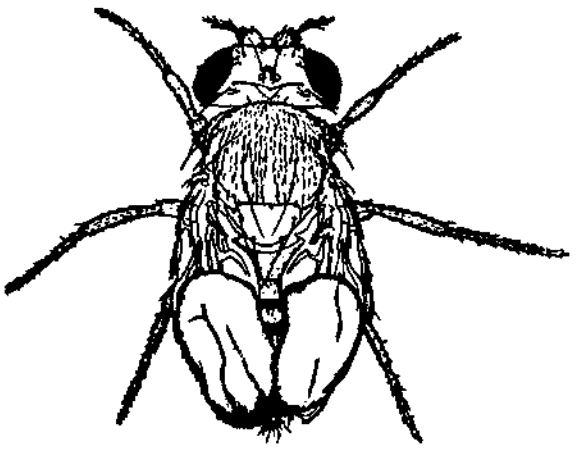
origin: X ray induced.

discoverer: R. L. King, 32d.

synonym: *Balloon.*

phenotype: Wings of heterozygous female smaller, trimmed, and inflated. Bubble in first posterior cell. In extreme cases and usually in males, the wing is a small inflated sac. Sexual difference in expression may indicate that J56 is on the *X*. Female fertile; male entirely sterile; therefore homozygous females not obtainable. RK3A.

cytology: Associated with *T(l:3)Bb* = *T(1;3)13E;84F* (Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).



Bb: Bubble

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 23.

BB: Bar + Bar

origin: Spontaneous though unequal crossing over in *B/B* (see description of *B).*
discoverer: Zeleny.
synonym: *Bar double; Ultra-bar; double Bar.*
references: 1920, J. Exptl. Zool. 30: 292-324 (fig-).
Sturtevant, 1925, Genetics 10: 117-47 (fig.)-
phenotype: Eye more reduced than in *B.* Facet numbers are 25, 29, and 45 in *BB/BB* female, *BB* male, and *BB/+* female, respectively. Median ocellus lacking or strongly reduced (Lefevre, 1941, DIS 14: 40). Optic glomerulus reduced (Power, 1942, Genetics 27: 161). RK1A.
cytology: Associated with a tandem triplication of the region duplicated in *Dp(l;l)B = Dp(l;l)15F9-16A1;16A7-B1* [Bridges, 1936, Science *83:* 210-11 (fig.)]-

BB^1: Bar + Bar-infrabar

origin: Spontaneous through unequal crossing over in *B/B^l*.
discoverer: Sturtevant.
references: 1925, Genetics 10: 117-47.
phenotype: Like *BB.* RK1A.
cytology: Associated with *Dp(l;l)BB = Dp(l;l)15F9-16A1;16A7-B1;* a tandem triplication,
other information: *B* is to the left of *B^l* and both types can be recovered as recombinants.

B'B: Bar-infrabar + Bar

origin: Spontaneous through unequal crossing over in *B/B^l*.
discoverer: Sturtevant.
references: 1925, Genetics 10: 117-47.
phenotype: Like *BB^1*. RK1A.
cytology: Associated with *Dp(l;l)BB = Dp(l;l)15F9-16A1;16A7-B1;* a tandem triplication.
other information: *B^l* is to the left of *B* and both types can be recovered as recombinants.

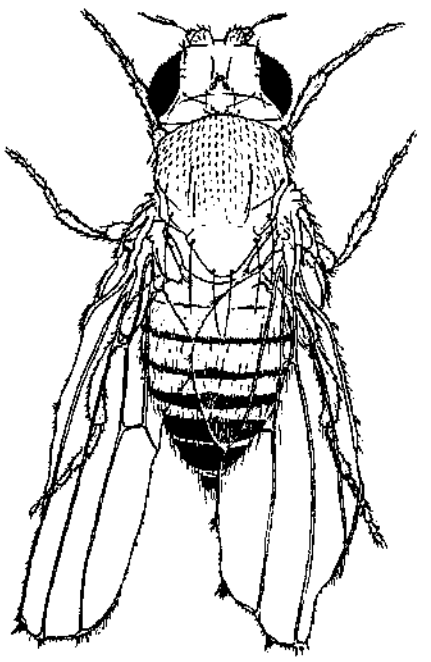
B'Bi

origin: Spontaneous through unequal crossing over in *B'/B^l*.
discoverer: Sturtevant, 1923.
synonym: Bar-infra *double.*
references: 1925, Genetics 10: 117—47 (fig.).
phenotype: Less reduction in eye than *BB.* Facet numbers are 38, 46, and 200 in *B'B^B^'* female, *B^{l}B^l* male, and *B^{i}B^i/+* female, respectively. Median ocellus lacking or strongly reduced (Lefevre, 1941, DIS 14: 40). RK1A.
cytology: Associated with *Dp(l;l)BB-- Dp(l;l)15F9-16A1;16A7-B1;* a tandem triplication.
other information: *B** can be recovered as recombinant from *B^{i}B^i/+*.

***Bi40bBi40b**

origin: Spontaneous, presumably through unequal crossing over in *B$^{i4(}$>b/B^0b$_{\%}$*
discoverer: Steinberg, 40b.
references: 1942, DIS 16: 53.
phenotype: More extreme reduction in eye size than *Bi40b.* RK2A.
cytology: Associated with *Dp(l;l)BB = Dp(l;1)15F9-16A1;16A7-B1;* a tandem triplication.

bd:* see *ra^2



6 of: *Beaded*

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 152.

6of; *Beaded*

location: 3-93.8.
discoverer: Morgan, lOe.
references: Dexter, 1914, Am. Naturalist 48: 712-58 (fig.).
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 37, 152 (fig.)-
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 45.
phenotype: Wings reduced by marginal excision both anteriorly and posteriorly. Extremely variable and overlaps wild type. Expression and interaction studied by Goldschmidt and Gardner (1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 103-24). Almost entirely suppressed by fif. In combination

with many different Minutes, causes incomplete development of anal and genital imaginal discs in males and less frequently in females (Goldschmidt, 1948, Proc. Natl. Acad. Sci. U.S. 34: 245-52,' Sturtevant, 1949, Proc. Natl. Acad. Sci. U.S. 35: 311-13). Homozygous lethal. RK2 as lethal, RK3 as dominant.

other information: *Bd/In(3R)C, l(3)a* was the first described case of a balanced lethal [Muller, 1918, Genetics 3: 422-99 (fig.)].

***Bd49**

origin: X ray induced.
discoverer: Ohnishi, 49116.
references: 1950, DIS 24: 61.
phenotype: Like extreme *Bd.* Variable, overlaps wild type. Homozygous lethal. RK2 as lethal; RK3 as dominant.

Bd^G; Beaded of Goldschmidt

origin: Found among progeny of heat-treated flies.
discoverer: Goldschmidt, 1934.
references: Gottschewski, 1935, DIS 4: 14, 16.
phenotype: Like *Bd* but more extreme; not overlapping wild type in stock. Balancers also reduced with no overlap. Partially suppressed by *H.* Schultz and Curry report recurrent small or welt-like eye effect that is not well understood but is in chromosome *3* and may be an effect of Bd^G. Lethal homozygous and in combination with Bd. RK1.

***Bd^G45**

origin: Spontaneous.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 520.
phenotype: Like *Bd* but with more extreme scalloping effect. RK3.

***BdP: Beaded of Piternick**

origin: X ray induced.
discoverer: Piternick, 1949.
references: Goldschmidt, 1953, J. Exptl. Zool. 123: 79-114.
phenotype: Like Bo* but more highly penetrant. 30—40 percent *BdP/+* are phenotypically *Bd.* Penetrance 100 per cent when heterozygous for third chromosome inversions, e.g., *In(3L)P + In(3R)P.* Interactions with other genes discussed by Goldschmidt (1953). Homozygous lethal. RK2 as lethal; RK3 as dominant.

***Bd": Beaded of Wallace**

origin: Spontaneous.
discoverer: E. M. Wallace, 15110,
phenotype: Like *Bd* but more extreme; ends of L3 and L4 split or disturbed. Overlaps wild type. Least extreme recognizable phenotype is nick opposite L3. Homozygous lethal. RK2 as lethal.

bdw:* see *osbdw

***be~3: benign tumor in chromosome 3**

iocotion: 3-25.
origin: Spontaneous.
discoverer: Stark, 16k.
references: 1919, Proc. Natl. Acad. Sci. U.S., 5: 573-80 (fig.).
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 179 (fig.).
Stark and Bridges, 1926, Genetics 11: 249-66.
Stark, 1935, DIS 4: 62.
phenotype: Melanotic tumors appear in larvae and persist in adults. Subject to modification by genetic factors. Nonlethal. RK3.

Beaded:* see *Bd
Beadex:* see *Bx
Beadexoid:* see *Bxd
bending wings:* see *os^bdw
benign tumor in chromosome 3:* see *be-3
bent:* see *bt
bent scutellars:* see *bsc

***ber: berrytail**

location: 1-52.4.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 67.
phenotype: Abdomen narrow, ending in a berry-like protrusion carrying defective genitalia. Wings opaque, with areas of deranged hairs (some with cut inner margins and interrupted or abnormally positioned longitudinal veins). Anterior scutellars often acutely bent; eyes occasionally misshapen. Males sterile and viability about 40 percent wild type. RK3.

bf: brief

location: 3-95.
origin: Spontaneous.
discoverer: Curry, 3813.
references: 1939, DIS 12: 45.
phenotype: Fly small; bristles Minute-like. Classification perfect, viability fair. Male completely sterile, female with low fertility. RK3.

fig; *Bag*

location: 1-51.6 (to the right of *sd).*
origin: Spontaneous.
discoverer: Bridges, 33d22.
phenotype: Heterozygous female with wings shorter and blunter, shortened L5, extra veins or gaps near anterior crossvein, and inflated bag centering in first basal cell. Frequently overlaps wild type. Lethal in male. RK2 as a lethal, RK3 as a dominant.
cytology: Probably in 13C, based on Bg-like variegation of *T(l;3)rasv = T(1;3)9E;13C;81F.*

***Bg2**

origin: Spontaneous.
discoverer: S^mme.
synonym: *Uw: Uneven wing.*
phenotype: Heterozygous females with inner wing margin frequently nicked or uneven; longitudinal veins sometimes shortened; one wing often shorter than the other. Some delay in eclosion. Overlaps wild type. Viability and fertility fair. Reduces size of *B* eye and is itself exaggerated in combination with *B.* Male lethal. RK2 as lethal; RK3 as dominant.

***Bg49h**

origin: Induced by ingested radiophosphorus.

discoverer: R. C. King, 49h.
references: Poulson and King, 1949, DIS 23: 62.
phenotype: Heterozygous female has wings with no crossveins, L5 shortened. Wings asymmetric in size and blistered. L3 very thick; gaps in L3 and L4. Extra veinlets; veins may fork at wing edge. Wings often excised terminally and along inner margin. Phenotype very variable, overlaps wild type. Viability 65 percent normal. Male lethal. RK3.

**BgS2c*

origin: Thermal neutron induced.
discoverer: R. C. King, 52c.
references: 1952, DIS 26: 65.
phenotype: Like $Bg^{49h'}$, overlaps wild type. Male lethal. RK3.

hi: bifid

location: 1-6.9.
discoverer: Morgan, Ilk.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 28 (fig.).
phenotype: Longitudinal veins fused at base of wing into bifid stalk. L3 delta-like at tip; L4 often incomplete at tip. Wing margins often excised at tip of L4. Wings spread in proportion to their shortness. High temperature enhances and low temperature produces overlapping of wild type. Stronger in male than in female. Enhances *Bx* alleles as well as *sd, cp,* and $vg^{n}P$ (Waletzky). RK1.
cytology: Between 4C7-8 and 4D1-2 according to Demerec, Kaufmann, Fano, Sutton, and Sansome (1942, Carnegie Inst. Wash. Year Book 41: 191).

***bi35**

origin: Spontaneous.
discoverer: Gottschewski, 1935.
phenotype: Like *bi,* but whereas males show 100 percent expression at 25°C, females show 0—3 percent. RK1 in male, RK3 in female.

bis: bistre

location: 1-20.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 67.
phenotype: Very dark brown eye color; ocelli also dark. Wings frequently unexpanded. Males sterile. Viability varies from less than 10 percent to 70 percent wild type. RK2A.
cytology: In bands 7B6 and 7; associated with *Dt(l)bis = Df(l)7B5-6;7B7-8.*

****Bit: Bitten***

location: 3- (not located; crossing over between ru and *th* almost completely suppressed).
origin: X ray induced.
discoverer: Lefevre, 48g5.
references: 1949, DIS 23: 58.
phenotype: Inner margin of wing indented. Wings, normally folded, appear to have had a bite taken out of the back. Marginal hairs present unlike *N* and *ct.* Flight is impeded, although little wing area lost. Homozygous lethal. RK1A.
cytology: Associated with *In(3L)Bit;* breakpoints not determined.

bithorax:* see *bx

Bithoraxlike:* see *Ubx

bithoraxoid:* see *bxd

Bitten:* see *Bit

****bk: buckled***

location: 1-59.8.
origin: Induced by p-NN-di-(2-chloroethyl)amino-phenylethylamine (CB. 3034).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 83.
phenotype: Wings slightly altered in shape and frequently divergent, with membranes warped between longitudinal veins. Veins slightly thickened at wing margins. Eye shape slightly altered. Scutellar bristles frequently abnormal, either inserted in base atypically, bent, or duplicated. Males viable and fertile. RK3.

****bk2***

origin: Induced by L-l:6-dimethanesulfonyl mannitol (CB. 2628).
discoverer: Fahmy, 1960.
references: 1964, DIS 39: 58.
phenotype: Fly small. Legs shortened; posterior pair frequently deformed or absent. Wings shortened, abnormally shaped, with varying amounts of marginal vein incised. Sex combs may be enlarged. Bristles stiff; occasionally an extra scutellar bristle. bk^{2}/bkl normal. RK3.

****Bkd: Blackoid***

location: 2-65 (Braun).
origin: Spontaneous.
discoverer: Goldschmidt, 1938.
phenotype: Body color black in homozygote, distinctly darker than wild type in heterozygote. RK2.

****bkl: buckledlike***

location: 1-59.9.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 83.
phenotype: Wings slightly divergent with membranes warped between longitudinal veins, which themselves are often slightly thickened. Abnormally shaped eyes, frequently compressed dorsoventrally. Both sexes viable and fertile. RK3.
other information: Probably a complementing allele of *bk.* One X-ray-induced allele.

BI: Bristle

location: 2-54.8 (crossing over may be reduced).
origin: Spontaneous.
discoverer: R. L. King, 25dll.
references: 1927, Biol. Bull. 53: 465-68.
phenotype: Bristles one-half to two-thirds normal length, blunt, thicker, and beaded in outline. Posterior scutellars often cross and adhere to body. Eyes somewhat larger and rougher. Probably affects nature of bristle secretion, particularly outer layer [Lees and Waddington, 1942, DIS 16: 70; Lees and Picken, 1945, Proc. Roy.

Soc. (London), Ser. B 132: 396-423 (fig.)]. Viability of heterozygote is good but erratic; homozygotes usually lethal; survivors female-sterile with roughish eye character. RK1 as dominant.

***fi130**

origin: Recovered among progeny of heat-treated flies.
discoverer: Plough, 1930.
synonym: *Sy^{30}: Stubby-30.*
references: Plough and Ives, 1935, Genetics 20: 42-69.
phenotype: Like *Bl.* RK1.

***Bl311**

origin: Recovered among progeny of heat-treated flies.
discoverer: Ives 31119.
synonym: *Sy31U9.*
references: Plough and Ives, 1935, Genetics 20: 42-69.
phenotype: Like *Bl. Bl^t/Bl* like *Bl/Bl* and poorly viable. Bl^{311} regularly homozygous lethal. RK1.

***h!a: bladderwing**

location: 1-43.2.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 67-68.
phenotype: Wings grossly deformed, small, and normally full of fluid. Eyes slightly abnormal in shape. Males fertile, females sterile; viability about 50 percent wild type. RK3.

black:* see *b
black leg:* see *bleg
Blackoid:* see *Bkd
bladderwing:* see *bla
Bid: Blond

location: 1- or 2- (associated with rearrangement).
origin: Spontaneous in chromosome containing *In(2R)Cy.*
discoverer: Burkart, 1930.
references: 1931, Rev. Fac. Agron. Vet. Univ. Buenos Aires 7: 393-491.
Burkart and Stem, 1933, Z. Induktive Abstammungs- Vererbungslehre 64: 310—25 (fig.).
phenotype: Bristles of heterozygote are gleaming yellow at tips and for varying lengths of more basal regions. Hairs not much paler and bristles of abdomen only slightly affected. Larval mouth parts wild type. No overlap. Viability and fertility of male and heterozygous female excellent. Formerly viable as a homozygous female but in lines now available the homozygote is lethal, presumably owing to a lethal mutation closely linked to breakpoint of translocation in chromosome two. RK1A.
cytology: Associated with *T(l;2)Bld~, T(1;2)1C3-4;60B12-1*J.
other information: *Bid* phenotype associated with the $2R^{D}X^{p}$ element of the translocation.

***Bte: Barlike* eye**

location: 3-94.
origin: X ray induced.
discoverer: Crowell, 57i.
references: Meyer, 1958, DIS 33: 97.
phenotype: Eye shape indistinguishable from Bar. Expression of *Ble/+* varies; best at 26°C. Excellent expression in homozygote at all temperatures. *Ble/Ble* in combination with JB results in an extremely narrow eye. RK1.
other information: If *Ble* represents a transposition of the Bar locus to chromosome *3,* the flanking loci of f^{+} and od^{+} have not been transposed. Also against transposition is absence of sexual dimorphism that dosage compensation of *B* should produce in such a case.

bleg: black leg

location: 3- (near p).
discoverer: Bridges, 16b23.
references: Bridges and Morgan, 1923, Carnegie Inst, Wash. Publ. No. 327: 158.
phenotype: Legs black, body color pallid. Wings flimsy. RK3.

blistered;* see *bs
Blister I ike:* see *Bsl
blister/:* see *by
bio: bloated

location: 2-58.5.
origin: Recovered among descendants of heat-treated flies.
discoverer: Ives, 33f26.
synonym: Originally referred to as *ba^: balloon* and *ba33f26.*
references: Plough and Ives, 1934, DIS 1: 33.
1934, DIS 2: 10.
1935, DIS 3: 6.
Bridges, Skoog, and Li, 1936, Genetics 21: 788-95.
phenotype: Wings spread, crumpled, and vesiculated; wing shows irregular plexus of extra veins. In extreme cases wings unexpanded. Occasional hooked or wavy bristles. Developmental studies by Waddington [l939, Proc. Natl. Acad. Sci. U.S. 25: 299-307 and 1940, J. Genet. 41: 75-139 (fig.)] show intervein material spongy and veins swollen, with inadequate contraction after inflated stage of pupal wing. Droplets of hemolymph often become clothed with cells liberated from epithelium and remain along basal processes. Does not overlap wild type, but has poor viability and hatches later. RK2.
cytology: Not included within and does not recombine with (0/1098) *D((2R)Np = Df(2R)44Fl-2;45El-2* (Bridges, Skoog, and Li, 1936).

Blond:* see *Bid
***blot:* see ap^{bit}**
btt: ballet

location: 1- (not located).
origin: X ray induced.
discoverer: Iyengar.
references: 1962, DIS 36: 38.
phenetype: Wings one-third the normal length; stretched outward and slightly upward; wing tip broadened; venation markedly altered as in fused.

Male viability impaired; females almost completely lethal. RK2.

bit: **see** ***ap^{blt}***

****blu: blunt***

location: 3- (near ru).
origin: Spontaneous.
discoverer: Wallbrunn, 46j23.
references: 1947, DIS 21: 71.
phenotype: Wings slightly shorter and broader than normal, giving a squared appearance. Sometimes difficult to classify. RK3.

****bn: band***

location: 3>72.
origin: Spontaneous.
discoverer: Morgan, 12g.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash.. Publ. No. 327: 79 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 215 (fig.), 218.
phenotype: Trident pattern and scutellum darker, with dark transverse band across anterior portion of mesonotum. Thorax vacuolated; hairs on thorax sparse and directed medially, in bowed lines. RK2.

ÐO: bordeaux

location: 1-12.5.
discoverer: Nazarenko.
phenotype: Eye color dark wine; not completely separable from wild type. Red pigment 67 percent wild-type level; brown pigment normal (Nolte, 1955, J. Genet. 53: 1—10). Transplantation indicates *bo* may be nonautonomous (Ephrussi and Beadle, 1937, Genetics 22: 65-75). Larval Malpighian tubules bright yellow (Beadle, 1937, Genetics 22: 587-611). RK3.

bobbed: **see** ***bb***

bobbed on the Y chromosome: **see** ***bb^{Y}***

bod: bowed

location: 3-48.3.
origin: Spontaneous.
discoverer: Nichols-Skoog, 35b20.
references: 1937, DIS 7: 6.
phenotype: Wings bowed downward over abdomen, curvature along both axes; curvature occasionally reversed. Wings somewhat smaller than wild type. Whole fly smaller and humpy; eyes slightly bulged. Overlaps wild type slightly. Viability 75 percent wild type. RK3.

****bord: bordered***

location: 1-70.
origin: Spontaneous.
discoverer: Bridges, 1916.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 220.
phenotype: Wings smaller and slightly extended; venation ragged and veins bordered by darker bands. Viability poor; classification unreliable. RK3.

bordeaux: **see** ***bo***

bordered: **see** ***bord***

****bos: bordosteril***

location: 3-0.0.
origin: Spontaneous.
discoverer: Fabian, 1941.
references: 1948, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 23: 512-17.
phenotype: Eye color dark brownish red; darkens with age. Malpighian tubules and testis sheaths colorless. Male fertile; female sterile. RK2.

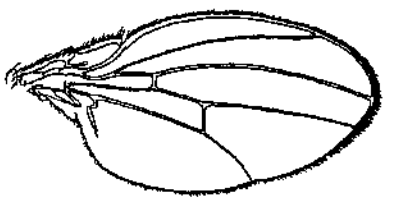
****tow: bow wings***

location: 1- (not located).
discoverer: Bridges, 12hl5.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 46 (fig.).
phenotype: Wings curved downward over abdomen and also sideways like bowl of a spoon. Overlaps wild type. RK3.

bow-legged: **see** ***bwl***

bowed: **see** ***bod***

bp: **see** ***bul^{b}P***



br: broad

Edith M. Wallace, unpublished.

br: broad

location: 1-0.6.
discoverer: Bridges, 15i26.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 145, 220 (fig.).
phenotype: Wings somewhat broader than and about 80 percent of length of normal, with round full tip; crossveins closer together. Shape difference visible in middle prepupal stage immediately after eversion; probably an influence on cell division [Waddington, 1939, Proc. Natl. Acad. Sci. U.S. 25: 299-307; 1940, J. Genet. 41: 75-139 (fig.)]. RK1.
cytology: Located between 1C5 and 2C10 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

br3

origin: Spontaneous.
discoverer: Bridges, 31el.
references: 1935, DIS 3: 7.
phenotype: Wings like *br* but more often arc-like and crumpled. RK2.

br^{S9}l

origin: Induced by DNA.
discoverer: Fahmy, 1959.
phenetype: Extreme expression of ôr'*? phenotype. *br^{S9}!/br* and *bc^{S9}i/ br^{ut}l* have mutant phenotype. RK1.

****br^{D}: broad-Dominant***

origin: Spontaneous,
discoverer: Muller, 19h.

references: Muller and Altenburg, 1921, Anat. Rec. 20: 213.
Muller, 1935, DIS 3: 29.
phenotype: br^D/+ resembles *br/br*. ὸr-D′orand br^D/Y are lethal. RKl.

*Jbr/-o; *broad-lethal-a*
origin: Spontaneous.
discoverer: Muller, 19h.
synonym: ifljfer^.
references: Muller and Altenburg, 1921, Anat. Rec. 20: 213.
Muller, 1935, DIS 3: 29.
phenotype: br^{lmB}/br female is phenotypically *br*. *br′-** male dies. RK2.

origin: Spontaneous.
discoverer: Muller, 19h.
synonym: $l(l)br^b$.
references: Muller and Altenburg, 1921, Anat. Rec. 20: 213.
Muller, 1935, DIS 3: 29.
phenotype: Like $6r^{:"a}$. RK2.

**br*^{h}: broad-short*
origin: Spontaneous.
discoverer: Bridges, 14g20.
references: 1916, Genetics 1: 151.
phenotype: Wings one-half to two-thirds normal length, often arc-like and crumpled. Crossveins closer together than normal and slight plexus effect. Legs gnarled. RK2.

**br^{u}i: broad-unequal wings*
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
synonym: *uq*.
references: 1958, DIS 32: 77.
phenotype: Wings short and very broad, often unequal in length; more extreme at 25°C. Occasionally one wing blistered, or grossly deformed. Thoracic hairs irregularly distributed and sparse. Ocasional abnormality in bristle position or size. Eyes smaller. Viability and fertility good in both sexes, *bruq/br* is wild type. RKl.
other information: One X-ray-induced allele.

**Br: Bridged*
location: 1- (right half; crossing over suppressed to the right of v).
origin: X ray induced.
discoverer: Muller, 2713.
references: 1935, DIS 3: 29.
phenotype: Plexus-like wings, with extra cross-veins bridging logitudinals. L4 bent. Wings arched. Male lethal. RK3A.
cytology: Associated with *In(l)Br*.

Br: see *Sp*
brachymacrachaetae: see *brc*
bran: see a^{ba}
Bran: see a^{Ba}
Branchlet: see *Bt*

**brb; broad abdomen*
location: 1-52.9.
origin: Induced by styrylquinoline (CB. 3086).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 83.
phenotype: Fly with broad abdomen and slightly shortened thorax and wings. Wings frequently slightly divergent. Eyes small and dull red with reflection spots. Bristles slightly shortened and lying flatter on thorax. Males and females viable and fertile. RK2.
other information: One allele induced by CB. 3025.

brc: brachymacrochaetae
location: 1-0.0 (no recombinants with sc among 6746 sons).
origin: Induced by triethylenetnelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 68.
phenotype: One or more thoracic bristles much reduced in size; scutellars and dorsocentrals most frequently affected. Occasional bristles duplicated. Good viability and fertility in both sexes. RK2.
other information: One allele each induced by CB. 3025, by CB. 1246, and by X rays.

**brd: broadened*
location: 1-33.
origin: X ray induced.
discoverer: Muller, 26127.
references: 1935, DIS 3: 29.
phenotype: Wings expanded. Viability 20 percent wild type. RK3.

**bre: bright eye*
location: 1-24.6.
origin: Induced by L~p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 68.
phenotype: Eye color brighter red. Wings shorter, often crumpled or waved. Abdomen disproportionately large. Male viability and fertility good, but females have reduced fertility. Not easily classified. RK3.
other information: One allele induced by CB. 1540.

brevis: see *bv*
bri: bright
location: 2-54.3.
origin: Spontaneous.
discoverer: Nichols-Skoog, 34b23.
references: Beadle and Ephrussi, 1937, Am. Naturalist 71: 91-95.
phenotype: Eye color bright red like en^2 or v2; difficult to separate from wild type. Malpighian tubules pale yellow (Beadle, 1937, Genetics 22: 587-611). RK3.

Bridged; see *Br*
brief: see *bf*
bright: see *bri*
bright eye: see *bre*
Bristle: see *Bl*
Bristled: see *Sp*
broad: see *br*
broad abdomen: see *brb*
broadened: see *brd*
broader wing: see *brw*

bronze: see *sf*[2]
bronzy: see *mal*[bz]
brown: see **few**
brown-like[1]*:* see *red*
brunette: see *Hn*[r2]

6rw:** ***broader wing
location: 1-39.8.
origin: X ray induced.
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 83.
phenotype: Wings broad and rounded at the tips. Males show reduced viability and are sterile. RK3.

**bs: blistered*
location: 2-107.3.
origin: Spontaneous.
discoverer: Bridges, Ilk16.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 155 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 219 (fig.).
phenotype: Wings blistered, small, pointed; venation thick and plexus-like, with branches from and parallel to L5 beyond second crossvein, where there is a semidominant free vein effect. Eye color softened. Temperature sensitive. RK2 at 19°C; RK3 at 25°C.
cytology: Located between 60C5 and 60D2, based on its inclusion within *Df(2R)Px = Df(2R)60B8-10:60D1-2* and within *Df(2R)Px*[2] *= Df(2R)60C5-6;60D9-10* (Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55).
other information: May be part of a pseudoallelic complex with *ba* and Px.

bs*: blistered-2
Edith M. Wallace, unpublished.

bs[2]
discoverer: Bridges, 25k24.
phenotype: More extreme allele of 6s. *bs*[2]*/Df(2R)Px* easily separable from *+/Df(2R)Px,* especially at or below 19°C. Wing effect caused by same mechanism as that of px [Waddington, 1940, J. Genet. 41: 75-139 (fig.)]. RK2.

b$_{S}$*3*
origin: Spontaneous.
discoverer: Swigert, 31d.
synonym: *balloon wing; px*[3id]*;* and px*>«,
references: Plough and Ives, 1934, DIS 1: 33.
1935, Genetics 20: 42-69.
phenotype: Extremely blistered wing. Classification easy in most stocks, + *bs*[3]*/px* + shows wing effect owing to additive semidominance; was originally interpreted to indicate allelism. RK2.

**b*$_{s}$*4*
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 197-221.
phenotype: More extreme allele of *bs.* RK2.
cytology: Salivary chromosomes normal (Hannah).

bs[3 8i]*;* see *bs*>l*

***bs**[52d]
origin: Spontaneous.
discoverer: Strangio.
phenotype: More extreme allele of 6s with variable expression, but wing generally converted to one large blister. Fully penetrant at 20°, 25°, and 30°C; blistering effect most marked at 20°C. RK2.
cytology: Salivary chromosomes normal (Strangio).

bs[54j]
origin: Spontaneous.
discoverer: Mohler, 54j7.
references: 1956, DIS 30: 78.
phenotype: *bs*[S4]*i/bs*[S4]*i = bs*[s]^*i/bs*[2] more extreme and less variable at 25°C than *bs*[2]*/bs*[2]. Viability good in uncrowded cultures. RK2.

***bs**[bl]
origin: Spontaneous derivative of 6s.
discoverer: Goldschmidt, 38i.
synonym: *bs*[3Si].
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 408-9, 416-17.
phenotype: Stronger allele than *bs*[2] but of low viability and fertility. Wing shows very extended web near the crossvein, which reaches margin of wing; above web a blister is formed. RK2.

bscy; blistered-curly
origin: Spontaneous.
discoverer: King and Poulson, 461.
references: Poulson and King, 1948, DIS 22: 54.
phenotype: Heterozygotes show venation abnormalities, with tiny free veins usually in the third posterior cell and occasionally in the second in about 50 percent of males and 90 percent of females. Less often extra veinlets project from posterior crossvein. Homozygotes have bizzare networks of wing veins. Wings of freshly emerged adults inflated with hetnolymph, producing large blister in middle of one or both wings just posterior to the anterior crossvein. Blisters cover one-fourth to one-half of total wing area. Lymph later dries, leaving wing vesiculated and curled upward. Condition more pronounced in females. Flight restricted. *bs*[c]*y/bs*[2] females are like weak *bs°y* and males like *bs*[2]. Viability nearly normal. RK1.

******bsP*
origin: Spontaneous derivative of *bs,*
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zooi. 49: 409-18.
phenotype: Stronger allele than 6®. Sensitive to genetic modification. Females show broad chi-

tinous mass of extra veins; males show extra veins branching from L2. RK2.

**bsPP*

origin: Spontaneous derivative of 6s.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 409-18, 433-39.
phenotype: Stronger allele than *bs.* RK2.
cytology: Frequently associated with short deficiency to the right of 6a (or 6s ?) within *Df(2R)Px2?*
other Information: Claimed by Goldschmidt frequently to recur by mutation in certain lines.

bsc: bent scutellars

location: 1-1.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 68.
phenotype: One or more scutellars bent on themselves in form of inverted V. Other bristles irregularly bent. Eyes slightly smaller. Wings slightly abnormal in shape. Male viability about 50 percent wild type; fertility much reduced. RK3.
other information: One allele each induced by CB. 3025 and CB. 3026.

***Bsl: BlisterIike**

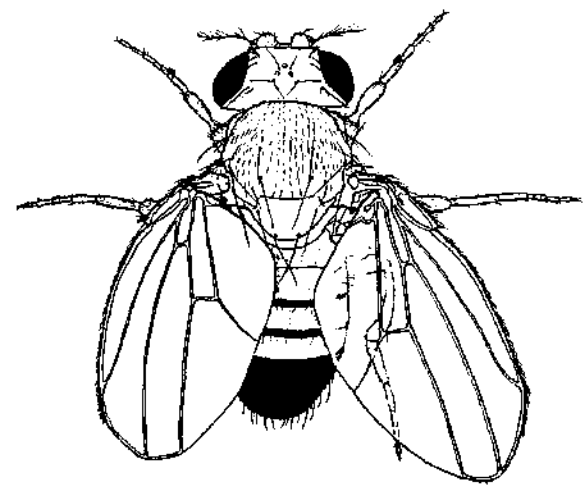
location: 2-104 (but located 3.2 units from *bw* which is at 104.5).
origin: X ray induced.
discoverer: Oliver, 29bl.
references: 1939, DIS 11: 47.
phenotype: Extra veins and blister centering in region of posterior crossvein, which is usually absent. Fluctuation in expression from thickening of veins to blister covering entire wing. Vein L5 may be short. Homozygous lethal. RK3.
cytology: Not done, but Bridges has suggested that this is probably a Plexate deficiency.

bsp: brown spots

location: 2-40.6.
origin: Spontaneous.
discoverer: Di Pasquale.
references: 1959, DIS 33: 128.
Di Pasquale and Zambruni, 1963, DIS 37: 73 (fig.).
1966, DIS 41: 119.
phenotype: Spots of brown pigment appear in integument of *bsp/bsp* females only after they have mated. Di Pasquali and Zambruni (1963) showed that copulation with any male, sterile or fertile, triggers formation of brown spots. Courtship without copulation ineffective; virgin females never show brown spots. No phenotype in males. Penetrance 60—80 percent; viability excellent. RK3.

bt: bent

location: 4-1.4 [mapped in diplo-4 triploids by Sturtevant (1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7)].
origin: Spontaneous. First mutant found on chromosome *4.*
discoverer: MulIer, 1914.
references: 1914, J. Exptl. Zool. 17: 325-36.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 216 (fig.), 219.
Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Wings held out at base and bent sharply backward. Rear legs often lumpy at first tarsal joint. May have one to four "preleg" or "first ventral" bristles on ventral surface of thorax anterior to first pair of legs, in space otherwise devoid of bristles or hairs. Overlaps wild type at 25°C, very much at 19°, and little if any at 29°C (Metz, 1923, Proc. Soc. Exptl. Biol. Med. 20: 305-10). RK2 at 28°C.



bt: bent

From Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 216.

bt^D: bent-Dominant

origin: *X* ray induced.
discoverer: Schultz, 33all.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: When found, bt^D/+ showed regularly divergent wings with some angular bend near base. Legs lumpy at low temperature. Preleg bristles present as in *bt.* Homozygous lethal. RK3 as lethal.
other information: Balanced stocks in existence today show only preleg bristle character and recessive lethality (Lewis).

***Bt: Branchlet**

location: 1- (rearrangement).
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 54.
1951, DIS 25: 77.
phenotype: Heterozygous female has posteriorly directed branchlet on posterior crossvein as well as other extra venation. Abdominal segments often poorly chitinized. Male lethal. RK3A.
cytology: Associated with *Dp(l;l)Bt--- Dp(l;l)3B2-Cl;6F6-7.*
other information: Phenotype may be *Co.*

**bu: bulging*
location: 1-58.
origin: X ray induced.
discoverer: Muller, 2618.
references: 1935, DIS 3: 29.
phenotype: Eyes rough and bulging. Semilethal. RK3.

bv: see *Hn™*

bu-w^{61}): see *vs^{61}i*

Bubble: see *Bb*

bubble wing: see *vs^ij*

buckled: see *bk*

buckledlike: see *bkl*

bul: bulge
location: 3-43.6.
origin: Spontaneous.
discoverer: Spencer, 36d28.
references: 1937, DIS 7: 6.
Curry, 1939, DIS 12: 45.
phenotype: Eyes very large and bulging; facets rounded, in irregular rows, and some quite large. Wing margin heavy; end of wing somewhat squared off to L3. RK3.

bul^{b}P: bulge-bumpy
origin: Spontaneous,
discoverer: E. H. Grell, 1955.
synonym: *bp,*
references: 1955, DIS 29: 72.
phenotype: About one-half the eye surface erupted into irregular yellowish blisters. Facets larger than normal in nonblistered areas. Homozygotes occur with 1 percent of expected frequency. Surviving homozygotes vigorous and male fertility high; females lay eggs abundantly, but only rarely does an egg hatch. RK3.

bulging: see *bu*

**buo: burnt orange*
location: 2-57.1.
origin: Spontaneous.
discoverer: T. Hinton and Kleiner, 1941.
references: Hinton, 1942, DIS 16: 48.
phenotype: Eye color bright orange-brown. Malpighian tubules colorless in larva (Brehme and Demerec, 1942, Growth 6: 351-56). RK2.
other information: Not an allele of *en.* Allelism with *ltd* (2-56) apparently never tested.

bur: burgundy
location: 2-55.7.
origin: Ultraviolet induced.
discoverer: Edmondson and Meyer, 49c.
references: Meyer and Edmondson, 1949, DIS 23: 60.
phenotype: Eye color dull, darkish brown, like *pr;* brilliant orange in combination with en. Classification and viability excellent. Fertility of females good; of males, variable. RK1.
other information: Not allelic to *It, ltd,* or *pr.*

bur2
origin: Spontaneous.
discoverer: Hall, 60h.
references: Meyer, I960, DIS 34: 52.
phanotype: Eye color reddish brown; brilliant orange in combination with en. Good viability. RK1.

burnt orange: see Jbuo

bv: krmvis
location: 3-102.7 (recalculated from Sturtevant, 1956, Genetics 41: 118-23).
discoverer: Bridges, 33e25.
phenotype: Bristles uniformly short and stubby. Body chunky. Hatches late but viability excellent. RK1.

bw: brown
location: 2-104.5.
discoverer: Waaler, 19J15,
references: 1921, Hereditas 2: 391-94.
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eye color light brownish wine on emergence, darkening to garnet. Red pigments lacking; ommochromes at 87 percent normal level (Nolte, 1954, J. Genet. 52: 111-26). Adult testes and vasa colorless. Larval Malpighian tubules pale yellow (Beadle, 1937, Genetics 22: 587-611). Produces white eyes in combination with *v, en,* or *st.* Eye color autonomous when transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). RK1.
cytology: Placed between 59D4 and 59E1 by Bridges [1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55], on the basis of its exclusion from the inner inversion of *In(2LR)bw^l = ln(2LR)21C8-Dl;60Dl-2 + In(2LR)40F;59D4-El* and its inclusion in *In(2R)bw^{v}Oe2 = l$_{n}$(2R)41A-B;59D6-El.* Based on the study of *bw* rearrangements, Slatis (1955, Genetics 40: 5-23) tentatively places *bw* in 59D9, 10, or 11.
other information: Separable into at least two subunits by recombination with *bw* and *bw^{75}* about 0.001 units to the left of *bw*** and *bw^{81}* (Divelbiss, 1961, Genetics 46: 861).

**bw2*
origin: Spontaneous.
discoverer: P. R. Sturtevant, 1921.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 220.
phenotype: Darker and redder than *bw.* RK1.

bw2b
origin: X ray induced,
discoverer: Demerec, 28dl3.
phenotype: Like *bw2.* RKl.

**bw2c*
origin: Spontaneous,
discoverer: Emerson, 32dl9,
phenotype: Like *bw*.* RKl.

*bw**
origin: Spontaneous.
discoverer: Mohr, 31k28.
phenotype: *bw*/bw** is wild type. *bw^{4}fbw^{s}* is purpleoid-like. *bw^{4}fbw* like *bw* but darker. RK3.
other information: 'aw'* originally found in *bw^{4}/bw$* combination and called purpleoid-like. *bw^{4}* and *bw-5* separated by Bridges.

bw5

origin: Spontaneous.
discoverer: Mohr, 31k28.
phenotype: bw^s/bw^4 is purpleoid-like (see bw^4); bw^s/bw is light yellowish brown; $bw^s/+$ is wild type; *bwS/bw** is lethal. RK2A.
cytology: Associated with a deficiency or an inversion involving 59E1 to 59F1 (Schultz).

**bw24*

origin: X ray induced.
discoverer: Slatis, 1950.
references: 1955, Genetics 40: 5-23.
phenotype: Wild type in combination with bw^{S9} and bw^{7S}, but shows intermediate phenotype in combination with *bw* and bw^{ai}. Studied only in males (see *cytology).* RK3A.
cytology: Associated with but presumably separable from *T(Y;2)R24 = T(Y;2)45A;51E.*

***bw37g**

origin: Spontaneous.
discoverer: Clancy, 37g26.
references: 1938, DIS 10: 55.
phenotype: Eye color like *bw* but darker (like bw^2 ?). Produces yellowish pigment in combination with v. RK1.

bw45a

origin: Spontaneous in *In(2L)Cy* 4- *In(2R)Cy, Cy* en^2 sp^2.
discoverer: Ives, 45a.
references: 1945, DIS 19: 46.
Ives and Scott, 1948, DIS 22: 71.
Ives and Evans, 1951, DIS 25: 107.
phenotype: bw^{45a}/bw is brown; bW^{45a}/bw^4 is wild type; therefore bw^{45}* behaves like bw^4. Homozygote has not been tested because bw^{45}* has not been separated from *Cy** RK3A.
other information: Probably occurred simultaneously with or^{45}*.

bw47j

origin: Spontaneous.
discoverer: Ives, 47j.
references: Ives and Scott, 1948, DIS 22: 71.
Ives and Evans, 1951, DIS 25: 107.
phenotype: Brown in combination with *In(2L)Cy* + *In(2R)Cy, Cy* en^2 bw^4** sp^2 or^4**, but wild type in combination with *bw,* bw^{2b}, bw^4, *or* and or^{4*B}. Homozygous normal. RK3.
other information: Several alleles of this type with varying degrees of expression found by Ives in a natural population from South Amherst, Mass.

***bw53i**

origin: Spontaneous,
discoverer: Clancy, 53i.
references: 1960, DIS 34: 48.
phenotype: Intermediate between few and $bw^{37}t$ both alone and in combination with *v.* RK1.

bw59

origin: X ray induced,
discoverer: Slatis, 50fl6.
references: 1951, Dig 25: 75.
1955, Genetics 4Ch 5-23.
phenotype: Homozygote not clearly distinguishable from wild type. Also wild type in combination with bw^{24} and bw^{7s}. Produces a phenotype intermediate between *bw* and wild type in combination with *bw* and *bw^l.* RK3.
other information: Shown to lie to right of *bw* and bw^{7S} by recombination; nonrecombinant reversions recovered from bw^{*9}/hw^{81} (Divelbiss, 1961, Genetics 46: 861).

$bw^{61}i$: see *$vs^{61}J$*

***bw69**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
phenotype: Like *bw.* RK1.
cytology: Salivary chromosomes normal.

***bw72**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Like *bw.* RK1.
cytology: Salivary chromosomes normal.

bw75

origin: X ray induced.
discoverer: Slatis, 50f25.
references: 1951, DIS 25: 75.
1955, Genetics 40: 5-23.
phenotype: Intermediate allele of *bw.* bw^{7*}/bw^{7s} darker than bw^{7*}/bw; about 1 percent of bw^{7*}/bw flies show twin spots in eye. RK1.
other information: Located to the left of bw^{81} and bw^{59} by recombination (Divelbiss, 1961, Genetics 46: 861).

bw81

origin: X ray induced.
discoverer: Slatis, 50hl.
references: 1951, DIS 25: 75.
1955, Genetics 40: 5-23.
phenotype: Intermediate allele; more extreme than bw^{7*}. RK1.
other information: Located to the right of *bw* and bw^{7*} by recombination; bw^{sl}/bw^{59} produces nonrecombinant reversions (Divelbiss, 1961, Genetics 46: 861).

**bw^+21*

origin: Isoallele of *bw* recovered from an X-ray-induced brown-Variegated mosaic.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23,
phenotype: Normal, but gives less pigment in combination with variegating alleles than other bw^+ alleles.
cytology: Salivary chromosomes normal.

bw°: brown-amber

origin: Spontaneous.
discoverer: R. C. King, 48fl5.
references: Poulson and King, 1948, DIS 22: 54.
phenotype: Eye color light brownish yellow. Adult testes and vasa colorless. Larval Malpighian tubules slightly paler yellow than wild type. *bW/bw* gives eye color slightly lighter than *bw.* RK1.

bw^A*: *brown-Auburn
origin: X ray induced.
discoverer: Dubinin,
synonym: *A;* Pm^'.
references: Dubinin and Heptner, 1935, J. Genet. 30: 423-46 (fig.).
Dubinin, 1936, Biol. Zh. (Moscow) 5: 851-74.
phenotype: Nearly uniform brown, but with extra *Y* chromosome shows strong variegation. Homozygote usually lethal. RK1A.
cytology: Associated with *In(2R)bw^A* = *In(2R)41;59D.*

bw^AD*: *brown of A. Das
origin: Spontaneous.
discoverer: Das, 63a7.
synonym: *bw^3^.*
references: Sarkar, 1963, DIS 38: 28.
phenotype: Eye color light brown, darkening with age. RK1.

bw^CB*: *brown-Chester Beatty
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Reddi.
references: 1960, DIS 34: 53.
phenotype: Lethal allele of *bw.* RK2.
cytology: Salivary chromosomes normal (Slizynska).

bw^D*: *brown-Dominant
origin: Spontaneous.
discoverer: T. Hinton, 1940.
references: 1940, DIS 13: 49.
1942, DIS 16: 48.
Slatis, 1955, Genetics 40: 246-51.
phenotype: Eye color varies with age from purple to brown. Shows slight variegation in combination with *st* (Slatis, 1955). Wings pebbled. Variegation suppressed by extra *Y* chromosomes (Brosseau, 1959, DIS 33: 123). Homozygote viable and fertile. Larval Malpighian tubules bright yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1A.
cytology: Shultz reports an extra band in 59E that tends to pair with a band in the homolog, suggesting a duplication of one band from 59E. Slatis (1955) reports insertion of three or four bands, probably of heterochromatic origin. Reverts to wild type when extra bands separated from *bw* locus (Hinton and GoodSmith, 1950, J. Exptl. Zool. 114: 103-14).

few58; *brown* of Meyer**
origin: Spontaneous.
discoverer: Meyer, 58k.
references: 1959, DIS 33: 97.
phenotype: Intermediate allele. Reddish brown eyes (like *g)* of somewhat reduced size. May overlap wild type in old crowded cultures. Testis sheath light yellow in young but dark in old males. Good viability and fertility. RK2.

b_wMiS9*: *brown of Mischaikow
origin: Spontaneous.
discoverer: Mischaikow, 59e.
reference*: 1959, DIS 33: 97.
phenotype: Like *bw* except testis sheath pale yellow in older males. Gives some pigmentation of eyes in combination with v. RK1.

by/R3: *brown-Rearranged*
origin: X-ray-induced derivative of *bw.*
discoverer: Slatis, 48kl6.
references: 1955, Genetics 40: 5-23.
phenotype: Heterozygotes with $6w^+$ strongly variegated. Homozygous lethal; lethal or semilethal in combination with other *bw* rearrangements. RK1A.
cytology: Associated with *In(2LR)bw^R3* = *In(2LR)40F;51F;55E;57E;58D8-9.*

b_wR4
origin: X-ray-induced derivative of *bw.*
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Expression in *bw^R4*/+ varies from moderate to strong, depending on origin of *bw.* Homozygote brown and almost completely lethal. RK1A.
cytology: Associated with *T(2;3)bw^R4* = *T(2;3)S9B2-3;80-81.*

**b_wR 7 2*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
phenotype: Weakly mottled in *bw^R12*/+ heterozygote; *bw^R12* homozygote somewhat more extreme. Homozygote semilethal. RK1A.
cytology: Associated with *T(2;3)bw^Rl2* = *T(2;3)59D;80C.*

bwR14
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate. Homozygous lethal. RK1A.
cytology: Associated with *T(2;3)bw^Rl** – *T(2;3)59E2-3;80.*

bwR15
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate. Homozygote lethal. RK1A.
cytology: Associated with *T(2;3)bw^Rl$* – *T(2;3)59D;80C.*

bwR18
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate. Homozygotes lethal. RK1A.
cytology: Associated with *ln(2)bw^Rl^a* = *In(2)40F-41A;59E4-Fl.*

'bwR20
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation weak. Homozygote lethal. RK2A.

cytology: Associated with *In(2LR)bw^{R2}* = *In(2LR)40D;59D5-6.*

%$_{W}$R2S

origin: X-ray-induced derivative of *bw.*
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation not described. Homozygote like *bw.* RK2A.
cytology: Associated with *T(2;4)bw^{R25}* = *T(2;4)59D;101E.*

***bwR27**

origin: X-ray-induced derivative of *bw.*
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate; brown in combination with *bw.* RK1A.
cytology: Associated with *T(Y;2)bw^{R27}* = *T(Y;2)59D11-E1.*

***bwR32**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
phenotype: Variegation intermediate to slight. Homozygote shows extreme variegation and reduced viability. RK1A.
cytology: Associated with *In(2R)bw^{R32}* = *In(2R)41A;59D.*

**by,R33*

origin: X ray induced.
discoverer: Slatis, 5CM16.
references: 1955, Genetics 40: 5—23.
cytology: Associated with *Ia(2R)bw^{R}33* = *In(2R)41;59D'E.*

***bwR35**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate to slight; homozygotes show more extreme variegation and reduced viability. RK1A.
cytology: Associated with *In(2)bw^{R}35* = *In(2)4QF-41A;59Dl1-E1.*

***bwR40**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
phenotype: Shows slight dilution of eye pigment in *bw$^{R4°}$f*+ heterozygote. Homozygote presumably lethal. RK2A.
cytology: Associated with *Dl(2R)bw^{R}40* = *Df{2R)59C5~6;59E2-3.*

***bwR45**

origin: X-ray-induced derivative of *bw.*
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
pfoeno*ype: Variegation of *bw^{R}4$*/+ slight. Homoxygote lethal. RK2A.
cytology: Associated with *In(2)bw^{R45}* = *ln(2)4QF-41A;59E3-4.*

***bwR47**

origin: X ray induced.
discoverer: Slatis, 5CM16.
references: 1955, Genetics 40: 5—23.
phenotype: Variegated in heterozygotes with *bw^{+};* strongly variegated in homozygotes, and in heterozygotes with *bw* and other variegated browns. Homozygotes show melanotic clots of dried hemolymph. RK1A.
cytology: Associated with *In(2)bw^{R}47* = *In(2)40-41;59DU-El.*

***bwR50**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
cytology: Analysis incomplete; one break at 59D2-3.

**b*wR *55*

origin: X ray induced.
discoverer: Slatis, 50d23.
references: 1955, Genetics 40: 5—23.
phenotype: *bw^{RS5}*/+ and *bw^{R}55/bw* usually show small amounts of variegated eye tissue; but occasionally entire eye nearly lacks red pigment. Homozygous lethal. RK1A.
cytology: Associated with *In(2LR)bw^{RSS}* = *In(2LR)24El-D;42E* + *In(2R)40F-41A;59D4-5.*

***bwR56**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation intermediate in heterozygote, extreme in homozygote. RK1A.
cytology: Associated with *In(2)bw^{R}S6* = *In(2)40F-41A; 59D-E.*

***bwR57**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation weak in heterozygote. RK2A.
cytology: Associated with *T(Y;2)bw^{RS7}* = *T(Y;2)59D5-6.*

***bwR58**

origin: X ray induced.
discoverer: Slatis,
references: 1955, Genetics 40: 5—23.
phenotype: Variegation in heterozygote weak. Homozygote lethal. RK1A.
cytology: Associated with *T(2;3;4)bw^{R}S8* = *T(2;3;4)59D;65;101C.*

***bwR67**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Variegation in heterozygote moderate to strong. Homozygote lethal. RK1A.
cytology: Associated with *In(2)bw^{R}67* = *In(2)40F'41A;59E4-Fl.*

***bwR68**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
phenotype: Like *bw.* RK1A.

cytology: Associated with complex rearrangement with one break near 58F; mutation and rearrangement presumably independently induced.

***bw^{R73}**

origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
cytology: Associated with *In(2)bw^{R73} = In(2)40F-41A;59E4-Fl.*

***bw^{R79}**

origin: X ray induced.
discoverer: Slatis, 50g26.
references: 1955, Genetics 40: 5-23.
phenotype: Strongly variegated in combination with either *bw* or *bw^{+}*. Homozygous lethal and lethal or semilethal with most other brown-Variegateds. RK1A.
cytology: Associated with **In(2)bw^{R79} =** *ln(2)40F-41A;59F2-3.*

bw^{V1}: *brown-Variegated*

origin: X ray induced.
discoverer: Muller, 1929.
synonym: *Pm; Plum.*
references: 1930, J. Genet. 22: 299-334 (fig.).
Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Eye color like *bw* or *pr,* mottled with darker spots that deepen in red color with age. With sf or v, has pale orange ground with dark orange spots. Extra *Y* chromosome, as with other variegated browns, suppresses brown color, giving red eye sparsely speckled or splotched with darker spots. Larval Malpighian tubules normal (Glass, Brehme). Generally lethal homozygous and in combination with other brown-Variegateds. Heterozygotes fully viable and fertile. RK1A.
cytology: Associated with *In(2LR)bwV^{1} = In(2LR)21C8-Dl ;60Dl-2 + In(2LR)40F;59D4-El* (Schultz and Bridges).

***bwV2**

origin: X ray induced.
discoverer: Harris, 1929.
synonym: *Discolored.*
references: Muller, 1930, J. Genet. 22: 299-334 (fig.).
Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
phenotype: Eye color similar to *bw^{vl},* but less purplish, v, *bw^{v}2* has yellower ground color and browner spots than *bw^{vi}; st.* Homozygote nearly always lethal. Malpighian tubules of larvae normal (Glass, Brehme). RK1A.
cytology: Not studied. Shown genetically to be associated with *In(2R)bw^{v}*2.

bwV3

origin: X ray induced,
discoverer: Muller, 1929.
synonym: *Tarnished.*
references: 1930, J. Genet. 22: 299-334 (fig.).
Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
phenotype: Eye color like *bw^{vi}* but with browner ground and numerous discrete very dark granular spots; more variable. Larval Malpighian tubules normal (Glass, Brehme). Homozygote generally lethal. RK1A.
cytology: Associated with *T(2;3)bwV3.*

bwV*

origin: X ray induced.
discoverer: Patterson, 1929.
synonym: *Rosy.*
references: Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
phenotype: Eye color yellow-brown ground with numerous dark granular spots. Homozygous lethal in 95 percent of cases; survivors have pale rose-brown eye color with few darker spots, which change to white and yellowish in combination with *st.* Larval Malpighian tubules normal (Glass, Brehme). RK1A.
cytology: Associated with *T(2;3)bwV4$_{4}$*

bwV5

origin: X ray induced.
discoverer: Patterson, 1929.
synonym: *143a.*
references: Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
phenotype: Like *bw^{v}3* and *bw^{v}** but browner ground color. Rare homozygous survivors. Larval Malpighian tubules normal (Glass, Brehme). RK1A.
cytology: Associated with *T(2;3)bwV5$_{w}$*

***bwV6**

origin: X-ray-induced derivative of *bw.*
discoverer: Moore, 1929.
synonym: *A34.*
references: Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
phenotype: Like *bxvVS.* RK1A.
cytology: Associated with *T(2;3)bw^{v}6.*
other information: Lost by reversion.

***bwV7**

discoverer: Winchester, 1932.
phenotype: Eye color like *bw^{vs}.* Homozygote moderately viable; eye color of pale rose-brown ground with few spots. RK1A.
cytology: Associated with *In(2R)bw^{v}7*

***bwV8**

origin: X ray induced,
discoverer: Levy, 1932.
references: 1935, DIS 3: 7.
phenotype: Like *bwV^.* RK1A.
cytology: Associated with *T(2;3)bw^{V8}.*

bwV291

origin: Radium induced.
discoverer: Van Atta, 291.
synonym: *Cream; Dilute-1.*
references: Hanson and Winkelman, 1929, J. Heredity 20: 277-86.
Van Atta, 1932, Genetics 17: 637-59.

phenotype: Like *bwVl,* RK1A.
cytology: Associated with *In(2LR)bv/V29l,*

$*b_wV30a$

origin: X ray induced.
discoverer: Oliver, 30a.
phenotype: Almost homogeneous brown eye color. RK3(A).

b_wV30k1

origin: X ray induced.
discoverer: Van Atta, 30kl.
synonym: *Dilute-2.*
references: 1932, Genetics 17: 637-59.
phenotype: Like *bwVl.* RK1A.
cytology: Associated with *In(2LR)bw^{V30k}*-.

$b_wV3Okl0$

origin: X ray induced.
discoverer: Van Atta, 30kl0.
synonym: *Dilute-3.*
references: 1932, Genetics 17: 637-59.
phenotype: Eye color blotched heavily with large patches of red and brown. Homozygous lethal. RK1A.
cytology: Associated with *In(2R)bwV3Okio%*

$*b_wV30kl2$

origin: X ray induced.
discoverer: Van Atta, 30kl2.
synonym: *Dilute-4.*
references: 1932, Genetics 17: 637-59.
phenotype: Eye color mostly red with a sprinkling of spots and facets of brown, appearing as dark spots. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)bwV30kl2,*

bwV30k13

origin: X ray induced.
discoverer: Van Atta, 30kl3.
synonym: *Dilute-5.*
references: 1932, Genetics 17: 637-59.
phenotype: Eye color mostly red with brown spotting. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)bwV30kl3,*

bwV30k18

origin: X ray induced.
discoverer: Van Atta, 30kl8.
synonym: *Dilute-6.*
references: 1932, Genetics 17: 637-59.
phenotype: Eye color mostly red with sprinkling of dark (brown) facets. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3;4)bwV30kl8$_w$*

bwV32g

origin: X ray induced.
discoverer: Dobzhansky, 32g6.
synonym: *Pm^2.*
references: Schultz and Dobzhansky, 1934, Genetics 19: 344-64.
Schultz, 1936, Proc. Natl. Acad. Sci. U.S. 22: 27-33.
phenotype: Dominant eye color like brown but flecked with darker spots. Shows 18 percent normal red pigment and 88 percent normal brown pigment (Nolte, 1954, J. Genet. 52: 127-39). *bw^v32t/bw* is like *bw* with very few spots. *$t,_wV32g/_+$* j_S easily separable from wild type except in the presence of an extra *Y.*

bwV32e/lt

shows variegation for light (Schultz, 1936). Viability excellent. Homozygous lethal except for rare survivors with light eye color and somatic abnormalities. Larval Malpighian tubules somewhat lighter than wild type but not useful in classification (Brehme and Demerec, 1942, Growth 6: 351-56). RK1A.
cytology: Associated with *In(2LR)bw^v32g = In(2LR)40F;59E.*

bwV34k

origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Oliver, 34k22.
synonym: *Var34k22,*
references: 1937, DIS 7: 19.
phenotype: Eye color nearly homogeneous brown, slightly mottled. Larval Malpighian tubules normal (Glass, Brehme). RK1A.
cytology: Associated with *In(2R)bw^{v34k} = In(2R)41;59E,* which carries as an included inversion *In(2R)Cy = In(2R)42A2-3;58A4-Bl.*

$*b_wV40b$

origin: X ray induced.
discoverer: T. Hinton, 40b.
references: Atwood, 1942, DIS 16: 47.
phenotype: Eye light brown with some darker variegation. Homozygous lethal. RK1A.
cytology: Associated with *ln(2R)bw^v40b = In(2R)41A-B;59D-E.*

bwV54a

origin: Gamma ray induced.
discoverer: Mickey, 54a6.
references: 1963, DIS 38: 29.
phenotype: Variegated for *bw.* RK1A.
cytology: Associated with *In(2R)bw^{v54a} = Jn(2R)41A-B;59D4-9.*

$*b_wV54b$

discoverer: Mickey, 54bl2.
references: 1963, DIS 38: 29.
phenotype: Variegated for *bw.* RK1A.
cytology: Associated with *In(2R)$bw^{v54t>}$ = In(2R)41A;60D9-ll.*

$*b_wV54c$

origin: Neutron induced.
discoverer: Yanders, 54c5.
references: Mickey, 1963, DIS 38: 29.
phenotype: Variegated for *bw.* RK1A.
cytology: Associated with *In(2R)bw^{V54c} = In(2R)41;59El.*

bwV57e

origin: X ray induced in *In(2LR)SMl, al^2 Cy en^2 sp^2.*
discoverer: E. H. Grell, 57e.
references: Hochman, 1961, DIS 35: 85—86.
Welshons, 1962, Genetics 47: 743-59.
phenotype: Eyes brown and mottled. Viability of *$bw^vS7e_{/bw}vl$* about 40 percent at 26°C and 20 percent at 23.5°; body tends to be small, wings divergent and often not expanded; patches of unpigmented microchaetae. RK2A.
cytology: Salivary chromosomes not examined, but likely that *bw^{VS7e}* is the result of a rearrangement superimposed on *SMI.*

bw^VD: brown-Variegated Dichaete linked
origin: X ray induced.
discoverer: Oliver, 29k24.
synonym: *Ic D.*
references: 1932, Z. Induktive Abstammungs-Vererbungslehre 61: 447-88.
phenotype: Like *bw^vl*, but redder and more variable. Homozygous lethal, but not lethal in combination with other brown-Variegateds. RK2A.
cytology: Associated with *T(2;3)bwVE>%*
other information: Irradiated third chromosome carried *D.*

bwVDe* I; *brown-Variegated* of *Demerec
origin: X ray induced.
discoverer: Demerec, 33i28.
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Eye color variegated brown and red; extreme dominant brown with pebbled wing. Lethal when homozygous and in combination with *bw**. RK2A.
cytology: Associated with *In(2R)bwV^el – In(2R)41 B2-Cl;59E2-4.*

bw^VD•2
origin: X ray induced.
discoverer: Demerec, 33J14.
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Eye color mosaic of brown and dark brown patches. RK2A.
cytology: Associated with *In.(2R)bw^VDf>2 – In(2R)41A-B;59D6-El.*

bw^VD•3
origin: X ray induced.
discoverer: Demerec, 33jl4.
phenotype: Eye color variegated brown and red. In *bw^VDe3/bw^5*, wings fail to expand; joints and sutures weak with melanotic clots. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)bw^vE>^e3 = T(2;3)59D;81F.*

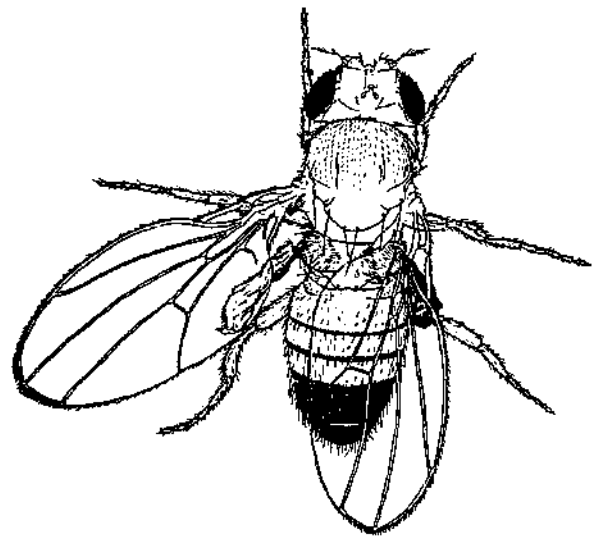
bw^VD•4
origin: X ray induced.
discoverer: Demerec, 33k22.
phenotype: Eye color red with brown spots; *bwVDe4/bw* and *X/0; bwVDe4/+* are brown. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)bw^vDe4 – T(2;3)59D2~4;80.*

****bwVh brown-Variegated of Ives***
origin: Spontaneous.
discoverer: Ives, 38113.
references: 1950, DIS 24: 58.
phenotype: Like *bw^D*. RKlA.
cytology: Associated with *ln(2R)bw^vl – In(2R)41A;59D* (T. Hinton).

****bw-b: brown-b***
location: 3- (between 97.0 and 104.2).
origin: X ray induced.
discoverer: E. L. Smith, 34f.
references: Robertson, 1935, DIS 4: 15.
Smith and Robertson, 1938, Genetics 23: 167.
phenotype: Like *bw* in young flies but much darker than *bw* in old individuals. RK1.
other information: Apparently never tested for allelism with ca (3-100.7).

bw-l:* see *red

****bwl: bow-legged***
location: 1-21.9.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 83.
phenotype: Poorly viable with shorter divergent wings. Bristles thinner and shorter. Legs shortened and either femur or tibia, or both, bow-shaped. Males sterile. RK3.



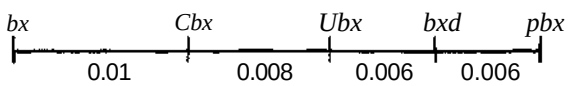
bx: bithorax
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Pubi. No. 327: 152.

bx: bithorax
location: 3-58.8.
discoverer: Bridges, 15i22.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 137, 152 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 79, 214 (fig.).
Lewis, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (fig.).
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: Anterior half of metathorax becomes mesothoracic and posterior half remains unchanged. This results in the appearance, between the scutellum and the first abdominal segment, of rudimentary anterior mesothoracic elements (i.e., mesonotum and scutellum), with the proper bristles and hairs. Balancers directed ventrally, enlarged, vesiculate or winglike, with typical but rudimentary wing venation and bristles. Metathoracic tibia has a mesothoracic tibial bristle. Variable, overlapping wild type at 25° and more so at 19°C. Dorsal metathoracic disk of mature larva is 60 percent larger than wild type ŧChen, 1929, J. Morphol.

47: 135—99 (fig.)]. Thoracic musculature studied by El Shatoury [1956, J. Embryol. Exptl. Morphol. 4: 228—39 (fig.)] and Pantelouris and Waddington [1955, Arch. Entwicklungsmech. Organ. 147: 539—46 (fig.)]. Bristle patterns studied by Waddington (1962, New Patterns in Genetics and Development. Columbia University Press). Slight expression in combination with bw^{34e} and bw^{w} (Hollander, 1937, DIS 8: 77), and no interaction as *trans* heterozygote with *bxd* or *Vbx* (E. B. Lewis). RK3.

cytology: Located close to if not within the 89E1-2 doublet (Lewis, 1951).

other information: The leftmost member of a pseudoallelic series including from left to right, *bx, Cbx, Ubx, bxd,* and *pbx.*



Map of the *bx* region
From Lewis, 1963, Am. Zoologist 3: 33-56.

bx^3

origin: Spontaneous.
discoverer: Stern, 25b2.
references: 1935, DIS 3: 29.
Lewis, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (fig.).
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: Extreme expression of 6x metathoracic effect. Little variability. Viability low but can be maintained homozygous. Balancers enlarged in heterozygote. Interactions with other *bx* pseudoalleles described by Lewis (1951, 1955, 1963). Almost completely suppressed by $su(Hw)^2$. RK3.

bx^{34e}

origin: Spontaneous.
discoverer: Schultz, 34e20.
references: 1935, DIS 4: 6.
Lewis, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74.
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: Metathoracic outpushing is a uniform, narrow hairy band. Balancers depressed, inflated, with elongated pointed tip and heavy line of costal bristles. Base of third leg shows sternopleural bristles like those of normal second leg. Metathoracic development of bx^{34e}/bx^{340} > *bx3«»/bx*^{w}> *bx34°/bx* (Hollander, 1937, DIS 8: 77). *bx^4e/Ubx* has round, flat, winglike halteres; *bx^4e i/bx/+ + = Ubx/+* (Lewis). Complements *hxd.* Reasonable viability and fecundity. Highly constant expression and easy separability. Expression increased slightly at 29°C, decreased at 15°C (Villee, 1943, Anat. Record 87: 475). RK2.

bx^{51i}

origin: Spontaneous.
discoverer: Gunson.
references: 1952, DIS 26: 63.
phenotype: Penetrance 0.5 percent at 16°, 1 percent at 20°, and 29 percent at 25°C. RK3.

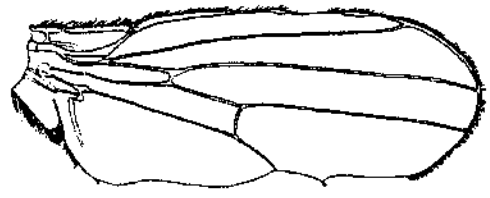
$bx^{D>}$: see *Ubx*

bx^{w}: *bithorax*-W/scons/n

origin: Spontaneous; recovered in one third chromosome of the female in whose other third chromosome *Ubx* was first recovered.
discoverer: Hollander, 1934.
references: 1937, DIS 8: 8, 77.
phenotype: Metathorax developed more than any other *bx* allele and strongly bristled. Halteres directed ventrally, large, flat, and winglike, with veins and bristles. Mesothorax shows clear stripe or bifida condition. Wings usually spread, often dragging. Sternopleural and tibial and ventral bristles of third leg resemble those of normal second leg. bx^{w}/bxd = +. Viability and fertility fair. RK2.

fix; *Beadex*

location: 1-59.4.
origin: Spontaneous.
discoverer: Bridges, 23a3.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 219.
Green, 1953, Genetics 38: 91-105 (fig.).
phenotype: Male and homozygous female with Beaded-like wings; long and narrow and excised along both margins. Male and homozygous female fully viable. Heterozygous female less extreme and overlaps wild type. Some venation abnormality. Development studied by Goldschmidt [1935, Biol. Zentr. 55: 535-54 (fig.)]. According to Waddington (1940), embryological effect is same as that of *vg.* RK2 (RK3 as Sx/+).
cytology: Locus in salivary region 17A, B, or C, based on limits of $Dp(l;l)Bx^{r49k}$ (E. B. Lewis). Salivary chromosomes of Bx normal. (Lewis).



Bxh Beadex-2
Edith M. Wallace, unpublished.

Bx^2

origin: Spontaneous.
discoverer: Mohr, 24129.
references: 1927, Nyt Mag. Natur 65: 265—74.
Green, 1953, Z. Induktive Abstammungs-Verebungslehre 85: 435—49.
phenotype: Wings of males and homozygous females narrowed by marginal excision. Wings often bubbly and ragged. Homozygous female fully viable.

Bx^2/+ less extreme; overlaps wild type. Classifiable in a single dose in triploids (Schultz, 1934, DIS 1: 55). RK1 (RK3 as *Bx2/+).*

Bx^3

origin: Spontaneous.
discoverer: Gershenson, 1927.
references: Gaissinovitsch and Gershenson, 1928, Biol. Zentr. 48: 385-87 (fig.).
phenotype: Extreme allele usually without the bubbles in the wing. Shortened L5 a constant character (few Bx^2 show this). Wings more pointed than Bx^2 and hairs at tip of wing clumped. Scalloping visible in prepupal wing bud [Waddington, 1940, J. Genet. 41: 75-139 (fig)], Bx^3/+ fully separable. RK1.

***Bx^{59h}**

origin: Spontaneous.
discoverer. T. J. Lee, 59h.
references: 1964, DIS 39: 60.
phenotype: Like *Bx.* RK2.

****Bx^c: Beadex of Catcheside***

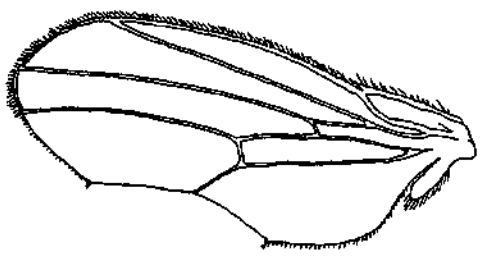
origin: Spontaneous.
discoverer: Catcheside, 39c3.
references: 1939, DIS 12: 49.
phenotype: Posterior wing margin excised as far as and including most of L5; end of wing notched and anterior margin weakly excised. Wings blistered, especially basally. *BxC/+* is like *Bx^Y.* RK1.

Bx-I: Beadex of Jollos

origin: Induced by heat treatment.
discoverer: Jollos, 1930.
synonym: *Ptd: Pointedoid.*
references: 1933, Naturwissenschaften 21: 831—34.
Gottschewski, 1935, DIS 4: 7, 14, 16.
Jollos and Waletsky, 1937, DIS 8: 9.
phenotype: Wings reduced to slender strip; only posterior cell present at tip. Femur shortened or legs otherwise abnormal, especially third pair. Homozygous female viable. Interacts with *bi* to give more nearly normal wings. Embryology like *Bx* [Goldschmidt, 1935, Biol. Zentr. 55: 535-54; Waddington, 1940, J. Genet. 41: 75-139 (fig.)]. RK1.

Bx^r: Beadex-recessive

origin: Spontaneous.
discoverer: Ives, 35k.
references: 1937, DIS 7: 6.
Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 949-53.
1953, Genetics 38: 91-105 (fig.).
phenotype: Bx^r/+ is normal. Male and homozygous female show less extreme narrowing of wings than *Bx.* Anterior crossvein short and thickened and that region blistered. May overlap wild type in old crowded cultures at 25°, more extreme at 19°C. RK3A.
cytology: Associated with $Dp(t;l)Bx^r$ ~ *Dp(l;l)17A;17E-F* (Green, 1953, determined by E. B. Lewis).
other information: $Bx/Dp(l;l)Bx^r$ produces recombinants of genotype Bx^+Bx and $BxBx^+$, which are more extreme than *Bx.* Same holds for $Bx^2/Dp(l;l)Bx$*.



Bx^9k: Beadex-recessive 49k

From Green, 1953, Z. Induktive Abstammungs-Vererbungslehre 85: 435-49.

Bx^{r49k}

origin: Spontaneous.
discoverer: Mossige, 49k22.
synonym: Bx^{l2}.
references: 1950, DIS 24: 61.
Green, 1953, Z. Induktive Abstammungs-Vererbungslehre 85: 435-49 (fig.).
phenotype: Slight scalloping of posterior wing margin only; overlaps wild type. RK3A.
cytology: Associated with $Dp(l;l)Bx^{rJ}$*9k ~ *Dp(l;l)17A;17C* (E. B. Lewis).
other information: This duplication undergoes unequal crossing over readily and forms triplications and quadruplications. Duplication is recessive; triplication is dominant. Phenotypic interaction with Bx same as for Bx^T.

hxd: hithoraxoid

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 225.

bxd: bithoraxoid

location: 3-58.8.
origin: Spontaneous.
discoverer: Bridges, 19127.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 225 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 214 (fig.), 219.
Lewis, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (fig.).
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: Posterior portion of metathorax becomes mesothoracic; anterior metathorax unaffected. Enlarged metathoracic postnotum forms two wedges of tissue, devoid of hairs and bristles, meeting at the mid-dorsal line. Balancers enlarged into circular disks that are cupped and bent downward and show venation but are bare of bristles except for weak ones at rear margin. Stalk of balancer wide and flat. First abdominal segment shows thoracic modification (modification of anterior portion is metathoracic-like, posterior portion is partially mesothoracic-like). Rudiments of a first pair of abdominal legs and, in certain combinations, of partially wing-like first abdominal halteres may occur. Interactions with other bithorax pseudoalleles described by Lewis (1951, 1955, 1963). RIG.
cytology: Locus probably 89E3-4 (E. B. Lewis).

bxd[100]

origin: X ray induced.
discoverer: E. B. Lewis.
references: 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74.
phenotype: More extreme bithoraxoid phenotype than bxd. RK2A.
cytology: Associated with *Tp(3)bxdi00 – Tp(3)66C;89B5-6;89E2'3*. *bx*$^{+}$ but not *bxd* included in transposed section.

***bxd[101]**

origin: X ray induced in ss *bx Su(ss)*^{2}.
discoverer: E. B. Lewis,
phenotype: Like *hxd*O°*. RK2A.
cytology: Associated with *T(3;4)89E = T(3;4)89E2-3;101F*.

bxd[110]

origin: X ray induced in *pP bx sr e*^{a}.
discoverer: E. B. Lewis.
phenotype: Like *bxd*^{10}®. RK2A.
cytology: Associated with *Tp(3)bxd*$^{11(}$*> = Tp(3)89E2-3;91C7-Dl;92A2-3*.

bxd[121]

origin: X ray induced.
discoverer: E. B. Lewis.
references: 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74.
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: *hxdm/bxd* shows infrequent development of abdominal wing-like halteres as well as abdominal legs. RK2.

hxd>:* see *Vbx*

**Bxd: Beadnxoid*

location: 1-45.
origins Spontaneous.
dlscov»r«r: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 507, 520.
phenotype: Like a strong Bx. RK2.

Bxl: see *Ubx*

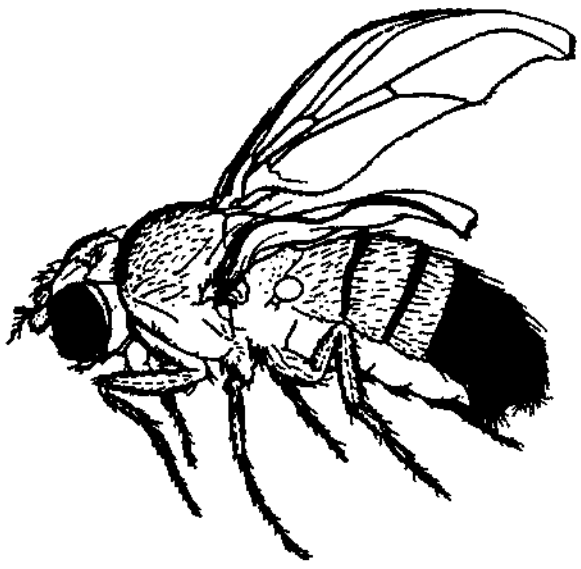
by: blistery

location: 3-48.7.
origin: Spontaneous.
discoverer: Glass, 33a.
references: 1934, DIS 2: 8.
phenotype: Wings blistered in subterminal region, and wing surface dusky and warped. Thorax humpy. RK1.

**by46h*

origin: Spontaneous.
discoverer: Ives, 46hl5.
references: 1948, DIS 22: 53.
phenotype: Like *by* but without thoracic effect. RK1.

hi: see *mal*^{bz}



c; *curved*

From Bridges and Morgan, 1919, Carnegie Inst. Wash. Pubi. No. 278: 165.

c: *curved*

location: 2-75.5.
origin: Spontaneous.
discoverer: Bridges, 11124.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 164 (fig.)-
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 211 (fig.).
phenotype: Wings thin textured, divergent, uplifted at base, and curved downward throughout their length. RK1.

**C"K: Curved of Krivshenko*

location: 2- or 3- (rearrangement).
origin: X ray induced,
discoverer: Krivshenko, 5513.
references: 1956, DIS 3th 74.
synonym: *C*^{K}.

phenotype: Wings are thin textured, slightly divergent, uplifted basally, and then curved downward. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)C-K = T(2;3)52;76;81;86.*

C( ): Crossover suppressor

The terminology originally used for dominant suppressors of crossing over. These effects were found to be rearrangements and are so treated here. The symbol C in this context has been dropped except where included under synonymy.

****c(l)a:* recessive crossover *suppressor for chromosome1***

location: One factor in *X* and probably several autosomal modifiers,
origin: Spontaneous.
discoverer: Bridges, 1916.
references: Bonnier, 1923, Hereditas 4: 81—110. Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 220.
phenotype: Reduces recombination between v and *f* from 23 to 15 percent and between *w°* and v from 31 to 10 percent. *c(l)a* was probably the cause of a secondary nondisjunction frequency of 15—30 percent. RK3.
other information: Validity of phenotypic description seems dubious.

C(2)R: see *In(2R)NS*
C(2;3): see *In(2L)t*
C(2L)HR: see *In(2L)t*
C(2L)T: see *ln(2L)t*

***c(3)G: recessive* crossover *suppressor in chromosome 3 of* Gowen**

location: 3-57.4 (1.0 to the left of *sbd*^{2}, 4.0 to the right of *cv-c).*
origin: Spontaneous,
discoverer: Gowen and Gowen, 1917.
synonym: ex (Gowen, 1928, Proc. Natl. Acad. Sci. U.S. 14: 475-77).
references: 1922, Am. Naturalist 56: 286-88. 1932, Proc. Intern. Congr. Genet., 6th. Vol. 2: 69-70. 1933, J. Exptl. Zool. 65: 83-106.
phenotype: In homozygous females, crossing over in entire chromosome complement reduced to a small fraction of normal. Production of triploids and intersexes 300—500 times normal. Nondisjunction increased; egg hatching very low, probably owing to aneuploid zygotes. Core structures characteristic of electron microscope preparations of normal oocyte nuclei absent in *c(3)G/c(3)G* oocytes (Meyer, 1964, Proc. Eur. Reg. Conf. Electron. Microscop. 3rd, pp. 461—62). Somatic crossing over normal (Le Clerc, 1946, Science 103: 553-54). Increased recombination observed in *c(3)G/+* females (Hinton, 1962, Genetics 47: 959; 1966, Genetics 53: 157—64). Meiosis in males not affected. RK3.
cytology: Included within *Df(3R)sbd*05 = D((3R)88F9-89Al;89B4-5* (Lewis, 1948, DIS 22: 72-73).

C2L: see *ln(2L)NS*
C3: see *In(3R)C*
CHL: see *In(2L)NS*
CIIIRE: see *In(3R)C*

co: *claret*

location: 3-100.7.
origin: Spontaneous.
discoverer: Bridges, 19112.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 219 (fig.).
phenotype: Eye color ruby. Red and brown pigments 27 and 29 percent of normal levels, respectively (Nolte, 1955, J. Genet. 53: 1-10). With *en,* eye color is deep reddish yellow; with *bw,* translucent brownish yellow (Mainx, 1938, Z. Induktive Abstammungs- Vererbungslehre 75: 256—76). Larval Malpighian tubes colorless (Beadle, 1937, Genetics 22: 587—611). Eye color autonomous when larval optic disk from ca is transplanted into wild type or v. Wild-type disk in ca not entirely autonomous (Beadle and Ephrussi, 1936, Genetics 21: 230); *ca* flies produce less v^{+}substance than wild type (Clancy, 1942, Genetics 27: 417-40). Slightly narrow body and pointed wing. RK1.
cytology: Judged to be in 99C-E, based on *In(3R)ca*^{v} *= In(3R)81F;99C-B* (E. B. Lewis).

co2

origin: Spontaneous in *In(3R)P = In(3R)89C2-3; 96A18-19.*
discoverer: Bridges, 32f22.
phenotype: Eye color like ca. Same body and wing effect as *ca.* Larval Malpighian tubes colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1A.

cand; clarei-nondisjunctional

origin: X ray induced.
discoverer: E. B. Lewis and Gencarella.
references: 1952, Genetics 37: 600—1.
phenotype: Eye color like ca, but homozygous females lay mostly inviable eggs; surviving progeny often show results of chromosome nondisjunction and loss; meiosis normal in *ca*nd*/ca* females. Similar in action to *ca* of *Dzosophila simulans* (Sturtevant, 1929, Z. Wiss. Zool. Abt. A 135: 323—56). One experiment yielded 1373 progeny of females homozygous for *ca*nd, and gave the following results: 42 percent regular offspring, 15.0 percent exceptional *(X/X/Y* and *X/0),* 32.0 percent haplo-4, 3.9 percent haplo-4 mosaics, and 5.4 percent gynandromorphs. The remaining 0.8 percent included a triploid female, triploid intersexes, probable superaales, and a few other kinds of mosaics. Causes nondisjunction and loss of major autosomes (Davis, D. G., 1963, Ph.D. Thesis, Univ. Georgia). Hinton and McEarchen (1963, DIS 37: 90) reported haploid-diploid mosaic. Crossing over between *X* chromosomes normal (Davis). *ca*nd ovaries transplanted into normal host behave autonomously (Roberts, 1962, DIS 36: 112). Chromosome segregation normal in *ca*nd males. RK3.

ca*: claret-variegated

origin: X ray induced.
discoverer: E. B. Lewis.

phenotype: ca^{v}/ca slightly variegated. Can be confused with wild type. ca^{v}/ca^{nd} females produce normal progeny- Homozygous lethal. RK3A.
cytology: Associated with $In(3R)ca^{v}$ = *In(3R)81F;99C-E.*

**cal: coal*
location: 3-59.5.
origin: Spontaneous.
discoverer: Grout, 47120.
references: Ives, 1948, DIS 22: 53.
phenotype: Black body color similar to e^{4}. Viability reduced slightly. RK2.

canopy wing: see cpw

car: carnation
location: 1-62.5.
origin: X ray induced.
discoverer: Patterson, 28c20.
references: 1934, DIS 1: 31.
phenotype: Eye color dark ruby. Body shape and proportions seem rounded. With *st,* eye color is yellow-brown, with *bw,* brownish yellow to brown (Mainx, 1938, Z. Induktive Abstammungs-Vererbungslehre 75: 256—76). Maipighian tubes pale yellow in mature larva (Beadle, 1937, Genetics 22: 587—611) but hard to distinguish from wild type before third instar. Eye color autonomous in transplant into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Contains 33 percent wild-type red pigment and 47 percent brown pigment (Nolte, 1959, Heredity 13: 233-41). RK1.
cytology: Shown to lie in doublet 18D1-2 by deficiency analysis (J. I. Valencia).

***car²**
discoverer: Nolte, 1952.
references: 1954, DIS 28: 77.
phenotype: Visually resembles *car,* but contains only one-half the amount of red pigment of *car,* 16 percent of wild-type red pigment, and 48 percent of wild-type brown pigment (1959, Heredity 13: 233-41). RK1.

$_{CQr}$*26-48*
origin: Induced by mustard gas.
discoverer: Sobels and Jansen, 571.
references: Sobels, 1958, DIS 32: 84.
phenotype: Eye color darker than *car* and tends to resemble pn more than car. RK1.

cardinal: see ccf
carmine: see *cm*
carnation: see *car*
Cat: see spa^{Cat}

**cb: club*
location: 1-16.5.
origin: Spontaneous.
discoverer: Morgan, 13e.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 69 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 78 (fig.),
phenotype: Wings club-like in about half the flies. Sternopleural bristles absent from all flies. RK3.

Cb: Curled blistered
location: 1-13.
origin: Spontaneous.
discoverer: Villee, 40b.
references: 1945, DIS 19: 47.
phenotype: Heterozygous or homozygous *Cb* give curled and blistered wings only in presence of homozygous px^{Cb}. RK3.

**cbd: cluboid*
location: 3- (about 30 units to right or left of *D).*
origin: Spontaneous.
discoverer: Bridges, 16il5.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 169.
phenotype: Wings not expanded. Dwarfish. Low fertility. RK3.

**cbf: clubfoot*
location: 1-45.
origin: X ray induced.
discoverer: Cantor, 46d20.
references: 1946, DIS 20: 64.
phenotype: Leg segments greatly shortened; abnormally shaped tarsi and metathoracic legs. Wings slightly warped, wide in center, and tapering at ends. All flies emerging show both wing and leg effects but expression variable. Only about 3 percent of *cbt* flies eclose. RK3.
other information: Not tested for allelism to *pi* (1-47.9).

Cbx: Contrabithorax
location: 3-58.8 (to the right of *bx;* to the left of *Ubx).*
origin: X ray induced. Arose simultaneously with *pbx.*
discoverer: Bacon, 49h.
references: Lewis, 1954, DIS 28: 76.
1954, Proc. Intern. Congr. Genet., 9th. 1: 100-5.
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 35—56 (fig.).
phenotype: *Cbx/+* and *Cbx/Cbx* virtually indistinguishable and have small wings. The posterior portion of the mesothorax transformed into a structure that resembles posterior portion of metathorax. Wings have veins LI, L2, and L3 only. In extreme cases, entire mesothorax resembles metathorax so that wings resemble halteres. Metathorax is wild type. *Cbx* acts as dominant suppressor of homozygous *pbx* and partial suppressor of *bx* and *bxd.* Interactions with other *bx* pseudoalleles described by Lewis (1955, 1963). RK2.
cytology: Salivary chromosomes normal. Located close to if not within the 89E1-2 doublet (Lewis).
other information: A member of the bithorax pseudoallelic complex (see *bx).*

*cc; *chlorotic*
location: 1-0.0 (0.1 to left of sc).
origin: Spontaneous.
discoverer: Mohr, 19jl8.
references: 1923, Studia Mendeliana (Brunae): 266-87.
phenotype: Body color greenish yellow. Flies small. Mortality 90 percent. RK3.

**CCY: chlorotic-yellowish*
origin: Spontaneous.
discoverer: Morgan, 21i.
references: 1929, Carnegie Inst. Wash. Publ. No. 399:190.
phenotype: Body color pale yellow. Viability and fertility low. Like *cc.* RK3.

ccw: *concave wing*
locotion: 1-23.4.,
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 68.
phenotype: Wings shorter and narrower, with L3 and L4 shifted toward each other; occasionally truncated. Wing membrane depressed in center into slight concavity, giving slight scooped effect. Not easily classified. RK3.
other information: One allele induced by CB. 3025.

cd: cardinal
location: 3-75.7.
origin: Spontaneous.
discoverer: Johnson, 19k24.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 217 (fig.).
phenotype: Eye color yellowish vermilion, changing toward wild type with age. Brown pigment 15 percent of normal (Nolte, 1954, J. Genet. 52: 111—26). Ocelli white, showing no effect of age. Eye color autonomous in transplant of larval optic disk into wild type, *ca, en, st,* or v larval host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes bright yellow; not distinguishable from wild type. RK2.

*cc/3
origin: Spontaneous.
discoverer: Ives, 32c30.
references: Plough and Ives, 1934, DIS 1: 34. 1935, Genetics 20: 42-69.
phenotype: Like cd. RK2.

$_{c}$d63
origin: Spontaneous.
discoverer: Clancy, 63a.
references: 1964, DIS 39: 65.
phenotype: Like *cd.* RK2.

****Cd: Coildex***
location: 2-54.6 (0.1 unit to the right of pr).
origin: X ray induced.
discoverer: Bateman, 1954.
synonym: *Coiled.*
references: 1955, DIS 29: 69.
phenotype: Similar to *Cy,* but wing curvature more extreme; wings opaque and greyish. Anterior margin of wing invaginated at point where LI meets wing margin. When expression is weakest it appears only as a slight wave in the wing margin. In 10—15 percent of the flies, wings also curve downward over flanks before curling upward. In *y; Cd* flies, curvature reduced to a shallow spoon. *Cd* epistatic to *Cy.* Homozygous lethal. RK2.

*Ce: *Cell*
location: 4- (not located).
discoverer: Glass, 39a28.
references: 1939, DIS 12: 47.
phenotype: Varies from almost complete fusion of veins L3 and L4 to wild type. Intermediate types have narrowing and closing of first posterior wing cell with extra veins in region of anterior cross-vein and deltas at ends of L3 and L4. Expression is better above 25°C. Homozygous lethal. RK3.
cytology: Placed in salivary chromosome region 101E through 102B16, based on inclusion of Ce^ within *Dt(4)M = Df(4)101E-F;102B6-17.*

Ce^{2}
origin: Spontaneous.
discoverer: Green.
references: 1952, DIS 26: 63.
phenotype: Ocelli reduced or absent; ocellar and scutellar bristles absent; wing veins L3 and L4 converge, giving wing phenotype much like *fa,* although wing phenotype variable. Homozygous lethal; lethality occurs during embryonic period (Hochman). RK3.
other information: Allelism based on phenotype and lethal interaction with *Df(4)M* (Hochman).

*Ce3
origin: X ray induced.
discoverer: Green, 59cll.
references: 1959, DIS 33: 94.
phenotype: Identical to *Ce^{2}.* RK3.

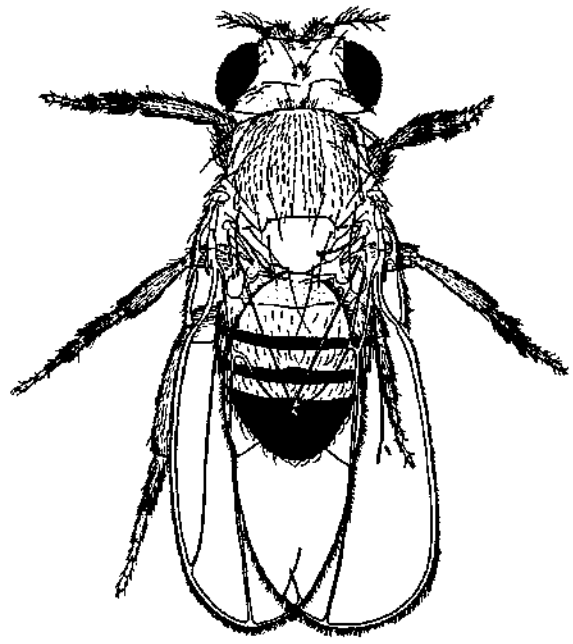
****cf; cleft***
location: 1-65.6.
origin: Spontaneous.
discoverer: Bridges, 14J28.
references: Morgan, Bridges and Sturtevant, 1925, Bibliog. Genet. 2: 55 (fig.).
phenotype: Wings smaller and somewhat spread. L3 split just beyond first crossvein; extra crossveins and branches. Gap in L4 beyond second crossvein. Males sterile.. Viability good. RK2.

****Cf: Confluent***
location: 2- (not located).
origin: Spontaneous.
discoverer: Bridges, 14i23.
references: Bridges, 1916, Genetics 1: 151. Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 255.
phenotype: Veins thickened and knotted, especially L2 opposite anterior crossvein and at costa. Wing smaller. Low fertility in heterozygote; good viability. Homozygous lethal. RK2.
other information: May have been a Plexate.

Cf-3:* see *Die(-3

eg: comb gap
location: 2-71.1.
origin: Spontaneous.
discoverer: Bridges, 25kl6.
phenotype: Sex combs of male extremely large. Some distortion and shortening of legs. Wings show gap in vein L4 between posterior crossvein and margin. Wings slightly curved. Effects result from a combination of overgrowth and irregular folding of imaginal rudiments during the pupal

period. Strong exaggeration in compound hotnozygotes with genes such as *d, fj, ds,* and ss^{fl}. Double heterozygote for eg and *ci* often shows gap in L4 (Waddington, 1952, J. Genet. 51: 243-58). Double heterozygote *en* cg/++has slight degree of L4 interruption and thinning at low temperature. Triple heterozygote en *cg/++; ci/+* has L4 interruption in half the flies (House, 1961, Genetics 46: 871). ci^w interacts strongly with *eg. cg/+; ci^w/+* resembles ci^w/ci^w (House, 1953, Genetics, 38: 669—70). Females sterile. Oogenesis highly irregular (Beatty, 1949, Proc. Roy. Soc. Edingurgh B 63: 249-70). RK2.



eg; *comb gap*

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 40.

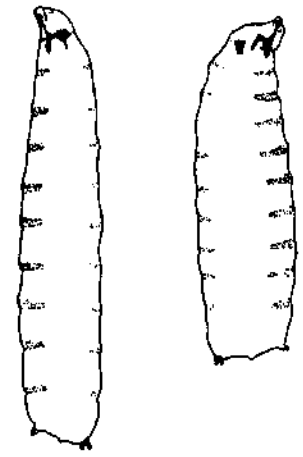
eft: *chubby*
location: 2-72.5.
origin: Spontaneous.
discoverer: Bridges, 17J26.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 222.
phenotype: Adults, pupae, and larvae thickset and short. Difficult to distinguish from wild type. Chubby larvae shorter than wild type at hatching [Dobzhansky and Duncan, 1933, Arch. Entwicklungsmech. Organ. 130: 109-30 (fig.)]. RK3.

ch-b: chilblained-b
location: 1-23.8.
discoverer: Moriwaki, 39e22.
references: 1939, DIS 12: 50.
phenotype: Tarsi conglutinated. RK3.

cftofe//e: see eft/

che: cherub
location: 2-62.0.
origin: Ultraviolet induced.
discoverer: Meyer, 48g.
references: Meyer and Edmondson, 1951, DIS 25: 71.
phenotype: Wings short, papery, and downcurved with short, broad alulae. Males sterile. Homozygotes short lived and balanced stock *en che bw sp/In(2L)Cy + In(2R)Cy, al% Cy en^2 L^4 sp?* has a generation time 30 percent longer than normal. RK3.

cfte*
origin: Ultraviolet induced.
discoverer: Meyer and Edmondson, 481.
references: 1951, DIS 25: 71.
phenotype: Similar to cfte in wing characteristics and male sterility. RK3.



eft: *chubby*

Left: wild-type larva. Right: *chubby* larva. From Dobzhansky and Duncan, 1933, Arch. Entwicks-lungmech. Organ. 130: 109-30.

*cfte3
origin: X ray induced.
discoverer: Meyer, 60g.
references: 1963, DIS 37: 50.
phenotype: Wings curved, spread, and short. Less extreme than *che. che^3/che* sterile in both sexes. *che3/che^3* not tested for sterility because *fs(2)B* and *ms(2)2* on same chromosome. RK2.

***chilblained-b:* see cft**

eft/: *chaetelle*
location: 2-60.8.
discoverer: Bridges, 33a4.
references: Beatty, 1949, Proc. Roy. Soc. Edinburgh B 63: 249-70.
phenotype: Bristles very small. Wing venation slightly plexus-like; exaggerates px when combined with it. Body size small. Rotated genitalia in many males. Blunt-tipped abdomen. Females infertile, but ovary and oocytes appear normal. RK2.

cft/orof/c: see cc

cfto: *chocolate*
location: 1-5.4 (left of ec).
origin: X ray induced,
discoverer: Weigle, 1955.
references: Sturtevant, 1955, DIS 29: 75.
phenotype: Eye color brown with whitish highlights. Paler than *se,* less purplish than *pa.* Malpighian

tubes of larvae and adults contain brown pigment like *red.* Larvae easily distinguished from wild type. Brown pigment of Malpighian tubes absent when *cho* is combined with *v, en,* or sr mutations, which prevent formation of brown eye pigment. Eye color of *cho v* is yellowish, but cho *g* cannot be distinguished from *g.* Separability, viability, and fertility excellent. RK1.

other information: Not included in *Df(l)N^{8} = Df(l)3B4-Cl;3D6-El.*

cho^{2}

origin: Spontaneous.
discoverer: Green, 1955.
references: Sturtevant, 1955, DIS 29: 75.
phenotype: Dark brownish eye; indistinguishable from *cho.* RK1.

chocolate:* see *cho

****chr: chrome***

location: 1- (not located).
origin: Spontaneous.
discoverer: Bridges, 13115.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 74.
phenotype: Body color brownish yellow or tan. Abdominal bands clear yellow. RK3.
other information: Probably a tan allele.

chubby:* see *ci

chy: chunky

location: 2- (between 8 and 28).
origin: Spontaneous.
discoverer: Bridges, 38blO.
phenotype: Body short and heavy set. Wings shorter than wild type. Difficult to classify. RK3.

ch cubitus interruptus
Wings showing from no interruption (extreme left) to complete absence (extreme right) of the cubital vein. From Stern and Kodani, 1955, Genetics 40: 343-73.

ci: cubitus interruptus

location: 4-0 (most proximal mutant in *4).*
origin: Spontaneous.
discoverer: Tiniakov and Terentieva, 30b.
references: Terentieva, 1931, Zh. Eksperim. Biol. 7: 187-90 (fig.).
Tiniakov and Terentieva, 1933, Genetics 18: 117-20 (fig.).
Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
Sturtevant, 1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7.
Stern and Kodani, 1955, Genetics 40: 343-73 (fig.).
phenotype: Vein L4 shows one or more gaps both distal and proximal to posterior crossvein, generally nonterminal. Anterior crossvein shortened or absent. Other gaps and scattered branch veins in region of crossveins. At 19°C nearly all flies have a mutant phenotype; at 25°C there is slight overlap with wild type; at 30°C virtually all flies are wild type. Dosage effect such that *ci/0* haplo-4's are more extreme than *ci/ci* diplo-4's, which are more extreme than *ci/ci/ci* triplo-4's. For interactions of ci with en, *H,* ve and *eg, see* House, 1953, Genetics 38: 199-215, 309-27; 1955, Anat. Record 122: 471; 1959, Genetics, 44: 516; 1961, Genetics, 46: 871. Expression of *ci* sensitive to genetic background; selection possible for more and less extreme phenotypes (House and Yeatts, 1962, Genetics 47: 960). Phenotypic effect visible in prepupa by absence of the lower longitudinal vein. RK1 at 19°C and higher rank with higher temperatures.
cytology: Placed in salivary chromosome region 101F2-102A5, on the basis of its inclusion in *Df(4)M^{6}3^{a} = Df(4)101F2-102Al;102A2-5.*
other information: The expression of ci^{+} can be altered in direction of *ci* by certain chromosome rearrangements that have one break in vicinity of *ci* locus. Rearranged fourth chromosomes carrying a mutant allele of *ci, R(ci),* may also show altered expression of gene (Stern and Kodani, 1955). *R(ci)* and *R(ci^{+})* terminology not retained here; interaction with *ci* included in descriptions of aberrations involving chromosome *4.*

ci3 6l

origin: Spontaneous.
discoverer: Curry, 361.
phenotype: Less extreme than *ci.* Ranges from appearance of a plexus in L4 between crossveins to gaps in L4 and L5 posterior to crossveins. RK3.

ci^{+}2; *cubitus interruptus-wild-type isoallele*

origin: On fourth chromosome carrying *ey^{2}.*
discoverer: Stern and Schaeffer, 1943.
references: 1943, Proc. Natl. Acad. Sci. U.S. 29: 361-67.
phenotype: Homozygote wild type at 14° and 26°C. *ci^{+2}/Df(4JM* wild type at 26°C; shows some thinning and interruption of L4 at 14°C. *ci+2/ci* wild type at 26°C; at 14°C fewer flies show thinning or interruption of L4 than *ci^{+}*C/ci. *ci*^{2}/ciW* shows significantly greater amount of thinning and interruption of L4 than ci^{+c}/ci^{w}\ RK3.

ci^{+}3

discoverer: Stern and Schaeffer, 1943.
referenees: 1943, Proc. Natl. Acad. Sci. U.S. 29: 361-67.
phenotype: Homozygote wild type at 26° and shows some thinning of L4 at 14°C. About half of *ci^{+3}/ci* heterozygotes are not wild type at 25° and about three-fourths are not at 14°C. Only a few *ci*3/ci^{w}* individuals overlap wild type. RK3.

C/+5

origin: A male of the Cockaponsett wild stock.
discoverer: Hochman, 551.

references: 1961, Evolution 15: 239-46.
phenotype: Wild type at 25°C; at 17°C a small fraction of flies display wing vein abnormalities; however, not involving L4. Over 80 percent of ci^{+5}/ci flies show gaps in L4 distal to posterior crossvein. RK3.

C/+C
origin: Canton-S wild type.
discoverer: Stern and Schaffer, 1943.
references: 1943, Proc. Natl. Acad. Sci. U.S. 29: 361-67.
phenotype: When homozygous, wild type at 14°, 18°, and 25°C. $ci^{+c}/Df(4)M$ wild type at 26°C; very few flies show thinning or interruption of L4 at 14°C. *ci^C/ci* wild type at 26°; some flies show thinning or interruption at 14°C. ci^{+c}/ci^{w} causes significant thinning or interruption of L4 at 26°C. RK3.

ci^D: cubitus interruptus-Dorninant
origin: X ray induced.
discoverer: Ruch, 32al8.
references: Bridges, 1935, Biol. Zh. (Moscow), 4: 401-20.
phenotype: Wings show interruptions of L4 in two places; proximal to and distal to, anterior crossvein. L5 also shows distal interruption. L3 and L5 thick. Considerable plexus effect and knotting of veins. Wings broader and warped or concave upward, regularly extended and bent backward. Alula fused with and in same plane as blade of wing. Black dried blood from axillary spiracle. Slight scalloping of inner wing margin, with hairs and tufts. Direction and extent of temperature effects depends on genetic background (Scharloo). In general, no overlapping wild type. *H/+* inhibits scalloping of ci^D but greatly enhances L4 interruption (House, 1959, Genetics 44: 516). Fully dominant in triplo-4's (Sturtevant, 1936, Genetics 21: 448). Homozygous lethal. Lethal acts in embryonic stage (Hochman). RK1.
cytology: Salivary study by Bridges revealed no chromosomal aberration.
other information: Not allelic, at least with respect to its lethality, since $ci^D/Df(4)M^{63a}$ survives, whereas $ci/Dt(4)M^{63a}$ is mutant (Hochman, 1965, DIS 40: 60).

c/0-6; *cubitus interruptus-Dominant of* G/oor
origin: Obtained by recombination between chromosomes with *ci*® and *spaP°K*
discoverer: Gloor.
references: Scharloo, 1963, DIS 38: 32.
phenotype: Less extreme than ci^D. Interruption of L5 is infrequent. Usually a terminal interruption of L4 distal to second crossvein and a gap proximal to first crossvein. Wings neither spread nor warped. No black dots present in axillary spiracles, but overlaps wild type at lower temperatures. Good expressivity at 25°C (Scharloo). RK1.

ci*; *cuhitus interrvptvs* of *Wallace*
origin: Spontaneous.
discoverer: E. M. Wallace, 36d20.
synonym: *It: Interntptus.*
phenotype: Homozygote is extreme *ci* type. Wings sometimes almost twice normal width, arclike, and virtually lack veins. Often present is a well-organized pattern of venation in which the posterior crossvein flows smoothly into L5. Legs lumpy; sex combs larger than normal; antennae enlarged; eyes smaller; and extra bristles present. Heterozygote shows gap in L4 in 80 percent of flies. ci^{w} enhanced by *H,* en, and *Cy* (House, 1953, Genetics 38: 669-70; 1959, Genetics 44: 516), Temperature effect described by House (1955, Genetics 40: 576). RK2.

***cinnabar:* see en**

ck: crinkled
location: 2-53.
origin: Spontaneous.
discoverer: Bridges, 30c30.
phenotype: Wings flimsy, crinkled, or wavy. Irregular stubby or wavy bristle effect. Viability poor. RK3.

cl: clot
location: 2-16.5.
origin: Spontaneous.
discoverer: Bridges, 27a3.
phenotype: Eye color dark maroon to sepia-like with age; less extreme than sepia. Sixty percent more red pigment than wild type (Nolte, 1954, J. Genet. 52: 127—39). Eye color autonomous when larval optic disk is transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes pale yellow, distinguishable from wild type (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
cytology: Placed in salivary chromosome region 25E1 to 26C1 (E. H. Grell).

c/2
discoverer: Terry, 1928.
phenotype: Eye color like *cl* but darker. Larval Malpighian tubes pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

***claref:* see ca**

*c/c/: *cloudy*
location: 2-96 to -101.
origin: Gamma ray induced.
discoverer: Wallbrunn, 61j6.
references: 1964, DIS 39: 59.
phenotype: Wings opaque from fluid between upper and lower membranes; occasionally fluid forms small blisters. Males sterile, females highly infertile. RK2.

cleft:* see *cf

elf; see *wtwdf*

***Cli: Clipped wings**
location: 1- (to the left of *f).*
discoverer: Agol.
references: 1936, DIS 5: 7.
phenotype: Dominant wing mutant (no description given). Viable in male and homozygous female. RK3.

clip wing: see *dp°²*

clipped: see cp

Clipped wings: **see *Cli***

Clipt: **see *Cpt***

elm: clumpy marginals

location: 1-32.6.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 68.
phenotype: Irregularly bent marginal hairs, especially on posterior border of wings. Bristles stiff and frequently bent or split. Viability and fertility of males good. Homozygous females reduced in viability and fertility. RK2.
other information: One allele each induced by CB. 1506 and CB. 3007.

clot: see *clt*

cloudy: see *eld*

cloven thorax: see *clv*

club: see *cb*

clubfoot: see *cbf*

cluboid: see *cbd*

clumpy marginals: see *elm*

*clv-7; *cloven thorax no.* 7

location: 1-0.0.
origin: X ray induced.
discoverer: Muller, 19h.
references: 1935, DIS 3: 29.
phenotype: Thorax often has long cleft; partially dominant. Semilethal at low temperature, viable at high one. RK3.

***clv-2**

location: 1-42.0.
origin: X ray induced.
discoverer: Muller, 26111.
references: 1935, DIS 3: 29.
phenotype: Thorax has logitudinal cleft, sometimes half thorax. One wing often reduced or like *vg.* Partially dominant. Semilethal. RK3.

*$_c$*ly.2S2b*

origin: X ray induced.
discoverer: Bateman, 52b.
references: 1953, DIS 27: 55.
phenotype: Like *clv-2.* Some flies have no dorsal thorax at all. Viability 30 percent. Penetrance 50 percent. The apparently wild-type males are fertile; abnormal ones sterile. Completely recessive. RK3.
other information: Allelism with *clv-2* not tested.

cm: *carmine*

location: 1-18.9.
origin: Spontaneous.
discoverer: Mohr, 27d27.
references: 1927, Z. Induktive Abstammungs-Vererbungslehre 45: 403—5.
phenotype: Eye color translucent dark ruby. With *st,* eye color deep orange; with brown, slightly lighter than *bw* alone. Larval Malpighian tubes very pale yellow. RK1.
cytology: Locus lies between 6A3-4 and 6F10-11 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). More precisely located by Hannah-Alava in 6E, probably in or near 6E6.

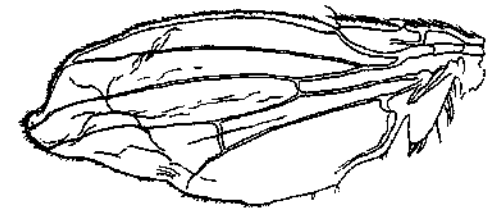
cm:* see *emp

cm$^{28\text{-}4}$

origin: Induced by mustard gas.
discoverer: Sobels, 571.
references: 1958, DIS 32: 84.
phenotype: Eye color more translucent and ruby-like than *cm.* RK1.

cm$^{R8\wedge H4}$

origin: X ray induced in *R(l)2.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with *Dt(l)cm^{R8BH4} =Df(l)6E* (J. I. Valencia).

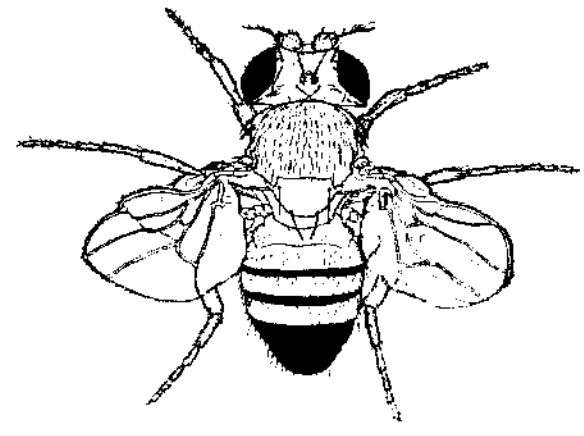


Cm: Crimp

Edith M. Wallace, unpublished.

***Cm: Crimp**

location: 3-43.5.
origin: Spontaneous.
discoverer: Bridges, 28a28.
phenotype: Heterozygote has crimped wings ruffled on rear edge. Classification good in first 4 days' hatch, then *Cm* overlaps wild type progressively. Better at 25° than at 19°C. Homozygous lethal. RK2 as lethal; RK3 as dominant.



crop: *crumpled*

Edith M. Wallace, unpublished.

emp: crumpled

location: 3-93.
origin: Spontaneous.
discoverer: Bridges, 22d2.
synonym: cm.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash, Publ. No. 327: 247.

Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 223.

phenotype: Wings about two-thirds normal size and greatly crumpled or blistered. Marginal hairs irregularly clumped. Legs irregularly shortened and gnarled. Bristles somewhat short and thick. Posterior scutellars slightly divergent. Branches of aristae bent anteriorly near middle, with apices parallel to main axes of aristae. Viability and fertility may be low. RK3.

en: cinnabar

location: 2-57.5.

origin: Spontaneous.

discoverer: Clausen, 2018.

references: 1924, J. Exptl. Zool. 38: 423-36.

phenotype: Eye color bright red, like v or *st.* Ocelli colorless. Eye color darkens with age, but ocelli remain colorless. Larval Malpighian tubes pale yellow (Beadle, 1937, Genetics 22: 587—611). Nonautonomous in development of pigment of transplanted eye disks (Beadle and Ephrussi, 1936, Genetics 21: 230), *en* blocks conversion of kynurenine to 3-hydroxykynurenine, which has been identified as the *en* '*' hormone (Butenandt, Weidel, and Schlossberger, 1949, Z. Naturforsch. 4b: 242-44). RK1.

cytology: Proximal to 44C, based on its inclusion in *Dp(2;3)P32 = Dp(2;3)41A;42D-E;44C-D;89D7-El* (E. B. Lewis).

cn2

origin: Spontaneous in *In(2R)Cy.*

discoverer: L. Ward, 1921.

references: 1923, Genetics 8: 276—300.

phenotype: Eye color slightly brighter than normal and ocelli pale. cn^2/cn bright scarlet like cn/cn and has colorless ocelli but darkens more rapidly with age. Malpighian tubes of en^2/en pale yellow (Brehme and Demerec, 1942, Growth 6: 351—56). RK2.

en*:*cinnabar-sterile*

origin: Spontaneous.

discoverer: Ives, 40el8.

phenotype: Eye color like *en,* but females sterile. RK2,

other information: Possibility that sterility factor separable from *en* not completely eliminated. Found in chromosome carrying *In(2L)t = In(2L)22D3-El;34A8-9.*

Co:Confluens

location: 1-3.0.

origin: Recovered among progeny of cold-treated fly.

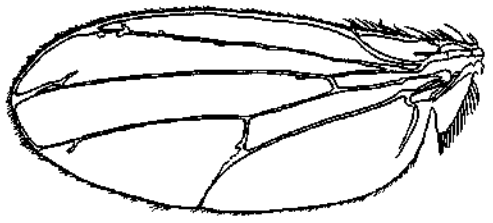
discoverer: Gottschewski 34c.

references: 1935, DIS 4: 7, 14, 16.
1937, Z. Induktive Abstammungs- Vererbungslehre 73: 131-42.
1937, DIS 8: 12.

phenotype: Veins irregularly thickened, especially toward tips, which are usually deltas and fused broadly to marginal vein. Stronger expression in males than in females. Co/N^8 wild type except for slightly thicker L3 vein. *Co/Ax* like *Ax/+.* RK1A.

cytology: Associated with a tandem duplication, *Dp(l;l)Co = Dp(l;l)3C4-5;3D6-El* (Schultz, 1941, DIS 14: 54-55). Result of duplication of 3C7, deficiency for which gives Notch (Morgan, Schultz, and Curry, 1941, Carnegie Inst. Wash. Year Book 40: 283).

other information: Reversion to wild type occurs in *Co/Co* by unequal crossing over. A member of the Notch pseudoallelic complex.



Co: *Confluens*
Edith M. Wallace, unpublished.

Co-3A: see *l(2)S3a*

Co-7: see *1(2)S7*

coal: see *cal*

*coc: *collapsed ocelli*

location: 1-61.5.

origin: Induced by D-l:6-dimethanesulfonyl mannitol (CB. 2511).

discoverer: Fahmy, 1960.

references: 1964, DIS 39: 58.

phenotype: Ocelli small and flat; deflated owing to lack of eye fluid. Anterior ocellar hairs frequently missing. Other slight alterations in body size and wing shape. RK3.

cytology: Placed in salivary region 18A4 through 18B8 on the basis of its inclusion within the deficiency carrying the left end of $In(l)y^4$ = *In(l)lA8-Bl;18A3-4* and the right end of *In(l)sc^ =In(l)lB2-3;18B8-9* (Norton and Valencia, 1965, DIS 40: 40).

Co/: *Coiled*

location: 2-48.7.

origin: X ray induced.

discoverer: Carlson, 57g.

references: 1960, DIS 34: 48.

phenotype: *Coi/+* has curled wings like *Cy/+* or *j. Coi/Coi* viable, with strongly curled wings similar to *Cy/+;* JD/+. *Coi/j* shows no interaction. Excellent viability and fertility. RK1.

cytology: Not included in *Df(2L)64j = Df(2L)34E5-F1;35C3-D1* (E. H. Grell).

Coiled: see *Cd*

Coiledex: see Co'

collapsed ocelli: see coc

*co/n: *compressed*

location: 3-48.5.

origin: Spontaneous.

discoverer: Bridges, 18k27.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 193.

phenotype: Head flattened ventraliy. Eyes small, displaced. Vibrissae tufted. Aristae crumpled. Humeral patches elevated. Wings droopy. Poor viability and fertility. RK3.

**com~d: compres sed-dilapida tor*
location: 3-68.5.
origin: Spontaneous.
discoverer: Bridges, 19c8.
phenotype: Flies small, pale, weak, with defective legs and wings. RK3.

comb gap: **see eg**

compressed: **see com**

con:** ***condensed
location: 1-27.1.
origin: Spontaneous.
discoverer: Bridges, 36dll.
references: 1937, DIS 7: 6.
phenotype: Thorax and abdomen shortened; abdomen dilated, exposing ventral skin to side view. Eyes slightly roughened, occasionally kidney shaped and somewhat dark. Wings short, bluntly rounded, with crossveins closer together than normal. Bristles shortened and somewhat fine at 19°C, stubby at 25°C. Postscutellars semierect and crossed; posterior verticals shortened or missing. Male entirely sterile. Viability 50 percent wild type. RK2.
cytology: Salivary chromosome studies (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191) show locus to lie between 7C4-5 and 8C1-2. Further restricted to 7E1 through 8C2, on the basis of its genetic location to the right of *oc* which is excluded from *Di(l)sn = Df(l)7B2-3;7D22-El* (Hinton and Welshons, 1955, DIS 29: 125-26).

concave *wing:* see ccw

condensed: **see con**

Confluens: **see Co**

Confluent: **see *Cf***

Confluent-3: **see *Dlcf-3***

contorted: **see *ctt***

Contrabithorax: **see *Cbx***

convex wing: **see cvw**

cop; *copper*
location: 1-43.3.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 68.
phenotype: Brownish red eye color. Best classification in newly emerged flies. Occasionally wings show cutaway inner margins. Excellent viability and fertility in both sexes. RK2.
other information: Two alleles induced by CB. 3025.

Cor: ***Corroded eye***
location: 3- (not located),
origin: X ray induced,
discoverer: Muller.
references: 1946, DIS 20: 66.
phenotype: *Cor/+* shows slight irregular flecking of eye. In combination with v, expression enhanced, producing patchy diminution in color, especially near posterior margin of eye, giving impression that color was washed or eaten away, especially from deeper layers; regions of surface often blackened. Homozygote not described. RK2.

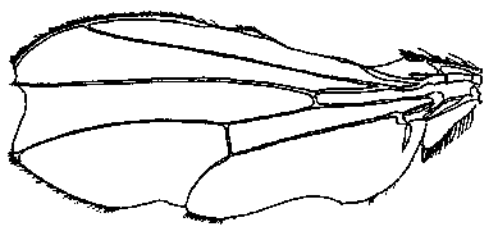
corr; *corrugated wing*
location: 2-36.
origin: Spontaneous.
discoverer: Mayeda, 61g.
references: 1963, DIS 38: 31.
phenotype: Wings wrinkled and wavy, reduced to three-fourths normal size. Whole wing corrugated at 20°C, only posterior third at 25°. Good classification. RK2.

Corroded eye: **see Cor**

corrugated wing: **see corr**

costakink: **see *csk***

cp: clipped
location: 3-45.3.
discoverer: Mainx, 34g.
references: 1936, Z. Induktive Abstammungs-Vererbungslehre 71: 303-4 (fig.).
Pollitzer, 1937, DIS 8: 91.
phenotype: Wing margins snipped, most often along marginal vein. At 19°C character slighter but completely penetrant. RK1.



cp; *clipped*
Edith M. Wallace, unpublished.

****cpl: cupola***
location: 1-0.0 (no crossing over with sc in 584 males).
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 83-84.
phenotype: Small, inviable fly. Wings shorter and curved to form canopy over abdomen with tips converging toward mid-dorsal line. Head and eyes slightly deformed. Abdominal tergites abnormal; from irregular pigmentation to absence or gross deformation of the sixth and seventh tergites. Males sterile. RK3.

****Cpt: Clipt***
location: 2-43.7.
origin: Spontaneous.
discoverer: Sturtevant, 26bl8,
phenotype: Bristles short, like those of *Sb*. Homozygous lethal. Male sterile. RK1.

**cpw: canopy wing*
location: 1-2.5.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Wings short and very broad; longitudinal veins frequently do not reach wing margin and

often diverge. Eyes large and slightly rough- Head bristles reduced in number (ocellars most frequently affected). Thorax broad, one or more bristles occasionally absent; hairs more widely separated, with noticeable hairless areas. Males sterile. Viability 40 percent wild type. RK3.

eg; see *rk*[4]

**cr: crisp*

location: 1- (not located).
discoverer: Agol.
references: 1936, DIS 5: 7.
phenotype: Bristles like forked. RK2.
other information: Not an allele of *I* or sn.

**Cr-2: Cream in chromosome 2*

location: 2- (not located).
origin; Spontaneous.
discoverer: Bridges, 13il5.
references: 1919, J. Exptl. Zool. 28: 337-84.
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 239 (fig.).
phenotype: Specific dilutor of w^0, w^e; Cr-2/Cr-2 has a pale cream eye color. w^e; *Cr-2*/+ has eye color between eosin and cream. RK3.

*cr-3: cream *in chromosome 3*

location: 3-36.5.
origin: Spontaneous,
discoverer: E. M. Wallace, 14b27.
references: Bridges, 1919, J. Exptl. Zool. 28: 337-84.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 112 (fig.).
phenotype: Homozygote has slightly diluted eye color. Eye color of w^e; *cr-3* cream. Larval Malpighian tubes of w°; *cr-3* white, those of *cr-3* bright yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK3.

**cr-a: cream-a*

location: Autosomal, not located.
origin: Spontaneous.
discoverer: Bridges, 13gl5.
references: 1916, Genetics 1: 147.
1919, J. Exptl. Zool. 28: 337-84.
phenotype: Strong specific dilutor of w^e. RK3.

**cr-b*

location: 2-24.
origin: Spontaneous.
discoverer: Bridges, 14clO.
references: 1916, Genetics 1: 149.
1919, J. Exptl. Zool. 28: 337-84.
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 245 (fig.).
phenotype: Specific dilutor of w^e. RK3.

*cr-c

location: 2- (near S).
origin; Spontaneous.
discoverer: Bridges, 16gl3.
phenotype: Weak specific dilutor of w^e. RK3.

cramped: see *crm*
cramped-like: see *crm*[2]
CRB: see *T(1;4)A1*
etc: see *l('2)crc*
cream: see cr
Cream: see *Cr*
Cream: see *bwV2 9l*
cream underscored: see *cru*
creased: see cs
creeper: see *rk*[4]
Crimp: see *Cm*
crinkled: see *ck*

**crip: cripple*

location: 2- (between *pr* and *en).*
discoverer: Komai, 1924.
references: 1926, Genetics 11: 280-93.
1927, Mem. Coll. Sci. Univ. Kyoto, Ser. B 2: 211—57.
phenotype: Middle and hind legs twisted and shortened. Thirty percent penetrance. RK3.

crisp: see *cr*

**crk: crooked setae*

location: 1-60.1.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Bristles thin and slightly shortened; occasional missing scutellar. Acrostichals deranged. Abdominal hairs of female frequently missing; tergites occasionally abnormal. Classification difficult. Viability and fertility good. RK3.
other information: One allele induced by CB. 3025.

**crm: cramped*

location: 1-1.4 (based on crm^).
origin: Induced by P32.
discoverer: Bateman.
synonym: *sta*[p]*: stubarista from* P^{32}.
references: 1951, DIS 25: 78.
1953, DIS 27: 55.
phenotype: Antennae stumpy with shrunken, warped aristae, usually lying back on head. Initially showed narrowed and scalloped wings and eyes shaped like inverted pears, but these effects variable. Viability low. Sterile. RK3.

**crm*[2]

origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
synonym: *cramped-like.*
references: 1958, DIS 32: 69.
phenotype: Antennae stumpy and short, with reduced, abnormal aristae. Wings frequently abnormally held, with cuts on inner margins. Eyes pear shaped. Small extra sex combs on second tarsal segment. Not easily classified. Viability and fertility slightly reduced in males, greatly reduced in females. RK3.
other information: Allelism to *crm* inferred from position of *ctni* at 1:14 and phenotype. Seven other alleles: 1 each induced by CB. 1540, CB 1592, CB. 3007, CB. 3025, CB. 3034, and 2 induced by CB. 1506.

cro: see *ptg*[3]
crooked: see *fw*[c]
crooked setae: see *crk*
crossover suppressor: see *c( )*

crossveinless; see cv

crowri: see *ptg*[3]

crs: cru sterile
location: 2- (between px and *bw).*
discoverer: Muller.
references: 1951, DIS 25: 119.
1955, DIS 29: 146.
phenotype: Male sterile. RK2.
cytology: Located between 58E3 and 59A2 on basis of sterility in combination with *Di(2R)P + Dp(2;Y)bw+ = Di(2R)58E3-Fl;60D14-E2 + Dp(2;Y)Y*[L]*;58Fl-59A2;60D14-E2* (Muller, 1955).
other information: Male sterility formerly associated with but separable from cru.

crt: crumpled tips
location: 1-40.3 (7.3 units from v, based on 3035 flies).
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1959, DIS 33: 84.
phenotype: Wing tips frequently shriveled, pleated, or crumpled, and often turned up or down. Wings vary from completely unexpanded to wild type. Viability and fertility good in both sexes. RK2.
other information: Twelve other alleles: 1 each induced by X rays, CB. 1246, CB. 1522, and CB. 3025; 2 induced by CB. 3034; 3 each induced by CB. 1592 and CB. 3007.

cru: cream *underscored*
location: 2-52.5.
origin: Spontaneous.
discoverer: Bridges, 20a5.
phenotype: Specific dilutor of w^e and P. Slight dominant but used as a recessive. Originally thought to be male sterile, but this was caused by a factor in *2R,* crs. Larval Malpighian tubes of w^e*; cru* colorless; those of +; *cru* bright yellow (Brehme and Demerec, 1942, Growth 6: 351—56). RK3.

crumpled: see crop

crumpled tips: see erf

cru *sterile:* see crs

*cs; *creased*
location: 1-56.
origin: X ray induced.
discoverer: K. C. Atwood, 41i.
references: 1942, DIS 16: 47.
phenotype: Wings logitudinally creased in first posterior cell from distal end of L3 virtually to anterior crossvein. Fertility and viability good. RK1.

CS53
origin: X ray induced.
discoverer: Krivshenko, 53k5.
references: 1956, DIS 30: 74.
phenotype: Wing longitudinally creased. Lateral edges of wings bent slightly downward distally. RK1.
other information: According to crossover data of M. Aronson and description, this is an allele of cs, which was lost before this mutant was discovered.

**csk: costakink*
location: 1-33.0 (no crossovers with v in 526 males).
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Eyes smaller. Wings slightly reduced in size and abnormally held; costal vein frequently kinked near L2. Not fully penetrant. Male viability and fertility good, but female viability and fertility reduced to about 50 percent wild type. RK3.
other information: One X-ray-induced allele.

cf: cuf
location: 1-20.0.
origin: Spontaneous.
discoverer: Bridges, 15J12.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 35, 223 (fig.).
phenotype: Wings cut to points and edges scalloped. Eyes smaller and somewhat kidney shaped. Abdominal bands warped. Antennae often deformed. RK1.
cytology: Placed in salivary gland chromosome bands 7B3-4 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Hannah-Alava agrees.

cf2a2
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal. Shows cut phenotype in combination with viable *ct* alleles; lethal in combination with lethal *ct* alleles. RK2A.
cytology: Associated with *Dl(l)ct*^{a} = *Df(l)7B3-6;7B6-7.*

*$_{cf}$*2a3*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct***?. RK2A.
cytology: Associated with *D((l)ct*^{2a3} = *Dt(l)7B2-3;7Cl-2.*

*$_{ct}$*2cl*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2a}. RK2.
cytology: Salivary chromosomes normal.

ct
discoverer: Morgan, 17a22.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 35 (fip.).
phenotype: Extreme *ct* allele. Wings short, dark, and crumpled as well as cut and scalloped. Abdominal bands warped. Antennae flattened and embedded. Aristae concave forward. Eyes smaller and kidney shaped. Vibrissae gone. More extreme

expression in females than in males; females have much poorer viability. 1 female:3 males in stock. RK3.

*$_c$f3o2

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal in male and homozygous female, as well as in combination with other lethal alleles of *ct*. Extreme *ct* phenotype in combination with ct^6. Like ct^n in combination with ct^n, Phenotype reportedly suppressed by addition of *Y* chromosome material. RK2A.
cytology: Associated with *In(l)ct^{3a2} — In(l)7B2-Cl; 19-20.*

*$_{cf}$3b1

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal, but unlike other lethal *ct* alleles tested by Hannah, fails to survive in combination with $Dp(l;3)sn^{13al}$. RK2A.
cytology: Associated with *In(l)ct^{3bI} = In(l)3A4-Bl;7B2-5.*

*$_{cf}$4b1

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like cf^{2}°2. RK2A.
cytology: Associated with *Df(l)ct^{4bi} = Di(l)7B2-4;7C2-4.*

*$_{ct}$4d

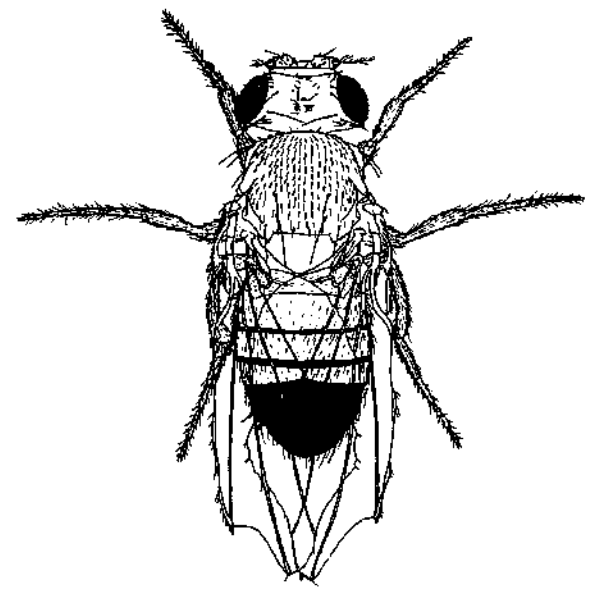
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ctl*2.* RK2.
cytology: Salivary chromosomes normal.

ct^6

origin: Spontaneous.
discoverer: Bridges, 2Oc20.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 35 (fig.).
phenotype: Wing character uniform and reliable; usually lacks the abdomen, antenna, arista, and eye effects of *ct*. Vibrissae gone or displaced downward to bottom of eye. Developmental study by Waddington Il939, Proc. Natl. Acad. Sci. U.S. 25: 299-308; 1940, J. Genet. 41: 75-139 (fig.)] shows wing bud narrower than wild type as early as just after eversion of wing in early pupa. RK1.
other information: Allele most used as genetic marker.

*ct^{6a1}

origin: X ray induced,
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal. Expression in combination with ct^6 suppressed by Y^L. RK2A.
cytology: Associated with *Tp(l)ct^{6a}l = Tp(l)7B2-Cl;19;20.*



ctf>: cut-6
From Morgan, Bridges, and Sturtevant, 1925, Bibliob. Genet. 2: 35.

*C/7a7

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal. ct^{7al} /$Dp(l;3)sn^{13al}$ males show reduced viability and are probably sterile. RK2A.
cytology: Associated with *T(l;2)ct7ai = T(1;2)7B.*

*$_c$f7o2

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like c*2a2. RK2A.
cytology: Associated with *Df(l)ct?^{a}2 = Di(l)7A5-Bl;7C4-9.*

*$_c$*f7b2*

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like cf^{2fl}2. RK2.
cytology: Salivary chromosomes normal.

*$_{cf}$7c7

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct3*2.* RK2A.
cytology: Associated with *T(l;2)ct^{7cl} - T(1;2)7B2-3;8E2-3;25C.*

*$_{ct}$*7c2*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2a2}. RK2A.
cytology: Associated with *Df(l)ct?*^{c2} = *Df(l)6Fll-7Al;7B8-Cl.*

*$_{c}$*f9bl*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588—89.
phenotype: Similar to *ct*^{6}. RK1.
cytology: Salivary chromosomes normal, but staining of 7B1-2 and 7B5 lighter and darker than normal, respectively.
other information: Induced simultaneously with an independent but closely linked recessive lethal mutation.

*$_{c}$*f9b2*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Semilethal but semilethality not shown to be at *ct* locus; males appear rarely; sterile with small yellowish tan bodies. Margin notched from the costal cell around wings to base of inner margin. RK2A.
cytology: Induced simultaneously with but apparently independently of a complex inversion and translocation between *X* and *3R.*

***$_{c}$f70o7**
origin: X ray induced.
discoverer: DeFrank, 1947.
references: Hannah, 1949, Proc. Intern. Congr. Genet., 8th. pp. 588—89.
phenotype: Like *ct*^{2a2}. RK2A.
cytology: Possibly associated with *Dt(l)ct*^{1Oal} = *Df(l)7B3-4;7B6-7.*

***ct^{10b1}**
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2a2}'. RK2A.
cytology: Associated with *Dl(l)ct*^{1Obl} = *D((1)6D8-E1;7B7-C1.*

*$_{c}$f70c7
origin: X ray induced.
discoverer: DeFrank, 1947.
references: Hannah, 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Males have notched but unexpended wings; may have abnormal antennae and vibrissae. Males show very low viability, usually dying in larval stage. Surviving males sterile. Lethal in combination with other lethal *ct* alleles; heterozygous females made using *Dp{l;3)&n*^{13l}*l.* RK2.
cytology: Salivary chromosomes normal.

***ct^{11o}**
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct***^{2}. RK2A.
cytology: Associated with *T(l;3)ct*^^{a} = *T(1;3)1B; 7B2-3;8E-F;84B.*

*$_{c}$f72a7
origin: X ray induced.
discoverer: DeFrank, 1947.
references: Hannah, 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal in hemizygote and in combination with other lethal *ct* alleles. Expression variable in combination with viable *ct* alleles. *ct*^{12al} */Dp(l;3)an*^{i3al} males show low viability and are sterile. RK3.
cytology: Salivary chromosomes normal.

*C/J2o2
origin: X ray induced.
discoverer: DeFrank, 1947.
references: Hannah, 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2a2} except that lethal not covered by *Dp(l;3)sn*^{13al}. RK2A.
cytology: Associated with *In(l)ct*^{12a2} = *ln(l)4E2-3;7B2-4.*

*$_{c}$f72c7
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Lethal, In combination with viable *ct* alleles, some flies show abnormal venation. *ctl*^{2c}*l/Dp(l;3)snl3*^{al} males viable but sterile. RK2A.
cytology: Associated with *T(l;3)ct*^{I2c}*l* = *T(l ;3)7B2-3;7D2-6;85.*

***ct^{12c2}**
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2}*^{2}. RK2A.
cytology: Possibly associated with *Dt(l)ct*^{12c2} — *Df(l)7B2-3;7B6-7.*

***ct^{13}**
origin: Spontaneous.
discoverer: Bridges, 21f7.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 25: 35 (fig.).
phenotype: Like *ct* but females usually sterile. RK2.

$_{C}$f73o7
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct*^{2}®^{2}. RK2A.
cytology: Associated with *In(l)ct**^{3mi} — *In(l)7B2-3; 19-20.*

***ct13a2**

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Similar to *ct*^{6}. RK1.
cytology: 7B1-2 show abnormal staining and ectopic pairing with heterochromatic regions.

***ct13b1**

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct^e?*. RK2A.
cytology: Associated with *T(l;4)ctl3bl - T(l;4)lA;7B2-3;101A-D;102.*

***ct14a1**

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Slightly less extreme than *ct*^{6}. RK1.
cytology: Salivary chromosomes normal.

$_{c}$*fUa2

origin: X ray induced,
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct^^*. RK2A.
cytology: Associated with *T(l;2)ctl*^{4a}*2 = T(l;2)7B2-4;19-20;41El-2.*

$_{c}$*fl4a3

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct2a2*$_{f}$ but *ct^'f*^{n}*3/Dp(l;3)sn^3ai* shows reduced viability. RK2A.
cytology: Associated with *In(l)ct*^{14a3} = *ln(l)7B2-3;20.*

***ct14b1**

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like cf2«2, RK2A.
cytology: Associated with *Dt(l)ct*^{14bl} = *Df(l)7B2-3;7C3'4.*

$_{c}$*fUb2

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *c t ^*. RK2A.
cytology: Associated with *In(l)ct*$^{14l>}$*2 - In(l)3D2-5;7B2'4.*

$_{cf}$*Uc1

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like cf-?«2. RK2A.
cytology: Associated with *Df(l)ct*^{14cl} = *Df(l)7B3-4;7B6-9.*

***ct15b1**

origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
phenotype: Like *ct2*2*. RK2A.
cytology: Associated with *Df(l)ct*^{1Sbl} = *Df(l)7B2-4;7B6-7.*

ct15B4

origin: X ray induced in *In(l)sc*^{slL}*sc*^{8R}*+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53
references: Valencia, 1966, DIS41: 58.
phenotype: Male viable. RK2.

$_{c}$*f36b

origin: Spontaneous.
discoverer: Stalker, 36b28.
references: Spencer, 1937, DIS 7: 20.
phenotype: Slight nick at tip of one or both wings. Less than 50 percent penetrance at 19°C, 85 percent penetrance at 25°, and 100 percent penetrance at 29°. RK3.

cf43aHl

origin: X ray induced.
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
phenotype: Male lethal. RK2A.
cytology: Associated with *In(l)ct*^{43aH1} = *In(l)4Bl-4;7B4-C1 + In(l)10D5-6;20B-C.*

***ct461**

origin: X ray induced.
discoverer: King and Poulson, 461.
references: Poulson and King, 1948, DIS 22: 54.
phenotype: Distal edges of wings scalloped in area between L3 and L4, and, occasionally, lateral surface of wing toward L5 scalloped. Abdomen, antenna, arista, and eye effects of *ct* absent. Classification of males and females reliable. More extreme than *ct*^{n} and more viable than *ct*^{6}. *ct*^{461}*/ct*^{6} flies have slightly nicked wing tips resembling *ct*^{n}. RK1.

***$_{c}$f50e**

origin: Spontaneous.
discoverer: Bakkum, 5Oe.
references: Mickey, 1951, DIS 25: 74.
phenotype: Wings cut to points. Eyes slightly ovoid. Viability and fertility lowered, especially in females. RK2.

ct62a

origin: Recovered among progeny of radiofrequency-treated male,
discoverer: Mickey.
references: 1963, DIS 38: 28.
phenotype: Like *ct.* RK1.

$_{cf}$*62f

origin: Spontaneous in *Base.*
discoverer: Mickey, 62f8.
references: 1963, DIS 38: 28.
phenotype: Lethal in male. RK2A.

***cf268-l**
origin: X ray induced.
discoverer: Demerec, 33j.
phenotype: Lethal and cell lethal. RK2.
cytology: Salivary chromosomes normal (Hoover).

*cf268-2
origin: X ray induced.
discoverer: Demerec, 33k.
phenotype: Lethal but not cell lethal. RK2.
cytology: Salivary chromosomes normal (Hoover).

*cf268-3
origin: X ray induced.
discoverer: Demerec, 33k.
phenotype: Lethal but not cell lethal. RK2.
cytology: Salivary chromosomes normal (Hoover).

*cf268-5
origin: X ray induced.
discoverer: Demerec, 33k.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;3)ct268-5 = T(l;3)7B2-3;90C4-Dl.*

*cf268-6
origin: X ray induced.
discoverer: Demerec, 331.
phenotype: Lethal but not cell lethal. RK2.
cytology: Salivary chromosomes normal (Hoover).

*cf268-13
origin: X ray induced.
discoverer: Demerec, 34f.
references: Hoover, 1937, Genetics 22: 634-40. 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34.
phenotype: Lethal but not cell lethal. RK2A.
cytology: Associated with *In(l)ct26S-l 3- ~ln(l)2E3-F1;2F2-3;7B2-3;7B4-5;19A4-5;19A6-B1.* Salivary bands 2F1-2, 7B3-4, and 19A5-6 missing.

*cf268-75
origin: X ray induced.
discoverer: Demerec, 34g.
phenotype: Lethal but not cell lethal. RK2.
cytology: Salivary chromosomes normal (Hoover).

*cf268-17
origin: X ray induced.
discoverer: Demerec, 34h.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;2)ct268-l7 = T(l;2)7B2-5;41E2-4* (Hoover).

*cf268-18
discoverer: Demerec, 34i.
references: Hoover, 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420—34.
phenotype: Lethal. RK2A.
cytology: Associated with *InCl^t269,n1^ = In(l)7B2-3;7B4-5;lW8-9.*

*cf268-20
origin: X ray induced.
discoverer: Demerec, 35g.
references: Hoover, 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420—34.
phenotype: Lethal and cell lethal. RK2A.
cytology: Associated with *In(l)ct26S,n20 = In(l)6Fll-7Al;7B5-6;l OBI 1-12.*

***cf268-21**
origin: X ray induced.
discoverer: Hoover, 35i.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;3)ct268-21 = T(l;3)7B3-4; 7B4-5; 96 F.*

*cf268-23
origin: X ray induced.
discoverer: Hoover, 35g.
phenotype: Lethal but not cell lethal. RK2(A).
cytology: Salivary chromosomes show possible deficiency for 7B3.

*cf268-24
origin: X ray induced.
discoverer: Hoover, 35i.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;2)ct268-24 = T(1;2)7B2-5;41F6-42A1.*

*cf268-26
origin: X ray induced.
discoverer: Hoover, 35j.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;2)ct268-26 = T(1;2)7B3-C1;36E.*

*cf26B-27
origin: X ray induced.
discoverer: Hoover, 35j.
references: 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34.
phenotype: Lethal but not cell lethal. RK2A.
cytology: Associated with *In(l)ct268-27 = In(l)3D6-El;7B3-5.*

*cf268-29
origin: X ray induced.
discoverer: Demerec, 38d.
phenotype: Lethal but not shown that lethality at *ct* locus. RK2A.
cytology: Induced simultaneously with but presumably separable from *T(l;3)lz268,29 = T(1;3)8D8-9;81F.*

*cf268-30
origin: X ray induced.
discoverer: Hoover, 38d.
phenotype: Lethal and cell lethal. RK2A.
cytology: Associated with *Df(l)ct268-30 = Df(l)7B2-3;7C3-4.*

*ct268-31
origin: X ray induced.
discoverer: Demerec, 38d.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;3)ct2^S-3l = T(1;3)3D2-3;7B2-5;84D4-5;86B4-C1;88F* (Hoover).

*cf268-32
origin: X ray induced.
discoverer: Demerec, 38e.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;'2)ct26S-32 = T(l;2)lE-F;3D-E;7B2-5;46* (Hoover).

*ct268-33
origin: X ray induced.
discoverer: Demerec, 38e.
phenotype: Lethal. RK2A.

cytology: Associated with *T(l;2)ct^{268}~^{33} = T(1;2)7B2-5;41E* (Hoover).

*$_{c}$*f268-35*

origin: X ray induced.
discoverer: Demerec, 38k.
phenotype: Lethal. RK2.
cytology: Salivary chromosomes normal (Sutton).

*$_{c}$*f268-36*

origin: X ray induced.
discoverer: Demerec, 39j.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;3)ct268-36 = T(1;3)7B2-C1;66F.*

*$_{c}$*f268-37*

origin: X ray induced.
discoverer: Demerec, 39k.
references: 1940, Genetics 25: 618—27 (fig.). Sutton, 1940, Genetics 25: 534-40.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;3)ct268-37 = T(l;3)5D2-3;7B2-3;80C-F.*

*$_{c}$*f268-38*

origin: X ray induced.
discoverer: Demerec, 39k.
phenotype: Lethal. RK2.
cytology: Salivary chromosomes normal (Sutton).

*$_{c}$*f268-39*

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Lethal. RK2.
cytology: Salivary chromosomes normal (Sutton).

*$_{c}$*f268-40*

origin: X ray induced.
discoverer: Demerec, 39k.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;2;3)ct268-40 = T(l;2;3)7D2-3;10A5-6;21B-C;28-29;40-41;75B-C;87D;88C;92.*

*$_{c}$*f268-4l*

origin: X ray induced.
discoverer: Demerec, 391.
phenotype: Lethal. RK2A.
cytology: Associated with *T(l;2)ct^{268}~^{41} = T(l;2)7B2-5;37C2-3.*

$_{c}$*f268-42*

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Lethal. RK2A.
cytology: Associated with *D((l)ct$^{26S\prime 42}$ = Dt(l)7A5~6;7B8-Cl.*

$_{c}$fdo'vg*: *cut-dominigene for vestigial

discoverer: Goldschmidt.
references: 1935, Z. Induktive Abstamrnungs- Vererbungslehre 69: 36—131 (fig.). 1935, Biol. Zentr. 55: 535-54. Gardner, 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 85-102.
phenotype: *ct^{do}~^{v}if+* interacts with *vg/+* to produce scalloped wings. RK3.
other information: Presumed by Goldschmidt to enhance dominance of *vg* and thus termed a ''dominigene.''

cfK; *cut of Krivshenko*

origin: Spontaneous.
discoverer: Krivshenko.
references: 1956, DIS 30: 74.
phenotype: Both margins, as well as tips, of wing are scalloped. Bristles of mesonotum, and especially scutellum, are fine as in Minutes. Bristle abnormality cannot be separated from wing effect by crossing over. Viability and fertility of both sexes high. RK1.
cytology: Salivary gland chromosomes appear normal.

ct": cut'notch

origin: Recovered among progeny of heat-treated flies.
discoverer: Ives, 32c3.
references: Plough and Ives, 1935, Genetics 20: 42-69. 1934, DIS 1: 31.
phenotype: Wings notched at tips. Classification of males reliable, of females harder, but perfect at higher temperatures. Viability excellent. RK1 in male.

**Cfn4*

origin: Spontaneous.
discoverer: Mischaikow, 58g.
references: 1958, DIS 32: 83.
phenotype: Wings notched at tips and inner margins, similar to *ct^{n}*. Excellent viability and fertility. RK1.

**Ctn63*

origin: Spontaneous.
discoverer: Datta, 63bll.
references: Sarkar, 1963, DIS 38: 28.
phenotype: Wings cut to point and notched. Abdominal bands somewhat warped. Expression more extreme in females than in males. Classification, fertility, and viability excellent. RK1.

ct^{s}°: cut of Sytko

discoverer: Sytko.
references: Agol, 1936, DIS 5: 7.
phenotype: Deeply notched wing tips. Good expression and viability. RK1.

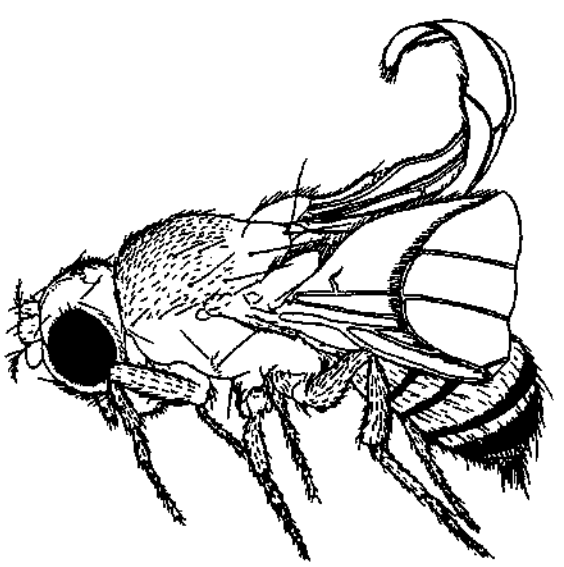
ctt: contorted

location: 1-0.3.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 84.
phenotype: Wings shorter than normal and abnormally shaped; frequently curved either convexly or concavely. Eyes rough and slightly altered in shape. Bristles thinner and straggly; orbitals frequently reduced or absent. Male genitalia frequently slightly twisted and abnormal. Males fertile and females sterile. RK2.

cu; *curled*

location: 3-50,0.
origin: Spontaneous.
discoverer: Morgan, 15115.
references: Morgan and Bridges, 1923, Carnegie Inst. Wash. Publ. No. 327: 152 (fig.).

Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 215 (fig.), 223.
Whittinghill, 1937, DIS 7: 22.
phenotype: Wings curved upward throughout length and slightly divergent. Body color dark. Post-scutellars erect and crossed. Good nutrition of larvae enhances curled character as does high temperature in last day of pupal life. (Nozawa, 1956, Japan J. Genet. 31: 321-26). RK1.
cytology: Shown to be in region 86D2 through 87B2 by its inclusion within the synthetic deficiency with *3R* proximal derived from *T(3;4)86D = T(3;4)86D2-3;101F* and *3R* distal derived from *T(Y;3) P102 = T(Y;3)87B2-3 (Cleland).*



cu: curled

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 152.

*$_{cu}$700.69
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like cu. RK1.
cytology: Associated with *T(l;3)cu^{l} 00.69 – T(1;3)6B1-C1;88A4-B1.*

*$_{cu}$100.384
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Curled in combination with cu; homozygotes semilethal. RK2.
cytology: Salivary chromosomes normal.

*$_{cu}$300.2J5
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Curled in combination with *cu;* homozygous lethal. RK2.
cytology: Salivary chromosomes normal.

Cu: Curl
location: 2-55.2 (located using *b* and *en).*
origin: Spontaneous.
discoverer: Ives, 48e3.
references: 1948, DIS 22: 53.
phenotype: Distal part of wing curled as in *Cy;* proximal part to just beyond alula maintains lateral compression and indentation fold of unfolded marginal wing. Usually an extra cross-vein beyond posterior crossvein extending across L2, L3, and L4. *Cu/+* and Cu/Cu identical; both have good viability. RK1.

Cu^{A}: Curl-Argentine
origin: Spontaneous.
discoverer: Fernandez Gianotti.
synonym: *Ac: Argentine Curly.*
references: 1948, DIS 22: 53.
phenotype: Wings curled more strongly than *Cy;* waxy texture. Homozygous viable; viability and fertility good. RK2.
other information: Allelism inferred from similarity in phenotype and genetic location (2-56.6) to *Cu.*

Cu-3: Curl in chromosome 3
location: 3-66.0.
origin: Spontaneous.
discoverer: Erickson and Meyer, 51c.
synonym: Cur; *Curl* preoccupied.
references: Meyer, 1952, DIS 26: 66.
phenotype: Heterozygote has curly wings with parchment-like texture resembling *Cy.* Homozygous lethal. RK2.

cu-X: *curled-X*
location: 1- (not located but not allelic to ex).
origin: Spontaneous in *In(l)dl-49+B^{M1}, y sc v.*
discoverer: Krivshenko, 57j29.
references: 1956, DIS 32: 80.
phenotype: Males have wings that are bent upwards and diverge slightly. *cu-X* is never expressed in females. It represents a mutation whose phenotypic expression is sex limited. Expressed equally well in males with and without a *Y* chromosome. RK2.

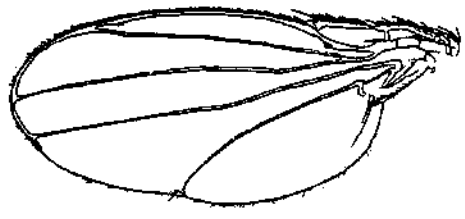
cubitus interruptus: **see *ci***

cuh **curvi**
location: 2-23.4 (1.4 to the right of *Sp* and 0.5 to the right of *lys).*
origin: Spontaneous.
discoverer: Nicoletti.
synonym: *curved.*
references: 1957, DIS 31: 84.
phenotype: Distal half of wing curved upward. Viability and expressivity very good. RK1.

cupola: **see *cpl***

cur: curvold
location: 3-30.
origin: Spontaneous.
discoverer: Bridges, 33cl4.
phenotype: Wings divergent and curved down. Resembles c. Viability erratic. RK3.

Cur: see *Cu-3*
Curl:* see *Cu
curled: see co
Curled blistered:* see *Cb
***curlex:* see ex**
Curly:* see *Cy
Curlyoid:* see *Cyd
***curved:* see c**
curved: see cui
Curved of Krivshenko: see C-K
curvi: see *cut*
curvoid: see cur
cuf: see cf



cv: *crossveinless*
From Weinstein, A., 1920, Proc. Natl. Acad. Sci. U.S. 6: 625-39.

cv: *crossveinless*
location: 1-13.7.
origin: Spontaneous.
discoverer: Bridges, 19112.
references: 1920, Proc. Natl. Acad. Sci. U.S. 6: 660-63.
Weinstein, 1920, Proc. Natl. Acad. Sci. U.S. 6: 625-39 (fig.).
phenotype: Crossveins absent or traces only present. Veins L3 and L4 slightly delta at tips. Classifiable in unexpended wings. Wing effects due to excessive contraction in the pupal period, obliterating the cavity which should normally remain between the epithelia to form the vein (Waddington, 1940, J. Genet. 41: 75-139). RK1.
cytology: Salivary-chromosome studies by Demerec and Sutton show locus to lie from 4F1-2 through 5D1-2 inclusive (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Region can be narrowed to 4F9 through 5D2 on basis of inclusion of cv^+ in *Dp(l;l)ybl « Dp(l;l)lB2-3;4F8-9;5D4-5* (Lindsley).

cv-2: *crossveinless on chromosome 2*
location: 2-96.2.
origin: Spontaneous.
discoverer: Nicoletti, 62j.
phenotype: Anterior and posterior crossveins absent. RK1.
cytology: Salivary chromosomes normal.

**cv-b;* *crossveinless-b*
location: 3-65.
origin: Spontaneous.
discoverer: Bridges, 24k8.
phenotype: Crossveins reduced or absent. May overlap wild type. RK3.

cv-c: *crossveinless-c*
location: 3-54.1 (4.7 units to the left of *sb<J2* by C. Hinton).
origin: Spontaneous.
discoverer: Stern, 25gl3.
references: 1934, DIS 1: 35, 36.
phenotype: Posterior crossvein usually absent or greatly reduced. Anterior crossvein usually present but often detached. Eye flattened or with vertical shallow furrow. Legs weak, especially tarsal joints. Occasionally overlaps wild type. RK2.
cytology: In region 88A through 88C, based on its inclusion in the synthetic deficiency with *3R* proximal derived from *T(Y;3)PJ02 = T(Y;3)87B2-3* and *3R* distal derived from *T(3;4)P86 = T(3;4)88B-C;101* (Bernstein) as well as in the duplication from *T(1;3)O5 = T(1;3)4F2-3;62B-C;88A-C;92C-D* (Lindsley and Grell, 1958, DIS 32: 136).

cv'd: crossveinless-d
location: 3-65.
origin: Appeared among progeny of ether-treated flies.
discoverer: Duncan, 34c.
references: 1935, DIS 4: 7.
phenotype: Posterior crossvein absent or reduced to an oblique fragment or bar parallel to L5. Anterior crossvein sometimes detached. RK2.
other information: Possibly an allele of cv-b.

*cvw; convex *wing*
location: 1-58.2.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Wings slightly shortened and arched convexly. Variable and may overlap wild type. Tergites in some females have serrated edges or are grossly deformed. Viability and fertility good in both sexes. RK2.

cx; cur/ex
location: 1-13.6.
origin: Spontaneous,
discoverer: R. L. King, 1927.
phenotype: Wings bent upward for posterior two-thirds of length; anterior one-third warped and margin kinked. Wings not spread. RK2.
cytology: Salivary analysis by Demerec and Sutton shows that locus lies from 4F1-2 through 5D1-2 inclusive (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

cX: see *c(3)G*

cx*9; *curlex-twisted genitalia*
origin: Spontaneous,
discoverer: Curry, 37cl9.
phenotype: Wings always divergent, usually 45° from axis. Basal one-third of wing wavy, but less so than in cx; posterior two-thirds of wing curled slightly upward or downward. Genitalia of nearly all males rotated, usually 45° counterclockwise.

Flies dwarfish. Viability irregular. Male sterile. RK2.

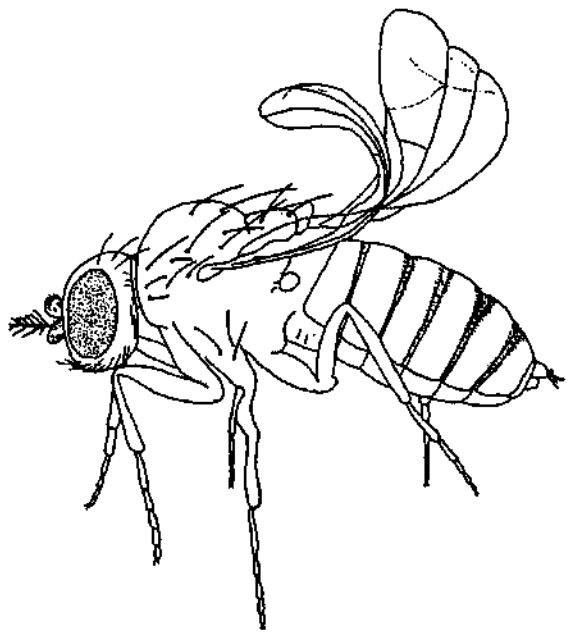
cx-b: see *wy*[2]

CxD: see *In(3LR)CxD*

CxF,D: see *In(3LR)DcxF*

Cy: Curly

location: 2-6.1 (removed from *In(2L)Cy* and located by Tinderholt).
origin: Spontaneous.
discoverer: L. Ward, 20c.
references: 1923, Genetics 8: 276-300 (fig.)-
phenotype: Wings curled upward; rarely overlaps wild type at 25°, but frequently overlaps at 19°C. Curvature caused by the unequal contraction of the upper and lower epithelia during the drying period following emergence from the pupa case (Waddington, 1940, J. Genet. 41: 75-139). Classifiable in single dose in triploids. Usually homozygous lethal, but may emerge as dwarf with more extreme wing character. RK1A.
cytology: Ordinarily inseparable from *In(2L)Cy* = *In(2L)22Dl-2;33F5-34Al,* although it has been separated by Tinderholt (1961, DIS 35: 47).
other information: *Cy* removed from *In(2L)Cy* still causes a local reduction in crossing over in the *ed-cl* region (Sederoff).



Cy: *Curly*
From L. Ward, 1923, Genetics 8: 276-300.

Cyd: Curlyoid

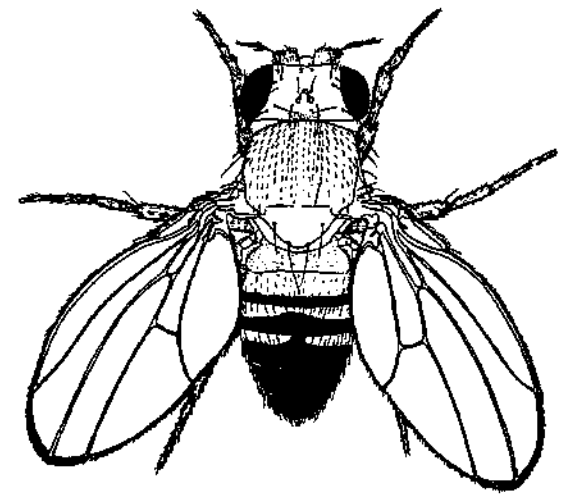
location: 3- (rearrangement).
discoverer: Jollos.
references: Curry, 1939, DIS 12: 46.
phenotype: Wings curled upward in heterozygote. Homozygous lethal. RK2A.
other information: Associated with an inversion of *3R;* possibly *In(3R)P.*

cy/: see rA'[c>]'

d: dachs

location: 2-31.0.
origin: Spontaneous.
discoverer: Morgan and Bridges, 12k22.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 216 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.), 223.
phenotype: Tarsi four jointed instead of five jointed. Legs short and held close to body. Leg effects enhanced by ss[a] and *ss*B* (Villee, 1945, Genetics 30: 26—27). Wings smaller than wild type, narrowed, with L2 and L3 joined near anterior crossvein; distance between crossveins smaller and crossveins sometimes absent. Angle between L2 and L5 greater than normal. Eyes small and rough. Posterior scutellar bristles erect. Viability erratic. Frequently sterile. RK2.

dU see *Df(2L)d*



D: Dichaete
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 127.

D: Dichaete

location: 3-40.7 (40.4-41.0).
origin: Spontaneous.
discoverer: Bridges, 15a3.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 127 (fig.).
phenotype: Wings extended uniformly at 45° from body axis and elevated 30° above (occasionally sharply downcast and dragging). Alulae missing. Dorsocentrals and some other bristles reduced in number (Sturtevant, 1918, Carnegie Inst. Wash. Publ. No. 264; Plunkett, 1926, J. Exptl. Zool. 46: 181-244). Head often deformed or split in postvertical region. Halteres turned down. Homozygous lethal. Nearly lethal in combination with *eyD* (Sobels, Kruijt, and Spronk, 1951, DIS 25: 128). Partially suppressed by sc alleles that remove postverticals (.sc, sf*. *sc*[6], *sc*[7]) but not by others *(sc^, sc$)* (Sturtevant). Ciassifiahle in triploids. RK2A.

cytology: Inseparable from *Jn(3L)D = In(3L)69D3-El;70C13-Dl* (Bridges in Morgan, Bridges and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).

origin: Spontaneous; derivative of *D.*
discoverer: Plunkett, 24f.
references: 1926, J. Exptl. Zool. 46: 181-244.
phenotype: Less extreme than *D.* Wings extended and lifted; alulae missing. Head effect of *D* missing. Bristles usually wild type; occasionally outer verticals, upper humerals, presuturals, and anterior postalars absent. Viability of *D^/+* better than *D/+*. RK2A.
cytology: *In(3L)D* present as in D.

**D^E^: Dichaete-Extended*

origin: Spontaneous in £>/+ culture; probably a modified *D.*
discoverer: Sturtevant, 16fll.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 165 (fig.).
phenotype: Wings divergent but not bent at base. Bristles and alulae normal. Overlaps wild type. Homozygous lethal; *D/D^* is lethal. RK3(A).

da: daughterless

location: 2-39.3.
origin: Spontaneous.
discoverer: Bell,
references: 1954, Genetics 39: 958—59.
1954, DIS 28: 73.
phenotype: Homozygous *da* females, mated to any male, produce normal sons but no daughters. Otherwise, *da/da* individuals appear wild type. Lethal action of da occurs in egg stage. Counce finds lethal female embryos show consistent abnormalities in midgut formation. In about half the abnormal embryos, shortening of germ band fails and anus and posterior spiracles open on dorsal surface behind head segments. Differentiation of almost all other tissues surprisingly normal. RK3.

cfe; see *dar*
dachs: see *d*
dachsous: see *ds*

**dar: darky*

location: 1-0 (no crossovers with sc in 547 flies).
origin: X ray induced.
discoverer: Fahmy, 1956.
synonym: *da;* preoccupied.
references: 1959, DIS 33: 84,
phenotype: Small, heavily melanized flies. Sometimes wings curl upward. Male sterile; viability about 15 percent wild type; late ©closing. RK2.

**dark: darkener of white-eosin*

location: Autosomal.
discoverer: Bridges, 13i23.
references: 1916, Genetics 1: 148.
1919, J. Exptl. Zool. 28: 347.
phenotype: Specific partial suppressor of *w^e^*. RK3.

dark: see *dk*
dark body: see *db*
dark bubbly: see *dkb*
dark eye: see ***dke***
dark eye^1^: see *sf3* ***2e***
dark red brown: see ***drb***
Darkened eye: see ***Dke***
darkener of w/i/fe-eos/n: see ***dark***
darker legs: see *thl^d^*
darky: see ***dar***
daughterless: see ***da***

db: dark body

location: 3-44.4.
origin: Spontaneous.
discoverer: Chovnick and Talsma, 1965.
references: 1966, DIS 41: 58.
phenotype: Body color darker than normal. Male rarely survives; dies in late pupal stage. RK2.

DcX: see *ln(3LR)CxD*
DcxF: see *In(3LR)DcxF*

**dd: displaced*

location: 1-24.3.
discoverer: Bridges, 31d7.
phenotype: Antennae sunken into shortened head; eyes also deformed. Females often sterile. RK2.
cytology: Locus lies between 7C4-5 and 8C1-2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Further restricted to 7E1 through 8C2, on the basis of its genetic location to the right of *oc* which is excluded from *Df(l)sn = Df(l)7B2-3;7D22-El* (Hintonand Welshons, 1955, DIS 29: 125-26).

**ddh displacedlike*

location: 1-27.2.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer Fahmy, 1953.
synonym: *dd$.*
references: 1959, DIS 33: 84.
phenotype: Frontal region with antennae sunken into shortened head. Eyes deformed. Thoracic bristles stiff and slightly shortened. Wings frequently misheld. Males sterile and viability slightly reduced. RK2.
other information: One X-ray-induced allele.

**de: deacon*

location: 1-56.
origin: X ray induced.
discoverer: Muller, 26112.
references: 1935, DIS 3: 29.
phenotype: Body and wings narrow and rectangular. Eyes slightly flattened, with oblique cast. RK3.
other information: Possibly an allele of *si* (1-53.5).

De; *Dented*

location: 2- (between *dp* and *b).*
origin: X ray induced,
discoverer: Belgovsky, 36c.
references: 1937, DIS 8: 7.
phenotype: In heterozygote most flies show one or two indentations on thorax at front. Homozygote has two smaller, sharper dents. Wings often raised. RK3.

deacon: see *de*
deep orange: see *dor*
defective: see *df*
deflected wing: see *dfw*

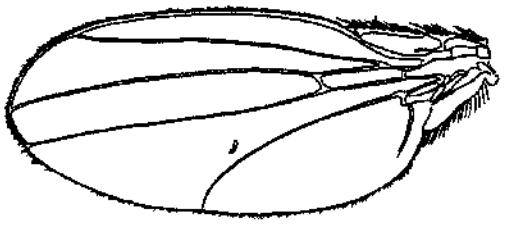
Deformed: **see *Dfd***
deformed antennae: **see *dfa***
deformed eye: **see *dfi***
deformed terga: **see *dft***
deformed wings: **see *dwg***
degenerated spermatheca: **see *dg-a***
Delta: **see *Dl***
delta vein: **see *thv^{d}***
delta wing: **see *dta***
deltex: **see *dx***
deltoid veins: **see *dlv***
Dented: **see De**

****dep: depressed***
location: 1-18.
discoverer: Bridges, 13d.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 67 (fig.).
phenotype: Wings turned down at tips, flat from side to side. Somewhat variable but does not overlap wild type. RK2.

****depl: depressedlike***
location: 1-23.
origin: Recovered among progeny of flies treated with Janus green,
discoverer: Muller, 28e20.
synonym: *dep^{r}: depressed-roof.*
references: 1935, DIS 3: 29.
phenotype: Wings droop at sides. Flies dark and weak; bristles fine. Viability variable, about 20 percent wild type. RK3.

depressed: **see *dep***
depressedlike: **see *depl***

****der: deranged***
location: 1-57.2.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Thoracic hairs deranged; many point toward midline. Wings usually obliquely upheld and twisted, bringing inner margins together. Overlaps wild type. Good viability in both sexes, but female fertility reduced. RK3.



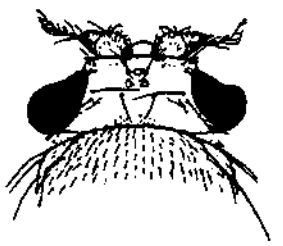
det: detached
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 54.

det: detached
location: 3-72.5.
origin: Spontaneous.
discoverer: Nichols-Skoog, 35k27.
phenotype: Posterior crossveins detached from longitudinals at one or both ends and may be absent. Wings occasionally folded back under or folded flat at middle. Eyes sometimes rough and bulging. Wings slightly spread. Bristles tend to break; scutellars occasionally doubled. RK3.

Detached: **see *Dt***

****df: defective***
location: 1-32.5.
origin: Spontaneous.
discoverer: Bridges, 1513.
phenotype: Head bristles around ocelli missing. Viability poor. RK3.

****dfa: deformed antennae***
location: 1-13.9.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 84.
phenotype: Wings short, broad, either convex or concave, and abnormally held. Eyes small, dark, and rough. Bristles short, stiff, occasionally bent. Trident pattern more pigmented. Abnormal antennae and aristae. Males viable and fertile. Females sterile. RK2.



Dfd: Deformed
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 94.

Dfd: Deformed
location: 3-47.5.
origin: Spontaneous.
discoverer: Cattell, 13g.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 93 (fig.). Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 223 (fig.).
phenotype: Eye reduced ventrally and anteriorly, or furrowed. Vibrissae tufted. Extremely variable, often overlapping wild type, but usually excellent character with *Ly* or at 19°C. Classifiable in single dose in triploids (Schultz, 1934, DIS 1: 55). Homozygous lethal, although Muller reported an occasional homozygote as extreme dwarf with flimsy wings. RK2.
cytology: Salivary gland chromosomes appear normal.

**Dfd38k*
origin: Spontaneous.
discoverer: Mossige, 38k30.
references: 1939, DIS 12: 47.
phenotype: Like *Did.* Homozygous lethal. RK2,

Dfdr; Deformed-recessive
origin: Spontaneous.
discoverer: Bridges, 3014.
synonym: *&m: almond.*

phenotype: Eye small, narrow, and kidney shaped. Overlaps wild type in older cultures. *Dfd^{r}/Dfd* more extreme than *Dfd*/+, RK2.

**Dfdr2*

origin: Spontaneous.
discoverer: Pierce.
references: 1945, DIS 19: 46.
phenotype: Eyes smaller and more constantly kidney shaped than in *Dfd^{r}*. Wings thin, dull, uneven, slightly spread (about 60° from body axis), and drooping. Body slightly smaller and lighter colored than normal. Bristles shortened and delicate. Last abdominal segment of male may be rotated. Viability low. *Dtd^{r2}/Dfd^{T}* slightly more extreme than *Dfd^{r}/Dfd^{r}*. RK2.

Dfdr57

origin: Spontaneous.
discoverer: Hollander, 1957.
references: 1960, DIS 34: 51.
phenotype: Kidney-shaped eye. Penetrance and expressivity variable. RK2.

Dfdr60

origin: Spontaneous.
discoverer: Kidwell.
references: 1961, DIS 35: 46.
phenotype: Eyes reduced. Expression varies from absence of both eyes to wild type. Penetrance varies from 75 to 100 percent. Penetrance increased by selection for reduced eye. About 5 percent of *Dfd^{r60}/+; ey/+* flies exhibit deformed phenotype. RK2.

Dfd^{ri}-: Deformed-recessive of Luers

discoverer: Luers.
references: Vogt, 1946, Experientia 2: 313-15. 1947, Biol. Zentr. 66: 81-105 (fig.)-
phenotype: Like *Dfd^{r}*. RK2.

**dfi: deformed eye*

location: 3- (near D).
origin: Recovered among descendants of heat-treated flies.
discoverer: Ives, 32c.
synonym: *rough III.*
references: Plough and Ives, 1934, DIS 1: 34. 1935, Genetics 20: 42-69.
phenotype: Eyes roughish, reduced, and misshapen. Overlaps wild type. Female sterile, poorly viable. RK3.

**dft; deformed tergi*

location: 1-33.7.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer. Fahmy, 1956,
references: 1959, DIS 33: 84.
phcnotype: Small fly with small, slightly rough eyes. Wings slightly divergent or upheld, abnormally shaped with occasional incision of the inner margin. Bristles slightly thinner and shorter with one or both postscutellars frequently absent; and a dorsocentral occasionally missing. Abdominal segmentation deformed to various degrees; abdominal hairs fewer and deranged. Males poorly fertile, viability about 50 percent wild type. RK2.

dfw: deflected wing

location: 1-21.6.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer:: Fahmy, 1955.
references: 1959, DIS 33: 84.
phenotype: Wings slightly divergent and upheld to various degrees, often twisted on their axes. Inner margins frequently incised; occasionally wing membranes separated by fluid. Eyes slightly smaller. Males viable and fertile. Females sterile; viability reduced. RK2.
other information: One X-ray-induced allele.

**dg-a: degenerated spermatheca*

location: 3-75.5.
origin: Spontaneous.
discoverer: Collins, 21a.
references: Wexelsen, 1928, Genetics 13: 389-400 (fig.).
phenotype: Adult females show degeneration and pigmentation of epithelial cells of spermathecae 24 hr or more after eclosion. Viability and fertility good. Penetrance 100 percent. RK3.

dh: see *eg^{2}*

**di: dimorphos*

location: 1- (near spindle attachment).
origin: Spontaneous.
discoverer: Harnly, 32dlO.
references: 1935, J. Exptl. Zool. 72: 75-99 (fig.). 1940, DIS 13: 49.
phenotype: Specific lengthener of *vg* wings, especially in males *(di; vg* female much like *vg).* At higher temperatures, eyes small and rough and wings of both sexes approach wild type. RK2 in *vg* male.

dibrd: see *fr^{di}*

Dichaete: see D

dihedral: see *eg^{2}*

**dil: specific dilutor*

location: 2-57.
origin: Spontaneous,
discoverer: Bridges, 32f22.
phenotype: Dilutes *bw* to pale yellowish brown, and *w^{e}, w^{e2}* and *w^{b}** to paler grades. RK3.

**dil-3: dilute in chromosome 3*

location: 3- (not located).
discoverer: Bridges, 1519.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 151.
phenotype: Eye color like maroon, overlaps wild type. RK3.

***c///-w°: *dilutor of* wft/fe-opricof**

location: 3- (not located).
discoverer: Weinstein.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218.
phenotype: Lightens »^{a}. RK3.

dilute in chromosome 3: see *dil-3*

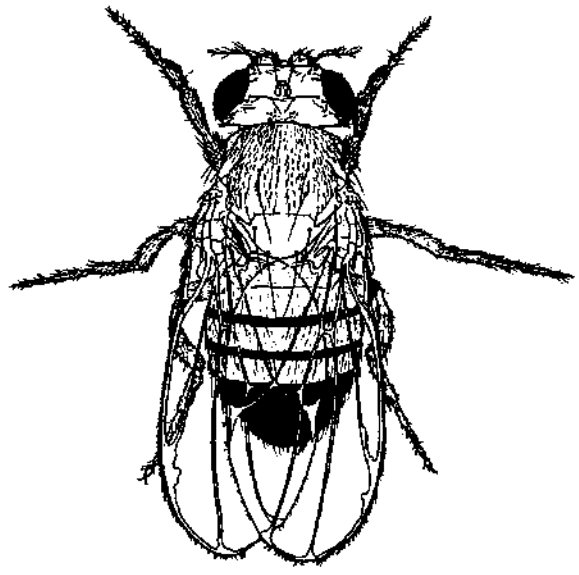
dilute ocelli: see *po^{2}*

Dilute-1: see **bwV291**

Dilute-2: see **bwV30k1**

Dilute-3: see **bwV30k10**

Dilute-4: see *bwV30ki2*
Dilute-5: see *bwV3 0ki3*
Dilute-6: see *bwV30kis*
dilutor of white-apricot: **see *dil-w^a***
diminutive: **see *dm***
dimorphos: **see *di***
Din: Dinty
location: Unknown; associated with a rearrangement.
origin: X ray induced.
discoverer: Braver, 55a.
references: 1955, DIS 29: 70.
Pollock, 1963, DIS 38: 50.
phenotype: In male and heterozygous female, central portion of vein L2 interrupted. Posterior supra-alar bristles absent in 95—99 percent of females and 97—99.5 percent of males. Anterior postalar bristles absent in 6—11 percent of females and 2—6 percent of males. Wings divergent. Viable and fertile in male and heterozygous female; homozygous lethal. RK2.
cytology: Associated with *T(l;2;3)Din = T(1;3)3C;63A + T(2;3)39D;73A.*
****dis: distorted eye***
location: 1-23.
origin: Recovered among progeny of natural-gas-treated fly.
discoverer: Mickey, 49b5.
references: 1951, DIS 25: 74.
phenotype: Whole or part of eye roughened. Sometimes bristles absent or doubled. Wings may be roughened with nicked margins and plexus veins. Expressivity variable. RK3.
cytology: Salivary chromosomes appear normal.
Discolored: see *bw^v?*
dishevelled: see ***dsh***
displaced: see ***dd***
displaced!ike: see ***ddl***
disrupted: **see *dsr***
distorted* eye:** see ***dis
disturbed segmentation": see ***dss***
divergent: see ***dv***
divergent wings: see ***dvw***
divers: see ***dvr***
****dk: dark***
location: 3- (not located).
discoverer. Clausen, 20g.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 235.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 223.
phenotype: Eye color maroon. Overlaps wild type. RK3.
****dkb: dark bubbly***
location: 2- (to the left of *vg).*
discoverer: Bridges, 38d25.
phenotype: Thorax has dark bubbly longitudinal streak. RK3.
***dke: dark* eye**
location: 2-73.
origin: Spontaneous.
discoverer: Bridges, 38cll.
phenotype: Eye color soft, dull, and dark, like *sf. sf/dke* is wild type. Flies have 65 percent normal red pigment and 98 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1-10). RK2.
Dke: Darkened eye
location: 2- (not located).
origin: X ray induced.
discoverer: Hendrix. 1963.
references: 1964, DIS 39: 58.
phenotype: In heterozygotes eye facets roughened with black-spotted pigmentation, varying from light spotting near margin of eye to heavy pigmentation covering one-half of the eye. A bleached area sometimes appears adjacent to the pigmentation. Effect usually symmetrical. Homozygous lethal. RK3.
cytology: Salivary chromosomes appear normal (Peacock).
dkl: **see *thl^d***



Dl: Delta
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 197.

Dl: Delta
location: 3-66.2.
origin: Spontaneous.
discoverer: Bridges, 18k30.
references: Bridges and Morgan, 1923, Carnegie Inst, Wash. Publ. No. 327: 197-201 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 75 (fig.).
phenotype: Veins thickened and broadened into deltas at junction with margin. Eyes somewhat small and slightly roughened. In extreme cases, ocelli run together into a crescent that encloses the ocellar bristles. Hairs on thorax straggly and more numerous. Body color dark. Wings small, dark, and somewhat spread. Effects of *DI* neutralized by *H. DI* and several of its alleles shown to interact synergistically with certain Minutes, producing extreme phenotype and drastically

lowered viability (Schultz, 1929, Genetics 14: 366-419). Homozygous lethal. RK2.
cytology: Located in region 91D1-92A2, inclusively, based on its inclusion within the transposed section of *Tp(3)bxdU0 = Tp(3)89E2-3;91C7-Dl;92A2-3* (E. B. Lewis) and in *Df(3R)Dl» = D((3R)91C6-Dl;92A2-3* (Slizynski). Heterozygous deficiency for 91D1-92A2 produces the *Dl* phenotype since *Tp(3)bKd*l°/+* is $D/^{+}$, whereas *Df(3R)bxdU0/+* j_s *Dl.*

origin: Spontaneous.
discoverer: Bridges, 24110.
phenotype: Like *Dl* but deltas at margin are slight; longitudinal veins between anterior and posterior crossveins and crossveins themselves are thickened. Spreading of wing slighter than in *Dl.* Better viability than *Dl.* Homozygous lethal. RK1.

***DI4**

origin: Spontaneous.
discoverer: Bridges, 26g28.
phenotype: Slight deltas at margin; posterior parts of L2 and L3 thickened to delta at margin; L4 and L5 slight. RK2.
other information: Gives increased crossing over throughout the third chromosome.

Dis

origin: X ray induced.
discoverer: R. L. King, 32d.
phenotype: Resembles *Dl* but deltas are slight. Wings occasionally vesiculated; only slightly spread. Homozygous lethal. RK3.
other information: heterozygote shows reduced crossing over.

***DI6**

origin: X ray induced.
discoverer: Schultz, 33a5.
phenotype: Extreme *Dl.* Veins at basal part of wing thicker than *Dl;* thickening marked along entire L2, with a striking confluent delta at margin; L3 has basal and distal thickening and marginal delta; L4 extremely broad, especially beyond posterior crossvein ending in large delta. Posterior crossvein moderately thick. Wings blistered and wrinkled. Veins inhibited from narrowing in late pupal period [Waddington, 1940, J. Genet. 41: 75—139 (fig.)]. Homozygous lethal. RK2.

origin: X ray induced,
discoverer: Schultz, 33a7.
phenotype: Like D/*. RK3.

***DI7P: Delto-7 of Pan shin**

discoverer Panshin, 1935.
references: 1935, Dokl. Acad. Nauk SSSR 4: 85-88.
phenotype: Like *Dl$.* RK3A.
cytology: Associated with *T(3;4)Dl^p.*

***Dl55k**

origin: X ray induced.
discoverer: Clark.
references: 1956, DIS 30: 71.
MacDonald, 1957, DIS 31: 84.
phenotype: Spreading of veins most marked for L2 and L5. Posterior crossvein thickened, coalescing with the delta of L5. L2 slightly thickened. Expression more extreme at higher temperature, especially in males. Spreading of veins apparent in the 40- to 41-hr-old pupa. Suppressed by *H.* Lethal homozygous and in combination with *Dl3.* RK2.
cytology: Salivary chromosomes normal.

***Dl1; Delta-Barish**

discoverer: Schultz, 1933.
phenotype: Delta venation and eyes of a broad heterozygous Bar type. Homozygous lethal. RK2A.
cytology: Associated with *In(3R)DlB = In(3R)90A;91A* (Schultz).

***DI^{Cf-3}: Delta-Confluent**

origin: Spontaneous.
discoverer: Imaizumi.
synonym: *Cf-3.*
references: 1962, DIS 36: 38.
phenotype: Like *Dl.* Homozygote dies as late embryo or early larva. RK2.

***DlH**

origin: Induced by unspecified chemical (probably mustard gas).
discoverer: Auerbach.
references: 1943, DIS 17: 49.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with $Dl(3R)Dl^{H}$ = *Df(3R)91C6-Dl;92A2-3* (Slizynski).

***D/': Delta-lethal**

origin: Spontaneous.
discoverer: Bridges, 38clO.
synonym: *1(3)DL*
phenotype: Heterozygote normal; homozygote not tested; thought to die in combination with Dl^{12}. RK3.
other information: Presence of a recessive lethal allele of *Dl* on the *H* chromosome inferred from failure to observe Dl^{i2}/H progeny from cross of *h cu* H^2 *ca/In(3R)P, Did ca* X $Dl^{\wedge 2}/?$ A recessive lethal allele of *H* on the Dl^{*2} chromosome seems an equally likely interpretation.

***DlOf: Delta-Overflow**

origin: Spontaneous.
discoverer: Tsukamoto, 1956.
synonym: *Of.*
references: 1956, DIS 30: 79.
1957, DIS 31: 85.
phenotype: Slight deltas at margins; striking confluent effects on longitudinal veins, especially L2 and L5, and near posterior crossvein. Eyes nearly normal, but with spa^{c}**, posterior half of eye surface resembles $spaP^{ot}$. Suppressed by *H.* Lethal homozygous and in combination with Dl^{12}. RK1.

dlv: deltoid veins

location: 1-25.9.
origin: Induced by S-2-chloroethylcysteine (CB. 1592).

discoverer: Fahmy, 1957.
references: 1959, DIS 33: 85.
pbenotype: Wings small, abnormal, with margin occasionally incised, and frequently either divergent or slightly upheld. Extra venation, especially at junctions between longitudinal and costal veins, giving Delta-like formations. In extreme cases, wings grossly deformed and blistered. Excess melanization throughout body. Eyes dark, small, and slightly rough. Total body size reduced. Both sexes viable and fertile. RK1.
other information: One allele induced by CB. 1592.

dm: diminutive

location: 1-4.6.
discoverer: Nichols-Skoog, 33j9.
references: 1935, DIS 3: 10.
phenotype: Bristles and body small and slender. Viability excellent. Females sterile. RK1.
cytology: Locus placed between 3C9 and 3D2 by Slyzinska (1938, Genetics 23: 291—99), at 3C9 by Schultz, and at 3D1-2 by Demerec, Kaufmann, Fano, Sutton, and Sansome (1942, Carnegie Inst. Wash. Year Book 41: 191).

dm264-S8

origin: X ray induced.
discoverer: Demerec, 38d.
references: 1940, Genetics 25: 618-27.
phenotype: Described only as nonvariegated. RK2A.
cytology: Associated with $T(1;3)N^{264\text{-}58}$ ~ *T(l;3)3B2-3;3D6-7;80D-F* (Sutton).

dn: doughnut

location: 3-50.
origin: Spontaneous.
discoverer: Wallbrunn.
references: 1942, DIS 16: 54.
Wright, 1946, DIS 20: 68.
phenotype: Eye of se *dn* has unpigmented spot (in middle or toward posterior) at emergence from puparium. Spot gradually darkens; after 2 days eyes appear sepia. Difficult to detect with wild-type eye color; appears as slightly lighter red spot, which disappears after 2 days. Viability low; many die as pupae at 25°C. Viability nearly normal at 17°C, but character not detectable. Both sexes highly infertile; testes about one-third normal length. Spermathecae very small. External genitalia of both sexes often abnormal. RK3.

dd: see po^2

dor: deep orange

location: 1-0.3 [allelic to dor^1 (Redfield and Schultz; Clancy)].
origin: X ray induced.
discoverer: E. D. King.
references: Merrell, 1947, Am. Naturalist 81: 399_400.
Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 443-61 (fig.).
phenotype: Eye color true orange at 25°C, red-orange at 18°. Chromatographic studies (Counce, 1957, Experientia 13: 354) indicate pteridine patterns differ from wild type. Red pigment reduced (but increased in heterozygous females); *dor/dor* and *dor/+* females accumulate more isoxanthopterine than wild-type females, but *dor* males contain less than wild-type males. These differences detectable in prepupal stages. Ommochrome pigments also affected. Reciprocal transplantation experiments show that eye color is autonomous (Hadorn and Counce). Homozygous *dor* females exhibit same sterility effects as *tu* (Merrell, 1947); i.e., *dor* progeny of dor mothers die. *dor* females crossed with wild-type males produce some *dor/+* daughters. Under certain conditions *dor* males sterile as result of excess accumulation of preadult fat, which mechanically prevents union of gonads with rudiments of rest of genital system (Counce). Post-blastulation development of *dor* progeny of *dor* females abnormal, leading to embryonic death (Hildreth and Lucchesi). Cellular degeneration begins before gastrulation is ended, and by 16 hr, degeneration of embryo is almost complete. Some embryos die at early cleavage regardless of sex. Eggs of *dor* females contain less than normal amounts of yolk (Counce, 1956). The double mutants *dor; ry,* and *dor,* ry^2 are lethal (Luchessi, 1963, Proc. Intern. Congr. Genet, 11th. Vol. 1: 169-70). RK1.
cytology: Placed in region from 1F1 through 2A2 on the basis of its inclusion in *Dp(l;f)1337 = Dp(l;f)lF4-2A3; 19-20* but not in *Dp(l;f)112 = Dp(l;f)lE4-Fl; 19-20* (R. F. Grell, Gersh).

dor61e

origin: Spontaneous.
discoverer: Hildreth, 61e.
references: 1963, DIS 37: 48.
phenotype: Orange eye color. Poor viability. RK2.

dor^1: deep orange-lethal

origin: Spontaneous.
discoverer: Bridges, 15al.
synonym: *1(1)7: lethal(l) 7.*
references: 1916, Genetics 1: 149.
phenotype: Male larvae die 90—lOOhr after hatching. According to Russell [l940, J. Exptl. Zool. 84: 363—79 (fig.)], a gut abnormality appears at 65 hr resulting in obliteration of gut lumen and loss of all food material. Stark observed me Ian otic tumors [1918, J. Cancer Res. 3: 279-301 (fig.); 1919, J. Exptl. Zool. 27: 509-29 (fig.)]. Oftedal studied histology of dor^1 larvae (1953, *Z.* Induktive Abstammungs- Vererbungslehre 85: 408—22). Malpighian tubes nearly colorless except at base. dor^1/'*dor* has orange eyes like *dor/dor* as well as the sterility effects (Clancy; Redfield and Schultz). RK2.

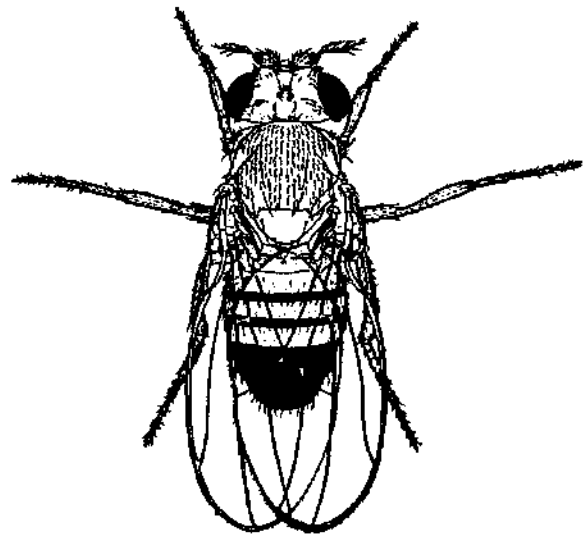
$*dor^{l2}$

origin: X ray induced.
discoverer Alikhanian.
synonym: *1(1)76.*
references: Ardoshnikov, 1941, Dokl. Akad. Nauk SSSR 30: 344-46.
phenotype: Like dor^1. Incidence of dor^{l2}/Y larvae bearing melanotic masses reduced if one parent carries a free duplication carrying *dor**. RK2.

***dor*^{I3}**
origin: Spontaneous.
discoverer: H. W. Lewis.
references: 1954, J. Exptl. Zool. 126: 235-75 (fig.).
phenotype: Like *dorK* Survival of larvae containing melanotic masses optimal at 25°C. *dor*^{I3}*/Basc* female shows more rapid development and higher viability than *+/Basc* female. RK2.

**double: double*
location: 1-0.
origin: Spontaneous.
discoverer: Bridges, 1918,
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 224.
phenotype: Postvertical bristles doubled. Wings very small. Viability somewhat low. RK3.

Double Bar: see *BB*
Double Inhabar: see *B'Bi*
double sex: see *dsx*
Doublet: see *Dp(l;l)BSRMG*
doughnut: see *dn*

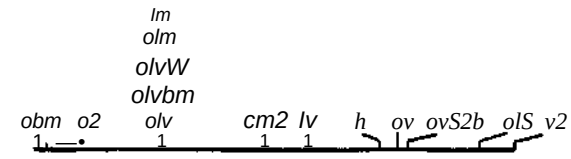


rfow: *downy*
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 64.

dow: downy
location: 1-8.0.
origin: Spontaneous.
discoverer: Bridges, 36c28.
phenotype: Bristles very short and slender, nearly as small as *as.* Males entirely sterile; testis shape normal. Viability good, RK2.

dp; dumpy
location: 2-13.0.
references: Carlson, 1958, Ph.D. Thesis, Indiana Univ.
1959, Genetics 44: 347-73 (fig.1.
Seuthin and Carlson, 1962, Genetics 47: 1017-26

phenorype-: Alleles of *dp* produce three general phermtypes: oblique wings Co), vortices on thorax O), and lethal CO. A specific *mllele* may have one, two, or all of these phenotypes. For example: *dp°* (o) has oblique wings, but no vortices, and is not lethal; *dp*^{ov} (ov) has oblique wings and vortices, but is not lethal; and *dp*^{ol,v} *(olv)* has all three attributes. The three recessive characteristics *o, I,* and v complement one another. Thus *dp*^{ol}*/dp*^{v}, *dp*^{ov}*/dp*^{l}, and *dp°/dp*^{lv} are phenotypically wild type; *dp°/dp°"*, *dp*^{ol}*/dp°v*, and *dp°/dp*^{olv} are o; *dp°v/dp*^{v}, *dp*^{lv}*/dp°v*, and *dp*^{v}*/dp*^{olv} are v; any two lethals are lethal in the *trans* heterozygote.
cytology: Located between 24E2 and 25A2 based on its inclusion in *Df(2L)M-zB = Df(2L)24E2-F1;25A1-2* (Morgan, Bridges, Schultz, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77).
other information: The alleles at the *dp* locus are pseudoallelic and have been positioned by Carlson (1959) and Southin and Carlson (1962) (see map). Carlson often puts the superscripts on the line and has used an apostrophe instead of dp; dp$^{o/}$" may be written, therefore, as *olv* or *'olv.*



Map of the dp locus
From Southin and Carlson, 1962, Genetics 47: 1017-26.

dp: see *dp*^{ov}
dp:* see *dp*^{lv}?

***dp*^{49}**
origin: X ray induced.
discoverer: Fogel, 1949.
references: 1950, DIS 24: 57.
other information: A series of 13 alleles of diverse phenotype. Viability data given (Fogel, 1950).

***dp*^{50c}:** See ***dp*^{o50c}**
dps^{*1}:* see ***dp*^{ov51f}**
dpS2b; see ***dp*^{ov52b}**
**dpS8*
origin: Spontaneous.
discoverer: Fradkin, 1958.
references: 1958, DIS 32: 79.
other information: A series of 14 alleles; not described or tested for viability.

d$_p$*61d*
origin: X ray induced.
discoverer: Thompson, 61d.
cytology: Associated with *T(Y;2)dp*$^{(>1d}$.

***dpb*^{w}:** see *dpobw*

*c/pcm: *dumpy-comma*
origin: Spontaneous.
discoverer: Bridges, 13b5.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 228 (fig.).
phenotype: Sharply outlined depressions of comma shape at anterior edge of thorax. Penetrant in 20 percent of females but rarely in males. RK3.

<Jpcm2
origin: Spontaneous.
discoverer: Meyer, 53c.
references: 1955, DIS 29: 74.
phenotype: Homozygotes nearly normal at 25°C, with slightly oblique wings in some. Anterior edge of thorax usually shows a pair of commalike depressions; wings may occasionally have blisters. dp^{cm2}/dp^{ov} shows good commas in all flies, vortices in most, and slightly oblique wings. $dp<>^{TM}2/d_p olv_{is}$ semilethal at 22°C, and survivors are similar in phenotype to dp^{ov}/dp^{olv}. Degree of viability of $dp^{cm}2$ when heterozygous with various dp°'"-like alleles varies, but is usually lower at low temperatures (Carlson and Falk, 1962, DIS 36: 59-61). RK3.

dp^D: dumpy-Dominant
origin: X ray induced.
discoverer: E. B. Lewis, 1962.
synonym: *olv^D.*
references: Del Campo, 1963, DIS 38: 32.
phenotype: $dp^D/+$ has slightly oblique wing and moderate vortex and comma effects on thorax. dp^D/dp^{ov} has strong wing and thorax effects, with reduced leg and body size. dp^D/dp^{olv} is lethal, and *dpD* resembles dp^{olv} in several ways. dp^D/dp^v has strongly enhanced thorax effects, and *dp°/dpD* has reduced wings with possibly enhanced thoracic effect. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)dpD = T(2;3)25A;95B-D.*

dpdei: see ***rfpodef***

dp^dr: see dp^ovdr

****dpG; dumpy of Goldschmidt***
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 511, 520.
other information: Several alleles; not analyzed in detail for effect.

dp^h: dumpy-humpylike
origin: Spontaneous,
discoverer: Edmondson, 54g.
references: 1955, DIS 28: 73.
phenotype: As homozygote, has strongly truncated wings, four marked thoracic humplike vortices, strong comma effect, reduced body size, and small, weak legs. Because of weak legs, flies have difficulty walking and become stuck in the food. No body or leg reduction in dp^h/dp^{v2} but vortices and commas present as in dp^{v2}/dp^{olv}. dp^h viable with $dp^{o'}S$, dp^{olv}, dp^{lv}, and dp^I^, RK2.

dp^H: see *dpoivH*

dp^lM: dumpy-lethal of Meyer
origin: Ultraviolet induced.
discoverer: Meyer, 57f.
references: 1958, DIS 32: 83.
phenotype: Homozygous lethal and lethal in combination with dp^{olS}, $dp^{0,1,}$, and dp^{lv}. Slight oblique effect in dp^{l}^/-*h; Me/+* and *dpIM +/+ ta.* Phenotypically normal in combination with dp°2(dp^{v}?, dp^{ov}, and $dp^{cTM}2$. RK2.

dp^L': see dp^ol
dp^LM: see dp^olM
dp^LS: see dp^ols
dp^Lsch: see dp^ols

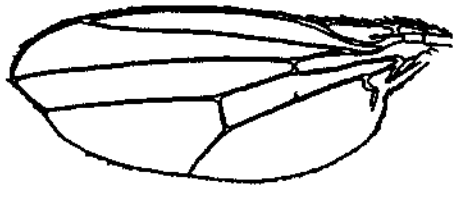
dpi: dumpy-lethal vortex*
origin: Spontaneous.
discoverer: Bridges, 20c3.
synonym: *dp^tx: dumpy-thoraxate.*
phenotype: Homozygous lethal; no abnormalities when heterozygous witti wild type. dp^{lv}/dp^{ov} has strong volcanolike dorsocentral mounds or pits with brown pigmentation; comma effects striking; sternopleural bristles turned down; wings normal. At higher temperature (28°C), two additional pits anterior to dorsocentrals occasionally appear. Lethal in compound with dp^{o1}, dp^{o1}^, and $dp^{l}M_{\%}$ RK2.

dpi**
origin: Spontaneous within *In(2L)Cy.*
discoverer: Muller.
synonym: *dp2.*
phenotype: Similar to dp^{lv}; slight oblique wing effect in $dp^{lv}2/dp^{ov}$; comma effects occasionally seen in dp^2/+. RK2.

*c/p/v57e
origin: Ultraviolet induced.
discoverer: Meyer, 51e.
synonym: dp^"^5Je. *dumpy-thoraxate 51e.*
references: Meyer and Edmondson, 1951, DIS 25: 72.
phenotype: Similar to *dplv.* Occasionally *dplv51 e/dpov* shows blistering of wings but no oblique truncation. RK2.

dp^lvl: dumpy-lethal vortex of Ives
origin: Spontaneous within *In(2t,)Cy.*
discoverer: Ives, 39j.
synonym: dp^{tx}^i *dumpy-thoraxate of Ives;* ***dp^Th;*** ***dp^ThI.***
phenotype: Identical to dp^{lv}. RK2.

dpNov: see ***dp^ovN***



dp°: dumpy-oblique
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 65.

dp°: dumpy-oblique
origin: Spontaneous.
discoverer: Bridges, 17i24.
phenotype: Wings obliquely truncated but nearly full length; overlaps wild type at 25°C when homozygous and in combination with dp^{ov}. RK3.

dpo2
origin: Spontaneous.
discoverer: Laemmerts, 1926.
synonym: *clip wing.*
phenotype: Wings truncated and shortened as in dp^{ov}, but without vortex or comma effects. No overlap with wild type as homozygote. Overlapping frequent at 25°C in compound with *dp°v*. Mutant effect more pronounced in females than in males in dp^{o2}/dp^{ov}; sexual dimorphism less extreme in dp^{o2}/dp^{o2}. RK1.

**dpoS0c*
origin: Spontaneous.
discoverer: Sobels, 50c7.
synonym: *dp5°c.*
references: Sobels, Boterenbrood, Faber, and Oppenoorth, 1951, DIS 25: 76.
phenotype: Manifests oblique wing only when Me present. Best penetrance at 25°C; less at 28°C and none at 16°C. Manifestation better in females than males. Tests of allelism with dp^{ov} have been inconclusive. RK3.

dpoSU
origin: Ultraviolet induced.
discoverer: Byers and Meyer, 51e.
references: Meyer and Edmondson, 1951, DIS 25: 72.
phenotype: Slight wing effect in $dp^{ov}/dp°Sl$«; no vortex effect. Wing effect in $dp°Sl^{e}/dp°lv$ only slightly greater. RK3.

Jpobm; dumpy-oblique from bilateral mosaic
origin: X ray induced.
discoverer: Carlson, 1957.
references: Carlson and Southin, 1959, Genetics 44: 502-3.
phenotype: Inviable as homozygote, perhaps from independent lethal nearby, because heterozygotes with dp^{olv}, dp^{ol}, and dp^{1}* are viable. Heterozygous dp^{ov}/dp^{obm} has oblique wing, slightly reduced body size, and comma effects, but normal dorsocentral region. RK2.
other information: Arose in same fly as dp^{olvbm}; *dpolvhm/dpobm* is virtually lethal.

****dpobw: dumpy-oblique brown***
origin: Spontaneous,
discoverer: Höner, 1939.
synonym: *dpbw-, dtxmpy-brovm.*
references: 1939, Z. Induktive Abstammungs-Verebungglehre 77: SOI-15 (fig.).
phenotype: Homoxygous females have moderately truncated wings, but males only slightly affected. *dpQlvH/dpobw* females have reduced body and leg size, but males almost normal; variable expression in wing size. Some wings pointed in females. RK3.

****dp»d*f: dumpy-oblique deformed***
origin: Spontaneous,
discoverer. Höner, 1939.
synonym: $dp^{\wedge}®^{1}$; *dumpy-deformed.*
references: 1939, *Z.* Induktive Abstammungs-Vererbungslehre 77: 501-15 (fig.),
phenofype: Males normal, female wings slightly oblique. $dp@^{de(}/dp°^{lv}H$ shows moderate wing reduction in females and slight reduction in about half the males. RK3.

****dp°h dumpy-oblique lethal***
origin: Spontaneous in *dp°*.
discoverer: Muller, 1919.
synonym: dp^{L}: *dumpy-Lopped.*
phenotype: Homozygous lethal. dp^{ol}/dp^{ov} shows small body and legs and drastically reduced wings; thorax normal but occasional comma effects at 26°C or higher; no vortex effect. $dp°^{l}$/+ occasionally shows wing effect. RK2.

dpotM; dumpy-oblique lethal of Meyer
origin: Ultraviolet induced.
discoverer: Meyer, 51b.
synonym: dp^{LM}: *dumpy-Lopped of Meyer;* dp^{TSlb}: *Truncate*l*.*
references: 1952, DIS 26: 66.
phenotype: Homozygous lethal. Similar to $dp°^{l}$ but has occasional slight vortex effect and good comma effect in compound with $dp°^{v}$. RK2.

dp°IS; dumpy-oblique lethal of Schalet
origin: Spontaneous.
discoverer: Schalet, 1955.
synonym: dp^{LS}; *dumpy-Lopped of Schalet;* dp^{LSch}.
references: Carlson and Schalet, 1956, DIS 30: 70.
phenotype: Homozygous lethal. Heterozygote $dp°l\$/dp^{ov}$ shows small body and legs and drastically reduced wings; thorax normal but occasional comma effects at 26°C or higher; no vortex effect. Lethal with *dp°tv*, dp^{lv}, and dp'M. RK2.

dp°l^{v}: dumpy-oblique lethal vortex
origin: Spontaneous.
discoverer: Morgan, 1923.
synonym: dp^{T}: *dumpy-Truncate.*
references: Altenburg and Muller, 1920, Genetics 5: 1-59 (fig.).
phenotype: Homozygous lethal. dp^{olv}/dp^{ov} has reduced body and leg size; wings shortened to half length and obliquely truncated; thorax shows two and sometimes four vortices; comma effect strong; stemopleural bristles turned down; wings often elevated 45° and sometimes contain black blisters. Body reduction also seen in compound with $dp°^{2}$ but not with dp^{v2}. Lethal in compound with *dp°ts*, $dptM_{t}$ and dp/v, RK2.

****dp°lv2***
origin: Spontaneous.
discoverer: Muller, 1913.
synonym: $dpT2_{f}$ x^{2}.
references: Altenburg and Muller, 1920, Genetics 5: 1-59 (fig.).
phenotype: Similar to $dp°^{lv}M$. RK2.

**dpotv54d*
origin: Ultraviolet induced,
discoverer: Meyer, 54d.
synonym: $dpT54d_{w}$
references: 1955, DIS 29: 74.
phenotype: Like *dp°'**. RK2.

**dpolvSSb·*
origin: Spontaneous.
discoverer: Meyer, 55b.

synonym: *dp^{TSSb}*.
references: 1955, DIS 29: 74.
phenotype; Similar to *dpolv*, RK2.

***d$_p$olv55c**
origin: Ultraviolet induced.
discoverer: Meyer, 55c.
synonym: *dp^{TSSc}*.
references: 1955, DIS 29: 74.
phenotype: Like *dp^{olv}*. RK2.

***dpolvS7g**
origin: Ultraviolet induced,
discoverer: Meyer, 57g.
synonym: dp^{r}57g$_{\#}$
references: 1958, DIS 32: 78.
phenotype: Like *dp^{oJv}*. RK2.

dpolvbm; dumpy-oblique lethal vortex from *bilateral mosaic*
origin: X ray induced.
discoverer: Carlson, 1957.
references: Carlson and Southin, 1959, Genetics 44: 502-3.
phenotype: Like *dp^{otv}*. RK2.
other information: Recovered from same fly that produced *dp^{obm}*.

***dp^{olvD}: dumpy-oblique lethal vortex of Duncan**
origin: Spontaneous.
discoverer: Duncan, 1914.
synonym: *dpTD: dumpy-Truncate of Duncan.*
references: 1915, Am. Naturalist 49: 575-82.
phenotype: Similar to *dp°'vM*. RK2.

***cfpo/vH; dumpy-oblique lethal vortex of Hb'ner**
origin: Spontaneous,
discoverer. Hb'ner, 1931.
synonym: *dpH: dumpy of Höner,*
references: 1939, Z. Induktive Abstammungs-Vererbungslehre 77: 501-15 (fig.). 1939, DIS 11: 45-46.
phenotype: Similar to *dp^{olv}*. *dp°^{Iv}H/+* may show some wing truncation. RK2.
cytology: Salivary chromosomes normal.

***t/po/vM; dumpy-oblique lethal vortex of Morgan**
origin: Spontaneous,
discoverer: Morgan, lOh.
synonym: *dpTO. dumpy-Truncate zero.*
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 136 (fig.). Altenburg and Muller, 1920, Genetics 5: 1—59 (fig.).
phenotype: *dp°l^{v}M/+* showed oblique truncated wings in up to 90 percent of flies in maximally selected lines. RK2.
other information: Altenburg and Muller established that temperature and modifier genes affect a major gene at 2-13.0. Later tests with *dpo*, dpy, dp°* and other alleles established similarity to *dp^{olv}*.

***e/po'vP; dumpy-oblique lethal vortex of Plough**
origin: Recovered among progeny of temperature-shocked parents.
discoverer: Plough, 40cl5.
synonym: *dpTP', dumpy-Truncate of Plough.*
phenotype: Like *dpotr*, RK2.

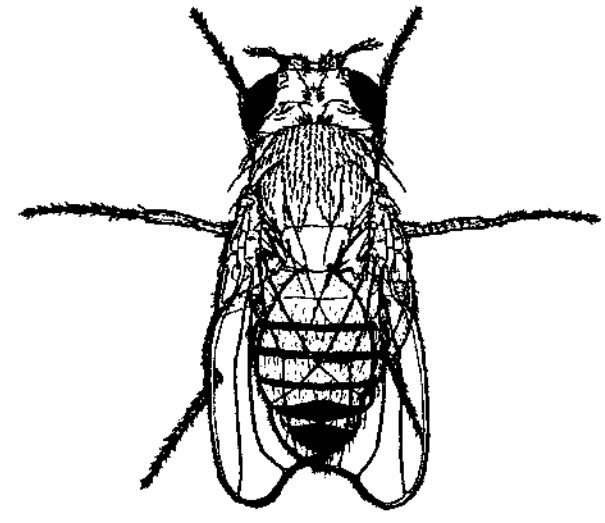
c/po'vR; *dumpy-oblique lethal vortex Ruffled*
origin: X ray induced.
discoverer: Schultz, 33a25.
synonym: *dp&t-. dumpy-Ruffled.*
phenotype: Similar to *dp^{oly}* but heterozygous *dpolvR* has slightly spread wings with uneven surface and ruffled margin. Raffling effect overlaps wild type at 25°C, RK2A.
cytology: Associated with *In(2L)dp^{olv}R = In(2L)25A;25B3-4.*

dpoIvS; dumpy-oblique lethal vortex of Schalet
origin: Neutron induced.
discoverer: Schalet, 1955.
synonym: *dpTSch. dumpy-Truncate of Schalet.*
references: Carlson and Schalet, 1955, DIS 29: 71.
phenotype: Similar to *dp^{oI}v*, RK2.
other information: Arose simultaneously with mutation to y in *Dp(l;2)sc$^{1\ 9}$*, but ed, *cl*, and *dw-24F* not affected; possibly a minute inversion.

***c/po'vSn: dumpy-oblique lethal vortex Snub**
origin: Spontaneous.
discoverer: Bridges, 16bl7.
synonym: *dpT^{s}: dumpy-Truncate Snub.*
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 140.
phenotype: Similar to *dp°lvM*. RK2.

c/po/vW; dumpy-oblique lethal vortex of Williams
origin: Spontaneous.
discoverer: Williams, 1957.
synonym: *dp^{TW}: dumpy-Truncate of Williams.*
references: Carlson, 1956, DIS 30: 70.
phenotype: Similar to *dp°tv*. RK2.

***dp^{ou}: dumpy-oblique ultraviolet**
origin: Ultraviolet induced.
discoverer: Meyer, 54g.
references: 1954, DIS 28: 76.
phenotype: Similar to *dp^{o2}*. RK2.



dp^{ov}: dumpy-oblique vortex
Edith M. Wallace, unpublished.

t/pov; *dumpy-oblique vortex*
origin: Spontaneous.
discoverer: Morgan, 18jl6.

synonym: dp.
references: Morgan, 1929, Carnegie Inst. Wash. Publ. No. 399: 196.
phenotype: Wings reduced one-third, with oblique truncation; angle between veins L2 and L3 widened and intercrossvein distances shortened; marginal vein intact; two vortices with whorls of hairs in dorcentral region; dorsocentral bristles medially displaced; vortex expression in most flies at 26°C; comma effect in anterior thorax also present in most flies at 26°C. At lower temperatures, wing effect persists but thorax appears normal. Body and leg size normal except at temperatures above 28°C, when they are somewhat reduced. RK1.

$d_p$ov51f
origin: Spontaneous,
discoverer: Mossige, 1951.
synonym: *dp^{sli}*,
phenotype: Like *dp°**. RK1.

$J_p$ev52b
origin: Spontaneous.
discoverer: Edmondson, 1952.
synonym: *dp^^b^*
references: 1952, DIS 26: 60.
phenotype: Like *dp°**. RK1.

dpovdr;dumpy-oblique*vortex*drumlins
origin: Spontaneous in *dp^{ov}*.
discoverer: R. C. King, 48b26.
synonym: dp*; *dumpy-dtumlins.*
references: Poulson and King, 1948, DIS 22: 54.
phenotype: Has a more pronounced vortex effect than *dp°y* but otherwise similar. Viability slightly reduced. RK1.
other information: Probably a modifier in or near the dumpy locus.

dpovN; dumpy-oblique vortex* of *Novitski
origin: X ray induced.
discoverer: Novitski.
•ynonym: *dpN°^{v}: dumpy of Novitski.*
phenotype: Like *dp^{ov}*. RK1.

dp^h see ***dp^{olvR}***
dpT; see ***dp^{olv}***
dp^{T0}: see ***dp^{olvM}***
dpT2; see ***dp^{olv2}***
dpTsib: see ***dp^{olM}***
dpTS4d: see ***dp^{olvs4d}***
dp^{T}55b; see ***dp^{olv55b}***
dp^{T55c}: see ***dp^{olv55c}***
***dp^{T57g}:* seedpotvsrg**
dp^{TD}: see *dp^{olvD}*
dp^{Th}: see ***dp^{lvI}***
dp^{Th51e}: see ***dp^{lv51e}***
dp^{ThI}: see *dp^{ivI}*
dp^{TP}: see ***dp^{olvP}***
dp^{TS}. see ***dp^{olvsn}***
dp^{Tsch}: see ***dp^{olvs}***
dp^{TW}: see ***dp^{olvW}***
dp**:* see *dp^{iv}
dp**':* see ***dp^{lvI}

dp^{y}: dumpy-vortex
origin: Spontaneous.
discoverer: Bridges, 1919.
references: Bridges and Mohr, 1919, Genetics 4: 283-306 (fig.).
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 168 (fig.).
phenotype: Homozygote normal; expresses vortices only when *e(dp^{v})* on the third chromosome is also homozygous. Heterozygotes with *$dp^{v}2$, dp°v, dp^{lv}*, and *dp^{olv}* have good vortices without *e(dp^{v}).* RK3.

dp^{v2}
origin: Spontaneous.
discoverer: Mohr, 20a30.
references: 1923, Studia Mendeliana (Brunae) pp. 266-87.
1929, Z. Induktive Abstammungs- Vererbungslehre 50: 113-200.
phenotype: Thorax shows two vortices in dorsocentral region, frequently pitted with brown pigment. Whorls of hairs and medially displaced dorsocentral bristles in almost all flies at 26°C. Females more extreme than males. No wing effect, no body or leg reduction in any compound. Commas absent in *dpv2/dpv2* and *$dp^{v}2/dp^{ov}$*, but present in *dpvl/dp^{1}** and *$dp^{v}2/dp°lv$.* RK2.

dp^{vM}; dumpy-vortex* of *Muller
origin: Spontaneous.
discoverer: Muller, 1920.
synonym: *dp^{vl}; dumpy-volcano.*
phenotype: Homozygote has vortices, but less well developed and less numerous than in *$dp^{y}2$.* Overlaps wild type. RK2.

dp**: dumpy-vortex* of *Vfaddington
origin: Spontaneous.
discoverer: Waddington.
synonym: *dp^{vo}*.
phenotype: Similar to *dp^{v2}*. RK2.

dp^{w}h dumpy-warped
origin: X ray induced.
discoverer: Schalet, 1955.
references: Carlson and Schalet, 1955, DIS 29: 71. Carlson, 1958, DIS 32: 117-18.
phenotype: Heterozygote of *dp^{ov}/dp^{wl}* has variable and asymmetrical expression of vortex and oblique wing effects. Mutant phenotype completely suppressed by an extra *Y* chromosome. Homozygous lethal but viable in compound with lethal *dp* alleles. *$dp^{w}l/dp^{tv}l$* have wrinkled opaque wings. RK2A.
cytology: Associated with *T(2;3)$dp^{w}l$* (breakpoints not determined).
other information: Appears to be a variegated position effect.

c/pw2
origin: X ray induced.
discoverer: Schalet, 55k.
references: Carlson and Schalet, 1956, DIS 30: 71. Carlson, 1958, DIS 32: 117-18.
phenotype: Similar to *dp*!.* RK2A.

cytology: Associated with *T(Y;2)dp*2* (break points not determined),

Dp: see *Dr*

***dpy: dumpoidy**

locotion: 3- (right arm near 90).
origin: Spontaneous.
discoverer: Villee, 40a.
phenotype: Wings obliquely truncated and reduced in length; marginal vein intact. No vortices or whorls of bristles on thorax. Suppressed by *Cy* and *Gla;* made dominant by *Me,* Overlaps wild type slightly. RK2.

d<j: see $L^{d(}$i

***dr: droopy**

location: 2-71.2 (to the left of Lobe).
origin: Ultraviolet induced.
discoverer: Meyer and Edmondson, 49c.
references: 1949, DIS 23: 60.
phenotype: Wings spread wide apart and droop downward, like c, often crumple and drag in the food. Alula broad and short. Viability at hatching fair; females tend to die before males. Penetrance 100 percent. Fertility good. RK2.
other information: Not alielie to c,

***dt: see drw**

***Dr: Drop**

location: 3-99.2.
origin: X ray induced.
discoverer: Krivshenko, 54c25.
synonym: *Dp.*
references: 1954, DIS 28: 75.
phenotype: Heterozygote has 1—10 eye facets, which appear dark red. Viability of heterozygote excellent. Homozygous lethal. RK1.
cytology: No visible rearrangement in salivary chromosomes,
other information: Recombination between Dr^{*1*0} and Dr^{We} indicates that Dr is a pseudoallelic locus (E. B. Lewis).

***Dr^{A}: Drop of Abrahamson**

origin: X ray induced.
discoverer: Abrahamson, 60d28.
synonym: Dp^{A}.
references: Abrahamson and Siegel, 1960, DIS 34: 48.
phenotype: Facet number of heterozygote averages four. Homozygote viable and usually lacks eye facets. RK1.

***Dr^{L}: Drop of Lewis**

origin: X ray induced,
discoverer. E. B. Lewis.
phenotype: Like Dr. RK1A.
cytology: Associated with $T(2;3)Dr^{L}$ = *T(2;3)44;89F-90A + In(3R)89C;95D-96Bl,* which is probably independent of the mutation.

***Dr^{Mlo}: Drop-Microp/ifhalmia**

origin: Mustard gas induced,
discoverer: Sobels, 57J22.
synonym: *Mlo.*
references: 1958, DIS 32: 84.
phenotype: $Dr^{\wedge io}$/+ show extreme reduction in eye size; facets coalesce to give a shiny, dark red appearance; constant expression. Lethal homozygous but survives in combination with Dr^{We} (E. B. Lewis). RK1.
other information: Dr^{JAio}/Dr^{We} yields rare wild-type recombinants (Lewis).

D_rWe: Drop-Wec/ge

origin: Spontaneous.
discoverer Muller.
references: 1965, DIS 40: 36.
phenotype: Eyes are small vertical wedges with points downward; much smaller than homozygous 23. Lethal homozygous and in combination with Dr, but Dt^{We}/*DiMio* survives (E. B. Lewis). RK1.
other information: $Dr^{\wedge e}/Dr^{\wedge io}$ yields rare wild-type recombinants (Lewis).

***drb: dark red brown**

location: 3-47.7 (may be rearrangement; *st—p* crossing over 50 percent of normal),
origin: Spontaneous.
discoverer: Rosin, 48b.
references: 1951, DIS 25: 75.
phenotype: Eye color dark red-brown at 18° and dark red at 28°C. *drb/+* darker than wild type at 18°, but not at 28°C. RK2(A).

***droop wings: see drp**

***droopy: see dr**

***droopy wing: see drw**

***Drop: see Dr**

***drp: droop wings**

location: 1- (rearrangement),
origin: Spontaneous,
discoverer: Ives, 48f.
references: 1949, DIS 23: 58.
cytology: Associated with *In(l)drp— ln(l)12B;20B.*

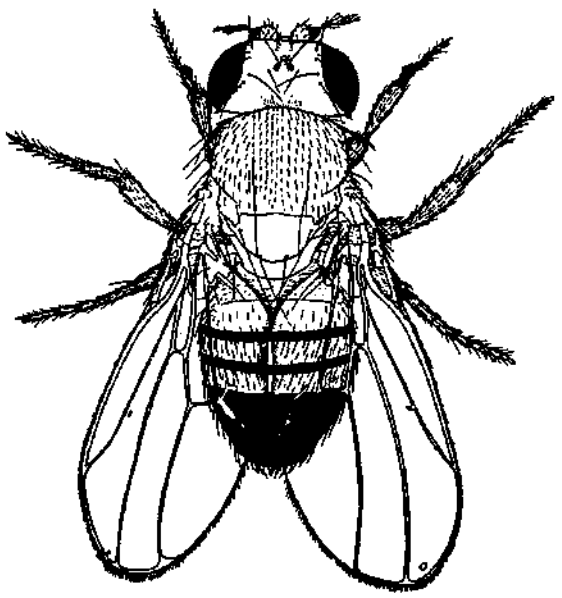
***drw: droopy wing**

location: 1-52.3.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
synonym: Symbol originally *dr,* which was preoccupied.
references: 1958, DIS 32: 69.
phenotype: Small fly with drooping wings. Chitin of abdomen irregularly ridged and pigmented. Hairs deranged. Males infertile; viability 10 percent wild type. RK3.

***ds: dachsous**

location: 2-0.3.
origin: Spontaneous,
discoverer: Bridges, 17kl2.
references: Stern and Bridges, 1926, Genetics 11: 511.
Mohr, 1929, Z. Induktive Abstammungs-Vererbungslehre 50: 113-200 (fig.),
phenotype: Wings shorter, blunter, and broader, with crossveins uniformly very close together. Abdomen and legs chunky. Slight dominance of close crossveins. Strong interaction with *d, ij,* and *eg;* double homozygotes often have excessive growth of thoracic parts and sometimes conversion of one organ into another [e.g., twinning of wings or antennae or conversion of eyes into antennae,

Waddington, 1943, J. Genet., 45: 44-50 (fig.)]. Tarsal shortening enhanced by homozygous ss^a and $_{ss}aB$ (Villee, 1945, Genetics 30: 26-27). RK1.
cytology: Analysis by E. B. Lewis (1945, Genetics 30: 137-66) indicates that *ds* is located in 21D1-2 or possibly slightly to the left in the last band of 21C.



ds: dachsous
Edith M. Wallace, unpublished.

*ds2
origin: Spontaneous.
discoverer: Bridges, 25d2.
references: Stern and Bridges, 1926, Genetics 11: 513.
phenotype: Crossveins closer together, but only slight shortening of legs, wings, and abdomen. Fully viable and fertile. RK1.

*ds3
origin: Spontaneous,
discoverer: Bridges, 25k5.
references: Stern and Bridges, 1926, Genetics 11: 513.
phenotype: Crossveins extremely close, but wings, legs, and abdomen shortened only slightly. Viability low (40 percent wild type), and females completely sterile. Males fertile. Emergence delayed. RK3.

ds2 3d: see *ds**

d_s33k
origin: X ray induced at same time as *ln(2LR}bwVl.*
discoverer: Bridges, 33k28.
references: 1935, DIS 4: 7.
phenotype: *dt^{33k}*/+ has phenotype like *ds^w/+;* scuteliar bristles wide apart, wings shorter and wider than normal, and crossveins close together. *d@33k/d_sW* ïn^g extreme phenotype like *d«^{d}*. RK3A.
cytology: Associated with *In(2LR)bw^{vl}* = *In(2LR)21C8-Dl;60Dl-2* + *ln(2LR)40F;59D4-El.*
other information: *ds^{33k}* has not been separated from the recessive lethal factor of *In(2LR)bwVl,* and so has not been observed in homozygous condition.

ds38k
origin: Spontaneous.
discoverer: Waddington, 38k.
references: Curry, 1939, DIS 12: 45.
phenotype: *ds^{38k}/ds* has close crossveins; fly short and thick bodied. Homozygote probably like *ds^d*. RK2.

*ds41b
origin: Spontaneous,
discoverer: T. Hinton and Bliven, 41b.
references: Hinton, 1942, DIS 16: 48.
phenotype: Wings shorter and extremely blunt. Less extreme and more varied in male. Viability and fertility good. RK2.
cytology: Salivary chromosomes normal.

ds51a
origin: Ultraviolet induced.
discoverer: Meyer and Byers, 51a.
references: Meyer and Edmonds on, 1951, DIS 25: 72.
phenotype: Like *ds^d*. RK3.

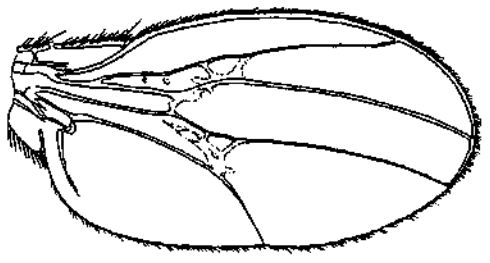
**ds^d: dachsous-dachsoid*
origin: Spontaneous.
discoverer: Sturtevant, 17b9.
references: Bridges and Morgan, 1919, Carnegie tost. Wash. Publ. No. 278: 294 (fig.).
phenotype: Wings broader but half normal length, almost round and widely spread; crossveins broken, very close together. Hairs erect on costal vein near base. Body small and foreshortened. Legs stumpy. Viability about 40 percent wild type. RK3.

**J_sd53h*
origin: Ultraviolet induced.
discoverer: Meyer, 53h.
references: 1953, DIS 27: 58.
phenotype: Wings rounded; crossveins close. Legs have thickened coxae. Viability low; females sterile. RK3.

ds: dachsous-Wide*
origin: Spontaneous.
discoverer Bridges, 29d24.
synonym: *da^{2}*^{d}*.
references: 1935, DIS 3: 10.
phenotype: Heterozygote has uniformly widely spaced posterior scuteliar bristles; wings a bit short and blunt; crossveins close together. Viability and separability excellent. Homozygote resembles ds^{rf} and *dts^{d3}* with viability 40 percent wild type. RK1 as heterozygous dominant; RK3 as homozygote.

dsh: dishevelled
location: 1-33.5.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 85.

phenotype: Thoracic hairs deranged. One or more hairs abnormally curved. Wings usually divergent and blistered. Eyes ellipsoid, with some deranged ommatidia. Males viable and fertile; females sterile. RK2.
other information: One allele induced by CB. 3026.



dsr: disrupted
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 71.

dsr: disrupted
location: 2-90.
origin: Spontaneous.
discoverer: Curry, 38a28.
phenotype: Wings have plexus of extra and doubled veins at anterior and posterior crossveins and at L3 and L4. L3 and L4 spread wide apart. Wing slightly wider and warped. At 25°, overlaps wild type; at 19°C, no overlap but viability reduced to 60 percent wild type. RK3.

dss: disturbed segmentation
location: 1-27.3.
origin: Spontaneous.
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 85.
phenotype: Extremely abnormal abdomen with segmentation grossly deformed, very few hairs, and disturbed pigmentation. Occasionally some bristles shortened. Eyes reduced in size and sometimes abnormal in shape. Males fertile; viability about 10 percent wild type. Females sterile. RK3.

dsx: double sex
location: 3-48.1 (to the right of pP).
origin: Recovered among progeny of flies fed tritiated thymidine.
discoverer: Hildreth and Lucchesi, 62c.
synonym: Originally called *ix^{62c}: intersex-62c*, but name and symbol preoccupied.
references: 1963, Proc. Intern. Congr. Genet., 11th, Vol. 1: 171.
Hildreth, 1965, Genetics 51: 659-78 (fig.)-
phenotype: Chromosomal females *(X/X)* and males *(X/Y)* transformed into intersexes. The two types are similar. Pigmentation of tergites similar to wild-type males. Like females, they have seventh tergite with seventh spiracle at its base. Ventral part of eighth abdominal segment has protuberance similar to female gonopod; ninth segment bears claspers like males. Anal plates situated vertically as in males. Neither *X/X* nor *X/Y* ixttersex has sex combs; however, on basitarsus of forelegs of each, bristles of last transverse row are enlarged and rotated toward area comb would occupy if present. Internally, the *X/X* intersex usually has male and female reproductive parts with varying degrees of completeness. Well-developed ovaries present in some. Frequently a single gonad is attached to both male and female systems. The *X/Y* intersex usually has a predominantly male internal reproductive system, but occasionally both a male and a female system are present. In all cases, gonads are poorly developed. RK2.
cytology: Salivary chromosomes normal.

dsx^{601}
origin: Spontaneous.
discoverer: Puro, 601.
synonym: Originally called *ix-3: intersex on chromosome 3.*
references: 1964, DIS 39: 64.
phenotype: Like *dsx, X/X* and *X/Y* flies have external characteristics of both sexes and are similar except for a slight difference in size. No sex combs. Last abdominal segments form rather well-developed but rotated male-like terminalia with female-like structures of the seventh and eighth tergites. Rudimentary gonads usually a mass of undifferentiated tissue. RK2.
cytology: Salivary chromosomes normal.
other information: Not allelic to *tra* and no interaction with *ix* in doubly heterozygous compounds.

Dt: Detached
location: 2-10.
discoverer: Bridges, 17ell.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 224.
phenotype: Vein L2 fails to reach margin in 60 percent of flies. Homozygote not known. RK3.
other information: Bridges considered this a possible effect of 5 or requiring S as an enhancer as it was found in a S stock and apparently was never separated from S.

dta: delta wing
location: 1- (rearrangement).
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
phenotype: Wings widely outspread, frequently drooping in homozygous female. Viability good but female sterile. RK2A.
cytology: Associated with *ln(l)dta* = *In(l)6B2-3;15E7-F2.*

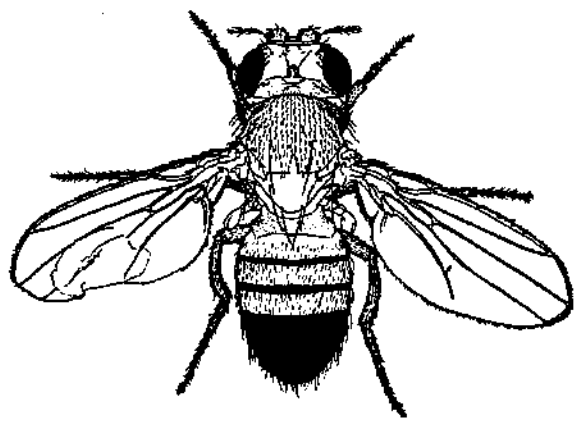
dtv:* see *thv**

du; dunkel
location: 3-47.
origin: Spontaneous,
discoverer: Hadorn, 49el5.
references: Hadorn and Fritz, 1950, Arch. Julius Klaus-Stift. Vererbungsforach. Sozialanthropol. Rassenhyg. 25: 504-8.
phenotype: Body color dark, sootylike. Wings blistered. Viability almost normal at 25°, greatly

reduced at 18°C. Males fertile; females sterile. Ovaries and eggs normal size and morphology. Insemination of females normal (motile sperm in spermathecae and receptaculum). Either eggs from *du* females not fertilized or zygotes die before blastoderm formation, du ovaries behave autonomously as implants in normal hosts, and wild-type ovaries are fertile in *du* hosts. RK2 at 25°C.

other information: Not an allele of *by* or *cu.*

dumpoidy: **see *dpy***
dumpy: **see *dp***
dunkel: **see *du***
dusky: **see *dy***
dusky body: **see *dyb***



dv: divergent

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 182.

****dv: divergent***

location: 3-20.0,
origin: Spontaneous,
discoverer: Bridges, 17fl3.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 182 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 58 (fig.).
Mohr, 1937, DIS 8: 12.
phenotype: Wings spread, smaller and have slight venation disturbances. Both sexes rather infertile. *dv/Dt(3L)Vn* progeny of homozygous *dv* mothers practically lethal although the same genotype from other crosses survives (Mohr and Mossige, 1943, Avhandl. Norske Videnskaps-Akad. Oslo, I. Mat.-Natur. Kl. No. 7: 1-51). RK2.
cytology: Salivary chromosome locus placed between 64C12 and 65E1, on basis of its inclusion in *Df(3L)Vn = Df(3L)64C12~Dl;65D2-El* (Mohr, 1938, Avhandl. Norske Videnskaps-Akad. Oslo, I. Mat.-Natur. Kl. No. 4: 1-7).

dvr: divers

location: 1-28.1 (located using aW).
origin: Recovered among progeny of iodine-treated male.
discoverer: Sacharov, 1932.
references: 1936, Biol. Zh. (Moscow) 5: 537—40 (fig.).
1937, DIS 8: 81.
phenotype: Has shorter, darker wings; post-scutellars bowed in; body size small; sterility high; semilethal. In combination with yellow-bodied *y* alleles, gives strongly curled wings with slight outward twist. With *f,* gives crumpled wings. With sc, almost lethal. RK3.
cytology: Salivary chromosome studies by Demerec and Sutton show locus to lie at right of 8D8-9 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

dvr^2

origin: Spontaneous.
discoverer: Curry, 37kl7.
phenotype: Practically wild type. With y^2, wings tightly curled; with *y,* wings spirally curled. RK2 with *y.*

****dvr^s: divers-subliminal***

origin: Spontaneous.
discoverer: Muller.
synonym: *dvri*).*
references: 1946, DIS 20: 67.
phenotype: Wild type either alone, heterozygous to dvr-2, or in combination with *y. y dvr^a/y dvt%,* on the other hand, has wings distinctly curly or wavy, usually as in typical *Cy,* but other effects noted in dvr flies not evident. RK3.

****dvw: divergent wings***

location: 1-13.3.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 85.
phenotype: Sex-limited character. Males late hatching; wings divergent, occasionally upheld, with inner margins frequently cut away to various degrees. Bristles short and stiff. Homozygous females normal. RK1 in males.

****dw: dwarf***

location: 3-50.
origin: Spontaneous.
discoverer: Bridges, 13kl2.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 101.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 58 (fig.).
phenotype: Body weight 76 percent that of heterozygous sibs. Females usually sterile (3 of 63 gave a few offspring). RK3.

dw-24F: dwarf in salivary chromosome section 24F

location: 2-13.
origin: Spontaneous.
discoverer: Curry, 39k.
references: 1941, DIS 14: 49.
phenotype: Body small; abdomen narrow and misshapen. Body surface dull if not properly dried. Eyes dull in color and smallish. Wings close textured, small, tend to droop; crossveins close. Bristles slender. Low viability and fertility. RK3.

cytology: Located between 24E2 and 25A2 based on its inclusion in *Df(2L)M-z^{B} = Df(2L)24E2-Fl;25Al-2* (Morgan, Bridges, Schultz, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77).

***dw-b: dwarf-b**

location: 3-12.
origin: Spontaneous.
discoverer: Bridges, 20b5.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 182, 228, 231 (fig.).
phenotype: Flies about 70 percent as heavy as wild type. RK3.

***dw-sc: dwarf with scute**

location: 1-0.7.
origin: Spontaneous (arose with sc and separated).
discoverer: Bridges, 16a22.
phenotype: Small body. Viability erratic. RK3.

dwarf unexpanded: see ***dwu***

dwarfex: see ***dwx***

dwarfish: see ***dwh***

dwarfoid: see ***dwf***

dwarp: see ***dwp***

***dwf: dwarfoid**

location: 1-13.3.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 85.
phenotype: Flies small. Males fertile; viability about 50 percent wild type. Homozygous females show extreme expression; fertility and viability low. RK2.

dwg: deformed wings

location: 1-1.6.
origin: Induced by DL-p-NN-di(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 85.
phenotype: Wings broad, round tipped, and have occasional marginal incisions; sometimes grossly deformed in shape and venation. Extremely fine bristles. Eyes small and occasionally rough. Males late in eclosion; viable but sterile. RK2.

dwh: dwarfish

location: 3- (not located),
origin: Spontaneous.
discoverer: Bridges, 30dl6.
phenotype: Small body. Wings disproportionately broad; eyes irregularly knobby and somewhat dull in color; legs weak and slightly crippled. RK3.

***dwp: dwarp**

location: 1-0.
origin: Spontaneous,
discoverer: Bridges, 23b20.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 225.
phenotype: Dwarf with warped wings. Body color pale. Nearly always lethal, but survivors fertile. RK3.

***dwu; dwarf unexpanded**

location: 1-58.3.
origin: Induced by 2-chlorethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 85.
phenotype: Extremely inviable dwarf; wings frequently fail to expand completely. Males fertile if they survive to breed. RK3.

dwx: dwarfex

location: 1-33.2.
discoverer: Bridges, 33c31.
phenotype: Body small. Wing texture coarse; marginal hairs slightly disarranged. Classification sometimes difficult. RK3.

***dwx^{mn}: dwarfex-manikin**

origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1954.
synonym: *mn.*
references: 1959, DIS 33: 88.
phenotype: Fly small with narrow abdomen. Reduction in size may be bilaterally asymmetrical and affect abdomen and thorax independently. Male viability reduced; flies rarely survive more than 48 hr. Sterile, probably owing to reduced vigor. RK3.
other information: One X-ray-induced allele.

dx: deltex

location: 1-17.0.
origin: Spontaneous.
discoverer: Bridges, 22h26.
references: Morgan, Bridges, and Schultz, 1931, Carnegie Inst. Wash. Year Book 30: 410.
phenotype: Veins show thickenings and terminal deltas, resembling *Dl* in third chromosome, but fully viable, fertile, and easily classified. Nearly suppressed by *su(dx), Su(dx),* and *Su(dx)^{2}*. RK2.
cytology: Demerec and Sutton show locus to be between 6A3-4 and 6F10-11 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

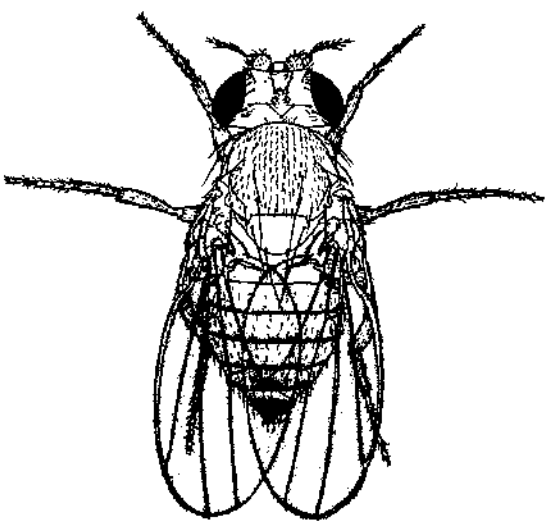
***dxst: deltex-sterile**

origin: Spontaneous change of *dx* to *dxst*.
discoverer: Bridges, 31a3.
phenotype: Veins heavy, confluent, and dilated at junctions; strong deltas at tips. Wings spread wide; margins and tips snipped and nicked. Ocelli sometimes fused, with disturbance of hairs and bristles in the region. Acrostichals irregular. Male sterile. Less abnormal phenotype and fertile with *Su(dx).* RK2.

dy: dusky

location: 1-36.2 (to the right of m).
origin: Spontaneous.
discoverer: Bridges, 1611.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 35 (fig.), 224.
Slatis and Willermet, 1954, Genetics 39: 45-58.
Dora and Burdick, 1962, Genetics 47: 503-18.
phenotype: Wings smaller than normal but of nearly wild-type shape, dusky in color. Cell expansion inhibited in prepupal as well as pupal period (Waddington, 1940, J. Genet. 41: 75-139). RK1.

cytology: Demerec and Sutton showed that locus lies just to right of 10E1-2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).
other information: No reverse mutations among 2 X 10^5 progeny of progeny of homozygous females (Pullar). A member of the *m-dy* pseudoallelic complex.



dy: dusky
Edith M. Wallace, unpublished.

**dy2*
origin: Spontaneous.
discoverer: Bridges, 20a3.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 224.
phenotype: Wings not quite so small as *dy.* RK1.

****dy3***
discoverer: Bridges, 22a2.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 224.
phenotype: Wings slightly larger than *dy.* Clean separation difficult in females. RK2.

**dy31d*
origin: X ray induced.
discoverer: Oliver, 1931.
synonym: *m-like: miniature-like.*
phenotype: Like *dy.* RK1.

dySSk
origin: Spontaneous.
discoverer: Krawinkel, 58k.
references: Burdick, 1961, DIS 35: 45.
Dorn and Burdick, 1962, Genetics 47: 503-18.
phenotype: Wings shorter than ay, resembling the longer-winged *m's.* Fertile in both sexes. Shows more complementation with *tn'»* than ay. RK1.
other information: Recotnbines with all m's except m^D but not with ay.

dy60k
origin: Spontaneous,
discoverer Burdick, 60k.
references: 1961, DCS 35: 45.
phenotype: Similar to other ay's. Fully fertile in both sexes. Shows high complementation with m^{60} and low with dy^{61a}. RK1.

d_y61a
origin: Gamma ray induced.
discoverer: Ives, 61a24.
references: 1961, DIS 35: 46.
Dorn and Burdick, 1962, Genetics 47: 503-18.
phenotype: Like *dy.* Good fertility and fecundity in both sexes. RK1.

dy62b
origin: Spontaneous,
discoverer: Burdick, 62b.
references: 1963, DIS 37: 47.
phenotype: Similar to other *dy's.* RK1.

**dy286-9*
origin: X ray induced.
discoverer: Demerec, 35b.
phenotype: Lethal in male and cell lethal. RK2.
cytology: Salivary chromosomes normal.
other information: rn^+ and fw^+.

**dyala: dusky-alae*
origin: Recovered among progeny of heat-treated flies.
discoverer: Gottschewski, 34c.
synonym: a/a; *ala parvae.*
phenotype: Wings about 90 percent as large as *dy.* RK1.

****dyb: dusky body***
location: 1-44.6.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1958.
references: 1959, DIS 33: 85.
phenotype: Dusky body color and browner eyes. Eye and wing shapes slightly altered. Males viable and fertile; females sterile. RK2.

e; *ebony*
location: 3-70.7.
origin: Spontaneous,
discoverer: E. M. Wallace, 12bl5.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 50 (fig.).
phenotype: Body color shining black. Puparia much lighter than wild type. Classifiable throughout larval period by darkened color of spiracle sheaths (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254—61). Viability lowered to about 80 percent wild type. Heterozygote has slightly darker body color than normal. For interaction with other body color mutants, see Waddington, 1941, Proc. Zool. Soc. London, Ser. A 111: 173-180. Virtually unable to incorporate C^{14} from labeled beta-alanine into puparium or hardening adult integument, whereas normal flies incorporate heavily; e/+ incorporates intermediate amounts Qacobs and Brubaker, 1963, Science 139: 1282-83; Jacobs, 1966, Genetics 53: 777-84). RK1.
cytology: Placed in salivary chromosome region between 93B7 and 93F9, on the basis of its inclusion

in both *Dt(3R)el 00.1 72 = Df(3R)93B7-10;93F10-94A1 and Df(3R)el 00.256 = Df(3R)93A5-Bl;93F5-9* (Ward and Alexander, 1957, Genetics 42: 42—54).

e[4]

origin: Spontaneous.
discoverer: Sturtevant, 17i27.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 184.
phenotype: Body color very dark like e, but abdomen lighter. Most viable and generally best of the dark alleles, such as e and *ell.* classifiable from hatching throughout larval period by darker spiracle sheaths (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

***e4.39**

origin: X ray induced.
discoverer: Alexander.
references: 1960, Genetics 45: 1019-22.
phenotype: Like e[s] when heterozygous with e«. Homozygous lethal. RK2A.
cytology: Associated with *Df(3R)e[4-39] = Di(3R)93B;93F.*

e[11]

origin: Spontaneous.
discoverer: Stern, 25a.
references: 1926, Z. Induktive Abstammungs- Vererbungslehre 41: 198-215.
1934, DIS 1:35.
phenotype: Dark allele similar to e and *e[4].* Tyrosinase formed in adults (Horowitz). Classifiable throughout larval period by dark spiracle sheaths (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254—61). Phenylthiocarbamide inhibits development of *ell* homozygotes more than wild type; reverse is true for inhibition by silver chloride; heterozygotes intermediate in both cases. Mixtures of the two inhibitors affect heterozygotes to a greater extent, thus exhibiting "negative heterosis" (Kroman and Parsons, 1960, Nature 186: 411—12), Under ordinary conditions, viability and fecundity of heterozygote superior to either homozygote (Moree). RK1.

eiitti:* see *tu-bw[e]

e60h

origin: Spontaneous,
discoverer: Ives, 60h.
references: 1965, DIS 40: 35.
phenotype: Medium e. RK1.

*e700.I72

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like e* when heterozygous with e*. Homozygous lethal. RK2A.
cytology: Associated with *Dl(3R)el 00.172 m Df(3R)93B7-10;93F10-94Al.*

***9100.2S6**

origin: X ray induced.
discoverer Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like e[s] when heterozygous with e». Homozygous lethal. RK2A.
cytology: Associated with *Df(3R)el00.256 = Df(3R)93A5-Bl;93F5-9.*

***e100.265**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like e. RK1A.
cytology: Associated with *In(3R)e*00.265 = In(3R)93B5-6;95E.*

***e100.307**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like e[s] when heterozygous with e«. Homozygous lethal. RK2.
cytology: Induced simultaneously with *In(3L)100.307 = In(3L)62E2-4;64C2-4.*
other information: Not shown whether lethality associated with e or the inversion.

***e300.96**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like e but male sterile. RK2(A).
cytology: Induced simultaneously with *In(3R)300.96 = In(3R)89F2-90Al;99B2-4* but probably separable from it.

e*: *ebony-sooty*

origin: Spontaneous.
discoverer: Sturtevant, 13i20.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 99 (fig.).
phenotype: Body color darker than wild type but lighter than e. Viability excellent. Most easily classified as *e[a]/e[4].* Classifiable from hatching throughout larval period by dark color of spiracle sheaths, although darkening is less than in e, *e[4],* or *ell* (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254—61). Ability to incorporate beta-alanine-derived C intermediate between that of e and + (Jacobs and Brubaker, 1963, Science 139: 1282-83; Jacobs, 1966, Genetics 53: 777-84). RK1.

e**: *ebony-striped

origin: Spontaneous.
discoverer: Villee, 39k.
references: 1941, DIS 14: 40.
1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 137.
phenotype: Body color similar to e[s] but with definite longitudinal stripes on mesonotum. *eat/ea* resembles *e[a]; e[at]/e* resembles e. Viability excellent. RK2.

eU9; *ebony-Uganda

origin: Spontaneous.
discoverer: Zurcher, 1956.
references: 1958, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 33: 75.

1960, DIS 34: 112.
1963, Genetics 34: 1-33 (fig.).
phenotype: A light ebony allele. Females have dark, extremely wide marginal bands on abdominal tergites; entire abdominal tergite region darkly shaded. Males only slightly darker than wild type. Viability lower than wild type. RK2.

E(B): Enhancer of Bar
location: 1-57.3.
origin: Spontaneous.
discoverer: Bonnier and Nordenskibld.
synonym: *i; I: Intensifier of Bar; Eb: Exaggeration of Bar.*
references: 1942, DIS 16: 47.
Bonnier, Nordenskiöld, and Bagman, 1943, Hereditas 29: 113-33 (fig.).
Rasmuson, 1948, Proc. Intern. Congr. Genet., 8th. pp. 645—46.
phenotype: *E(B)* heterozygous with any *B* allele, including 23^{+}, produces flies similar in phenotype to homozygotes for that allele. *B* +/+ *E(B)* eyes have 80—90 facets but *B E(B)*/++ eyes have only 40. Homozygous lethal. RK2(A).
cytology: Salivary chromosomes appear normal, but there is occasional indication of deficiency for faint bands 16A5 and 6.
other information: Reduces *B-fu* crossing over about 40 percent.

e(bx): enhancer of bifhorax
location: 1-1.0.
origin: Gamma ray induced.
discoverer: E. B. Lewis, 53b.
synonym: *en-bx.*
references: 1959, DIS 33: 96.
phenotype: Recessive enhancer of most bithorax alleles. By itself, the only abnormal phenotype is a slight variegated eye color. Most readily classified in combination with bx^{34e} +/+ *Ubx.* Enhances development of dorsal metanotum of latter from a few hairs to a broad band of hairy tissue somewhat like that seen in homozygous $fox^{3}*^{8}$. Enhances bx^{3} +/+ *pbx* from wild type to a slight postbithorax phenotype (slight wing-like modification of posterior portion of halteres). RK2A.
cytology. Associated with *In(l}e(bx) = In(l)3A;4F.* Locus within *Dp(l;l)w = Dp(l;l)3A;3C,* probably in section 3A.

e(bx)2
origin: X ray induced,
discoverer: E. B. Lewis, 55h,
synonym: m^{2}~*bx.*
references: 1959, DIS 33: 96.
phenotype: Similar to *e(hx).* RK2.
cytology: Salivary chromosomes normal.

E(bx): Enhancer of biihorax
location: 3- (to the left of *R).*
origin: X ray induced.
discoverer. E. B. Lewis.
synonym: En-bx.
ph*notyp«: Enhances expression of $bx^{34^{4}m}$, bx^{3}, and *Ubx/'*.* Lethal homozygous. RK2.

e(dp^{v}): enhancer of dumpy-vortex
location: 3-40.4.
origin: Spontaneous.
discoverer: Bridges, 16h7.
synonym: *vo-3: vortex in chromosome 3.*
references: 1919, Bridges and Mohr, Genetics 4: 283-306 (fig.).
1923, Bridges and Morgan, Carnegie Inst. Wash. Publ. No. 327: 168.
1925, Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 41-43 (fig.).
phenotype: Normal. In combination with dp^{v} produces one or two pairs of pits or volcanolike protrusions on thorax; hairs and bristles arranged in whorls. RK3.

****E(f): Enhancer of forked***
location: 2-86.5.
origin: X ray induced,
discoverer: Belgovsky, 37c4.
synonym: *I-t: Intensifier of forked.*
references: 1937, DIS 8: 7.
1938, Izv. Akad. Nauk SSSR, Ser. Biol. 1017-36.
1940, DIS 13: 52.
1944, Zh. Obshch. Biol. 5: 325-56.
phenotype: Homozygote has short, twisted bristles intermediate between *f* and *Bl;* postcutellars often pale; viability and fertility reduced. Heterozygote is wild type. *f/+; E(f)/+* slightly more extreme than *f. f/f; E(f)/+* has an extreme forked phenotype and hairs are forked, *f/f; E(f)/E(f)* rarely survives. RK3.
cytology: Salivary chromosomes normal.

****e(g): enhancer of garnet***
location: 1-5.9.
discoverer: Payne and Denny, 1921.
synonym: *m(g): modifier of garnet.*
references: 1921, Am. Naturalist 55: 377-81.
phenotype: Apparently wild type, but in combination with *g* produces a more orange eye than *g* alone. RK3.

****E(H): Enhancer of Hairless***
location: 2-50.5.
discoverer: Nash.
references: 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 174-75.
Nash, 1965, Genet. Res. 6: 175-89.
phenotype: *E(H); H* flies nearly devoid of chaetae. Majority of bristle sites are vestiges. RK2.

****E(M3g): Enhancer of Minute(3) g***
location: 3- (near spindle attachment).
origin: Spontaneous.
discoverer: Bridges.
phenotype: Specific intensifier of shortness of bristles of *M(3)g.* RK3.

****e(N*): enhancer of Notch-8***
location: 3- (not located).
origin: Spontaneous.
discoverer: Mohr, 181.
references: 1923, Z. Induktive Abstammungs- Vererbungslehre 32: 108-232 (fig.).
phenotype: Produces slight nicking of wings. Enhances N^{s}. RK3.

**e(S): enhancer of Star*
location: 3- (between 0 and 10; perhaps an allele of ru or *R).*
origin: Spontaneous.
discoverer: Bridges, 16kl8.
synonym: *S-i: intensifier of Star.*
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 175 (fig.),
phenotype: By itself, homozygous *e(S)* has normal eyes. *S/+; e(S)/e(S)* has eyes smaller and rougher than S/+, although overlapping somewhat; abdomen bulbous, body color darkish. RK3.

E(S): Enhancer of Star
location: 2-6 [claimed to lie between left break of *In(2L)Cy* and locus of *Cy*\.
discoverer: Bridges, 30a27.
phenotype: *E(S)/+* normal, *E(S)/B(S)* gives slight roughening of eye. *B(S)/+* strongly reduces size and increases roughness of *S/+* and S^2/+ eyes; imparts dominance to *ast/+*, *ast%/+*, ast^3/+, and as^/+(Lewis, 1945, Genetics 30: 137-66). S +/+ *E(S)* occasionally emerges as a late-eclosing giant. RK3A.
cytology: Arose in *In(2L)Cy = In(2L)22Dl-2;33F5-34Al.*

E(sd): Enhancer of scalloped
location: Autosomal.
origin: Spontaneous.
discoverer: R. M. Valencia, 1963.
references: 1965, DIS 40: 37.
phenotype: Almost completely removes wings of sd^BP; not tested with other alleles of *sd.* No interaction with *Bx* or Bx^T. RK2.

E(spl): Enhancer of split
location: 3- (near *ro).*
origin: Spontaneous.
discoverer: Green.
synonym: *En-spl.*
references: Welshons, 1956, DIS 30: 157-58. Von Halle, 1965, DIS 40: 60.
phenotype: Both *E(spl)/+* and *E(spl)/E(spl)* cause *spl/+* to resemble *spl/spl* and cause *spl/spl* and *spt/Y* to have an extreme phenotype. *spl/+/Dp(l;2)51b; E(spl)/+* less extreme than *spl/+; E(spl)/+*. *E(spl)* homozygote viable and fertile. RK2.

e(tu-K): enhancer of tumor K
location: 3- (not located).
origin: Spontaneous.
discoverer Burnet and Sang.
references: 1964, Genetics 49: 223—35.
phenotype: Homozygote produces a significant increase in the penetrance of *tu-K* in both untreated flies and those treated in ways known to increase tumor incidence in *tu-K.* RK3.

E(var)7: Enhancer of variegation
location: 2- (not located).
origin: X ray induced.
discoverer: Schultz.
phenotype: *E(ver)7/+* has no phenotype of its own but enhances variegation, e.g., *w**>** is made much lighter and variegation for *tmt* appears in males. Variegated position effects do not respond uniformly to *E(var)7.* RK2(A).
cytology: May be small abnormality in 25A (Schultz).

E(w°): Enhancer of white-apricot
location: 2- (not located).
origin: Spontaneous.
discoverer: Scandlyn.
phenotype: Heterozygote dilutes w^B to pale yellow. Homozygote with w^a is white. Not tested with other white alleles. No effect on eye color in presence of w^+. Homozygous sterile. RK3.

****efw«); enhancer of white-eosin***
location: 1-32.
origin: Spontaneous.
discoverer: Green, 55b21.
synonym: *en-*w^e.
references: 1957, DIS 31: 81.
1959, Heredity 13: 303-15.
phenotype: Enhances intermediate alleles at the fourth recombinational site of the *w* locus, e.g., w^e, w^{e2}, W^{BE}, w^h, and w^{Xi6} to produce nearly white eye color. No enhancement of tested intermediate alleles at other *w* subloci, e.g., w^a, *w"2)* w^a3, *w*"t*, w^{bi}, $w^{ch}2$, w^{co}, w^{coi}, or w^{sat}> Also suppresses f. $e(w^e)$ flies occasionally have *px*-like venation, or shortened wings, or both. Homozygous females sterile. RK2.

eagle: see **eg**

eb: ebonized
location: 1-42.0.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 86.
phenotype: Heavily pigmented fly, with trident pattern and scutellum very dark. Wings slightly shorter; membrane often slightly concave; wing tips occasionally truncate. Males viable and fertile; females sterile. RK2.

Eb: seeE(B)

ebonized: see ***eb***

ebony: see **e**

ec: *echinus*
location: 1-5.5.
origin: Spontaneous,
discoverer: Bridges, 1516.
phenotype: Eyes large and bulging. Eye surface rough; facets large. Wings rather short and broad. Body thickset. Tends to remove dorsocentrals (posterior more than anterior) and posterior notopleurals; may also add dorsocentrals anterior to anterior dorsocentrals whether or not posterior bristles removed (Sturtevant). ec is visible in +/ec/ec triploids (Gersh). RK1.
cytology: Locus placed at 3F1-2 by Demerec and Sutton (Demerec, Kaufraann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

echinoid: see *ed*

echinus: see ec

ed: echinoid
locotion: 2-11.0.

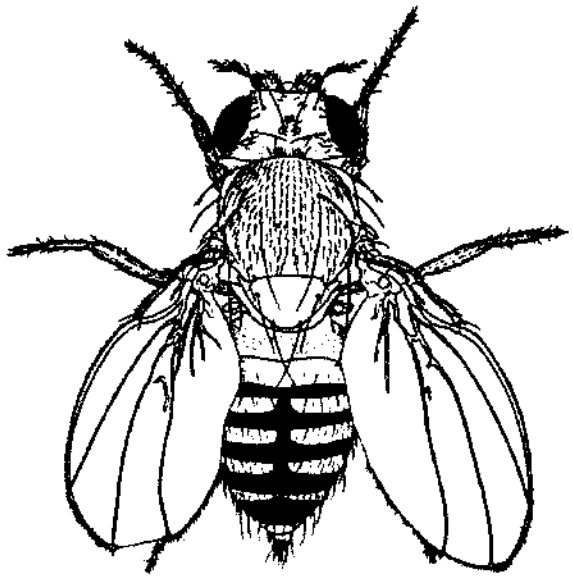
origin: Spontaneous.
discoverer: Bridges, 31al6.
phenotype: Eyes large and rough. Easily classified, although not so extreme as ec. RK1.
cytology: Placed between 24D2 and 24F1 on the basis of its inclusion in *Df(2L)M'Z^{c} = Df(2L)24D2-5;25A2-3* but not in *Df(2L)M-z^{B} = Df(2L)24E2-Fl;25Al-2* (Morgan, Bridges, Schultz, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77).

e/: *elfin
location: 1- (rearrangement).
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1959, DIS 33: 86.
phenotype: Small fly with slightly excess melanization. Wings proportionally smaller, slightly altered in shape, and warped. Abdominal tergites often broken and abnormally pigmented. Males viable but sterile. RK3A.
cytology: Associated with *T(l;2)ef = T(1;2)14C8-D1;2R.*

eg: eagle
location: 3-47.3.
discoverer: Morgan, 1930.
phenotype: Wings extended. Hairs on thorax somewhat disarranged. Dark pattern on thorax. RK2.

eg^{d}
discoverer: Bridges, 33J16.
synonym: *dh; dihedral.*
phenotype: Wings extended and uplifted. Females often sterile. RK2.

eg 57c
origin: Spontaneous.
discoverer: Nicoletti, 57c.
references: 1957, DIS 31: 84.
phenotype: Wings held out at 45-90° angle from midline. Excellent viability and fertility. RK1.



el: elbow
From Bridges and Brehme, 1944, Carnegie inst. Wash. Pub!. No. 552: 75.

el: elbow
location: 2-50.0.
origin: Spontaneous.
discoverer: E. M. Wallace, 35dl.
phenotype: Wings extended and bent backward (as in *bt* and *bat),* often warped, shortened; sometimes blistered or nicked. Alula always reduced and fused with main wing blade. Venation reduced by terminal shortening of L5 and of crossveins. Balancers reduced, especially in third segment. Eye size decreased, varying with other manifestations. RK2.
cytology: Placed in region between 34E5 and 35D1 on the basis of its inclusion in *Df(2L)64j = Df(2L)34E5-Fl;35C3-Dl* (E. H. Grell).

***elfin:* see ef**

Ellipse:* see *Elp

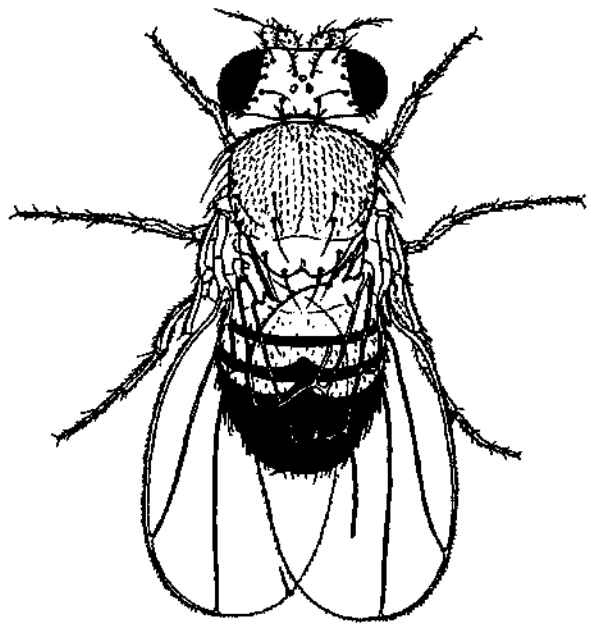
***elliptical rough:* see e/r**

Elp: Ellipse
location: 2-99 (to the left of px).
origin: Spontaneous.
discoverer: E. H. Grell, 57b.
references: 1960, DIS 34: 50.
phenotype: Eyes of heterozygotes rough and more oval than wild type. Homozygotes have small eyes with fused facets; resemble homozygous *ast.* Homozygotes have low viability. RK1 as heterozygote.

e/r; *elliptical rough
location: 1-25.1.
origin: X ray induced.
discoverer: Fahmy, 1956.
references: 1960, DIS 34: 49.
phenotype: Eyes slightly elliptical and rough. Wings slightly broader. Both sexes viable and fertile. RK2.
other information: Two other alleles: one induced by X rays, one by CB. 3025.

en: *engrailed*
location: 2-62.0.
origin: Spontaneous.
discoverer: Evang, 26k7.
references: Eker, 1929, Hereditas 12: 217—22 (fig.).
Bridges, Skoog, and Li, 1936, Genetics 21: 788—95.
Brasted, 1941, Genetics 26: 347-73 (fig.).
phenotype: Longitudinal cleft extends from rear border of scutellum forward; may be reduced to median nick or posterior flattening of scutellum. Bristles often javelin- or hooked-like. Wings larger, broader, and thin textured, with spatulate end; venation always disturbed (like that of cf), with gap in L4 and L5 and branching plexus of extra veins. In males, extra sex comb often present, smaller than normal and in mirror-image position on outer side of tarsus. Action of en on differentiation of secondary sex comb on male foreleg is autonomous [Tokunaga, 1961, Genetics 46: 157—76 (fig.)]. Male genitalia may be malformed and rotated, resulting in sterility (Curry, 1941, DIS 14: 50). *eg* en/+ + characterized by slight

degree of L4 interruption and thinning in males at low temperature. The triple heterozygote eg *en/+ +; ci/+* has about 50 percent expression of L4 interruption (House, 1961, Genetics 46: 871). For other interactions of en with *ci* alleles andfl, see House (1953, Genetics 38: 199-215, 309-27). RK1.



en; *engrailed*
From Eker, 1929, Hereditas 12: 217-22.

en-; see *e( )*
En-: see *E( )*
engrailed: see en
enhancer: see *e( )*
Enhancer: see *E( )*
eq: equational producer
location: 1- (to the right of *car* — probably heterochromatic).
origin: X ray induced,
discoverer: Schultz, 33a2.
references: Morgan, Bridges, and Schultz, 1934, Carnegie Inst. Wash. Year Book 33: 280.
phenotype: Produces 1—2 percent equational nondisjunction of *X's* in male, producing both *X/X* and nullo-X, nullo-Y sperm. Original eq male when crossed to attached-X female produced 89/289 equational exceptional *X/X* daughters. Claimed to generate 66-deficient *Y* chromosomes. RK3.
cytology: Both salivary and mitotic chromosomes appear normal.

er: ***erupt***
location: 3-70.7 (60.7 to 80.7; not an allele of *k).*
origin: Spontaneous.
discoverer: Glass, 1941.
references: 1943, DXS 17: 50.
1944, Genetics 29: 436-46.
1957, Science 126: 683-89 (fig.),
phenotype: Exhibits eruption of underlying hypodermis in center of one or both eye*. Eruption may be segmented and have hairs. Less extreme expression produces derangement of central or anterior-central facets. Eruption may occur as encroachment of chitin with bristles and hairs into anterior edge of eye. RK2.
other information: Alleles of at least five different strengths present in different wild stocks. Present in many wild stocks in suppressed condition.

Er:** ***Erect
location: 3-50.
origin: Spontaneous.
discoverer: Neel, 41c9.
references: 1942, DIS 16: 50.
phenotype: Posterior scutellars at greater than normal angle with body; vary from slight effect to condition in which bristles stand at right angles to scute Hum. In latter case, bristles usually appear warped and twisted. Wings incompletely expanded and crinkled to varying degrees. RK3.

erupt: **see er**

es: ***ether sensitive***
location: 2- (not located).
origin: Spontaneous.
discoverer: Tinderholt.
references: Kidd, 1963, DIS 37: 49.
phenotype: Hypersensitive to diethyl ether and chloroform. Homozygotes killed by exposure to doses of these agents harmless to normal flies. Sensitivity probably affected by modifiers. A male sterility factor seems to be associated but may be separable. Viability of homozygote about 70 percent that of *es/SMl* and remains low in strains selected for less sensitivity. Not sensitive to carbon dioxide. RK3.

esc; ***extra* sex *combs***
location: 2-54.9 (based on location of esc^{D}).
origin: Spontaneous.
discoverer: Slifer, 40e2.
references: 1942, J. Exptl. Zool. 90: 31-40 (fig.).
phenotype: Sex combs may be present on all six legs of male; at least one extra sex comb present in majority of males. Expression affected by culture conditions. When expressivity high, extra transverse bristle rows appear between sixth and eighth longitudinal rows of bristles, mainly on distal portion of basitarsus and tibia of second and third legs in both sexes; accompanied by shortening of affected leg segments. Sex comb development autonomous in mosaics produced by somatic crossing over [Tokunaga and Stern, 1965, Develop. Biol. 11: 50—81 (fig.)]. For interactions with *Pc* and Sex see Hannah-Alavah, 1958, Genetics 43: 878—905 (fig.). Males and females sterile. RK2.
cytology: Arose in chromosome carrying *In(2L)t* » *In(2L)22D3-El;34A8'9,* but mutant and inversion separable (Tokunaga).

esc^{2}: see esc^{D}

esc°: ***extrasexcombs-Dominant***
origin: Spontaneous,
discoverer: Strömnaes, 53f.
synonym: ©sc-^{2}; Esc^{2}.

references: Hannah and Strömnaes, 1955, DIS 29: 121-23.
phenotype: *esc&/+* similar to *esc/esc.* Homozygous lethal. RK2.

Est-6^F: Esterase 6-Fast

location: 3-36.8 (10.3 units to the right of h and 6.4 units to the left of *th).*
origin: Naturally occurring allele.
discoverer: T. Wright, 61h.
references: 1963, DIS 37: 53.
1963, Genetics 48: 787-801 (fig.).
phenotype: Esterase 6 is one of ten positively migrating esterases demonstrable histochemically with (X-naphthyl acetate and Fast Blue BB after starch gel electrophoresis of imaginal homogenates. Readily identified in zymograms as the most heavily staining esterase. Migrates about 5 cm when exposed to a voltage drop of 2.0—2.5 v per cm for 17 hr at 4°C in a starch gel prepared with 0.05 M tris buffer, pH 8.7. Flies homozygous for *Est-6^F* have a single esterase 6 band that migrates faster than a similar, single esterase 6 band found in flies homozygous for *Est-6^S*. The enzyme specified by *Est-6^F* is completely inactivated by exposure to 60°C for 10 min (Wright, 1964, DIS 39: 60). Heterozygotes, *Est-6^F/Est-6^S,* exhibit both the fast and slow esterase 6 bands and do not contain a hybrid esterase 6 with an intermediate electrophoretic mobility. No morphological difference between *Est-6^F* and *Eat-6^S* homozygotes is apparent. Both have been found together in wild populations and in numerous wild type and mutant stocks. Esterase 6 of Wright corresponds to esterase D of Beckman and Johnson. RK3.

Est-6^{F2}

discoverer: Maclntyre, 63d.
references: Wright, 1964, DIS 39: 60.
phenotype: Produces an esterase 6 with the same electrophoretic mobility as that produced by *Est-6^F* but that is stable to treatment with 60°C for 10 min. RK3.

Est-6^S: Esterase 6-Slow

origin: Naturally occurring allele.
discoverer: T. Wright.
references: 1963, DIS 37: 53.
1963, Genetics 48: 787-801 (fig.).
1964, DIS 39: 60.
phenotype: Produces slowly migrating esterase 6 that is stable to treatment with 60°C for 10 min. RK3.

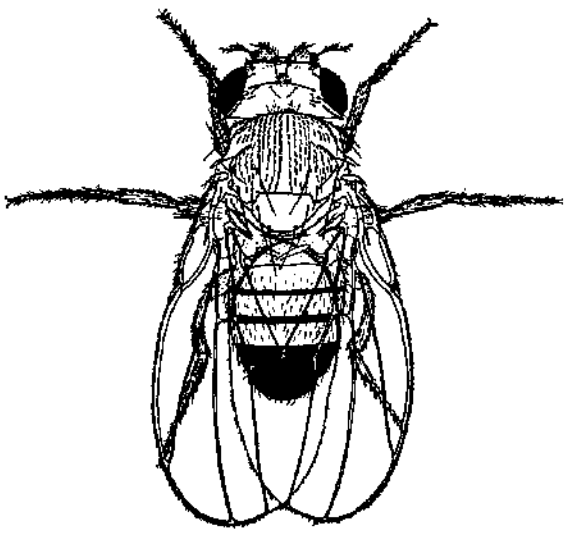
Est-C?: Esterase C-Fast

location: 3-49 (based on 2/68 crossovers with *Aph* and 9/43 with *Est-6).*
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
reference*: 1964, Hereditas 51: 212-20 (fig.).
phenotype: Esterase C is one of six postively migrating esterases that can be demonstrated with a-aapiithyl acetate and Fast Blue RR after starch gel electrophoresis of single fly homogenates for 3 hr at room temperature at a voltage gradient of 6—8 v per cm, using Poulik's discontinuous buffer system. *Est-C^F/Est-C^F* produces a rapidly migrating esterase C and *Est-C^F/Est-C^s* produces two bands on starch gel; no evidence for hybrid enzyme in heterozygotes. *Est-C^s Est-6^S/Est-C^F Est-6^F* homogenates produce four electrophoretic bands in place of the two found in homozygotes. RK3.

***Est-C^s: Esterase* C-S/ow**

origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 212-20 (fig.).
phenotype: Produces esterase C with slow electrophoretic mobility on starch gel. RK3.

***ether sensitive:* see es**



ex; *expanded*

From Stern and Bridges, 1926, Genetics 11: 503-30.

ex; *expanded*

location: 2-0.1.
origin: Spontaneous.
discoverer: Bridges, 17k21.
references: Stem and Bridges, 1926, Genetics 11: 514 (fig.).
phenotype: Wings extremely wide and large, sometimes curved and divergent. Effect produced in prepupal wing, probably by influence on cell division (Waddington, 1940, J. Genet. 41: 75-139). Eyes slightly reduced in size and roughish. Body large. RK.2.
cytology: Salivary chromosome location in or near 21C3 (Lewis, 1945, Genetics 30: 137-66).

***ex^{48k}**

origin: Recovered among progeny of flies treated as larvae with natural gas.
discoverer. Mickey, 48k.
references: 1950, DIS 24: 60.
phenotype: Slightly more extreme than ex. RK2.

Exaggeration of Bat:* see *E(B)

exi: exiguous

location: 1-51.5,
origin: Induced by 2-choroethyl methaneaulfonate (CB. 1506).

discoverer: Fahmy, 1956.
references: 1958, DIS 32: 70.
phenotype: Small fly with rather dusky body color. Not easily classified. Viability and fertility good in male, slightly reduced in female. RK3.

expanded: see ex

exr: extra *venation

location: 1- (associated with *In(l)exr).*
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 70.
phenotype: Eyes slightly rough and smaller than normal. Wings have irregularly distributed extra vein tissue. Males viable and fertile; females viable but sterile. RK3A.
cytology: Associated with *In(l)exr = In(l)l 2E8-10; 15D1 -3.*

**ext: extended*

location: 2- (not located),
origin: Spontaneous,
discoverer: Ströher, 1958.
references: Mainx, 1958, DIS 32: 82.
phenotype: Wings held out at about a 75° angle from body axis, are wavy and gradually curve downward. Distal parts of wings often crumpled and folded. Halteres normal. Function of wings reduced. Viability and fertility good. RK3.

Ext: Extras

location: 1-15.2.
discoverer Schultz, 3318.
phenotype: Heterozygous female has thickened, branched, and extra veins. Overlaps wild type. Lethal in male. RK3.

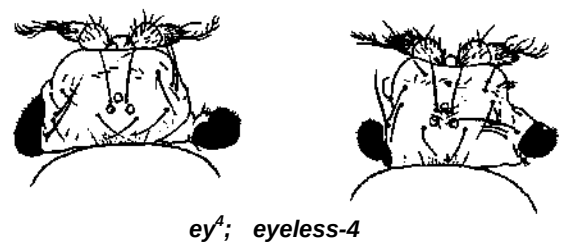
ext-b: see *bat*
Ext-sct-3: see *Su(sc)*
extended: see **exf**
extended-b: see *bat*
Extra sex comb: see Sex
***extra sex** combs:* see esc
extra venation: see **exr**
Extras: see **Exf**

ey; *eyeless*

location: 4-2.0 (located in diplo-4 triploids by Sturtevant, 1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7).
origin: Spontaneous.
discoverer: Hoge, 14e.
references: 1915, Am. Naturalist 49: 47—49.
Bridges, 1935, Biol. 2h. (Moscow) 4: 401-20 (fig.),
phenotype: Eye reduced to three-fourths to one-half normal area, but varies from no eyes to extensive overlapping of wild type. Less extreme at low temperatures. Optic ganglia reduced (Richards and Furrow, 1922, Proc. Oklahoma Acad. Sci. 2: 41—45). Variability in size of eye affected by environmental and genetic conditions (Morgan, 1929, Carnegie fast. Wash. Publ. No. 399: 139-68; Baron, 1935, J. Exptl. Zool. 70: 461-90). RK2.
cytology: Placed between 1O2C15 and 102E10 on basis of the absence of ey^+ from the $2L^D 4^{AP}$ element of *T(2;4)h~ T(2;4)25E;102C15'Dl* (Morgan, 1946, DIS 20: 88) and its presence on *Df(4)ll = Df(4)102E2-10;102F2-10* (Hochman).

ey-?

origin: Spontaneous.
discoverer: Nonidez, 1919.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20 (fig.).
phenotype: Eye reduced to one-half to one-fourth wild-type area, with relatively little variability. Cephalic complex smaller than wild type at 25 hr after hatching from egg at 27°C; subsequent growth rate same as wild type [Medvedev, 1935, Z. Induktive Abstammungs- Vererbungslehre 70: 55-72 (fig.); 1935, Tr. Inst. Genet. Akad. Nauk SSSR 10: 119-51; Steinberg, 1944, Proc. Natl. Acad. Sci. U.S. 30: 5-13]. RK1.
other information: Most often used ey allele.



ey⁴; eyeless-4
Edith M. Wallace, unpublished.

ey⁴

origin: Spontaneous.
discoverer: Li, 25fl0.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Eye size and variability intermediate between *ey* and *ey2.* Optic disk of mature larvae about 20 percent size of wild-type disk (Chen, 1929, J. Morphol. 47: 135—99). Expression and fertility of both males and females highly susceptible to modification of genetic background (Spofford, 1956, Genetics 41: 938-59). RK2.

**ey34g*

origin: Occurred among progeny of cold-treated fly.
discoverer: Gottchewski, 34g26.
references: 1935, DIS 4: 15.
phenotype: Strong allele of *ey,* like ey2. RK1.

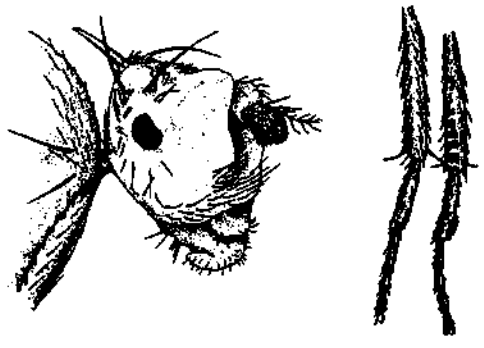
origin: Spontaneous.
discoverer: Spencer, 36e25.
references: 1937, DIS 7: 8.
phenotype: Like ey, expression variable; viability poor. RK3.

**ey46l*

origin: X ray induced.
discoverer: King and Poulson, 461.
references: 1948, DIS 22: 54.
phenotype: Eye smaller than ey^2, conical in profile, may be notched or partly covered with cuticle. Sometimes bristle-covered palps protrude from border of eye. Palps often found on bucca. Often dark smudges on gena. Extra vibrissae and buccal bristles. Anterior verticals usually doubled; posterior verticals thickened, shortened,

and bent or split at tips. ey^{46i}/ey^{2} intermediate between the two homozygotes. Viability fair. RK2.

***eyAD**: *eyeless of A. Das*
origin: Spontaneous.
discoverer: Das, 63a7.
references: Sarkar, 1963, DIS 38: 28.
phenotype: Bye varies from absence to normal. RK2.



ey^{D}: eyeless-Dominant
Left: head. Right: first pair of legs.
From Patterson and Muller, 1930, Genetics 15: 495-577.

eyD; eyeless-Dominanf
origin: X ray induced.
discoverer: Muller, 27k.
references: Patterson and Muller, 1930, Genetics IS: 495-577 (fig.).
Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
1935, Tr. Dinam. Razvit 10: 463-73.
phenotype: Eyes small, outline irregular, displaced toward top and rear. Head large, often with duplicated antennae or ocelli. Sex combs always very large. Second joint of tarsi shortened to give lumps, sometimes very conspicuous. Fully dominant in triplo-4 flies (Sturtevant, 1936, Genetics 21: 448). Eye size of B; ey-*V+ males larger than of *B* alone. Produces extreme phenotype in combination with *D*, JD/+; ey^{D}/+ almost completely lethal (Sobels, Kruijt, and Spronk, 1951, DIS 25: 128). Homozygous lethal. Homozygotes die during larval period and many ey^{D}/+ flies die as pupae (Hochman). RK2.
cytology: Salivary chromosomes show duplication of about a dozen bands inserted into middle of fourth chromosome as a reversed repeat. Source of duplication unknown (Bridges, 1935).
other information: May not be an allele of ey.

***$_{6}$yD39k**
origin: X ray induced.
discoverer: Suttoo, 39k.
references: Hinton, 1940, DIS 13: 49.
phenotype: Eyes appear as a knot or two separated knots. Homozygote overlap* wild type in 75 percent of flies. Heterozygote overlaps wild type in only 50 percent of flies (T. Hinton, 1942, Am. Naturalist 76: 219-22). RK3.
cytology: Salivary chromosomes normal.

eyK; *eyeless from Oregon-K*
origin: Spontaneous.
discoverer: Sang and McDonald.
references: 1954, J. Genet. 52: 392-412 (fig.).
Sang and Burnet, 1963, Genetics 48: 1683—1700.
phenotype: Eyes reduced in varying degrees from eyelessness to wild type. Supernumerary antennae occur in a small proportion of flies, especially in flies with no eyes. Eye size depends on diet. RK2.

***eyopt**: *eyeless-ophthalmoptera*
origin: Spontaneous derivative of *ey2*. On chromosome *4;* possibly separable from ey^{2}.
discoverer: E. Goldschmidt.
references: Goldschmidt and Lederman-Klein, 1958, J. Heredity 49: 262-66 (fig.).
phenotype: Eyes small with variable outgrowths. RK2.

ey^{R}: *eyeless-Russian*
origin: Spontaneous.
discoverer: Sacharov, 23hl3.
references: Serebrovsky and Sacharov, 1925, Zh. Eksperim. Biol. 1: 75—91.
Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Eye reduced to one-half or one-fourth normal area, reduction occurring chiefly in anterior part. Similar to ey2. RK1.

eyfu; *eyeless-fumorous
origin: Spontaneous,
discoverer. Datta, 63c26.
synonym: *tu-h^^: tumor head-63.*
references: Sarkar, 1963, DIS 38: 28.
phenotype: Abnormal growths in various regions of the head; protuberances on or near eyes; small eyes; aggregations of hairs in antennal region. RK2.
other information: Allelism shown by Fahmy.

***eyW59**: *eyeless of* Wfc/fe*
origin: Spontaneous.
discoverer: White, 59f.
references: Meyer, 1959, DIS 33: 97.
phenotype: Eyes small or absent. More extreme at higher temperatures. Good viability and fertility. RK1.

Eye: Eyeless dominant in chromosome 2
location: 2-62.7.
origin: Probably ultraviolet induced.
discoverer: Edmondson, 51g.
synonym: *ey-H^{D}*.
references: 1952, DIS 26: 60.
phenotype: Eyes may be greatly reduced in size, with frequent doubling of antennae. Overlaps wild type, especially in old vials. Recessive in triploids. *Eye/+'$_{f}$ &y^{D}/+* has smaller eyes than either alone. Homozygous lethal. RK3.

eye gone: see *eyg*

***eyeless:* see ey**

Eyeless dominant in chromosome 2:* see *Eye

Eyeluf.* see *Eyl

eyes reduced',* see *eyr

eyg: eye gone
location: 3-35.5.

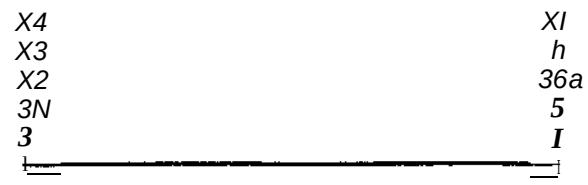
origin: Spontaneous.
discoverer: Ives, 40g20.
references: 1942, DIS 16: 48.
phenotype: Eyes and head much smaller than normal. Considerable pupal mortality, probably from inability to push open pupa cases. Adults normal in viability and productivity. Character subject to genetic modifiers and possibly environmental influences. Expression varies from complete absence of facets to formation of about 100 facets. RK2.

Eyl: Eyeluf

location: 1-18.
origin: Spontaneous.
discoverer: Marzluf.
phenotype: One or both eyes reduced in size. Expression varies from slight reduction to absence of eye. Sometimes extraneous materials protrude through eye; frequently one or more duplicated antennae present. Penetrance incomplete; viability good. In aged and crowded cultures, both penetrance and expressivity increased. Third chromosome carries important modifiers affecting penetrance, and different wild-type and mutant stocks carry different modifiers. Penetrance lower at 18°C than at 25°C. RK3.

eyr: eyes reduced

location: 3-103.
origin: Found among flies grown on food containing copper sulfate.
discoverer: Edwards and Gardner, 1962.
references: 1963, DIS 37: 47.
1966, Genetics 53: 785-98.
phenotype: Eyes vary from normal to absence of ommatidia. Shows some degree of dominance; many heterozygotes have some eye abnormality, usually a nick in anterior region of one or both eyes; an abnormal growth of wing tissue may be associated with the nick, eyr; ey^4 flies have very small heads, usually without ommatidia. Viability greatly reduced. RK2.

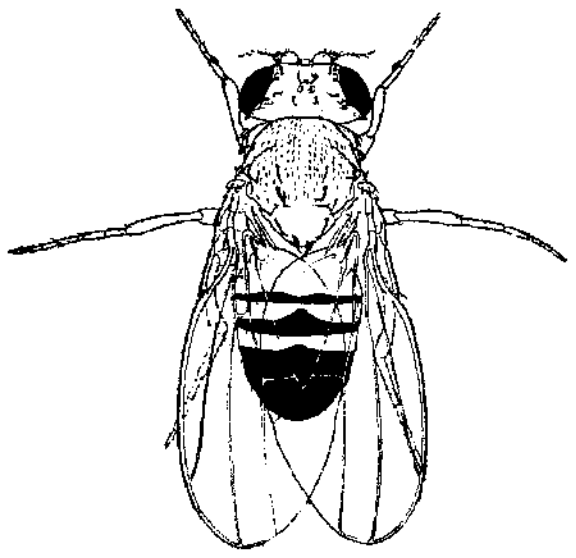


Map of the / locus

Drawn from Green, 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.

f: forked

location: 1-56.7.
origin: Spontaneous.
discoverer: Bridges, 12kl9.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash, Publ. No. 237: 58 (fig.),
phenotype: Bristles shortened, gnarled, and bent, with ends split or sharply bent. Hairs similarly affected, but this is visible only at high magnifications. Treatment with methylurea causes normal bristle formation (De Marinis). Developmental studies [Lees and Waddington, 1942, Proc. Roy. Soc. (London) Ser. B 131: 87-110 (fig.); Lees and Picken, 1945, Proc. Roy. Soc. (London), Ser. B 132: 396—423 (fig.)] show nature of pupal bristle secretion is affected. Suppressed by *su(f)*. RK1.
cytology: According to Demerec and Sutton, bands 15F1-5 are involved (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). This can be narrowed to 15F1-3 on the basis of *Df(l)f²S7-S = Dt(l)l 5E7-F1.-15F2-4.*
other information: Green (1955, Proc. Natl. Acad. Sci. U.S. 41: 375-79; 1956, Proc. Natl. Acad. Sci. U.S. 42: 73—77) showed the forked mutants can be assigned to either of two pseudoallelic series, f is a member of the right series. Back mutations to f^+ occur spontaneously and their incidence is not increased by X rays (Green, 1959, Proc. Natl. Acad. Sci. U.S. 45: 16-18; Lefevre and Green, 1959, Genetics 44: 769—76).



h forked

Edith M. Wallace, unpublished.

f3

origin: Spontaneous,
discoverer: Bridges, 19kl4.
references: 1938, DIS 9: 46.
Green, 1955, Proc. Natl. Acad. Sci. U.S. 41: 375-79.
phenotype: Slight allele of /. Ends of bristles twisted or split. Not suppressed by *su(f)*. RK2.
other information: A member of the left pseudoallelic series.

f3N

origin: Spontaneous derivative of /.
discoverer: Green.
references: 1955, Proc. Natl. Acad. Sci. U.S. 41: 375-79.

1959, Proc. Natl. Acad. Sci. U.S. 45: 16-18.
Lefevre and Green, 1959, Genetics 44: 769—76.
phenotype: Expression similar to /. Unlike f, does not respond to *su(f).* RK1.
other information: At the left f sublocus (Green). Reverts spontaneously, and X rays delivered to oogonia and oocytes cause high incidence of reversion. Irradiation of postmeiotic stages in the male does not cause back mutation (Green 1959; Lefevre and Green 1959).

{5

origin: Spontaneous.
discoverer: Bridges, 21b.
references: 1938, DIS 9: 47.
phenotype: Bristles and hairs much curled and twisted. A rather extreme allele of f. Suppressed by *su(f).* RK1.
other information: A member of the right f pseudo-allelic series (Green, 1955).

****f34b***

origin: X ray induced.
discoverer: Stone, 34b.
references: 1935, DIS 4: 63.
phenotype: Subliminal allele of f. Wild type in males and homozygous females, but gives a weak forked phenotype when heterozygous with / or *f5.* RK3.

****(34»***

origin: X ray induced.
discoverer Oliver, 34e4.
references: 1939, DIS 12: 48.
phenotype: Like f. RK1.

{36a

discoverer: Ives, 36a27.
phenotype: The most extreme f allele. Hairs and bristles extremely crooked. RK1.
other Information: A member of the right / pseudo-allelic series (Green).

****{42***

origin: Spontaneous,
discoverer: Anderson, 42c30.
references: Oliver, 1942, DIS 16: 53.
phenotype: An extreme allele like i^{s}. RK1.

****fSla***

origin: X ray induced.
discoverer: Green, 51a.
references: Lefevre and Green, 1959, Genetics 44: 769-76.
phenotype: An extreme *f* like f^{36a}. Not suppressed by *au{f).* RK1.
other information: Not observed to revert spontaneously; reversions not induced by X rays.

/56«

origin: Spontaneous.
discoverer; Williams, 56e.
references: 1956, DIS 30: 79.
phenotype: Like *i.* RK1.

f257-4

origin: X ray induced.
discoverer: Demerec, 33j.
phwitotyp*: Bristles and hairs strongly forked. Viability and fertility good. RKIA.
cytology: Associated with $In(l)i^{257,4}$ = ***In(l)15F2-16Al;16D2-El.***

f2S7-5

origin: X ray induced.
discoverer: Demerec, 33k.
phenotype: Lethal in male and cell lethal. RK2A.
cytology: Associated with $Dt(l)f^{257-5}$ = ***Df(l)15E7-Fl;15F2-4*** **(Sutton).**

****{2S7-6***

orjgin: Spontaneous; recovered originally as a Bar reversion.
discoverer: Bridges, 14i25.
references: 1917, Genetics 2: 445—65.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 164, 226.
Sutton, 1943, Genetics 28: 99.
phenotype: Lethal and cell lethal. RK2A.
cytology: Associated with *Dt(l)P57-6 =Df(l)15E4-****F1;16A7-1.***
other information: Identity of $Dt(l)f^{2}$*7-6 with the Bridges f *B* deficiency claimed in the original edition, but this does not seem well established. Bridges's case was the first recorded deficiency; in 1925 it was claimed to be lost. *Di(l)f257-6* obtained by Demerec from Pasadena in 1933 as a *t B* deficiency.

****f2S7-9***

origin: X ray induced; recovered with simultaneous reversion of *BiB*.*
discoverer: Demerec, 34c.
phenotype: Lethal in male and cell lethal. RK2A.
cytology: Associated with *Df(l)f2S7-9 =* ***Df(l)l 5E7-Fl;16D2-4.***

****f2S7-J5***

origin: X ray induced.
discoverer: Demerec, 35a.
phenotype: Lethal. RK2A.
cytology: Associated with $T(l;2)f^{257mls}$ = ***T(l;2)13E9-10;15E2-3;24F*** **(Sutton).**

/257-I9

origin: X ray induced.
discoverer: Hoover, 35h.
phenotype: Lethal, extreme forked. RK2.
cytology: No major band missing (Kaufmann).

****f2S7-22***

origin: X ray induced in *BiB* X* chromosome.
discoverer: Demerec, 36c.
phenotype: Lethal. RK2A.
cytology: Associated with $T(l;2)t^{2\wedge 7}$~22 = ***T(1;2)4D2-3;8F;15E4-F1;39E;41F-42A*** **(Kaufmann).**

****f2S7-24***

origin: X ray induced.
discoverer: Demerec, 36e.
phenotype: An extreme /. Lethal. RK2.
cytology: No major band missing (Kaufmann).

****{257-27***

origin: X ray induced.
discoverer: Demerec, 381.
phenotype: Lethal- RK2A.
cytology: Associated with *Df(l)l357-27 = Df(l)14F6-****15Al;l5FS-6*** **(Sutton).**

***f257-28**
origin: X ray induced.
discoverer: Sutton, 40h.
phenotype: Lethal. RK2A.
cytology: Associated with *Df(l)f257-28 = Df(l)15E7-F1;16E5-F1* (Sutton).

*/257-29
origin: X ray induced.
discoverer: Bishop, 401.
phenotype: Very slight *f* effect. Male sterile. RK2A.
cytology: Associated with *T(l;3)f[25]7-2 9 — T(1;3)15F5-16A1;64* (Sutton).

*{257-30
origin: X ray induced.
discoverer: Bishop, 41a.
phenotype: Forked bristles; viability and fertility good. RK1.
cytology: Salivary chromosomes apparently normal (Sutton).

*f2S7-31
origin: X ray induced.
discoverer: Bishop, 41a.
phenotype: Lethal. RK2A.
cytology: Associated with *Df(l)f257-31 =Df(l)15E7-F1.-J5F5-6* (Sutton).

f+//»; *forked-wild type in heterochromatin*
origin: X ray induced simultaneously with f^x.
synonym: *P": forked-mottled = f^x f^{+if}>.*
discoverer: Muller.
references: 1946, DIS 20: 88-89.
1947, DIS 21: 71.
Muller and Oster, 1957, DIS 31: 141-44.
Oster, Ehrlich, and Muller, 1958, DIS 32: 144-45.
phenotype: f^{+ih} with any *f* allele has normalizing effect. Patches of bristles and occasionally whole fly is wild type. An extra *Y* chromosome enhances the normalizing effect. RK2A.
cytology: Salivary chromosomes appear normal Q. I. Valencia).
other information: Apparently, £**** is all or part of the normal allele of f transposed to the proximal heterochromatin of the *X* chromosome, where it variegates.

fB; forked of Belgorsky
origin: X ray induced in *In(l)sc[s]* or *Jn(l)B[M2]*.
discoverer: Belgovsky, 1936-1937.
references: 1937, DIS 8: 7.
1938, Izv. Akad. Nauk SSSR, Ser. Biol., 1017-36.
1940, DIS 13: 47-48.
other information: A series of several dozen / alleles of different strengths. Analyzed genetically but not cytologically.

fBIS
origin: X ray induced in B^2 male,
discoverer Belgovsky, 361.
references: 1940, DES 13: 47.
phenotype: Shows variegated expression of *f*. More extreme in combination with *E(f)*. RK2A.
cytology: G#netic data indicate that the mutation is associated with a reinversion of the B^{M3} inversion. B^{MS} phenotype reverted.

fB27
origin: X ray induced in B^{M2} male.
discoverer: Belgovsky, 361.
references: 1940, DIS 13: 47.
phenotype: Males have mostly normal bristles; a few reduced like a Minute; rarely forked. f^{B27}/f are mosaic for forked. *fB27/fB27* females rarely survive, those that do sometimes have reduced bristles or notched wings or both, and are sterile. More extreme in combination with *E(f)*. RK3A.

/«: *forked of Hexter
origin: Spontaneous.
discoverer: Hexter.
synonym: f^3.
references: Green, 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.
phenotype: Like f but not suppressed by *su(f)*. RK1.
other informotion: A member of the right *f* sublocus.

/*"; see f^{+ih}

fa*: see f^x

f^x: forked from X irradiation
origin: X ray induced, simultaneously with f^{+il}*.
synonym: f"; *forked-mottled = f^x /^+^*.
discoverer: Muller.
references: 1946, DIS 20: 88-89.
1947, DIS 21: 71.
Muller and Oster, 1957, DIS 31: 141-44.
Oster, Ehrlich, and Muller, 1958, DIS 32: 144-45.
phenotype: A medium /• Suppressed by *su(f)*. RK1.
cytology: Salivary chromosomes appear normal (J. I. Valencia),
other information: Located to right of f^3-. Does not cross over with /. Is not induced to revert by X rays. See last two references for relation between f^x and f^{+ih}.

***fX7**
origin: X ray induced.
discoverer: Green.
references: 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.
phenotype: Like f but not suppressed by *su(f)*. RK1.
other information: In right f sublocus.

***fX2**
origin: X ray induced.
discoverer: Green.
references: 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.
phenotype: Like f but not suppressed by *su(f)*. RK1.
other information: In left *f* sublocus.

***+fX3**
origin: X ray induced.
discoverer: Green.
references: 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.
phenotype: Like /but not suppressed by *su(f)*. RK1.
other information: In left sublocus of forked.

****fX4**
origin: X ray induced.
discoverer Green.

references: 1956, Proc. Natl. Acad. Sci. U.S. 42: 73-77.
phenotype: Like f but not suppressed by *su(f).* RK1.
other information: In left sublocus of forked.

fa: facet

location: 1-3.0.
origin: Spontaneous.
discoverer: Bridges, 14b.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 76.
phenotype: Eyes of all males moderately rough owing to irregularity in size, shape, and arrangement of facets. Eyes of females less rough, with about 10 percent overlap of wild type. Eye abnormality caused by overgrowth of secondary pigment cells, which compresses cones and causes overlying corneal facet to bulge (Waddington and Pilkington, 1942, DIS 16: 70). Wings have apical nicks in 0.25 percent of males and 0—5 percent of females. *N/fa* has rough eyes of *fa* as well as a Notch phenotype; that is, *fa* has a pseudodominant effect with Notch. RK2.
cytology: Salivary chromosome locus placed at 3C7 by Slizynska (1938, Genetics 23: 291-99). Salivary chromosomes normal (Welshons).
other information: A member of the pseudoallelic series at the Notch locus (Welshons and Von Halle, 1962, Genetics 47: 743-59; Welshons, Von Halle, and Scandlyn, 1963, Proc. Intern. Congr. Genet., 11th, Vol. 1: 1-2), located between JV^{55eJjr} and fa^{no}.

fa*[3]: see *spl

****fado-vg*: *facet-dominigene for vestigial***

origin: Spontaneous.
discoverer: Goldschmidt.
references: 1935, Z. Induktive Abstammungs-Vererbungslehre 69: 38-131 (fig.)-1935, Biol. Zentr. 55: 535-54 (fig.). Gardner, 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 85-102.
phenotype: By itself it is wild type. fa^{do}-*v6/fa* shows rough-eye character of *fa.* fa^{do}~^{v}*6/*fa^{do} ^{rv}*i', v&/+* produces some wing notching. RK3.
other information: Presumed by Goldschmidt to enhance dominance of *vg* and thus termed a '*dominigene''.

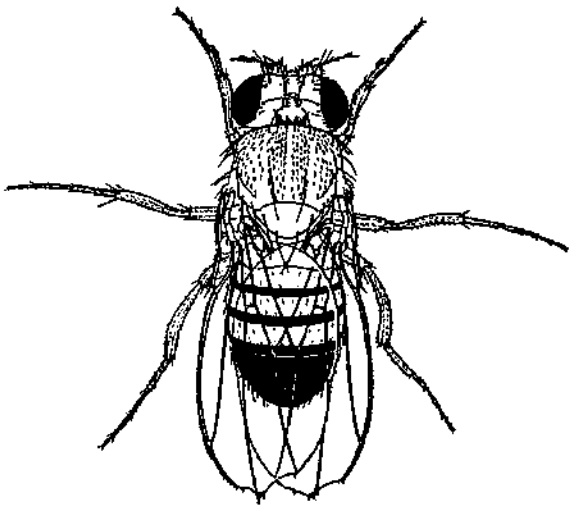
fa9: facet-glossy

origin: Spontaneous.
discoverer: Pratt, 1962.
phenotype: Eyes have facets more irregular than *fa,* but surface is smoothed, giving a glossy effect. Pigment distribution may be uneven, contributing to an impression of altered eye color. No wing effect. Eyes of fa*//a intermediate between the two homozygotes. Complementary with *apt, fa*^{no}*, nd,* and *nd*^{2} (Vtm Halle and Welshons). RK.1.
cytology: Salivary dtarotBOSoroe* normal (Welshons).
other infaraMrttoa: Loc@t©d to the left of fe**^{0}; not y«t ••pttnted from *fa (Wmlshoas,).*

**hh fwet-htlml*

dJ«c«v«r*r: Matter, 19b.

references: Muller and Altenburg, 1921, Anat. Record 20: 213.
Muller, 1935, DIS 3: 30.
phenotype: *fa^/fa* resembles *fa/fa;* not notched. Homozygous lethal. RK2.



fa": facet-notched

From Glass, 1933, J. Genet. 27: 233-41.

fa": facet-notched

origin: X ray induced in *In(l)dl-49.*
discoverer: Glass, 1929.
references: 1933, J. Genet., 27: 233—41 (fig.).
phenotype: Wings have apical nicks or notches in 90—100 percent of males, but only about 8 percent of homozygous females. Eyes not rough. *fa/fa*^{n} is wild type. Viability and fertility excellent. RK2 . in male.
cytology: *fa"* is on an *In(l)dl-49* chromosome but should be separable from the inversion.

fano; facet-notchoid

location: About 0.05 unit to right of *fa.*
origin: X ray induced.
discoverer: Bauer, 1943.
references: 1943, Z. Induktive Abstammungs-Vererbungslehre 81: 374-90 (fig.).
Welshons, 1958, Proc. Natl. Acad. Sci. U.S. 44: 254-58.
1958, Cold Spring Harbor Symp. Quant. Biol. 23: 171-76.
Welshons and Von Halle, 1962, Genetics 47: 743-59.
phenotype: Wings of both sexes notched at ends of L3 and *LA* veins; other longitudinal veins enlarged and show deltas. Somewhat less extreme at elevated temperatures. Up to 5 percent of *fa*^{no} males from aged cultures show hyper- and hypo-developed external genitalia (Kroeger, 1960, J. Morphol. 107: 227—32). Heterozygote shows extremely weak dominance. *fet*^{no}*/N* almost completely lethal. Rare survivors have exaggerated Notch phenotype. *ta*^{ao}*/fa* closely resembles wild type; nicks in wings appear infrequently. RK1.
cytology: Salivary chromosomes normal (Welshoos).

other information: A member of pseudoallelic series at the Notch locus, located between *fa* and *N264-40,*

facetious: **see *rg^{p}***

/as/: see *rg^{p}*

fat: **see *ft***

faulty chaetae: **see fc**

****fb: fine bristle***

location: 1-1.0.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 70.
phenotype: Thin, slightly shortened bristles. Occasional scalloping of wing margins. Delayed emergence. Good viability and fertility both sexes. RK3.

fc:** ***faulty chaetae

location: 1-0.9.
origin: Induced by DLT3-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 70.
phenotype: Short, thin bristles. About one-third of flies show either absence or duplication of one scuteliar bristle. Viability and fertility good both sexes. RK2-

****fd: furled***

location: 1- (rearrangement).
origin: Induced by P^{32}.
discoverer Bateman, 1949.
references: 1950, DIS 24: 54.
1951, DIS 25: 77.
phenotype: Like vestigial, but with immovable mouth parts and fully extended proboscis. Dies early, perhaps owing to failure to ingest. Viability at eclosion good. RK3A.
cytology: Associated with *T(l;3)fd= T(1;3)7A;86E + In(3R)89C;96A* (Darby).

Female lethal: **see *Fl***

female sterile: **see *fs( )***

Female sterile(2) Dominant: **see *Fs(2)D***

fern: **see *is(2)B***

fes(2)K: **see *is(2)K***

ff: fluff

location: 1-57.7.
origin: Induced by 2-chloroethyl rnethanesulfonate (CB. 1506).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 86.
phenotype: Extremely fine short bristles. Wings slightly rounded at tips. Males and females viable and fertile; eclosion delayed. RK3.
other information: One allele induced by CB. 1414.

****fft: fused filament***

location: Not located,
origin: Spontaneous.
discoverer: Robertson and Reeve.
references: 1954, DIS 28: 78.
phenotype: Chorionic filaments of eggs laid by *fit* female usually fused into a single structure. A few normal eggs also laid. Hatchability reduced and variable. RK3.

fg: **see *spdl&***

****fi: frail***

location: 1-53.
origin: Recovered among progeny of flies treated with Janus green.
discoverer: Muller, 28e20.
references: 1935, DIS 3: 30.
phenotype: Wings nearly as small as *tn*, thin and frail. Bristles fine. Fly weak. Viability 10—30 percent wild type. RK3.

****fil: fine lash***

location: 1-56.8.
origin: Induced by L-p-NN-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 86.
phenotype: Thin, slightly shorter bristles. Eyes reduced in size; posterior border very close to orbital bristles. Both sexes viable and fertile. RK3.
other information: Two alleles induced by CB. 1528.

fin: finer

location: 1-29.6.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 86.
phenotype: Fly slightly smaller than normal, with shorter, thinner bristles. Delayed eclosion. Males viable but sterile. RK3.

fine bristle: **see *fb***

fine chaetae: **see *fnc***

fine lash: **see *fil***

fine macros: **see *fm***

finer: **see *fin***

fj: four jointed

Second and third legs.
Edith M. Wallace, unpublished.

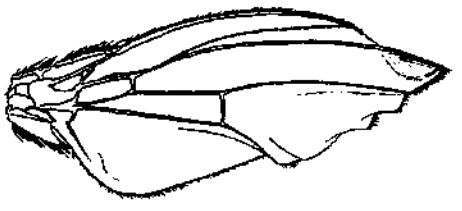
/f; *four jointed*

location: 2-81.
origin: Spontaneous.
discoverer: Schultz, 31dl.
phenotype: Tarsi four instead of five jointed. Legs short and stocky. Enhanced by ss^{a} and *ss*B* (Villee, 1945, Genetics 30: 26-27). Development

similar to that of dachs LWaddington, 1943, J. Genet. 45: 29-43 (fig.)]- Wings shorter, broader, with crossveins conspicuously closer together; veins diverge at greater angle. Effect visible in prepupal wing (Waddington, 1940, J. Genet. 41: 75—139). Eyes smaller, ellipsoid, coarse textured; head foreshortened. RK2.

***fj40e**

origin: Spontaneous.
discoverer: Ives, 40e.
references: 1941, DIS 14: 39.
phenotype: Venation irregularities more extreme than those described for *fj,* but variable and may overlap wild type. Production of fj^{*Oe} flies low in competition with wild-type flies in crowded cultures, but normal in a homozygous stock. Developmental period about 20 percent longer than wild type. RK2.



Edith M. Wallace, unpublished.

fl: fluted

location: 3-59.9.
origin: Spontaneous,
discoverer: Redfield, 211.
phenotype: Wings creased lengthwise and dark. Overlaps wild type slightly at 25° but not at 19°C. RK3.

***fl2**

origin: Spontaneous.
discoverer: Spencer, 36dl5.
phenotype: Like *tl,* RK3.

Fl: Female lethal

location: 1-19.1 (based on crosses with $F/^{s}$).
origin: Spontaneous.
discoverer. Muller and Zimmering, 1960.
references: 1960, Genetics 45: 1001—2.
phenotype: Viability of *F1/+* females varies from zero to normal, depending on maternal genotype. Where viability is low, surviving females often show diverse morphological abnormalities. *Fl/Fl* females lethal; die as early embryos (Oster). *tnftrm* has no effect on survival of *Fl/Fl* or *F1/+* (Zimmering and Muller, 1961, DIS 35: 103-4). *Ft/Y* males have normal viability and phenotype. RK2A.
cytology: Present in *X* containing *In(l)dt-49 = ln(l)4D7-El;llF2-4.*

Fl*: Female lethal-sterile

origin: Spontaneous.
discovmmr, Zimmering and Muller, 1961.
synonym; *F!%.*
references: 1961, DIS 35: 103-4.

phenotype: Fertility of $Fl^{s}/+$ females may be reduced. Fl^{s}/Fl^{*} females sterile. Fl/Fl^{s} fema lethal. RK3.

fla: flat eye

location: 1-2.4.
origin: Induced by L-p-NN-di-(2-chloroethyl)amin phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 70.
phenotype: Smaller fly, with smaller and less-curved eyes. Wings extremely variable, from normal, through incised margins, to crumpled vestigial stumps. Not easily classified. Viabil and fertility good in males but reduced in femal RK3.

flap wing:* see *flw

flateye:* see *fla

flipper:* see *flp

///: ftyless

location: 3- (not located).
origin: Spontaneous,
discoverer: Cercos, 41gl5.
references: Andres, 1943, DIS 17: 48.
phenotype: Wings apparently normal, but fly cann keep them spread and cannot fly more than a *fex* inches. RK3.

flp: flipper

location: 2-30.
origin: Spontaneous.
discoverer: Mohr, 18h5.
references: Bridges and Mohr, 1919, Genetics 4: 304.
phenotype: Wings fail to expand; remain compact, very dark, extended, and curved slightly down-ward. Fly a wizened dwarf. Body surface dull and dark. Both sexes sterile, RK3.

flp:* see *flw

fluff:* see *ff

fluted:* see *fl

flw: flap wing

location: 1-31.
discoverer: Waletzky, 1937.
synonym: *flp,* a preoccupied symbol.
phenotype: Wings held out; consistently concave upward; slightly pointed. Darkened longitudinal stripe along thorax, underneath chitin; occasion, bubbling, with maximum pigmentation in anterior part of stripe. Anterior scutellars sometimes missing or doubled. Eyes bulging; slightly roughened. Head compressed anteroposteriorly. Third antennal joint shortened. RK2.

flyless:* see *HI

fm: fine macros

location: 1-66.1.
origin: Induced by 2-chloroethyl methansesulfonate (CB. 1506).
discoverer: Fshmy, 1956.
references: 1959, DIS 33: 86.
phenotype: Small fly with narrow abdomen and extremely short, thin bristles. Males fertile; viability about 50 percent wild type. RK3.

**fnc: fine chaetae*
location: 1-34.9.
origin: Induced by S-2-chloroethylcysteine (CB. 1592).
discoverer: Fahmy, 1957.
references: 1959, DIS 33: 86.
phenotype: Extremely fine short bristles. Body parts disproportionately reduced; reduction least marked on head and most marked on abdomen. Wings broad and slightly rounded at tips, occasionally with incisions of margin. Eyes slightly brighter red than normal. Males viable but sterile. RK3.

fo: folded
location: 1-63.
discoverer: Grossman, 1932.
references: 1934, DIS 1: 30.
phenotype: Wings remain unexpanded in a varying percentage of flies. Balancers shriveled and post-scutellars bent forward. Overlaps wild type. RK3.

Fo; *Forkoid*
location: 2-107 (between *or* and *sp).*
origin: X ray induced.
discoverer. Mohler, 58cl8.
references: 1960, DIS 34: 52.
phenotype: Heterozygote shows reduction in size of bristles and weak forking of head and posterior thoracic bristles. Using *Dp(2;3)P,* it may be shown that the expression of *+/+/Fo <+/Fo <+/Fo/Fo; +/F0/F0* shows extreme forking of all bristles and is sterile. Homozygous lethal. *Fo* interacts with f alleles to produce extreme f bristles. RK1.
cytology: Located between 58E3 and 60B10, on basis of its inclusion in *Dp(2;3)P = Dp(2;3)58E3-F2;60D14-E2;96B5-Cl* but not in *Df(2R)Px = Df(2R)60B8-10;60Dl-2* (Mohler) or in the deficiency for the tip of *2R* derived from *T(l;2)Bld = T(1;2)1C3-4;6OB12-13* (Armentrout).

focal melanosfs: see me
**fol: folded wings*
location: 2-39.
origin: Spontaneous.
discoverer: Goldschmidt, 1937.
phenotype: Expanded wing folded. Overlaps wild type. RK3.
folded: see fo
folded wings: see /b/
forked: see *f*
Forkoid: see Fo
four jointed: see *//*

fr: fringed
location: 2-80.
origin: Spontaneous.
discoverer: Bridges, 22c30.
references: 1938, DIS 9: 48.
phenotype: Wings often spread; wing margins snipped and bristles irregular and fringelike. Eyes small and rough. Midline of abdomen at slight angle to ioagitudinal axis of fly. Much variability in expression; safest criterion is wing margin irregularity. Viability variable, from 16—90 percent wild type. Females rarely fertile. Character less extreme at low temperature. RK3.

****fr°: fringed-zero***
origin: Spontaneous.
discoverer: Bridges, 15a20.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 257 (fig.).
phenotype: Wing margins have bare spots; remaining hairs frayed and irregular. Wings smaller, discolored, somewhat divergent. Like *fr* but less extreme. RK3.
other information: Lost before *fr, fr^2,* and fr^{di} were found.

fr2
origin: Spontaneous.
discoverer: Novitski, 37a22.
synonym: tan: *trimmed.*
references: 1937, DIS 8: 10, 13.
Lewis, 1938, DIS 10: 55-56.
phenotype: Wings scalloped and fringed on all margins, slim and coarse textured, often divergent and uplifted. Eyes rough. Some extra bristles present. Abdomen slightly offset, as in *fr.* Female sterile. Classification at 25°C excellent; characters less extreme at 19°C. Viability generally good, but erratic. RK2.

****frdl; fringed-dibro***
origin: Spontaneous.
discoverer: Bridges, 17kl9.
synonym: *dihro.*
references: Lynch, 1920, Genetics 4: 527—28.
phenotype: Spread wings with scalloped margins. Eyes rough. Very inviable; both sexes sterile. RK3.

frail:* see *fi

Frd: Freckled
location: 2-103.1 (Nicoletti).
origin: X ray induced.
discoverer: M. G. Davis, 1961.
references: Erlich, 1963, DIS 37: 47.
Barigozzi, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 207.
1965, DIS 40: 64.
phenotype: Pupa and young fly characterized by accumulation of dark pigment; in older fly, pigment becomes concentrated in black specks scattered throughout body, head, and legs. Homozygous lethal. RK2.
other information: Barigozzi claims it has an extrachromosomal or episomal component in its transmission.

fringed:* see *fr
frizzled:* see *fz
fs 2.:* see *fs(2)E
fs(l)N: female sterile (1) of Nasrat
location: 1-0.0 (closely linked to *me).*
origin: Induced by an unspecified chemical mutagen.
discoverer: Nasrat, 1952.
synonym: /®f2)"^{ae}.

phenotype: Females sterile but no other distinguishing characteristics. Males fertile. Developmental study by Counce and Ede [l957, J. Embryol. Exptl. Morphol. 5: 404-21 (fig.)]. Eggs of *ta(l)N/i8(l)N* females will not support development of normal embryos. About half the eggs contain little or no yolk; development may or may not begin in such eggs but never progresses beyond a highly abnormal cleavage. In eggs containing more yolk, major effect is on synchrony of cleavage and blastoderm mitoses. Twenty percent of these embryos cease development before blastoderm formation. The remainder have abnormal blastoderms and aberrant gastrulation. Final pattern of damage determined by degree of abnormality of earlier stages, but some embryos show larval differentiation. A few of the least abnormal embryos may emerge but never move about or feed. Formation of polar granules abnormal. RK3.

cytology: No detectable chromosomal rearrangements (Slizynska).

fs(2)^{5}*6: **see *is(2)E9***

ts(2)adp: **see *adpte***

h(2)B: female sterile (2)* of *Bridges

location: 2-5.

origin: Spontaneous.

discoverer: Bridges, 29c2S.

synonym: *fes,*

references: King, Sang, and Leth, 1961, Exptl. Cell. Res. 23: 108-17 (fig.).

King, Koch, and Cassens, 1961, Growth 25: 45-65 (fig.).

Koch and King, 1964, Growth 28: 325-69 (fig.).

phenotype: External morphology normal. Male fertile; female sterile. Ovarioles of homozygous female subdivided into a series of sausage-shaped cell aggregates, each surrounded with an ill-defined follicular epithelium and filled with hundreds to thousands of mitotically active oogonia-like cells [King, Burnett, and Staley, 1957, Growth 21: 239—61 (fig.)]. These cells occasionally differentiate into cells resembling nurse cells, which may have polytene chromosomes, and rarely into oocytes. *la(2)B* ovaries transplanted into wild-type hosts in late larval stages and reciprocal transplant® develop autonomously (Clancy and Beadle, 1937, Biol. Bull, 72: 47-56; Bodenstein and King, *1963,* DIS 37: 65; 1965, Z. Naturforsch. 20b: 292-97). RK3.

Fs(2}D: Female sterile(2) Dominant

location: 2- (not located).

origin: Induced by ethyl methanesulfonate.

discoverer: E. H. Grell, 65e.

pfieraotype: Heterozygous female entirely sterile, with underdeveloped ovaries. Heterozygous male ba» normal fertility. Bristles short; thorax broad sad flattened with air bubbles under cuticle. RK3.

eth*r information: Sterility makes genetic mapping impossible.

****fs(2)Eh female sterile (2) of Edmondson***

location: 2-57.6.

origin: Ultraviolet induced.

discoverer: Edmondson, 50j.

synonym: *fs2.1.*

references: Meyer and Edmondson, 1957, DIS 25: 72.

phenotype: Sterile females do not lay eggs. Gonads rudimentary. RK3.

****fs(2)E2***

location: 2-22.0.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *fs2.2.*

references: 1952, DIS 26: 61.

phenotype: Females produce eggs that appear normal but do not hatch. Fertile in heterozygotes with *ms(2)E3* (2-28.0). RK3.

****fs(2)E3***

location: 2-47.5.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *fs2.3.*

references: 1952, DIS 26: 62.

phenotype: Female sterile; narrow curved wings. No eggs laid. Fertile in heterozygotes with *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *ts(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

****fs(2)E4***

location: 2-48.5.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *is2.4.*

references: 1952, DIS 26: 62.

phenotype: Very few eggs laid; female sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *is(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

****fs(2)E5***

location: 2-50.4.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *fs2.5.*

references: 1952, DIS 26: 62.

phenotype: Female semisterile. A few larvae hatch normally, but most embryos degenerate. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *ts(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

****fs(2)E6***

location: 2-54.4.

origin: Ultraviolet induced.

discoverer: Edmondson, 1950.

synonym: *f&2.6.*

references: 1952, DIS 26: 62.

phenotype: Female produces normal-appearing eggs, which do not hatch. Fertile in heterozygotes with *tm(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *ts(2)E4*

(2-48.5), *fs(2)E5* (2-50.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54:8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), *ms(2)E9* (2-57.0), and *is(2)E8* (2-62.6). RK3.

***fs(2)E7**

location: 2-55.2.
origin: Spontaneous.
discoverer: Edmondson, 1950.
synonym: fs2.7.
references: 1952, DIS 26: 62.
phenotype: Females produce collapsing eggs. Apparently, there is a weakness in the vitelline membrane, since these eggs cannot be successfully dechorionated; when chorion is removed, egg contents flow out. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *ms(2)ES* (2-55.6), *ms(2)E9* (2-57.0), and *fs(2)E8* (2-62.6). RK3.

***fs(2)E8**

location: 2-62.6.
origin: Ultraviolet induced.
discoverer: Edmondson, 49k.
synonym: *fs2.8.*
references: 1952, DIS 26: 62.
phenotype: Females do not lay eggs. Fertile in heterozygotes with *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), *ms(2)E9* (2-57.0), *ms(2)E10* (2-66.5), *ms(2)Ell* (2-68.0), and *ms(2)E12* (2-68.2). RK3.

***fs(2)E9**

location: 2-35.6.
origin: Ultraviolet induced.
discoverer: Edmondson, 1958.
synonym: *fs(2)^{ss}&.*
references: 1960, DIS 34: 49.
phenotype: Numerous infertile eggs produced. Viability normal. Males fertile. RK3.

***fs(2)K: female sterile (2) of Kikkawa**

location: 2-100.
origin: Spontaneous,
discoverer Kikkawa, 1960.
synonym: *ies(2)K.*
references: 1960, DIS 34: 51.
phenotype: Female sterile. Male fully fertile. RK3.

***fs(3)Gh female sterile (3) of Gill**

location: 3-47.
origin: X ray induced.
discoverer: Gill, 59a.
synonym: *fs(3)l*9».*
references: 1960, Anat. Record 138: 351.
1961, Ph.D. Thesis, Yale Univ.
1962, DIS 36: 37.
1963, J. Exptl. Zool. 152: 251-78 (fig.).
phenotype: Eggs die in early cleavage stage. Meiosis precocious in 2 percent of oocytes; first meiotic spindle parallel to egg surface. Males fertile. RK3.

***fs(3)G2**

location: 3-11.
origin: X ray induced.
discoverer: Gill, 59a.
synonym: *fs(3)2*^{9}*.
references: 1960, Anat. Record 138: 351.
1961, Ph.D. Thesis, Yale Univ.
1962, DIS 36: 37.
1963, J. Exptl. Zool. 152: 251-78 (fig.).
phenotype: Females almost sterile; produce rare surviving progeny. Oogenesis incomplete; usually stops in early phases of vitellogenesis. Most (89 percent) follicles contain 32 cells instead of normal 16 as a result of an extra oogonial division. The 32 cells of an incipient cyst enclosed in two chambers in 6 percent of the cases. Position of oocyte in follicle abnormal in 28 percent of cases. Males partially sterile. Viability low. RK3.

***fs(3)G3**

location: 3-25.
origin: X ray induced.
discoverer: Gill, 59a.
synonym: *fs(3)3^^{9a}*.
references: 1960, Anat. Record 138: 351.
1961, Ph.D. Thesis, Yale Univ.
1962, DIS 36: 37.
1963, J. Exptl. Zool. 152: 251-78 (fig.),
phenotype: Oogenesis incomplete; most follicles stop development during yolk deposition (after stage 9). Males fertile. RK3.

***fs(3)G5**

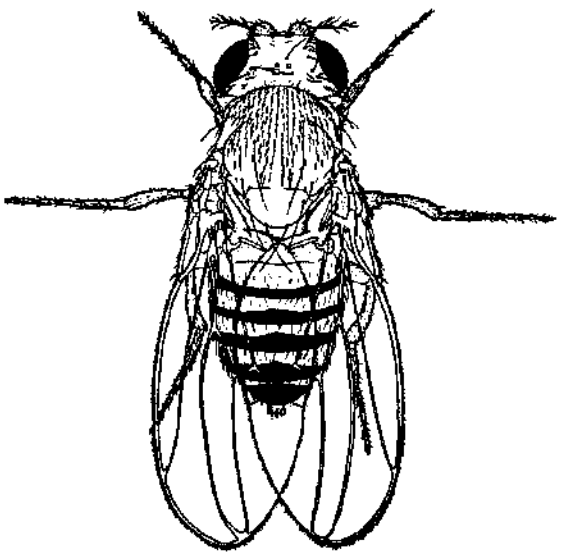
location: 3-49.
origin: X ray induced.
discoverer: Gill, 59a.
synonym: *fs(3)5^{S9a}.*
references: 1960, Ar"'. Record 138: 351.
1961, PhJD. Thesis, Yale Univ.
1962, DIS 36: 37.
1963, J. Exptl. Zool. 152: 251-78.
phenotype: Oogenesis incomplete; ovarioles contain excessive numbers of follicles, which usually stop developing at or before stage 9. Males fertile. RK3.

***ft: fat**

location: 2-12.0.
origin: Spontaneous.
discoverer: Mohr, 2Obi5.
references: 1923, Studia Mendeliana (Brunae) pp. 266-87.
1929, Z. Induktive Abstaimmngs- Vererbungslehre 50: 113-200 (fig.).
phenotype: Abdomen short and fat. Thorax broad. Wings short and broad, with crossveins much closer together than normal. Scutellutn shortened; scutellar bristles far apart. Viability good. Second- and third-instar larvae, particularly when there is little yeast in the food, show vacuoles in cytoplasm of salivary gland cells. Two waves of vacuole formation. Cells with vacuoles exhibit a slight puff in 24D-E, which is negatively correlated with puffing in 21 and 22. Tip of *X* disfigured.

possibly as a result of several small puffs intermingled with hard nonpuffed bands. In about 1 percent of larvae, salivary glands distally expanded and crooked [Slizynski, 1964, Cytologia (Tokyo), 29: 330-36 (fig.)]. RK1.

cytology: Placed between 24D2 and 24F1 on the basis of its inclusion in *Di(2L)M-z^{c} = Df(2L)24D2-5;25A2-3* but not in *Df(2L)M-z^{B} = Df(2L)24E2-Fl;25Al-2* (Morgan, Bridges, Schultz, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77).



fu: fused

Edith M. Wallace, unpublished.

fu; *fused*

location: 1-59.5.

origin: Spontaneous.

discoverer: Bridges, 12k4.

references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 55-58 (fig.). Lynch, 1919, Genetics 4: 501-33.

phenotype: Veins L3 and L4 fused from base to beyond anterior crossvein, with elimination of anterior crossvein and first basal cell; L3 and L4 fused at tip; this fusion may reach back to basal cell. Wings usually extended. Ocelli reduced or absent; bristles of ocellar region small or absent. Eyes small and slightly rough. Anterior scutellar bristle® reduced in number, and scutellum shortened. Female late to eclose and has decreased longevity. Ovaries histologically normal at eclosioo but with half the normal number of ovarioles (BMtty, 1949, Proc. Roy. 8oc. Edinburgh, B 63: 249—70); fecundity 7 percent normal. Dewioping egg chambers may fuse or become timorous with at® [King, Boraett, and Staley, 1957, Growth 21: 239—61 (fig.)]. Proportion of tumorou* egg chambers increases by *6* percent *pan* day. Female raised at 1S°C stews only 10 percent th« tumor development of that rmlaed at 25°. Ovarian effects *i&* female cairying *fa* and • deficiency for *§u [i.e.,* *In(l)Cl^{L}y^{4R} = Jn(l)4A5-Bl;17A6-Bl^lA8-B1;18A3-4^{R}]* are more extreme than those in *fu* homozygote (King, 1959, DIS 33: 142-43). *fu/fu* ovaries transplanted into fu^{+} hosts develop autonomously in regard to fertility (Clancy and Beadle, 1937, Biol. Bull. 72: 47-56; Sobels, 1950, Experientia 6: 139—40) and tumor formation (Bodenstein and King, 1963, DIS 37: 65). The few normal-appearing eggs that are laid by *fu/fu* females produce adults only if they have been fertilized by ftj^{+}-bearing sperm (Lynch, 1919, Genetics 4: 501—33). Eggs fertilized by *fu-* or F-bearing sperm develop into embryos that become abnormal 5-5V2 hr after fertilization. A general asymmetry in germ layers is responsible for many ensuing abnormalities. Such embryos never hatch but survive long after normal embryos have become larvae ŁCounce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 462-81 (fig.)], *fu* eggs from *fu/+* mothers develop normally. Heterozygous daughters from homozygous mother have high incidence of abnormal abdominal segmentation and, as embryos, have abnormal musculature. This is a maternal effect not found in the reciprocal cross, and it is temperature sensitive (Armstrong and Sobels). RK1.

cytology: Salivary chromosome location of *fu* appears to be in 17D or E (Green, 1953, Genetics 38: 91—105; 1953, Z. Induktive Abstammungs-Vererbungslehre 85: 435—49).

fu51

origin: Ultraviolet induced.

discoverer: Edmondson, 51e.

references: Meyer and Edmondson, 1951, DIS 25: 72.

phenotype: Like *fu,* but possibly slightly more extreme. RK1.

fu57a

origin: Induced by azo-mustard.

discoverer: Purdom, 57a.

references: King, Burnett, and Staley, 1957, Growth 21: 239-61.

phenotype: Veins L3 end L4 fused from origin to beyond anterior crossvein. Ocelli and ocellar and anterior scutellar bristles sparse or absent. Length of scutellum generally reduced. Female sterile as with *hi.* Ovaries tumorous but to a lesser extent than with *fu.* Wings not outstretched but held in normal position. RK1.

fu57f

origin: Induced by azo-mustard.

discoverer: Purdom, 57f.

references: King, Burnett, and Staley, 1957, Growth 21: 239-61.

phenotype: Wing veins L3 and L4 often completely fused. Wings outstretched. Ovaries tumorous. RK1.

fu59

origin: Spontaneous.

discoverer: R. F. Grell, 1959.

references: King and Smith, 1963, DIS 37: 49.

phenotype: Wings like *fu.* Rate at which ovarian tumors develop is the lowest of all alleles tested;

number of tumorous egg chambers increases by 1 percent per day. RK1.

*f_u6lfl
origin: Gamma ray induced.
discoverer: Fahmy, 62f.
references: Smith and King, 1963, DIS 38: 39.
phenotype: Like fu^{S7a}. RK1.

***fa62i2**
origin: Gamma ray induced.
discoverer: Fahmy, 62f.
references: Smith and King, 1963, DIS 38: 39.
phenotype: Wings and ocelli show typical abnormalities. Ovaries develop tumors. RK1.

*f_u62f3
origin: Gamma ray induced.
discoverer: Fahmy, 62f.
references: Smith and King, 1963, DIS 38: 39.
phenotype: Like *fa*. RK1.

***fu^{ff}: fused-formalin food**
origin: Induced by formaldehyde.
discoverer: Auerbach, 1951.
references: Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 462—81. King, Burnett, and Staley, 1957, Growth 21: 239-61.
phenotype: Like *fu* but wings not outstretched. Ovaries contain tumors. Development of lethal embryos roughly similar to that of *fu* (Counce, 1956). RK1.

***fu9: fused-glider**
origin: Found among heat-treated flies,
discoverer Grossman, 1932.
references: 1934, DIS 1: 30.
phenotype: Like *fu* except wings more divergent and females more fertile, *fu^/fu* females 40 percent fertile. *fu&/fu6* females 20 percent fertile. In general, pattern of development of lethal embryos is like that of *fu* (Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 462—81). RK1.

furled:* see *fd

furrowed:* see *fw

fused:* see *fu

fused filament:* see *fft

fuzzy:* see *fy

fw: furrowed
location: 1-38.3.
origin: Spontaneous,
discoverer: Duncan, 14k.
references: 1915, Am. Naturalist 49: 575—82. Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 80. Nachtsheim, Z. Induktive Abstammungs- Vererbungslehre 20: 118-56.
phenotype: Eyes with vertical fold and furrows. Head and scutellum shortened. Bristles gnarled and shortened, especially the postscutellars. Best classification character is short, blunt notopleurals. RK2.
cytology: Placed between 10E2 and 11A7 on the basis of its being to the right of *dy,* which is to the right of 10E2 and to the left of the *X* breakpoint of *T(l;4)A8 » T(l;4)llA6-7.*

***fw2**
origin: X ray induced.
discoverer: MuHer, 31a.
phenotype: Extreme *fw*. Female sterile. RK2A.
cytology: On a chromosome containing *In(l)dl-49.*

*f_w34e
discoverer: Duncan, 34e20.
phenotype: Originally showed eye surface medium folded; bristles much gnarled. Schultz and Curry report that stock in 1940 showed gnarled bristles and eye small but no vertical fold. RK2.

*f_w49c
origin: Induced by P^2.
discoverer: R. C. King, 49c28.
references: 1949, DIS 23: 62.
phenotype: Eyes furrowed; distal portions of aristal branches hooked; wings divergent and often stringy; scutellar groove reduced. Bristles split, bent, and often erect; acrostichal hair pattern distributed with whorls and naked areas. Late hatching, poorly viable, and mostly sterile. f_w49c/f_w phenotypically intermediate but more like *fw/fw* than *fw49c/f_w49c^* RK3.

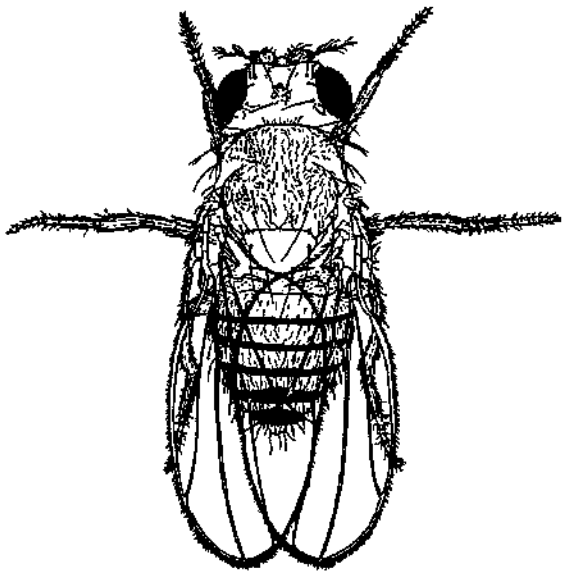
***fw59**
origin: X ray induced.
discoverer: Garcia-BeHido, 59i21.
references: 1963, Genet. Iberica 15: 1—102.
phenotype: Eyes rough and creased; facets irregular, 15 percent fewer than normal. Eyes browner than normal; pterine concentration reduced in the eyes and, except for isoxanthopterine, increased in testis sheath. Riboflavin accumulates in Malpighian tubules. Large bristles of head and thorax short, thick, angled, and blunt; occasionally reduced to stumps. Arista thick with contorted and supernumerary branches. Scutellum small with groove between it and thorax reduced. Hatchability and larval development normal; larval anal plates swollen and surrounded by melanotic halo. Melanotic anal region persists in pupa; pupa also has melanotic spots elsewhere that may result in nonpigmented areas on the imaginal integument. Extrusion of anterior and posterior spiracles in prepupa incomplete. Many *fn>59* flies die either after 24-30 hr of pupal development or at the time of eclosion. Fecundity of female reduced owing to reduced number of ovarioles. RK2.

***fw60**
origin: X ray induced.
discoverer: Garcia-Bellido, 60k8.
references'. 1963, Genet. Iberica 15: 1-102.
phenotype: Like fw^{59} but with lower penetrance and expressivity. RK2.

***fw^{w}; furrowed-weak**
origin: Spontaneous.
discoverer Ives, 43b24.
references: 1946, DIS 19: 46.
phenotype: Affects only bristles, particularly the scutellars and postaiars. Eyes normal. Normal fertility and viability. RK2.

fw^{wr}: {urrowed-wrinkled
origin: X ray induced *in In(l)sc^{slL}scSR+dl.49.*
discoverer R. M. Valencia, 1959.
synonym: *wr,*
references: 1959, DIS 33: 100.
1965, DIS 40: 36.
phenotype: Eye surface in folds. Some bristles shortened, thickened, or curved; many doubled and may be fused. Viability low. RK2.

fy: *fuzzy
location: 2-33.
origin: Spontaneous.
discoverer: Ives, 39a.
references: 1940, DIS 13: 49.
phenotype: Hairs on abdomen and thorax irregular and directed toward midline. Hairs on wing margins erect. Resembles *fz.* Fertility and viability below normal. RK2.

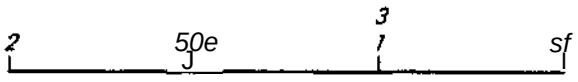


fz: frizzled
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Pobl. No. 552: 85.

fz: frizzled
location: 3-41.7.
origin: Spontaneous.
discoverer: Bridges, 38bl8.
phenotype: Hairs on thorax directed irregularly toward midline. Thoracic bristles also in turned and often wavy. Postverticals may turn outward. Hairs on wing edge and feet nearly erect. Wing may be reduced. Sex combs may be irregular. Eyes always rough. Resembles *in.* RK2.

f_z46f
origin: Spontaneous.
discoverer: Ives, 46120.
references: 1946, DIS 20: 65.
phenotype: Like fit. RK2.

9; *qornmt*
location: 1-44.4.
origin: Spontaneous.
discoverer: Bridges, 15bl9.
synonym: *salmon.*
references: 1916, Genetics 1: 151.
Chovnick, 1958, Proc. Natl. Acad. Sci. U.S. 44: 333-37.
1961, Genetics 46: 493-507.
phenotype: Eye color deep purplish ruby, like *pr;* pinkish in young and brownish in old flies. Eyes have 38 percent normal red and 56 percent normal brown pigment (Nolte, 1959, Heredity 13: 233—41). RK1.
cytology: Placed in salivary chromosome region 12B9-12C7 by deficiency analysis (J. I. Valencia).
other information: A pseudoallelic locus composed of four demonstrated sites; g^2 occupies the left-most, *gSOe* £he second, *g* and g^3 the third, and g^{si} the right-most site (Chovnick, 1961).



Map of the g locus
From Chovnick, 1961, Genetics 46: 493-507.

g^2
origin: Spontaneous.
discoverer: Bridges, 18c28.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 226 (fig.).
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eye color translucent yellowish ruby, somewhat lighter than *g.* Eyes contain 16 percent normal red pigment and 32 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Malpighian tubes very pale yellow at base (Beadle, 1937, Genetics 22: 587-611). Eye color autonomous in transplant into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). With *st,* gives dark yellow to orange color; with *bw,* gives reddish yellow to brownish rose (Mainx, 1938, *Z.* Induktive Abstammungs- Vererbungslehre 75: 256—76). Dominant in females homozygous for car, according to Schultz; i.e., pigmentation of g^2 *car/g^2 car* = g^2 *car/+ car* < *car/car.* RK1.
other information: Occupies left-most pseudoallelic site of the *g* locus (Chovnick, 1961, Genetics 46: 493-507).

g^{i1}
origin: Spontaneous.
discoverer. Bridges, 22d22.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 226.
phenotype: Like *g,* but gives lighter orange in combination with *v.* Has 21 percent normal red pigment and 47 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Malpighian tubes extremely pale yellow (Brehme and Demerge, 1942, Growth 6: 351-56). RK1.

other information: Occupies third pseudoallelic site from left of *g* locus (Chovnick, 1961, Genetics 46: 493-507).

g^{4}
origin: X ray induced in *In(l)dl-49.*
discoverer: Glass, 1929.
references: 1934, DIS 2: 7.
phenotype: Eye color, like *g*^{2}, has 22 percent normal red pigment and 23 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Malpighian tubes extremely pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
cytology: Probably inseparable from *In(l)dl-49.*

g17Ba6
origin: X ray induced in *In(l)sc*^{sIL}*'sc*^{8ri}*dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
phenotype: Male viable but sterile. RK1A.
cytology: Associated with *In(l)g*$^{x\ 7Bfl}$*<* = In(l)12B14-15;19F* (J. I. Valencia).

**g26-10*
origin: X ray induced.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 84.
phenotype: Eye color darker than *g2.* RK1.

g26-75
origin: Induced by mustard gas.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 84.
phenotype: Eye color like *g*^{2}. RK1.

**g26-41*
origin: Induced by mustard gas.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 84.
phenotype: Weak garnet allele. Eye color strikingly different from wild type in newly emerged flies. RK2.

**g28-10*
origin: Induced by mustard gas.
discoverer Sobels and Jansen, 1957.
references: Sobels, 1958, DIS 32: 84.
phenotype: Eye color like *g*^{2} but darkens more with age. RK1.

g28-40
origin: Induced by mustard gas.
discoverer Sobels, 1957.
references: 1958, DIS 32: 84.
phenotype: Eye color darker than *g*^{2}. RK1.

g49h
origin: Induced by P^{32}.
discoverer: R. C. King, 49h.
references: 1950, DIS 24: 58.
phenotype: Eye color light purple. Viability of male normal, female 60 percent normal. RK2.

gSOm
references: Chovnick, 1958, Proc. Natl. Acad. Sci. U.S. 44: 333-37.
1961, Genetics 46: 493-507.
phenotype: Eye color orange. RK1.
other information: Occupies second pseudoalleiic site from left of *g* locus.

g53d
origin: Spontaneous.
discoverer: Hexter, 53d.
references: 1958, Proc. Natl. Acad. Sci. U.S. 44: 768-71.
1956, DIS 30: 72.
1963, Proc. Natl. Acad. Sci. U.S. 50: 372-79.
phenotype: Eye color orange, like *w*^{B}. RK1.
other information: £^{53d}, when heterozygous with *g, g*^{2}, *g*^{3}, or *g*^{4}, yields wild-type progeny, some associated with crossing over in a manner consistent with ordering, and some not associated with recombination 6f outside markers. A double mutant is not produced by the event that yields wild types.

**g SSk*
origin: Spontaneous.
discoverer: Williams, 55k.
references: Muller, 1956, DIS 30: 80.
phenotype: Eyes translucent yellowish ruby. RK1.

**g271-2*
origin: X ray induced,
discoverer: Demerec, 1933.
phenotype: Male lethal, cell lethal. RK2.
other information: *ty* but not s, *wy,* or *pi* also affected.

**g271-6*
origin: X ray induced.
discoverer: Demerec, 34a.
phenotype: Male lethal and cell lethal. RK2.
other information: *ty* but not s or *wy* also affected.

**g27J-9*
origin: X ray induced,
discoverer. Hoover, 35h.
phenotype: Male lethal. RK2.
other information: *ty*$^{+}$.

**g271-T0*
origin: X ray induced.
discoverer: Hoover, 35h.
phenotype: Lethal. RK2.
other information: *ty*$^{+}$, s^{+}.

g(+): see *g*™

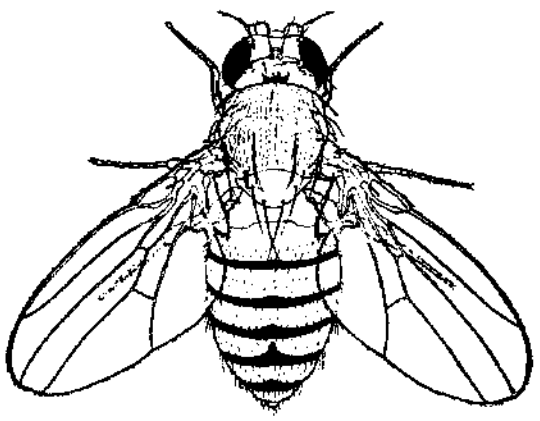
origin: Appeared among progeny of cold-treated flies.
discoverer Gottschewski, 34gl7.
references: 1935, DIS 4: 8, 15.
phenotype: Eye color of males like *g*^{2}, of females probably lighter than *g**. RK1.

9**: *garnet of Schalet*
origin: Spontaneous,
discoverer: Schalet.
references: Chovnick, 1961, Genetics 46: 493—507.
other information: Occupies right-most pseudoallelic site of the *g* locus.

gw. garnet-wild
origin: X ray induced,
discoverer: Muller.
synonym: |f(+).
references: 1946, DIS 20: 67.
Chovnick, 1958, DK 32: 88.
1961, Genetics 46: 493-507.

phenotype: Homozygote and hemizygote indistinguishable from wild type; however, g^w/g^2 (and probably other *g* alleles) is brownish. RK2A.
cytology: Associated with $In(l)g^w$ (breakpoints unknown), which lies between *dy* and *f*.

g^x: garnet from X irradiation
origin: X ray induced.
discoverer: Muller.
synonym: *g, Inh.*
references: 1946, SIS 20: 67.
phenotype: Like g^2. Male fertile; homozygous female has low fertility. RK2A.
cytology: Associated with /n(i;g* = *In(l)12;19-20.*



G: Gull
From Mohr, 1929, Z. Induktive Abstammungs- Vererbimgslehre 50: 113-200.

G: Gull
location: 2-12.0.
origin: Spontaneous.
discoverer: Mohr, 19k23.
references: 1923, Studia Mendeliana (Brunae), pp. 266-87 (fig.).
1927, Proc. Intern. Congr. Genet., 5th. Vol. 2: 1136.
1929, Z. Induktive Abstammungs- Vererbungslehre 501 113-200 (fig.).
pti*nofyp«: Wings Urge, held out from sides at 45—90°«gl«!, cttnred downward, and somewhat pointed. Vein LI thickened; crosaveins closer together, s©«teti»es broken. Thoracic and vertical bristles tfoplicated *in* majority of flies. *G/ft* has exaggerated *It pfamotypt.* Partially inhibited by d«/+ and ja»ei» inhibited by dc/rfc. Homozygous lethal. RK2.
cy*@J®fy: Placed between 24D2 und 24F1 on the b*fti* of its inclasioo *in Dt(2L,yt~z^c = Df(2L)24D2-&2SA2-3* bat »ot fa Df2L>f-x« **D§(2L)24E2~ Pli25Al'2* {**!»&„ Bridges, Scfaults, and Curry, 1939, Otraegic last. Wash. Y®ar Book 38: 273-77).
®§*? tafor»#tie«: Causes local shortening of map by abet* 1.1 units. I* a d^fk-iesicy for or an allel* of *it.*

er!ge »pontaneous derivative of 0.
discoverer: Bridges, 1930.

phenotype: Does not show *G* phenotype. Allelic to *ft,* but does not exaggerate *ft.* Lethal in combination with G. RK2.

g, Inh: see ***g****
gap: see ***gp***
garnet: see ***g***
****Gd: Gulloid***
location: 3-78.
origin: Spontaneous in *Dp(2;3)P.*
discoverer: Bridges, 22g26.
phenotype: *Gd/+* wings shorter, blunter, slightly more spread, and have crossveins closer together than wild type. Homozygous lethal. RK3A.
cytology: Inseparable from *Dp(2;3)P = Dp(2;3)58E3-F2;60D14-E2;96B5-Cl.*
****ge: genitalless***
location: 1-0.1.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 70.
phenotype: External male genitalia absent or grossly deformed. Bristles fine; wings often small and deformed. Tergites abnormal; abdomen frequently contains melanotic tumors. Males viable but sterile. RK3.
gespleten: see ***gs***
****99: goggle***
location: 1-23.1 (no crossovers with *oc* among 4300 flies).
origin: Spontaneous.
discoverer: Nichols-Skoog, 34el4.
phenotype: Eyes protruding and bulging; placed far back on a narrow head. Facets very large in rough areas. Wings smaller, with fringed marginal hairs; dusky; pebbly appearance caused by large cells. Bristles coarse and irregular; hairs sparse and irregular, especially on abdomen. Body small in late counts. Viability 20 percent wild type. Females usually sterile; males usually fertile. RK3.
gg2
discoverer: Waletsky, 371.
phenotype: Like *gg,* but many bristles on posterior lateral margin of head missing; others on head and thorax reduced or missing. Females sterile; at 19°C, ovaries small and contain no oocytes; at 25°C ovaries contain a few eggs, but none are laid (Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70). RK3.
99^3
origin: Spontaneous.
discoverer R. F. Grell, S3d.
references: 1953, DIS 27: 59.
phenotype: Similar to *gg,* but both sexes fertile. Viability low. RK2.
*99**
origin: Spontaneous.
discoverer: Mohler, 54J28.
references: 1956, DIS 30: 78.
phenotype: Similar to gg^3. Varies from eyelessness in first flies to emerge to nearly normal in aging

cultures. Always separable from wild type on basis of pebbly appearance of wings. RK2.

giant: **see *gt***

Giant: **see *Gt***

giantoid: **see *gtd***

gl: glass

location: 3-63.1.
origin: Spontaneous.
discoverer: Muller, 18b.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 188 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 214 (fig.), 226.
phenotype: Eyes reduced to one-half normal area; diamond shaped with glassy texture from fused facets and irregular surface. Eye color blotchy, ranging from scarlet to orange in males and orange to apricot in females; colorless rim and eroded patches, especially in female. Malpighian tubes of larva paler than wild type (Brehme). RK2.
cytology: Located in region between 90C2 and 91A3 on basis of its inclusion in *Df(3R)P14 = Df(3R)90C2-Dl;91A2-3* (E. B. Lewis).

gl2

origin: Spontaneous.
discoverer: R. L. King, 1927.
phenotype: Slightly less extreme than *gl.* Eyes reduced to two-thirds normal size; ovoid; glassier and smoother than *gl.* Eye color blotchy scarlet in both sexes, with rim and eroded patches of color-less material. Ocelli colorless and papillose. Larval Malphigian tubes normal yellow (Brehme). Cephalic complex smaller than wild type at 36 hr after hatching (27°C); growth rate subsequently normal [Medvedev, 1935, Z. Induktive Abstammungs- Vererbungslehre 70: 55—72 (fig.)J 1935, Tr. Inst. Genet. Akad. Nauk SSSR 10: 119-51]. RK2.

$_{g}$I3

origin: Spontaneous.
discoverer: Stern.
synonym: *rh: rauhig.*
references: Csik, 1929, Biol. Zentr. 49: 419—21.
phenotype: Eye small and elliptical, with surface less rough than *gl* or gl^2. Eye color homogeneous scarlet in both sexes. Ocelli colorless. Viability and fertility good. Malpighian tubes of larvae wild type (Brehme). RK1.

****gt4***

origin: Spontaneous.
discoverer: Villee, 40d.
references: 1941, DIS 14: 40.
1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 137.
phenotype: More extreme than *gl.* Eyes reduced to less than one-half normal area; ovoid; narrower, glassier, and smoother than *gl.* Eye color white to apricot in females, pink in males. Ocelli colorless. Viability about 65 percent wild type. RK2.

****gl40h***

origin: Spontaneous.
discoverer: Ives, 4Qh.
references: 1941, DIS 14: 39.
phenotype: Like gl^3, perhaps with eye color more normal. RK1.

****gl41e***

location: 3-64.
origin: Spontaneous.
discoverer: Oliver, 41el.
synonym: *gl-l: glass-like.*
references: 1942, DIS 16: 53.
phenotype: Eye texture smooth to rough. Eye smaller than wild type. Eye color orange; lighter around rim of eye. Viability and fertility good. RK2.

**glS1k*

origin: Spontaneous.
discoverer Edmondson, 51k.
references: 1952, DIS 26: 60.
phenotype: Like *gl.* RK2.

**glS4g*

origin: Spontaneous.
discoverer: Hexter, 54g.
references: 1956, DIS 30: 72.
phenotype: More extreme than *gl.* Facet area less than one-half of normal surface; very irregular. Eye color white with some orange specks in both sexes. Ocelli colorless. Malpighian tubes normal. RK1.

$_{g}$i62d

origin: Spontaneous.
discoverer: Tano, 62d.
references: Burdick, 1963, DIS 37: 47.
phenotype: Less extreme than gl^2. Viability normal. RK1.

**$_{g}$l63a14*

origin: Spontaneous.
discoverer: Ashburner and Hudson, 63al4.
references: 1966, DIS 41: 60.
phenotype: Similar to *gl,* but eye color darker and pigmented area larger. Male eyes darker than female. Malpighian tubules wild type, $gl^{63}*^{14}/gl$ has more eye pigment than either homozygote. Viability and fertility good. RK1.

gl63d

origin: Gamma ray induced.
discoverer: Ives, 63d29.
references: 1965, DIS 40: 35.
phenotype: Eyes small, nearly colorless, with a typically glassy surface. Viability of homozygote good except in competition with other genotypes. RK2A.
cytology: Associated with *T(2;3)*gl^{63d}; breakpoints unknown.

**$_{q}$J63f6*

origin: Spontaneous.
discoverer: Ashburner and Hudson, 63f6.
references: 1966, DIS 41: 60.
phenotype: Like gl^{63t}**4* and may be identical. RK1.

Gl: Glued

location: 3-41.4 [0.9 unit from *Ly* (Mossige, 1935, DIS 4: 59; 1938, Hereditas 24: 110-16)1.
origin: Recovered among progeny of heat-treated flies,
discoverer: Ives, 31f5.

references: 1934, DIS 1: 34.
1934, DIS 2: 35.
Plough and Ives, 1935, Genetics 20: 42—69 (fig.)
phenotype: Eyes rough, smaller, and oblong; facets rounded; surface smooth and shiny like *gl.* Bristles generally shortened slightly and straighter than normal. Viability and fertility good. Homozygous lethal. RK1.
cytology: Salivary chromosomes normal (Bridges in Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).

gl-1: **see *gl*i«**

Gla: Glazed
location: 2- (rearrangement).
references: Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293.
phenotype: Eye reduced to one-fourth normal area and narrowed to a point ventrally. Eye color generally diluted but with some black patches. Ommatidia coalesce into gleaming, smooth sheet. Malpighian tubes of larva somewhat lighter than wild type; difficult to classify (Brehme and Demerec, 1942, Growth 6: 351—56). Homozygous lethal. RK2A.
cytology: Associated with *In(2LR)Gla = In(2LR)27D;51E,* superimposed on *In(2L)Cy = ln(2L)22Dl-2;33F5-34Al* or *In(2L)t = In(2L)22D3-El;34A8-9.*

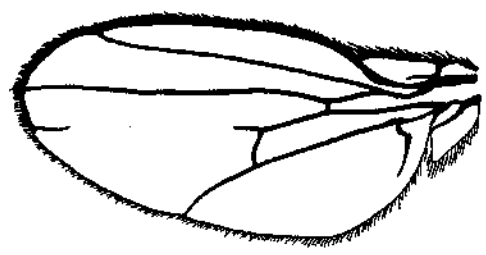
glass: **see *gl***
glass-like: **see *gl*$^{41\ e}$**
Glazed: **see *Gla***
gleam: **see *gm***
****gli: glide***
location: 1-38.0.
origin: Induced by DL~p-NN-di-(2-chlorethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 70.
phenotype: Wings held horizontally at right angles to body. Pigmentation of tergites frequently interrupted along mid-dorsal line; tergites occasionally show a nick in the posterior border. Males sterile; viability about 70 percent wild type. RK2.

glisten: **see *gn***
glossy: **see *Iz***
Glued: **see *Gl***
gly: **see *Iz6***
gm: gleam
location: 3- (not located),
origin: Spontaneous,
discoverer Bridges, 27cl.
phenotype: Eyes small and rough; irregular hairs and facets cause glints. Body small. Viability about 10 percent wild type but variable. RK3.
cytology: Associated with *In(3L)P,* according to Bridges (Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).

****gm: glisten***
Socotlon: 3-67.3.
origin: Gamsaa my induced.
discoverer. **WcUbrun,** 61i6.
references: Eyes rough but of normal size; facets and hairs irregular. RK2.

Go; *Gold tip*
location: 2-64.3 (57.5 to 71.1; between *en* and *eg).*
origin: Spontaneous.
discoverer: Sturtevant, 1948.
references: 1948, DIS 22: 55.
phenotype: Tips of many bristles and hairs pale and curved. Bristles often short (tips broken off ?). Wild-type bristles sometimes have pale tips, thus interfering with positive classification. Lethal when homozygous. Expression best at low temperatures. RK2.

goggle: **see gg**
Gold tip: **see Go**
gouty legs: **see *gy***



gp- *gap*
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 209.

gp; ***gap***
location: 2-74.
origin: Spontaneous.
discoverer: Bridges, 12alO.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 208 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.), 226.
phenotype: Vein L4 weak or has section missing beyond posterior crossvein. Overlaps wild type when homozygous; semidominant as heterozygote. RK3.

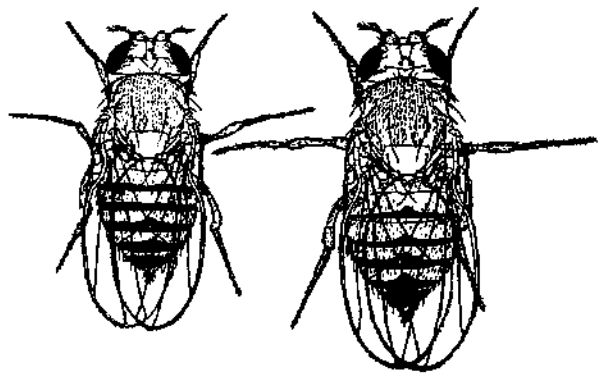
****gr: gracile***
location: 1-36.4.
origin: Induced by L-p-NN-di-2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 86.
phenotype: Small fly with narrow abdomen. Wings frequently held atypically, either upward or downward. Very inviable, many dying less than 24 hr after eclosion; males sterile. RK3.

****gre: green body color***
location: 1- (not located).
origin: Spontaneous.
discoverer: Bridges, 13e.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 73.
phenotype: Body color tinged greenish black, with marked trident pattern. Overlaps wild type. RK3.
other Information: Possibly an allele of *ptg.*

gro: ***groucho***
location: 3-90 (no recombinants with *Pr* obtained).
origin: Spontaneous.
discoverer: E. H. Grell, 64k.
phenotype: Clumps of extra bristles above each eye give impression of bushy eyebrows; also extra bristles on humerus. Top of head tends to be malformed; ocelli often enlarged and run together. In selected stocks, penetrance approaches 100 percent but is low in unselected stocks. Probably no gross chromosomal rearrangement since recombination is normal in vicinity of mutant. RK2.

grooved: **see gv**
groove/ess: see *gvl*
groucho: **see gro**

gs: gespleten
location: 3-35.1.
origin: Spontaneous.
discoverer: Smelink-den-Hollander, 561.
references: 1957, DIS 31: 85.
phenotype: Thorax cleft by medial groove. Eyes small; sometimes missing. Hair pattern on thorax disturbed. Viability and fertility excellent. RK1.
other information: Probably an allele of *gv* (3-36.2).



gt: gianf
Left: *wild-type* female. Right: *giant* female. From Bridges and Gabritschevsky, 1928, Z. Induktive **Abstammungs- Vererbungslehre 46: 231—47.**

gt: giant
location: 1-0.9.
origin: Spontaneous.
discoverer: Gabritschevsky, 25i2.
references: Bridges and Gahritschevsky, 1928, Z. Induktive Abstammungs- Vererbungslehre 49: 231-47 (fig.).
Gabritschevsky and Bridges, 1928, Z. Induktive Abstammungs- Vererbungslehre 49: 248—84.
phenotype: Larval development 4 days longer than normal, resulting in giant larvae, pupae, and imagos. Adult weight 1.7 times normal. But not all genetically giant flies show the character; the rest have normal size. Distribution sharply bimodal. Percentage giant greatest in well-fed cultures; also raised by modifying action of bh^{11}. Salivary gland chromosomes of double thickness in some cells (Bridges, 1935, J. Heredity 26: 60-64). RK3.
other information: Used by Bridges (1935) in the construction of salivary chromosome maps.

****Gt-2: Giant in chromosome 2***
location: 2- (not located),
origin: Spontaneous,
discoverer: Bridges, 14128.
phenotype: Heterozygote normal but, in presence of homozygous *gt-3,* gives giant male-sterile flies. Homozygous lethal. RK3.

****gt-3: giant in chromosome 3***
location: 3-64.
origin: Spontaneous.
discoverer: Bridges, 14i28.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 120 (fig.).
phenotype: Body size much larger than normal. Late hatching. Entirely sterile in male. Giant character produced only in flies homozygous for *gt-3* and heterozygous for *Gt-2.* RK3.

gt-4
location: 2-24.0.
origin: Spontaneous,
discoverer Bridges, 30bl4.
phenotype: Giant flies hatch very late. Viability variable but around 15 percent wild type. RK3.

****gtd: giantoid***
location: 1-0.5.
origin: Spontaneous.
discoverer: Bridges, 21cl2.
references: Bridges and Gabritchevsky, 1928, Z. Induktive Abstammungs- Vererbungslehre 46: 232 (fig.).
phenotype: Body size larger, especially head. Late hatching. Viability erratic, about 50 percent wild type. Separation difficult in females, easier in males. RK3.

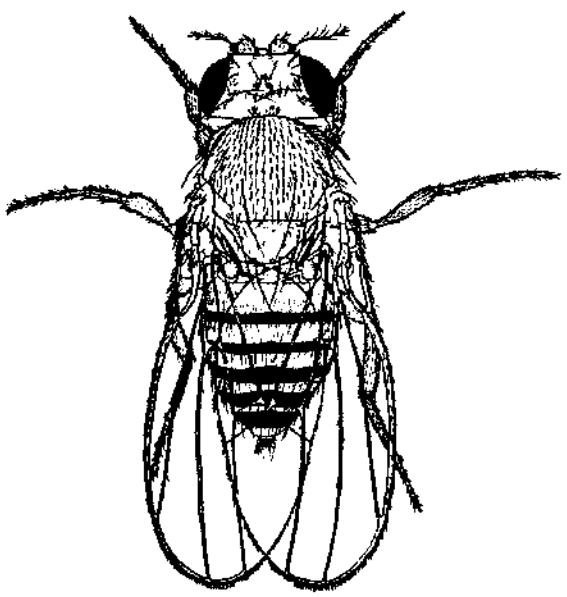
Gull: **see G**
Gulloid: **see *Gd***

****gv: grooved***
location: 3-36.2.
origin: Spontaneous,
discoverer Ives, 43128.
references: 1946, DIS 20: 65.
phenotype: A longitudinal medial groove in thorax; in extreme individuals, thorax nearly cleft. Eyes reduced. Irregular and often extra alar bristles. Viability good. RK1.
other information: Probably allelic to &*.

gvl: groove/ess
location: 4-0.2 fin diplo-4 triploids (Sturtevant, 1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7)].
origin: Spontaneous.
discoverer: Bridges, 33elO.
references: 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Sharp transverse groove between scutellum and thorax is nearly eliminated; no overlap of wild type. Black scars appear on scutellar groove at si«4e&, in pleural region, and behind stemopletirais. Viable and fertile. RK1.

gy: gouty legs

location: 4- (not located).
origin: Spontaneous.
discoverer: Muller.
references: 1965, DIS 40: 36.
phenotype: Legs shortened and thickened, especially the metatarsi of the hind legs, which are often swollen. Usually classifiable; viability and fertility good. *gy/ey*^{D} is *gy*. RK2.



From Bridges and Morgan, 1923, Carnegie Inst. Wash. PubJ. No. 327: 202.

h: hairy

location: 3-26.5.
origin: Spontaneous.
discoverer. Mohr, 18111.
references: 1922, Z. Induktive Abstammungs-Vererbungslehre 28: 17.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 202 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. (tenet. 2: 214 (fig.), 227,
Neel, 1941, Genetics 26: 52-68 (fig.),
pfoenotype: Extra hairs cm scutellum, along veins, on pleorae, and on top of head. Additional hair-forming cells present in 19-hr pupa (Lees and Waddiagtoa, 1942, DIS 16: 70). Interacts synergistically with *ppd* and *Hw* or Hw variegateds [e.g., JTnf/)*e*]; *In{l)sc7* suppresses *h* (Steinberg, 1942, DIS 16: 68; Neel, 1941). RK1.
ey*of*§y: Pla-eed is aalivsry chromosome region between 66D2 and 66E1, on basis of its inclusion in *DK3Lftt*^{e}*O.3f0* $_{m}$*DI(3L)6$D2-5;66DI4'E1* (Ward •ad *AUxmndm,* 1957, Genetics 42: 42-54).
e*h«r *in§ormotion:* As with c/$^{+}$, expression of *h*$^{+}$ may b® altered i© tht direction of ft by rearrangements with *bmstkm in* the vicinity of the *h* locus [Dubinin @«j Sldorov, 1934, Biol. *Zh.* (Moscow) 3: 307-31]. Unlike tike *ci* case, however, rearranged ft chrotno* [illegible] do act sfeow evidence of altered gene action (Stern, 1944, DIS 18: 56). Shown byboth Sturtevant and Rasmussen to recombine with and He to the right of *h*^{2}.

h2

origin: Spontaneous.
discoverer: Bridges, 28d23.
phenotype: Extra hairs on wings, but fewer than in *h.* Extra hairs not present on scutellum, pleurae, or top of head. Bristles cylindrical, with javelin heads. Some abnormal abdomen effect. RK2.
other information: Shown by both Sturtevant and Rasmussen to recombine with and lie to the left of *h.*

**h!00.12*

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous viable. RK2A.
cytology: Associated with *In(3L)h*$^{100\text{-}12}$ = *In(3L)61A2'3;66D.*

*/,700.239

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous semilethal. RK2A.
cytology: Associated *with In(3L)h*^{100,239} = *In(3L)66Dll-12;80C.*

**hl00.271*

origin: X ray induced.
discoverer: Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)ht00.271* = *T(2;3)41;66D14'E1.*

*/,7OO.39O

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Df(3L)h*^{100,390} = *Di(3L)66D2'5;66D14-El.*

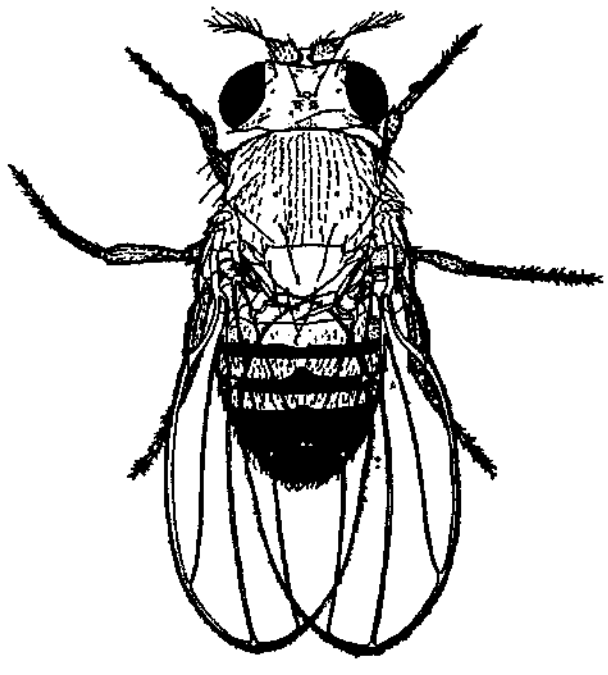
ft*; *hairy-subliminal*

origin: X ray induced.
discoverer: Green.
references: 1960, Proc. Natl. Acad. ScL U.S. 46: 524-28.
phenotype: Homozygote nearly lethal but has no *h* phenotype. Heterozygote with *h* and *h*^{2} also wild type. *h*^{e}/+ has extra hairs on wings, head, pleurae, halteres, and occasionally on scutellum if also heterozygous for certain X-chromosome inversions that variegate *for Hw,* including *In(l)sc*^{s}, *In(l)acS*, and ln(l)y*^{3P}. Presence of *y+Y* also induces extra hairs, RK3.

H: Hairless

location: 3-69.5.
origin: Spontaneous.
discoverer: Bridges, 16c4.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 161 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 170 (fig.), 227.
Nash, 1965, Genet. Res. 6: 175-89.
phenotype: Bristles, especially postverticals and abdominals, missing. Bristle sockets present at some sites, not at others. Veins L4 and L5 do not reach wing margin; occasionally true of L2 also. Eyes larger than wild type; body color somewhat paler. Lees and Waddington [1942, Proc. Roy. Soc. (London), Ser. B. 131: 87-110 (fig.)J show that trichogen cell forms a socket instead of a bristle at some sites. Interactions with other mutants studied by House (1953, Genetics 38: 199-215, 309-27; 1959, Genetics 44: 516; 1955, Anat. Record 122: 471; 1959, Anat. Record 134: 581-82). *H* suppresses wing notching of *lN, fa, fa*^{no}, and *nd;* enhances *Ax,* and enhances eye effect of *spl; H* removes more bristles in combination with *spl* (House, Von Halle). Shows some superadditive interaction with en, *ci, ci*^{w}, and *ci*® relative to degree of L4 interruption. L2 interruption augmented in combinations with ve and *ri;* L3 interruption augmented in combinations with ve and *tt.* Triploid, *H/+/+*, intermediate between wild type and *H/+*. *H/H/+* most extreme type, with bristles absent from head, thorax, and abdomen [Gowen, 1933, Am. Naturalist 67: 178—80 (fig.)J. Homozygous lethal. RK1.
cytology: Salivary chromosomes normal.



H: Hairless
From Bridges and Morgan, 1923, Carnegie Snst. Wash. Publ. No. 327: 161.

H2
origin: Spontaneous.
discoverer: Stwrtevant.
references: Plunkett, 1926, J. Exptl. Zool. 46: 181-244.
phenotype: Bristle effect more extreme than in *H* and more easily separated from wild type. Venation effect slighter than in *H.* Interactions with mutants at the *N* locus similar to those of *H* (Von Halle). Homozygous lethal. *H*^{2}*/H* lethal. RK1.

H3
discoverer: Sturtevant.
phenotype: Like *H.* RK1.

H4
origin: Spontaneous.
discoverer: Bridges, 30b20.
phenotype: Like *H.* RK1.

H58b
origin: Gamma ray induced.
discoverer: Ives.
references: 1959, DIS 33: 95.
phenotype: Extreme bristle effects; anterior lateral acrostichals removed. L5 incomplete distally. RK2A.
cytology: Shown genetically to be associated with T(Y;3)H^{58b}.
other information: Allelism to *H* inferred from phenotype.

HD1: Hairless of Dobzhansky
origin: X ray induced,
discoverer: Dobzhansky, 1930.
phenotype: Slight allele of *H* with no shortening of L4 or L5. Bristle effect slighter, particularly on abdomen. Homozygous lethal. RK2.

HP2: Hairless from P32
origin: Found among descendants of male fed P^{32}.
discoverer: Bateman, 1949.
references: 1950, DIS 24: 55.
phenotype: Bristle effect like *H,* but venation quite distinct. Veins not interrupted, but knotted. Homozygous lethal. RK1.

ha: hair bristles
location: 1-22.7.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahmy, 1954.
references: 1958, DIS 32: 70.
phenotype: Small fly with extremely fine, short bristles. Males viable and fertile. Females less viable and highly infertile. RK3.

Hairless: **see *H***

hairy: **see *h***

Hairy wing: **see Ww**

Haltere mimic: **see *Hm***

hdp: holdup
location: 1-59.5.
origin: Induced by DL-p-NN-di-{2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 70.
phenotype: Wings held up to various degrees. May overlap wild type. Viability and fertility good in both sexes. RK2.
other information; One X-ray-induced allele.

/i</prwg; *heldup-reduced wings

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
synonym: *rwg.*
references: 1958, DIS 32: 74.
phenotype: Wings short; upheld or outspread to various degrees. Small regions of deranged wing hairs, giving shaded streaks parallel to longitudinal veins. Male infertile; viability about 70 percent normal. RK2.

heavy vein:* see *hv

holdout',* see *ho

heldup:* see *hdp

Henna:* see *Hn

***Hermaphrodite:* see tra^{D}**

****hi: high***

location: 2- (not located).
origin: Found in Florida natural population.
discoverer: Ives, 1943.
references: 1943, Genetics 28: 77.
1950, Evolution 4: 236-52.
phenotype: Male homozygous for hi produces sperm containing 10 times normal frequency of mutations. Heterozygous *hi/+* causes a mutation rate 2—7 times normal. Ratio of sex-linked lethal to visible mutations about 8 to 1. Inversions associated with about 5 percent of mutations. RK3.
cytology: Salivary chromosomes normal.
other information: Homozygous *hi* constructed by crossing two balanced lethal stocks, *11 M/CyX 12 hi/Cy.* Since these stocks have developed a common lethal, it is now difficult to obtain hi homozygotes.

****Hi: Hirsute***

location: 3- (rearrangement).
origin: X ray induced.
discoverer: Bishop, 1939.
phenotype: All bristles except postscutellars and postdorsocentrals multiplied, especially on head and anterior thorax. Eyes smaller and facets irregular. Homozygous lethal. RK2A.
cytology: Associated with *In(3LR)Hi = In(3LR)71A;91F.*

Hia: Hiatus

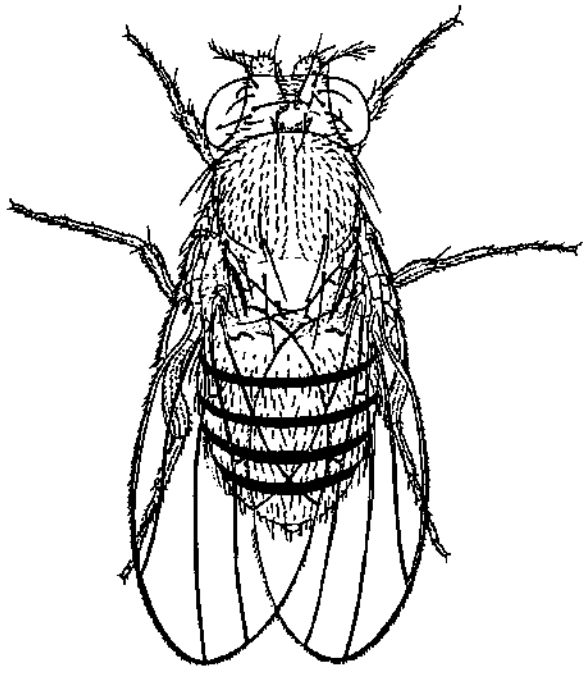
location: 2- (not located),
origin: Spontaneous.
discoverer: Bridges, 2%12.
phenotype: Terminal interruption of L2. More obvious in heterozygous male than in heterozygous female. Homozygous viable. RK3.

high:* see *hi

***Hirsute:* see Hî**

hk: hook

location: 2-53.9.
origin: Spontaneous.
discoverer; Mohr, 24a4.
references: 1927, Hereditas 9: 169-79 (fig.)-
plttttnotyp*: Bristles nearly ail hooked at tip or blunted; some bent at right angles. Scute liars and verticals especially affected. Acrostichal hairs fewer *mad* outer rows separated. Eyes slightly roughened. Wings usually divergent and may be smaller. Body sometimes small and chunky. Less extreme expression at 19°C, especially the wing character, but classification reliable. RK2.
cytology: Salivary chromosome locus between 37B2 and 40B2 (Schultz and Curry).



hk: hook

From Mohr, 1927, Hereditas 9: 169-79.

hk2

origin: Spontaneous.
discoverer: Bridges, 33a31.
phenotype: Bristles cylindrical, javelinlike, or bent, but effect less extreme than *hk.* RK2.

Hm: Haltere mimic

location: 2- or 3- (rearrangement).
origin: X ray induced.
discoverer Slatis, 49b5.
phenotype: Wing resembles a large haltere, but stalk is more winglike. In combination with *vg,* wing is further reduced and haltere almost completely eliminated. Homozygous lethal. RK3A.
cytology: Appears to be associated with complex translocation, *T(2;3)Hm.*

tin^{31}:* see *$Un^{T<}$*

Hn; Henna

location: 3-23.0.
origin: X ray induced.
discoverer: Van Atta, 30k.
references: 1932, Am. Naturalist 66: 93—95.
1932, Genetics 17: 637-59.
phenotype: Eye color homogeneous dark, dull brown. Classification difficult; best in aged flies. Homozygous lethal. Heterozygotes viable and fertile. RK2A.
cytology: Placed in 66A-B, on basis of its association with *Df(3L)Hn = Df(3L)66A;66B* (Lewis, 1956, DIS 30: 130). *Hn* was induced together with, but is separable from *T(2;3)Hn = T(2;3)53E-54A;77A;94F;96A.*

HnS3k

origin: Ultraviolet induced.
discoverer: Meyer and Verderosa, 53k.
references: Meyer, 1954, DIS 28: 76.
phenotype: Heterozygote has brick-red eye color, but classification difficult. Homozygote viable; eye color dark brown like sepia. RK1 as recessive.

Hn^r: Henna-recessive

origin: Spontaneous.
discoverer. Bridges, 33c20.
references: Mohr, 1937, DIS 8: 12.
phenotype: Eye color dull, dark brown, like *cl.* Best separability in aged flies. *Hn^r/Hn* more extreme than *Hn^r/Hn^r*. Eye color autonomous in transplant into wild-type larval host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes bright yellow as in wild type (Beadle, 1937, Genetics 22: 587—611). Eyes have 58 percent normal red pigment and 120 percent normal brown pigment (Nolte, 1954, J. Genet. 52: 127-39). RK2.

Hnr2

discoverer: Nordenskiöld, 39b9.
synonym: *bu; brunette; hn^.*
references: 1937, DIS 7: 18.
phenotype: Eye color darker than *Hn^T* in young flies. RK2.

Hnr3

origin: Spontaneous.
discoverer: Weinstein, 1927.
synonym: *sed: sepiaoid.*
phenotype: Eye color dull chocolate. Classification easier than for *Hn^r*. 79 percent normal red pigment, 100 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1—10). Eye color autonomous in transplants of optic disk into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes bright yellow as in wild type (Beadle, 1937, Genetics 22: 587-611). RK2.
other information: Allelism by Lewis (1956, DIS 30: 130).

*Hn'53/

origin: Ultraviolet induced.
discoverer: Meyer, 53j.
references: 1954, DIS 28: 76.
phenotype: Similar to se. RK1.

Hn^{r}h Henna-recessive of Ives

origin: Spontaneous.
discoverer: Ives, 45J17.
references: 1946, DIS 20: 65.
phenotype: Eye color brownish at hatching, darkens to black. Resembles se. Viability good. RK1.

Hn^{rN}: Henna-recessive from Nebraska

origin: Spontaneous.
discoverer: Williamson, 53j.
references: 1955, DIS 29: 75.
phenotype: Indistinguishable from se. Larval Malpighian tubules somewhat darker yellow than wild type. RK1.

ho: heldout

location: 2-4.0.
origin: Spontaneous.
discoverer Novitski, 35g.
references: Novitski and Rifenburgh, 1938, Proc. Indiana Acad. Sci. 47: 256-60.
phenotype: Wings extended at right angles to body. RK1.
cytology: Located in or near 22E (Lewis, 1945, Genetics 30: 137-66).

ho40

origin: X ray induced.
discoverer: E. B. Lewis, 1940.
synonym: *In-ho.*
references: 1945, Genetics 30: 137-66.
phenotype: Wings reduced to tiny stubs. Eyes reduced, with anterior indentation. Male lacks genitalia and anal apparatus; female fertile. *ho^O/ho* resembles *ho/ho.* RK2A.
cytology: Associated with *In(2L)ho'*0 = In(2L)21D4-El;22E2-3.*

hook:* see *hk

***Hooked veins:* see Hv**

hp: humped

location: 3- (rearrangement).
origin: Spontaneous.
discoverer: Bridges, 31a22.
phenotype: Thorax shortened and strongly humped, with thoracoscutellar groove almost absent. Eyes sharply reduced; may be absent at 19°C. Bristles Minutelike and occasionally missing. Viability 10 percent wild type. RK3A.
cytology: Associated with *In(3R)hp.*

hpa: hyperantenna

location: 1-50.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 86.
phenotype: Antennae enlarged or have duplicated parts, sometimes an extra antennal base near the eye. Grossly deformed head and eyes. Wings have rounded tips and incised inner margins. An occasional bristle absent or shorter. Phenotype variable and minimal expression slightly altered eye shape and blunt wing tips. Males viable and infertile; females sterile. RK3.

Ht:* see *tra^D

Hu: Humeral

location: 3-51 (48-54).
origin: X ray induced.
discoverer: Ruch, 1931.
phenotype: Extra bristles on humeral patches of *Hu/+.* Humeral bristles more numerous in homozygote, with a streak of hairs below humerus toward base of first leg. *Hu/Hu* has viability 90 percent wild type. RK2A as heterozygote.
cytology: Associated with *In(3R)Hu = In(3R)84B2-3;84F2-3;86B4-C1.*

humped:* see *hp

humpy:* see *hy

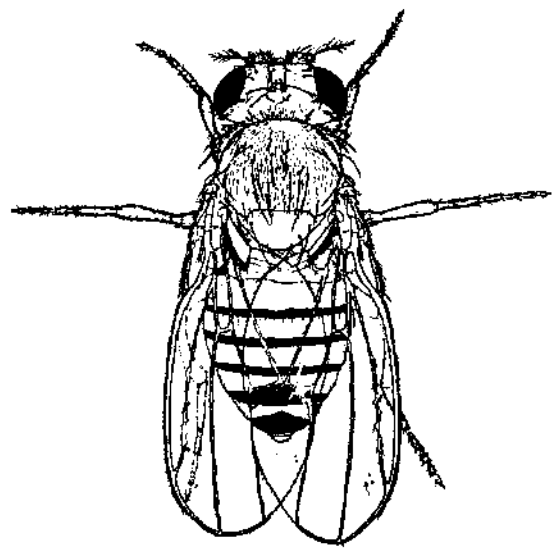
hv: heavy vein

location: 2-104.0.
discoverer: Curry, 36115.
phenotype: Veins thick and knotty, especially at ends of crossveins; posterior crossvein oblique

and may show break in middle; extra cross veins sometimes present. Wings broad, thick, dark, warped, divergent, and droopy. Eyes small and bulging. Posterior scutellars blunt, short, and crossed. Overlaps wild type at 25°C but useful at 19°C. RK2.

Hv: Hooked veins

location: 1-66.
discoverer: Tanaka, 35a4.
references: 1935, DIS. 4: 16.
1936, D1S 5: 8.
1937, DIS 8: 11.
phenotype: Heterozygous female shows small branches from posterior crossvein and L5. Eyes small and rough. Homozygous female lethal. RK3A.
cytology: Associated with *In(l)Hv.*



Hw: Hairy wing

Edith M. Wallace, unpublished.

Hw: Hairy wing

location: 1-0.0.
origin: Spontaneous in stock containing *y* and never separated.
discover**; Bridges, 23cl2.
reference*: N«el, 1941, Genetics 26: 52-68 (fig.).
pHenotyp*: M®ie has extra bristles along wing vein, ©a **btftd** (especially occipitals), and on thorax. Ala©, extra hairs on wing veins, back of head, and SMKopletvae. Homoxygous female sterile, expression *men mximmm* than male, and has 40—80 percent wiid-typ® viability. Heterozygous female has good viability. Phenotype similar to male. Classifiable an stagte do«# in triploids (Schultz, 1934, DB 1: 55). Interacts synergistically with ft and *Pf4* (M«®!(1941). Suppressed by *su(Hw)* and *mu(Hw)2.* REtA as heterozygous female and as **mm ie.**
cyteleoy: Salivary chromosome analysis by Denserec cad Hoover shows repeat for doublet 1B1-2, i.e., *Dp(lilti»l\9*9,* Gteetics 24: 68).

Hw*

origin: Spontaneous derivative **of *Hw.***
discoverer: Nichols-Skoog, 35a9.
phenotype: Females homozygous for Hw^2 show only occasional extra hairs along wings. Overlaps wild type. RK3A.
cytology: Salivary chromosome analysis by Schultz (Morgan, Schultz, and Curry, 1941, Carnegie Inst. Wash. Year Book 40: 284) shows small inversion of the region from 1A3 through 1B1 of the first 1B1-2 doublet of *Dp(l;l)Hw;* i.e., associated with *In(l)Hw2 =In(l)lA2-3;lBl-2.*

Hw49c

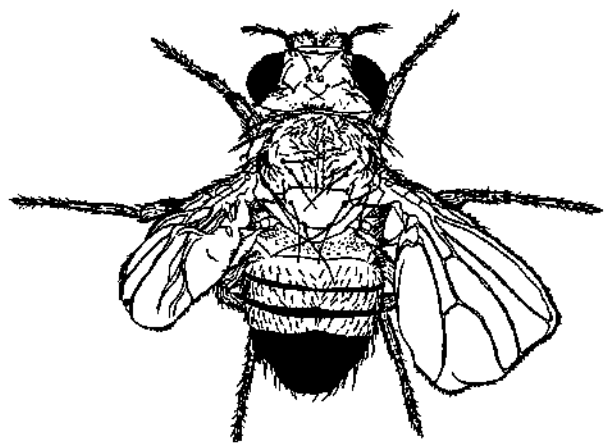
origin: Induced by P^{32} simultaneously with $sc^{45<}$=.
discoverer: R. C. King, 49c21.
references: Poulson and King, 1949, DIS 23: 62-63.
phenotype: More extreme than *Hw.* Homozygous female has doubling and tripling of many bristles; extra wing veins; gap in posterior crossvein; extra hairs on vein L2 and in wing cells. Heterozygous female has normal bristles but extra hairs on L2 and L3 and in wing cells; often an extra free vein from posterior crossvein. $Hw^{4\wedge c}$ male much like homozygous female, but bristle duplication less extreme. Male and heterozygous female fertile; homozygous female sterile. RK1.

Hx: Hexaptera

location: 2- (not located).
origin: Spontaneous.
discoverer: Herskowitz, 47j.
references: 1949, Genetics 34: 10-25 (fig.).
phenotype: Expression same in Hx/-f and *Hx/Hx;* varies from absence of a detectable difference from normal, through various intermediate types, to presence of large appendage on prothorax. Entire abnormal structure may remain beneath exoskeleton. Appendage varies from small amorphous mass to highly differentiated wing. May also produce haltere- and leglike appendages. Penetrance same in homozygote and heterozygote; enhanced by crowding and by high temperature (20°C, male 1.5 and female 3.3 percent; 25°, male 6.5 and female 24.2 percent); affected by genotype, e.g., suppressed by *In(2L+2R)Cy* and by $ln(2LR)bw^{vl}$. RK3.

hy; humpy

location: 2-93.3.
origin: Spontaneous.
discoverer: Bridges, 18j22.
references: 1937, Cytologia (Tokyo), Fuji! Jub. Vol. 2: 745-55.
phenotype: Thorax strongly ridged, with commas anteriorly and two pairs of vortices. Wings obliquely truncated to one-half normal length. An irregular contraction of larval muscles at time of pupation (Waddington, 1941, Proc. Zool. Soc. London Ser. A 111: 181-88). Viability low and erratic. Both sexes highly infertile. RK2.
cytology: Placed in region 57 on basis of its being to the right *o(In(2R)NS =In(2R)52A2-Bl;56F9-13* and to the left of *Df(2R)M'l = Di(2R)57Fll-58A1;58F8-59A1* (Bridges, 1937).



hy: humpy
Edith M. Wallace, unpublished.

hyperantenna: **see *hpa***

i: **see *E(B)***
I: **see *E(B)***
Ic D: **see *bwVD***
****if: inflated***
location: 1-55.
origin: Spontaneous.
discoverer: Weinstein, 1916.
references: 1918, Genetics 3: 157 (fig.).
phenotype: Wings inflated with lymph and smaller than normal; venation defective. Wings later dry and blistered. Viability and fertility poor. RK3.
if*
origin: Spontaneous.
discoverer: Curry, 38b.
references: 1939, DIS 12: 45.
phenotype: Resembles *if.* Longitudinal veins thickened, especially at wing base. Anterior crossvein thickened. In most cases, wings inflated or blistered. RK2.
If: Irregular facets
location: 2-107.6 (0.6 unit to the right of *sp,* according to Ives).
origin: Spontaneous.
discoverer: Casey, 65116.
phenotype: In heterozygote, eye area about one-half of normal; narrow and pointed ventrally; facets irregular and often missing across middle of eyes, sometimes fused or absent in ventral portion. In homozygote, eyes are narrow slits, with smooth glossy surface. Viability and fertility good. RK1.
****im: interrupted margin***
location: 1-3.1.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 86-87.
phenotype: Wing margin nicked to various degrees, with costal *vein* frequently interrupted. Extra wing venation often present, and occasionally anastomoses, giving a plexus, particularly at the wing apex. Eyes smaller and sometimes slightly rough. Bristles thin. Males small, late eclosing; viability reduced. Female sterile. RK3.
in: inturned
location: 3-47 (left of centromere).
origin: Spontaneous.
discoverer: Bridges, 26k20.
phenotype: Hairs and bristles on thorax directed irregularly toward midline. Marginal hairs of wing stand out from wing margin; wings slightly spread and tend to be long and narrow. RK1.
cytology: Tentatively placed in salivary region 77B-C (Hannah and*Arajarvi).
//?-/: see *E(f)*
In-ho: see ho^{40}
**inb: incised balloon*
location: 2-55.
origin: Spontaneous.
discoverer: Neel, 41d9.
references: 1942, DIS 16: 50.
phenotype: Wings held at 45° angle to body. Wing margins incised, varying from slight nicks to extreme reduction to small fluid-filled sacs. RK2.
cytology: Salivary chromosomes normal.
****Ind: Indented***
location: 2-63.
origin: Spontaneous.
discoverer Cole, 40e.
references: Whittinghill and Parker, 1945, Genetics 30: 27-28.
Whittinghill, 1947, DIS 21: 72.
phenotype: Eye usually kidney shaped with indentation anteriorly; shape sometimes normal, but facets irregular. Often indented posteriorly as well as anteriorly, sometimes dividing eye into two spots, or with only upper lobe persisting. Rarely eyeless. More extreme at 28° than at 25°C. RK2.
inflated: **see *if***
infrabar: **see B^r**
infrabar Bat: **see BB^i**
intensifies: **see *e( )***
Intensifiet: **see *E( )***
interrupted margin: **see *im***
Interruptus: **see ci^w**
intersex: **see *ix***
intersex on chromosome 3: **see *dsx^oi***
intersex-62c: **see *dsx***
inturned: **see *in***
Irregular facets: **see *If***
It: **see ci^w**
ix: intersex
location: 2-60.5.
origin: Spontaneous.
discoverer: L. V. Morgan, 1943.
references: Morgan, Redfield, and Morgan, 1943, Carnegie Insst. Wash. Year Book 42: 171-74.
Kroeger, 1959, Arch. Entwicklungsmech. Organ. 151: 301-22 (fig.).
phenotype: Females changed into sterile intersexes with a set of reduced male and a set of irregular female external genitalia. Gonads also mixed. They have no sex combs; pigmentation of abdomen

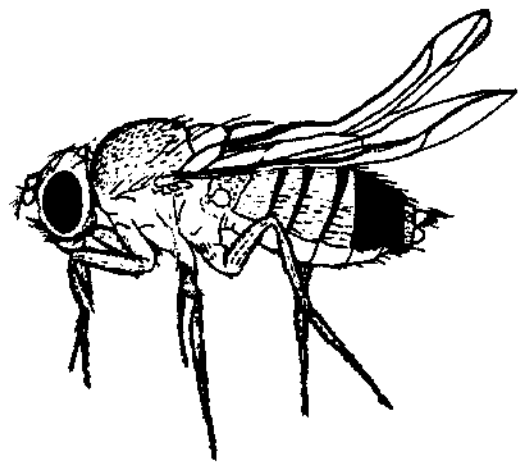
intermediate between male and female. A large mass of chitinized tissue protrudes from vaginal opening. Males not affected. RK2.

iV

origin: Ultraviolet induced.
discoverer: Meyer, 50k.
synonym: *torn: tomboy.*
references: Meyer and Edmondson, 1951, DIS 25: 73. Meyer, 1958, DIS 32: 83.
phenotype: Females homozygous for ix^2 have male-like pigmentation of posterior tergites, rudimentary ovaries, and are sterile. Expression extreme and viability reduced at 27°C; at 17°C, expression less extreme but viability greater. Homozygous males appear normal but have nonmotile sperm. RK2.
other information: The possibility that the male sterility is at another locus has not been excluded.

ix62c: see *fax*

ix-3: see ***dsx[60]***



j: jaunty
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 148.

/: *jaunty*
location*: 2-48.7.
origin: Spontaneous,
A'scovemr. Bridges, 11111.
rtfwrmcos: Bridges mnd Morgan, 1919, Carnegie fast. Wash. Pttbl. No. 278: 160 (fig.).
C!a»se<ra, 1924, J. Exptl. Zool. 38: 423-36.
Stem, 1927, Biol. Zeatr. 47: 361-69.
phmmw«- · Distal half of wing upturned. Curling is str«f if wteg unfolds at 25-30°C, but weak or overlaps wild type if wing unfolds below 25°C. RK2.
cytology: Placed to region between 34E5 and 35DI un th* basís of ïts iaclaaioo in *D§(2L)$4j* « *Df'2Lt34E5-Fl,35C3-m* (E. H. Gmll).

***j2**
origin: Spontaneous.
<li£c#Y#f#r Stern. 25431.
references: 1927, Biol. Zentr. 47: 361-69. 1934, DIS 1: 35.
phenotype: Wings upturned but less extreme than ;. Curl of wings dependent on hatching and unfolding at 25°C or higher. RK3.

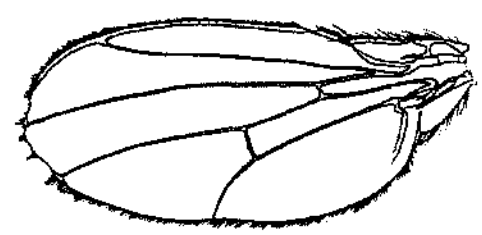
**j49j*
origin: Spontaneous.
discoverer: Mossige, 49J18.
references: 1947, DIS 25: 69.
phenotype: Less extreme than ;. Some overlapping at 21°, none at 30°C. Viability and fertility good. RK2.

*¡SO**
origin: Spontaneous.
discoverer: Mossige, 5Oe5.
references: 1951, DIS 25: 69.
phenotype: Like $j^{49}i$. RK2.

**j58i*
origin: Spontaneous.
discoverer: Andrew, 58i.
references: 1959, DIS 33: 82.
phenotype: Expression variable, although penetrance complete at temperatures above 25°C. In most-extreme cases, wings bend sharply upward in region of anterior crossvein. A small dark blot occurs near L3 vein at level of the deflection. Anterior crossvein partly or wholly absent in some cases. RK2.

J: Jammed
location: 2-41.0.
origin: Spontaneous.
discoverer: Bridges, 23d3.
phenotype: Wings often compressed into narrow strips; sometimes filled with fluid. Alula larger and square tipped, with clumped bristles and bare regions. Alula modification is characteristic least likely to overlap wild type. Completely overlaps wild type at 19°, almost never at 28° or 30°C. Not lethal when homozygous; viability, as in heterozygote, about 70 percent wild type. Classifiable in single dose in triploids (Schultz, 1934, DIS 1: 55). RK1 at 28°-30°C; RK2 at 25°C.
cytology: Salivary chromosomes apparently normal. (Bridges *in* Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).

*J34**
origin: Spontaneous,
discoverer*. Duncan, 34e3.
phenotype: Resembles / but produces more vigorous homozygous stock. RK1 at 28°C.



Jag; *Jagged*
Edith M. Wallace, unpublished.

Jag: Jagged
location: 2-54.9 (0.1 unit from *Bl).*
discoverer: L. V. Morgan, 34b20.
phenotype: *Jag/+* has end of wing cut off; better in early counts and above 25°C. *Jag/Jag* has reduced and roughened eyes and extremely jagged wings. RK2 as heterozygote; RK3 as homozygote.

Jammed:* see *J

jaunty:* see *j

jaunty x:* see *jyx

javelin:* see *jv

javelinlike:* see *jvl

****je: jelly***
location: 3-46.
origin: Spontaneous; arose simultaneously with *mu* (3-50).
discoverer: Mohr, 37121.
references: Mossige, 1939, DIS 12: 47.
phenotype: Dark pinkish eye color. RK1.

jv: javelin
location: 3-19.2 (0.9 unit to left of *dv).*
discoverer: Mohr, 31j29.
references: 1937, DIS 8: 12.
Mohr and Mossige, 1943, Skrifter Norske Videnskaps-Akad. Oslo, I: Mat.-Naturv. KL, No. 7. 51 pp. (fig.).
phenotype: All bristles and hairs cylindrical instead of tapered, with small enlargement before tip. RK2.
cytology: Placed between 64C12 and 65E1 on the basis of its inclusion in *Df(3L)Vn = D[(3L)64C12-D1;65D2-E1.*

jvl: javelinlike
location: 3-56.7.
origin: Spontaneous.
discoverer: Ives, 4012.
references: 1942, DIS 16: 48.
phenotype: Resembles *jv*, bristles sometimes more crooked. Viability and productivity somewhat lower than normal. RK2.

****jyx: jaunty x***
location: 1-24.
origin: Spontaneous,
discoverer: Bridges, 14112.
phenotype: Wings curved up at tips. Viability about 60 percent wild type. RK3.

ic: *kidney*
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 77.

k: kidney
location: 3-64.
origin: Spontaneous.
discoverer: Bridges, 12f26.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 72 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 214 (fig.), 227.
phenotype: Eye size reduced by indentation of front margin. Tuft of vibrissae and hairs below eye. Variable; overlaps wild type. RK3.

***fc2**
origin: From progeny of heat-treated flies.
discoverer: Goldschmidt, 1927.
references: Gottschewski and Ma, 1937, Z. Induktive Abstammungs- Vererbungslehre 73: 584_97.
phenotype: Eye reduced in size. Penetrance 50—80 percent. Expression variable. RK3.

k3
origin: Spontaneous.
discoverer: Gottschewski, 1937.
references: Gottschewski and Ma, 1937, Z. Induktive Abstammungs- Vererbungslehre 73: 584-97.
phenotype: A weak allele; penetrance 10—20 percent. RK3.

****k^{D}: kidney-Dominant***
origin: Spontaneous in chromosome containing *k.*
discoverer: Puro, 60cll.
references: 1964, DIS 39: 65.
phenotype: Eyes of heterozygote reduced at anterior edges. Expression variable; in extreme cases, eye size about one-third normal. *k^{D}/k* more extreme. Eyes of homozygote reduced about as much as *kP/k,* but occasionally one or both eyes missing; antennae usually slightly deformed with thickened aristae. RK1.

K-pn: Killer of prune
location: 3-102.9 (0.2 to right of *bv;* recalculated from Sturtevant).
origin: Spontaneous.
discoverer: Sturtevant, 54a.
references: 1955, DIS 29: 75.
1956, Genetics 41: 118—23.
phenotype: No phenotypic effects, either when homozygous or when heterozygous, except that all *pn; K-pn* flies die at end of second larval instar. Kills all seven alleles of *pn* that have been tested. *K-pn* eye disks transplanted to *pn* hosts develop autonomously, as do the reciprocal transplants (Grell, 1958, DIS 32: 123-24). RK3.

kar: karmoisin
location: 3-51.7.
origin: Spontaneous.
discoverer: Pariser.
references: Gottschewski, 1935, DIS 4: 15.
phenotype: Eye color like *st* but less bright. Ocelli white. Eyes contain 29 percent wild-type brown pigment (Nolte, 1954, J. Genet. 52: 111-26). Larval Malpighian tubes considerably lighter than wild type but difficult to classify in living larvae (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

cytology: Placed in region 87D-F, on basis of its inclusion *inDf(3R)ry = Df(3R)87D-E;87E-F.*

kar2
origin: Spontaneous.
discoverer: Bridges, 38blO.
phenotype: Like *kar* except that larval Malpighian tubes are bright yellow, similar to wild type (Brehtne and Demerec, 1942, Growth 6: 351—56), RK1.

kar^{31}: karmoisin-3 lethal
origin: X ray induced.
discoverer: Schalet.
references: 1964, DIS 39: 64.
phenotype: Heterozygote of *kar^{31}/kar* resembles *kar*. Homozygote lethal. RK2.
other information: *kar-ry* crossing over normal.

****ke: kidney eye***
location: 1-28.6.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 87.
phenotype: Eyes small and extremely rough; anterior border indented, giving a kidney shape. Wings small, abnormal, outspread, or upheld. Veins thick, and often interrupted or fail to reach wing margin, which is usually incised. Deformed antennae. Bristles straggly; occasionally one is missing. Flies short lived; 50 percent die less than 24 hr after eclosion. Sterile, probably because they are too weak to mate. RK3.

****kf: kinked femur***
location: 1-20.2.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 87.
phenotype: Small fly with slightly dark, dull red eye color. Wings seldom fully expanded: when they do expand, they are opaque and abnormal in shape. Femurs kinked. Flies seem unable to move normally and die on the food soon after eclosion. RK3.

****Kg: Kugel***
location: 3-48,2.
origin: Spontaneous.
discoverer: B©nx, 1953.
references: 1956, Rev. Suisse Zool. 63: 208-16.
phenotype: Larva, pupa, and adult shorter and thicker than normal. Most striking in pup®. Homoxygote more estrero« than heterozygote. Homozygote viability 68 percent of wild type and fertility somewhat reduced. RK2.

Ki: Kicked
location: 3-47.6 (to the left ©f p).
origin: Spontaneous.
discoverer: R. F. Grell, 571.
references: 1958, DIS 32: 80.
pJwftotyfHK All bristles and hairs of beterozygote shortened and twisted. Resembles *am.* Viability aKd fertility excellent; classification easy. Hoosozygote has more-extretne bristle and *limit* effects. Viability somewhat reduced but fertility near normal. RK1 as heterozygote.

kidney: **see *k***
kidney eye: **see *ke***
Killer of prune: **see *K-pn***
Kinked: **see *Ki***
kinked femur: **see *kf***

****kk: kinky***
location: 1-42.
origin: Spontaneous.
discoverer: Philip.
references: 1937, DIS 8: 10.
phenotype: Bristles slightly bent or forked. RK3.
other information: May be an allele of *fw.*

KL: Male fertility complex in the long arm of the Y chromosome

The male fertility complex of the long arm of the *Y* chromosome, originally called *KI* by Stern (1929, Z. Induktive Abstammungs- Vererbungslehre 51: 253—353) and subsequently called *KL* by Brosseau (1960, Genetics 45: 257—74), is subject to mutations or deficiencies leading to male sterility, which are symbolized *ms(Y)L.* By complementation analysis, Brosseau divided KL into five different complementing units designated *kl-1* through *kl-5.* By studying recombinants between the *X* and the y, i.e., detachments of attached *X's,* he ordered the complementation groups with respect to the centromere; he assigned the symbol *kl-1* to the proximalmost and *kl-5* to the distalmost.

kn: knot
location: 2-72.3.
discoverer: Nichols-Skoog, 31hl.
phenotype: Veins L3 and L4 shifted closer together in region of anterior crossvein, which is either extremely thick or eliminated by regional fusion of L3 and L4. Frequently extra crossvein between L3 and L4 near end of wing. Wing narrowed. Head narrowed and flattened, so that long axis of eye is at oblique angle. May overlap wild type at high temperatures and in late counts. Best at 19°C. RK2.

****kno: knobbyhead***
location: 1-63.9.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer. Fahmy, 1951.
references: 1958, DIS 32: 70.
phenotype: Abnormal head; one or both eyes irregularly shaped, often drastically reduced in size. Occipital region frequently has hairy tufts, often carried on protuberances. Males highly infertile; viability about 10 percent wild type. RK2.
other information: One altele induced by CB. 2511.

knot: see Jen

Kr: KrUppel
location: 2-108 (published value of 113 must be incorrect because the chromosome is only 108 units long)'
origin: Spontaneous,
discoverer: Graber.

references: Gloor, 1950, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 25: 38-44 (fig.).
1954, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 29: 277—87.
phenotype: *Kr/+* adult sometimes has thoracic malformation; a leg or wing may be absent. Penetrance low. *Kr/Kr* lethal before hatching. Primary body segments of embryo abnormal, particularly median segments. Ventral chain of ganglia disconnected. Tracheal system defective. Malpighian tubules missing. Salivary glands normal. RK2.

KS: Male fertility complex in the short arm of the Y chromosome

The male fertility complex of the short arm of the *Y* chromosome, originally called *K2* by Stern (1929, Z. Induktive Abstammungs- Vererbungslehre 51: 253—353) and subsequently called *KS* by Brosseau (1960, Genetics 45: 257—74), is subject to mutations and deficiencies leading to male sterility, which are symbolized *ms(Y)S.* By complementation analysis, Brosseau divided *KS* into two complementing units, *ks-1* and *ks-2.* He believes that the most probable order of factors on Y^s from the tip toward the centromere is *ks-2, ks-1, bb.*

Kugel:* see *Kg

kz: kurz

location: 1-0.9 (to the right of *pn).*
origin: Spontaneous.
discoverer: Stern, 26a23.
references: 1930, Z. Induktive Abstammungs-Vererbungslehre 53: 279-86.
1934, DIS 1: 35.
phenotype: Bristles shorter and finer, like a slight Minute. Postcutellars often absent. Hatches somewhat late. Viability fair; both sexes fertile. RK2.
cytology: Salivary chromosome location in region 2E1 through 2F6 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

L: Lobe

location: 2-72.0.
origin: Spontaneous.
discoverer: Bridges, 18i24.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230 (fig.).
phenotype: Heterozygous *L* eyes slightly smaller, with nick in anterior edge, and lower half of eye reduced more than upper; overlaps wild type. Homozygous *L,* eyes much smaller and less variable. Size of *L/+* eyes reduced in combination with *M(3)w, M(3)*h^{33}, and *M(2)*l^2 (Dunn and Coyne, 1935, Biol. Zentr. 55: 385-89). Best used as a recessive. RK2.

L.2

origin: Spontaneous.
discoverer: Mohr, 20b2.
references: 1924, Z. Induktive Abstammungs-Vererbungslehre 32: 216.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230.
phenotype: Eyes of L^2/+ as small as or smaller than *L/L.* L^2 homozygotes have tiny eyes and are poorly viable or completely lethal, depending on background. Best used as heterozygote. Eyes further reduced in combination with *M(3)w, M(3)*h^{33}*i,* and *M(2)*l^2 (Dunn and Coyne, 1935, Biol. Zentr. 55: 385—89). Classifiable in single dose in triploids (Schultz, 1934, DIS 1: 55). Reduced number of cells enter into formation of eye disks (Steinberg, 1944, Proc. Natl. Acad. Sci. U.S. 30: 5—13). RK1 as heterozygote.

L2: Lobe-2

Edith M. Wallace, unpublished.

***L3**

origin: Spontaneous.
discoverer: Bridges, 24dlO.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230.
phenotype: Eye reduction intermediate between *L* and L^2, but variability high. RK2.

L4

origin: Spontaneous.
discoverer: Sturtevant, 23f.
synonym: L^c.
phenotype: Heterozygote has fairly constant reduction in eye size, but not so great as to exclude its use in combination with most eye colors. Expression more extreme at 25° than at 19°C. Hoaoxygot© has smaller eyes but lowered viability. Six® of eyes of L^4/+ reduced in combination with *M(3)w, M(3)*h^{33}*i,* and *M(2)!*^{2} (Dunn and Coyne, 1935, Biol. Zentr. 55: 385—89). Development similar to L^3 (Steinberg, 1944, Proc. Natl. Acad. Sci. U.S. 30: 5—13). Reduced size of cephalic complex detectable in 24-hr larva, but subsequent growth rate similar to wild type (Medvedev, 1935, Z. Induktive Abstammungs- Vererbungslehre 70: 55—72; Tr. Inst. Genet. Akad. Nauk. SSSR 10: 119-51). RK2 as heterozygote.

L5

origin: Spontaneous,
discoverer: Mohr, 3!k26.
references: Dunn, 1935, DIS 4: 14.
pKenotyp©: Heterozygote ha* small nick in eyes, overlap* wild type. Hotnoajygote has small ef®s and tendency to antenna reduplication. May *h«* used as a recessive but not as a dominant. Mor# extreme than L^r but less so than *L*.* Development

similar to that of *L?* (Steinberg, 1944, Proc. Natl. Acad. Sci. U.S. 30: 5-13). RK3.

L34

origin: Spontaneous.
discoverer: Glass, 1934.
references: 1939, DIS 12: 47.
phenotype: Between *L* and L^4. Dominance varies in different crosses. RK2.

L52c

origin: Spontaneous.
discoverer: Nakayama, 52c.
references: 1953, DIS 27: 59.
phenotype: Like L. RK2.

L^B: Lobe of Becker

origin: Spontaneous in *In('2L)Cy +In(2R)Cy.*
discoverer: Becker.
references: 1957, Z. Induktive Abstammungs- Vererbungslehre 88: 333—73 (fig.).
phenotype: Not separable from *Cy;* homozygote therefore cannot be tested. Lower half of eyes reduced or absent in heterozygote; more extreme at 25° than at 18°C. Sectors of ommatidia replaced by chitin and bristles. Lower half of eyes apparently produced from fewer than the normal 9 or 10 presumptive ommatidia-producing cells. Lower half of head also reduced at 25° but not 18°C. Temperature-sensitive period for ommatidia formation first and second instars; third instar as well for head reduction. RK2A.
other information: Allelism to *L* inferred from phenotype and linkage to *Cy* alone.

L^c: see L^4

*L^d: Lobe-duplicating

origin: Spontaneous.
discoverer: Kodani.
references: Zimm, 1951, J. Exptl. Zool. 116: 289—319 (fig.).
phenotype: Partially dominant. Characterized by incomplete penetrance and variable expression: reduced single or bipartite eyes, kidney-shaped eyes with bristles, large eyes with palps, or duplicated antennae. Modifiers present on chromosomes I and *3.* Penetrance affected by temperature during development. RK3.

L^d: Lobe-diminished

origin: Spontaneous.
discoverer: Kadel and Jenkins, 55g.
synonym: *dq.*
references: Kadel, 1956, DIS 30: 73-74. 1957, DIS 31: 83.
phenotype: $L^dQ/+$ normal. Eyes of $L^{d<}3/L^{dt}i$ irregularly deformed; occasionally divided into two or root* lobes. Expression variable; some overlap of wild type, especially in old cultures. Aristae reduced and deformed. RK2.

L^K: Lobe of Krivsh&nko

origin: Spontaneous.
discoveror: Krivshenko, 1957.
references: 1958, DB 32: 81.
phenotype: Eye reduction strong, with little variation in heterozygote. Homozygote more extreme; viability and fertility high. RK2.
cytology: Salivary chromosomes normal.

L^r: Lobe-recessive

origin: Spontaneous.
discoverer: L. V. Morgan, 29h23.
phenotype: Homozygote has small kidney-shaped eyes. Overlaps wild type at 19°; generally good at 25°C. Heterozygote rarely shows seam or nick. RK2 as homozygote.

L^{rt}>: Lobe-rough

origin: Ultraviolet induced.
discoverer: Edmondson, 49k.
references: Meyer, Edmondson, Byers, and Erickson, 1950, DIS 24: 60.
phenotype: Eye reduction similar to L^4, but eye surface slightly rough.
Homozygote has extreme reduction of eyes; few or no facets. L^4/L^{TO} has similar reduction in size of eyes. Viability and fertility excellent. RK1 as homozygote; RK2 as heterozygote.

L^{si}: Lobe-sinuate

origin: Spontaneous.
discoverer: Morgan, 1932.
phenotype: Eyes of heterozygote flat, smooth, nearly full size, with sinuate margin; overlaps wild type only slightly. Eyes of homozygote smaller, with flat or concave contour, smooth surface, and sinuate lower margin. RK3.

l( ): lethalf)

General term used to describe recessive mutations that lead to death of most or all homozygous carriers. The symbol / is followed parenthetically by the chromosome and then by the designation of the particular mutant. Unfortunately, it is not practicable, except in special cases, to test allelism of sex-linked lethals, and it has not been common to retain and test allelism of autosomal lethals. Consequently, little information on allelism of lethals with similar genetic location is included.

1-mah see *l(l)m*

*l(l)h lethcl(l) J

location: 1-1.1.
origin: Spontaneous.
discoverer: Rawls, 12b.
references: 1913, Biol. Bull. 24: 115-24. Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 31.
other Information: First recessive lethal found in *D. melanogaster.*

KD3C3

location: 1-1.6 (between *w* and *rst).*
origin: Synthetic.
discoverer: Lefevre and Wilkins.
references: 1964, Genetics 50: 264.
phenotype: Male lethal. *l(l)3C3/w* is normal. RK2.
cytology: Associated with the deficiency for band 3-C3 obtained as a single recornbinant carrying the left ©nd of *T(l;4)w**J « T(t;4)3C2-3;2O;lQ2C* and the right end of $InfDnt^3$ * *In(l)3C3-4;20B.*

***l(1)6**
location: 1- (0.4 to the left of y).
origin: Spontaneous.
discoverer Bridges, 14d9.
references: 1916, Genetics 1: 149.

1(1)7:* see *dor[1]

l(1)7e
location: 1-0.
origin: Spontaneous in *dor[1]*.
discoverer: Bridges, 1928.
phenotype: Probably a specific modifier of *dor[1]*. *1(1)7'e dor[1]* dies earlier than *dor[1]*. RK3.
cytology: Included in $2R^{D}X^{P}$ element of *T(l;2)Bld = T(1;2)1C3-4;6OB12-13* whereas *dor[1]* is not.

***l(1)8**
location: 1-21.3 (19.0 to 23.6).
discoverer: Sobels.
references: Gloor, 1962, Rev. Suisse Zool. 69: 409-63 (fig.).
phenotype: Larvae lethal in third instar; survive up to 10 days. Testes and lymph glands degenerate. Imaginal disks develop normally after transplantation. Protein metabolism disturbed; free amino acids and peptides abnormally high. RK2.

l(l)48j:* see *l(l)mys

***I(J)52**
location: 1- (to the right of B).
discoverer: Sobels.
references: Gloor, 1962, Rev. Suisse Zool. 69: 409-63 (fig.).
phenotype: Larvae die in second instar. Growth retarded. Histology of nervous system, testes, and imaginal disks abnormal. Number of nuclei in salivary glands increased. Amino acids and peptides increased. Transplanted testes and imaginal disks autonomously lethal. RK2.

l(1)55a
location: 1- (claimed to be about 0.6 unit to the left of *y,* making it the leftmost known locus on the first chromosome).
discoverer: Burdick, 55a.
references: 1956, DIS 30: 69.
1957, DIS 31: 86.
phenotype: Presumed to be a lethal. Heterozygote claimed to have viability about 1.5 times normal. Not allelic to *1(1)J1*. RK2.
other information: Map location of this mutation must be near *y;* however, the published data (1957, DIS 31: 86) permit the following alternative to a location to the left of y: *l(l)55a* is not completely lethal, and the 1.29 percent scored as crossovers to the left of y are actually surviving noncrossovers.

1(1)76:* see *dor[13]

****l(1)184***
location: 1- (rearrangement),
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649—70.
phenotype: Almost completely lethal. The few survivors have dark rough eyes. RK2A.
cytology: Associated with *T(l;3)l-184 = T(1;3)18A;81.*

***I(J)272-J3**
location: 1- (rearrangement).
origin: X ray induced.
discoverer: Demerec, 1940.
references: Sutton, 1943, Genetics 28: 210—217.
phenotype: Lethal. *1(1)272-13/'sc* is scute. RK2A.
cytology: Associated with *In(l)l-272-13 = In(l)lA6-Bl;llA7-8;llF2-12Al;18A4-Bl.*

****l(1)291-***
origin: Spontaneous.
discoverer: Demerec, 1936, 1937.
references: Slizynski, 1938, Genetics 23: 283—90.
cytology: Salivary analysis (Slizynski, 1938) shows some normal, some deficient, and some inverted for single-lettered subdivisions of the *X* chromosome.
other information: A series of 13 independently occurring and genetically located lethals.

**l(l)294-*
origin: X ray induced.
discoverer: Demerec, 36d.
references: Slizynski, 1938, Genetics 23: 283—90.
cytology: Three normal, one deficient for 10B, and one deficient for IOC.
other information: A series of five independently induced and genetically located lethals.

**l(l)296-*
origin: Spontaneous.
discoverer: Demerec, 1936.
references: Slizynski, 1938, Genetics 23: 283-90.
cytology: Salivary chromosomes normal.
other information: A series of six independently occurring and genetically located lethals.

**l(l)302-*
origin: Neutron induced,
discoverer: Demerec, 36k.
references: Slizynski, 1938, Genetics 23: 283-9Q.
cytology: Three normal; one deficient for 3F.
other information: A series of four independently induced and genetically located lethals.

*/(7)304-
origin: X ray induced.
discoverer: Demerec, 37d.
references: Slizynski, 1938, Genetics 23: 283-90.
cytology: Three normal; one deficient for 4C.
other information: A series of four independently induced and genetically located lethals.

l(l)bt:* see *brl-KDC
location: 1-6 (between ec and *bi).*
origin: Spontaneous in *sc* t^{2} *v si B* chromosome.
discoverer: Muller, 20j.
references: 1928, Genetics 13: 279-357.
phenotype: Dies as late embryo or, more commonly, as first-instar larva (Brehme, 1937, Am. Naturalist 71: 567). RK2A.
cytology: Associated with the left breakpoint of *In(l)Cl «= In(l)4A5-Bl;17A6-Bl.*

***I(1)DM: lethol(l) of D.* Mor/wofcj**
origin: X ray induced.
discoverer: Moriwaki, 1932.

references: 1934, Japan J. Zool. 5: 585-602.
1940, DIS 13: 50.
other information: Five independently induced and roughly located lethals.

I(1)ENT: lethal(l) from Eugene nonautonomous
location: 1-46.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 51-52.
phenotype: Dies between first instar and prepupa; survives as patches of hemizygous tissue in gynandromorph. Salivary glands and gastric ceca small, and fat bodies usually absent in third-instar larva; excess of free alanine or closely related substance, and less free tyrosine than normal. RK2.

I(1)EN2
location: 1-0.3.
origin: X ray induced.
discoverer Novitski.
references: 1963, DIS 37: 52.
phenotype: Dies at end of third instar or in early pupa; survives as patches of hemizygous tissue in gynandromorph. More free glutamine but less free glutamic and as part ic acids than normal. RK2.

I(1)EN3
location: 1- (near *car).*
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Dies shortly after pupation; survives as patches of hemizygous tissue in gynandromorph. Larva usually has red-black pigmented areas in or on the cuticle. More free glutamine than normal. RK2.

I(1)EH4
location: 1-52.
origin: X ray induced.
discoverer Novitski.
references: 1963, DIS 37: 52.
phenotype: Roughly 40 percent eclose but die immediately; survives as patches of hemizygous tissue in gynandromorph. No morphological abnormalities observed in larva or pupa. More free glutamine than normal. RK3.

I(1)EN5
location: 1-47.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Usually dies before third instar; survive® as patches of hemizygous tissue in gynandroaaorpfa. More free glutamine than normal. RK2.

1(1)EN6
location: 1- 63 [between *cmr* and *au(f)].*
origin: X ray induced.
discoverer. Novitski.
r«f©rtmc«s: 1963, DIS 37: 52.
pbenotyp*: Dies at any stage; survives as patches of bemizygous tissue in gynandromorph. Larval fat bodies and Malpighian tubes reduced. More free glutamine than normal. RK2.

I(1)EN7
location: 1- (rearrangement).
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Usually dies as early pupa; survives as patches of hemizygous tissue in gynandromorph. Fat bodies beaded instead of ribbonlike in third larval instar. More free glutamine but less free tyrosine than normal. RK2A.
other information: Crossing over in *X* greatly reduced.

I(1)EN8
location: 1- (close to the left of cv).
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Usually dies in second larval instar; 25 percent survive to third instar and a few to pupation. Survives as patches of hemizygous tissue in gynandromorph. Fat bodies, Malpighian tubes, and salivary glands reduced. Rare adult survivors have soft exoskeleton and die within a few days. More free glutamine but less free tyrosine than normal. RK2.

I(1)EN9
location: 1-10.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Usually dies as third-instar larva; survives as patches of hemizygous tissue in gynandromorph. Larva becomes transparent. Salivary glands, Malpighian tubes, and fat bodies much reduced. Unknown fluorescent substance accumulates in larval cuticle. More free glutamine but less free tyrosine than normal. RK2(A).
other information: Crossing over suppressed at tip of-X.

!(1)ENJO
location: 1-59.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: About half die as pupae and half as few-day-old adults. Survives as patches of hemizygous tissue in gynandromorph. More free glutamine than normal; free tyrosine nearly absent; low in free proline. RK3.

KDENJOa
location: 1-50.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Dies as pupa. Third-instar larva shows large excess of free glycine. RK2.

KDEHll
location: 1-43.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.

phenotype: Dies from second instar through pupa. Survives as patches of hemizygous tissue in gynandromorph. Melanotic spots on some larvae and inside pupae. Culture with dying larvae has distinct urinous odor. More free phenylalanine and less free tyrosine than normal. RK2.

I(1)ENU

location: 1-3.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Usually dies in third larval instar or pupa. Rare survivors reach eclosion. Survives as patches of hemizygous tissue in gynandromorph. Flies that reach eclosion have soft exoskeleton with little pigmentation; appear almost translucent. Low in free tyrosine. RK2.

KDEN13

location: 1-13.4.
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52.
phenotype: Some survivors. No gross larval or pupal abnormalities. Low in free tyrosine. RK3.

KVENU

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Novitski.
references: 1963, DIS 37: 52-53.
phenotype: Dies mostly in second, but also in third-instar larva; survives as patches of hemizygous tissue in gynandromorph. Accumulates propanol-ammonia-insoluble fluorescent substance in larval cuticle. Less free tyrosine and proline than normal. RK2A.
other information: Crossing over in *X* greatly reduced.

KDEN15

location: 1- (near *car).*
origin: X ray induced.
discoverer Novitski.
references: 1963, DIS 37: 53.
phenotype: Dies as third-instar larva or early pupa; survives as patches of hemizygous tissue in gynandromorph. Less free tyrosine and proline than normal. RK2.

t(l)ENU

location: 1-24.
origin: X ray induced.
discoverer Novitski.
references: 1963, DIS 37: 53.
phenotype: Dies between first-instar larva and pupa. Less free tyrosine and proline than normal. RK2.

*!(l){fn: lethal(l) formalin food

location: 1- (not located).
origin: Induced by formaldehyde.
discoverer: Auerbach.
synonyms: *Ltlll.*
references: Ede, 1956, Arch. Entwicklungsmech. Organ. 148: 416-36 (fig.).
phenotype: Develop® to late embryonic stage, at 22 hr (normal hatching time) shows vigorous muscular movements but is unable to break through vitelline membrane. Muscular activity persists several hours, but hatching does not occur and cell degeneration begins at about 25 hr. Differentiation abnormal in several ways: pharyngeal apparatus reduced and distorted; brain forms irregular mass; constriction forms behind head; segmentation distorted; and body wall usually incomplete dorsally. RK2.

*l(1)GSB: lethal(l) of Gershenson, Shapiro, and Borissenko

origin: X ray induced in *In(l)sc^{s}*.
discoverer: Gershenson, Shapiro, and Borissenko, 1931.
references: Gershenson, 1934, DIS 1: 54.
other information: A series of 51 independently induced and genetically located mutants.

*l(l)l: lethal(i) of Ives

origin: Recovered from heat-treated lines.
discoverer: Ives.
references: Plough and Ives, 1934, DIS 1: 32. 1935, Genetics 20: 42-69.
other information: A series of 13 independently occurring mutants.

i(l)Jh lethal(i) of Jacobs-Duller

location: 1-0.0 (to the left of y).
origin: X ray induced simultaneously with *scJ**.
discoverer: Jacobs-Muller.
references: Muller, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 225. Muller, 1935, Genetica 17: 237-52.
phenotype: Lethal. Not cell lethal (Ephrussi, 1934, Proc. Natl. Acad. Sci. U.S. 20: 420-22). One recorded surviving male had rough eyes and was sterile. RK2A.
cytology: Probably in 1A6. Associated with *In(l)scJ^{1} =In(l)lA4-5;lB4-5* (Muller, Prokofyeva, and Raffel, 1935, Nature 135: 253-55).

I(1)J12S9

origin: X ray induced in y-bearing chromosome.
discoverer Lindsley, Edington, and Von Halle,
references: Frye, 1959, Genetics 44: 511.

*l(l)jl: lethal(l) /aw/ess

location: 1-14.
origin: Ultraviolet induced,
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403-7.
phenotype: Dies during first larval instar. Mouth parts poorly formed and sometimes absent. RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

*I(1)K: lethalO) of King

origin: Recovered among progeny of males fed P32.
discoverer: R. C. King, 1948 and 1949.
references: 1950, DIS 24: 58.
other informotion: Four independently induced and genetically located lethals.

*IO)LB: lethal(l) of Lüers and Belitz

discoverer: Lüers and Belitz, 1951-1956.
references: Belitz, 1954, Z. Induktive Abstarnrnungs-Vererbungslehre 86: 173-84. 1956, DIS 30: 104.

other information: A series of nearly 500 mutations recovered from untreated males or from males treated with Miracil [l-(2-diethylaminoethylamino)-4-methylthioxanthineJ, Mirasan, triethylenemelamine, aminopterin, hesperidine, or 2,5-bisethyleneimine-l,4-benzoquinone. All lethals were located genetically.

l(l)m: lethal(l) malignant

location: 1- (not located).
origin: Induced by mustard gas.
synonym: *l-m&l.*
references: El Shatoury, 1955, Arch. Entwicklungsmech. Organ. 147: 496-522 (fig.).
El Shatoury and Waddington, 1957, J. Embryol. Exptl. Morphol. 5: 143-52 (fig.).
phenotype: Cells originating from lymph glands in late third instar first spread to, and cause, destruction of imaginal buds and later may move along ventral nerve cord to attack posterior fat bodies and testes. The tumor cells eventually become melanotic after destruction of various healthy tissues. Death occurs in late larval or early pupal stages. Claimed to be the only true malignancy in *Drosophila melanogaster,* RK2.

I(1)MA: lethal(l) of Mailer and Altenburg

origin: Spontaneous.
discoverer: Muller and Altenburg.
references: 1919, Proc. Soc. Exptl. Biol. Med. 17: 10-14.
other information: A series of about 50 mutants of which only a few were located.

1(1)ml: lethal(l) melanoma!ike

location: 1-10.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403-7.
Oster and Sobels, 1956, Am. Naturalist 90: 55-60.
phenotype: Larvae die in third instar. At death, they have internal melanotic masses (usually one or two, sometimes as many as ten). RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

****l0)mt: lethal(l) midget***

location: 1-2.5.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403-7.
phenotype: Dies as undersized third instar larva. RK2.
cytology. Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

l(l)mys: lethal(l) myospheroid

location: 1-21.7.
origin: Induced by P^{32}.
discoverer: Poulson, 48j.
synonyms: *1(1)48).*
references: Rizki, 1956, J. Exptl. Zool. 131: 203-22 (fig.).
Wright, 1958,, Proc. Intern. Congr. Genet., 10th. Vol. 2: 323.
1960, J. Exptl. Zool. 143: 77-99 (fig.).
phenotype: 20-hr embryos (25°C) show mid-dorsal herniation of brain or mid-gut, or both, abnormal somatic, visceral, and pharyngeal muscles, and incomplete morphogenesis of yolk-filled mid-gut. Development of embryo normal up to 13 hr. Between 13 and 14.5 hr, first muscular contractions occur, while basement membrane is incomplete. This results in dorsal rupture of hypoderm, retraction of myogenic elements of somatic and pharyngeal muscles into spheroidal masses. Continuation of myogenesis produces spheroidal muscles with a cortex of disoriented fibrillae surrounded by a medulla of nucleated sarcoplasm. RK2.
cytology: Salivary chromosomes normal.

****l(l)nd: lethal(l) no differentiation***

location: 1- (not located).
origin: Induced by mustard gas.
references: El Shatoury, 1955, Arch. Entwicklungsmech. Organ. 147: 523-38 (fig.).
phenotype: Some or all imaginal buds fail to differentiate during larval third instar, apparently as a result of abnormal proliferation of imaginal disk mesoderm. Death in pupal or prepupal stage. RK2.

**l(l)ne: lethal(l) nonevaginated*

location: 1-0.1.
origin: Induced by urethane.
discoverer: Vogt, 1949.
references: 1951, DIS 25: 76.
Florschütz-de Waard and Faber, 1952, DIS 26: 99.
Faber, Sobels, Florschiitz-de Waard, and Oppenoorth, 1954, Z. Induktive Abstammungs-Vererbungslehre 86: 293—321 (fig.).
phenotype: Lacks imaginal thoracic hypoderm. Cephalic complex and thoracic imaginal disks fail to evaginate. The unaffected abdominal hypoderm develops but ends anteriorly in a free edge that folds back on itself and forms a darkly pigmented ring around the pupa. Genital disk capable of normal evagination but vasa deferentia do not connect to testes, which do not spiralize. Death occurs 3—5H days after prepuparium formation. Pupae darker than normal, with sticky, irregular surface and distinctly meandering tracheal trunks. RK2.

****l(l)nib; lethal(l) no imaginal buds***

location: 1- (not located).
references: El Shatoury and Waddington, 1957, J. Embryol. Exptl. Morphol. 5: 143—52 (fig.).
phenotype: Dies in third larval instar. Imaginal buds small or absent. Excessive proliferation of stomach epithelium leads to occlusion of gut. Proliferations degenerate into melanotic masses. RK2.

1(1)Q: lethal(l) Quinacrine mustard induced

origin: Induced by 2-methoxy-6-[3-(ethyl-2-chloroethyl)aminopropylaminojacridine (ICR 100).
discoverer: Carlson.
references: Carlson, Sederoff, and Cogan, 1967, Genetics 55: 295-313.

other information: A series of 64 independently induced and genetically located lethals. Their numbers and locations are tabulated below.

Number	Location
* 1	13.1
* 2	40.9
* 3	26.5
* 4	52.0
* 5	0.0
* 6	30.2
* 7	28.8
* 8	65.5
* 9	1.4
* 10	28.6
* 11	16.0
* 12	42.0
* 13	49.7
* 14	64.2
* 15	19.6
* 16	52.6
* 17	23.6
* 18	56.7
* 19	62.5
* 20	0.0
21	20.5
22	39.1
* 23	57.8
* 24	58.3
* 25	23.0
* 26	33.0
* 27	9.3
* 28	44.6
* 30	22.7
* 31	56.7
* 33	29.9
* 34	56.7
* 36	0.0
* 39	1.7
* 40	1.5
* 41	2.0
* 42	64.4
* 43	37.6
* 44	31.7
* 45	38.3
* 48	21.3
* 49	12.7
* 50	62.5
* 51	65.2
52	36.9
* 53	32.0
* 54	33.0
* 55	60.6
* 56	11.2
* 57	16.8
58	38.2
* 59	44.5
61	6.5
* 62	62.5
* 63®	53.0
64	41.4
65	20.5
* 66	33.0
* 67	20.3
* 68	40.4
* 69	54.1
* 70	51.9
* 71b	54.4
* 72	10.6
* 73	53.9
* 74	18.2
75	29.3
* 76	49.1
* 77	0.0
* 78	0.0
* 79	48.0
* 80	54.2
* 81	6.8
* 82	18.7
* 83	12.1
* 85	0.0
86	56.7
87	0.0
* 89	51.5
*201	13.4
202	40.1
203	62.5
*2O4	22.6
*205	21.1
206	13.0
208	17.0
*209	0.0
•210	64.5
•211	33.0
212	0
*214	56.7
*215	10.4
216	8.6
217	0.0
218	2.8
*219	1.3
220	0.0
221	0.0
222	57.9
223	29.2
224	47.8
225	36.0
226	47.9
227	27.4
*228	42.2
*231	13.5
*232	16.5
233	15.2
234	38.9
235	28.1
236	21.0
237	21.7
*238	54.1
*240	33.0
• 244	24.2
248	12.2

**l(l)R: tetbalO)* of *Roȟrborn*

discoverer: Röhrborn, 1955, 1956.

reference*: 1959, Z. Vererbungslehrts 90: 116-31.

other information: A series of 71 lethals including 3 spontaneous ones, 55 from males treated with 1:4-dimethanesulfonoxybutane (CB. 2041), and 13 from males treated with l:4-dimethanesulfonoxy-l:4-dimethylbutane (CB. 2348). All were located genetically.

l(l)rr: lethal(l) ring gland rudimentary

location: 1-0.3.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403-7.
phenotype: Dies during third larval instar. Larvae live 15—30 days but do not become giant. Ring gland abnormally small, probably causing failure to undergo third molt. RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

I(1)S: leihal(l) of Stark

origin: Spontaneous.
discoverer: Stark, 1913, 1914.
references: 1915, J. Exptl. Zool. 19: 531-58.
Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 64, 79.
other information: Four independently occurring lethals.

l(1)S9

location: 1- (to the right of car).
origin: Spontaneous.
discoverer: Auerbach.
references: Ede, 1956, Arch. Entwicklungsmech. Organ. 149: 256-66 (fig.).
phenotype: Almost all embryos deformed at anterior end, where there is usually some undigested yolk. Death occurs in embryonic, larval, and pupal stages. Primary abnormality is distribution of cleavage nuclei, which causes blastoderm to be fragile at its anterior end. RK2.

l(l)sc: lethal(l) at scute

location: 1-0 (immediately to the right of sc).
origin: Synthetic.
discoverer: Muller.
references: 1935, Genetica 17: 237—52.
other information: Inferred from the inviability of *In(l)nc*^{L}&c^{9R} = In(l)lB3-4;19F-20Cl^lB2-3;18B8-9^{R}* [left break of *In(l)sc9* in doubt] except in the presence of Dpfi;2)sc* *\

**l(1)sd: lethal(l) schaiben defekt*

location: 1-17.9.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: M. J. Fahmy.
references: Schnitter, 1961, Rev. Suisse Zool. 68: 345-418 (fig.).
phenotype: Dies during transition from larva to prepupa. Some larvae form puparia but do not differentiate further. Pattern of damage complex, most severe defects being found in certain imaginal disks. Several larval organs abnormal, especially the salivary glands. RK2.

l(l)te: lethal(l) tracheae enlarged

location; 1-0.3.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403—7.
phenotype: Dies during third larval instar. Main tracheal tubes greatly enlarged, sometimes lack functional posterior spiracles. RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

l(l)th lethal(l) tracheae lacking

location: 1-59.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403—7.
phenotype: Dies during first larval instar. Main tracheal tubes absent, although small side branches present. RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

****l(l)tr: lethal(l) tracheae ramified***

location: 1-56.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
references: Oster, 1952, Heredity 6: 403-7.
phenotype: Dies during first larval instar. Main tracheal tubes thick and have numerous side branches. RK2.
cytology: Salivary chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

**l(l)trs: lethal(l) tracheae stretched*

location: 1-8.0.
origin: Ultraviolet induced.
discoverer: McQuate, 1951.
synonym: *l(l)ts* (preoccupied).
references: Oster, 1952, Heredity 6: 403—7.
phenotype: Dies during first larval instar. Larvae very large for this stage and all tracheal tubes very thin, suggesting that they grow more slowly than larvae and thus become stretched. RK2.
cytology: Salivary gland chromosomes normal (Valencia and McQuate, 1951, Genetics 36: 580).

****l(l)ts: lethal(l) temperature sensitive***

location: 1-8.
discoverer: Falbo and Re'.
references: 1945, DIS 19: 45, 57.
phenotype: Inviable in cultures grown at 23°C but shows more than 50 percent survival in cultures grown at 26.5°. RK3.

****l(l)TS-45: lethal(l)* no. *45 of T. Shiomi***

location: 1-5.8.
origin: X ray induced.
discoverer: Shiomi, 52f.
references: 1954, DIS 28: 78.
Imaizumi and Shiomi, 1955, Arch. Biol. (Liège) 66: 483-87.
phenotype: Dies before hatching. No visible morphological abnormality. Heterozygote of *l(l)TS-45/Base* has average of 612 eye facets compared to only 402 in *+/Bssc.* Accumulation of urea or carbarnides in larvae of heterozygote; these compounds presumably tend to normalize the Bar phenotype. RK2.

*l(l)TS-56

location: 1-1.5.
origin: X ray induced.
discoverer: Shiomi, 52f.
references: 1954, DIS 28: 78.
phenotype: Lethal in late embryonic stage. Development of tracheae, other chitinized parts, and body segments abnormal. RK2.

l(l)v3: lethal(l) variegated

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 74 percent normal; recovery of *X/Y* males reduced by $M(2)S2^{10}$ but not *E(var)7*. *X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* males.
cytology: Associated with *T(l;3)l-v3 = T(1;3)4A;81,*

l(1)v11

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 78 percent normal; further reduced in presence of *M(2)S2*°* but not *E(var)7*. *X/Y* males fertile. Viability of *X/0* males 4 percent normal. Homozygous females survive and have blistered wings and duplicate anterior scuteliar and postalar bristles; addition of *y+Y* eliminates wing effect. RK3A.
cytology: Associated with *T(l;4)l-vll = T(1;4)15;101.*

I(l)v25

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: *X/Y* males of normal viability but sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* males.
cytology: Associated with *T(l;2)l-v25 = T(l;2)19-20;40-41.*

*l(J)v47

location: 1- (between cv and v).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: *X/Y* males have gg-like phenotype but with peripheral darkening of eye color; viability 41 percent normal; fertile. *X/0* males lethal. RK2A. as *X/0* male.
cytology: Associated with an insertion of an unspecified section of heterochromatin into 8F-9B. Linkage tests suggest second chromosome origin of inserted material. *T(l;2)l-v47 = T(1;2)8F-9B.*

I(l)v59

location: 1- (rearrangement).
origin: X ray induced.
discoverer. Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 63 percent normal; further reduced in presence of *E(var)7* and $M(2)S2^{l°}$. *X/Y* males fertile. *X/0* males lethal. Homozygous females viable, with fewer and smaller bristles. RK2A as *X/O* male.
cytology: Associated with *In(l)l-v59 = In(l)3-4;19-20.*

I(1)v75

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 26 percent normal; further reduced in presence of *E(var)7* but not $M(2)S2^{10}$. *X/Y* males sterile, owing to failure of sperm head to elongate. Viability of *X/0* males less than 1 percent normal. RK2A as *X/0* male.
cytology: Associated with *T(l;2)l-v75 — T(l;2)19-20;41.*

\(})vU9

location: 1- (rearrangement).
origin: X ray induced.
discoverer Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Semilethal. Viability of *X/Y* males 91 percent normal, of *X/0* males 26 percent normal, *X/Y* males sterile, owing to failure of sperm head to elongate. RK3A.
cytology: Associated with *T(l;2)l-vl29 = T(1;2)18B;41.*

M)vU2

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 83 percent normal. *X/Y* males fertile. Viability *otX/0* males less than 1 percent normal. Homozygous females viable. RK2A as *X/0* male.
cytology: Associated with *In(l)l-vl32 = ln(l)3-4;19-20.*

I(l)vl35

location: 1- (rearrangement).
origin: X ray induced,
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Originally recovered as Y-suppressed lethal, but in subsequent tests both *X/Y* and *X/0* males appeared to be lethal. Later tests by Thompson show viability of *X/Y* males to be 40 percent normal and *X/0* males less than 1 percent normal. RK3A.
cytology: Associated with *T(l;2)l-vl35 « T(l;2)18-19;41.* Induced simultaneously with *T(2;3)135 =» T(2;3)37;85A,* from which it has since separated.

I(l)vl39

location: 1-2 (between *w* and spj).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649-70.
phenotype: *X/0* and *X/Y* males lethal. *X/Y/Y* males viable and fertile; show strong variegation for *w* and *rst.* RK3A.
cytology: Associated with *In(lLR)l-vl39 = In(lLR)3C6-7.*
other information: Single recombinant carrying distal part of .X-centromere-bearing half of $T(l;4)w^{mS}$ = *T(l;4)3C3-4;101Fl-2* and proximal part of *In(lLR)l-vl39* is variegated for *w* but not for *rst* and is viable.

*t(l)vl46

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability *oiX/Y* males 41 percent normal; further reduced by $M(2)S2^{1}$ ° and *E(var)7. X/Y* males fertile. *X/0* males lethal. *I(l)vl46/I(l)vl46/Y* more viable than *I(l)vl46/l(l)vl46* females. Frequently have fewer dorsocentrals. RK2A as *X/0* male.
cytology: Associated with *In(l)l-vl46 = In(l)5-6;19-20.*

l(l)vl50

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 15 percent normal. *X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;2)l-vl50 = T(l;2)16-17;40.*

IO)v163

location: 1* (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 17 percent normal and of *X/0* males less than 1 percent normal. *X/Y* males sterile, owing to failure of sperm head to elongate. RK2A in *X/0* male.
cytology: Associated with *T(l;3)l-vl63* » *T(1;3)17A-B;8O-81.*

*}(l)v216

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von, Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 15 percent normal; reduced further in presence of $M(2)S2^{i}$ ° but not *B(var)7. X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;2;3)l-v216;* determined genetically; cytology not done.

I(1)v219

location: 1- (rearrangement),
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males normal, but reduced in combination with $M(2)S2^{10}$ but not *E(var)7. X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;2)l-v219 = T(l;2)10A;40.*

*l(l)v223

location: 1- (rearrangement).
origin: X ray induced.
discoverer. Lind^sley, Edington, and Von Halle.
references: I960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 41 percent normal. *X/Y* males sterile, owing to variegation for absence of external genitalia, especially in combination with *E(var)7. X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;2)l-v223 = T(l;2)UF;41;50E.*

I(1)v227

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 48 percent normal; further reduced in combination with $M(2)S2^{1}$ ° and *E(var)7. X/Y* males fertile. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *In(l)l-v227 = In(l)l-2;19-20.*

I(l)v231

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: *X/Y* males viable and fertile. Viability of *X/0* males less than 1 percent normal; the few survivors have reduced rough eyes. Homozygous females normal. RK2A in *X/0* male.
cytology: Associated with *In(l)l-v231 =In(l)lC-D-,19-20.*

*IO)v252

location: 1- (rearrangement).
origin: X ray Induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males normal, of *X/0* males 2 percent normal. *X/Y* males sterile, owing to failure of sperm head to elongate. RK2A as *X/0* male.
cytology: Associated with *T(l;3)l-v252;* determined genetically; cytology not done.

*l(l)v306

location: 1-0.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 78 percent normal. *X/Y* males fertile. *X/0* males lethal. Homozygous females viable. RK2A in *X/0* males.

cytology: Salivary chromosomes show insertion of material of unknown origin into 1B-E.

t(1)v361

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: *X/Y* males show normal viability but are sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;3)l-v361 = T(l;3)19-20;80-8t.*

I(l)v451

location: 1-56.7 (inseparable from f).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 63 percent normal, of *X/0* males 4 percent normal. *X/Y* males sterile; spermatogenesis appears normal but sperm not motile. RK3.
cytology: Salivary chromosomes appear normal.
other information: No translocation detectable genetically. Map distance between v and *i* reduced from standard 23.7 to 12.

I(l)v453

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males normal; reduced in combination with $M(2)S2^{1}$ ° but not *E(var)7. X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;3)l-v453 = T(1;3)12D; 80-81.*

I(l)v454

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
phenotype: Viability of *X/Y* males 50 percent normal; further reduced in combination with $M(2)S2^{10}$ and *E(var)7. X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males lethal. RK2A in *X/0* males.
cytology: Associated with *T(l;2;3;4)l-v454 = T(1;2;3)12B;22-23;81 + T(2;4)44F;t01F.*

f(1)v455

location: 1-(rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649-70.
phenotype: Viability in *X/Y* males low; further reduced in presence of both $M(2)S2^{10}$ and *E(var)7. X/Y* males sterile, owing to failure of sperm head to elongate. *X/0* males invisible. Eye color variegated in *I(l)v455/w* females. RK2A in *X/0* males.
cytology: Associated with *T(l;3)l-v455* « *T(1;3)3C;81.*

I(l)v459

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649—70.
phenotype: *X/Y* males have rough eyes and deformed wings and wing veins; 78 percent normal viability; fertile. *X/0* males lethal. RK2A as *X/0* male.
cytology: Associated with *T(l;2;3)l-v459 = T(l;2;3)3D-F;XR;50;80-81.*

l(J)v463

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
phenotype: Viability of *X/Y* males 50 percent normal; further reduced in combination with *E(var)7* but not *M(2)S2lO. x/Y* males sterile, owing to failure of sperm head to elongate. Viability of *X/0* males 18 percent normal. RK3A.
cytology: Associated with *T(l;3)l-v463 = T(l;3)19-20-.81-82.*

****l(l)w***

location: 1-66.
discoverer: Schubel, 1934.
references: 1934, Am. Naturalist 68: 278—82.
phenotype: Males survive; homozygous females die. RK3.
other information: Probably a lethal allele of *bb.*

****l(1)X2: lethol(l) X ray induced***

location: 1- (near forked).
origin: X ray induced.
discoverer: Auerbach.
references: Ede, 1956, Arch. Entwicklungsmech. Organ. 148: 437-51 (fig.).
phenotype: Embryos die in advanced stage of development. They live beyond normal hatching time, move actively, but do not hatch. Embryo distorted; head material not involuted and pharyngeal material external; body wall has disarranged segmentation in medial region. Mutant disrupts mechanism controlling mitosis in early stages of gastrulation, occasionally as early as blastoderm formation. RK2.
cytology: Salivary chromosomes normal.

****IO)X10***

location: 1-0.0 (near <sc).
origin: X ray induced.
discoverer: Auerbach.
references; Ede, 1956, Arch. Entwicklungsmech. Organ. 149: 247-58 (fig.).
phenotype: Variation in expression of factors discontinuous. There are three types of lethal embryos; some may survive into larval stage. Type 1 stops development after formation of a cap of undifferentiated cells. Type 2 has limited differentiation, often the nervous tissue exclusively, but no organ formation. Type 3 survives beyond normal hatching *time,* has no .gross abnormalities, but does not hatch. RK2.

l(J)X20

location: 1- (near sc).
origin: X ray induced.
discoverer: Auerbach.
references: Ede, 1956, Arch. Entwicklungsraech. Organ. 149: 101-14 (fig.)-
phenotype: Four types of defective embryos produced. Types 1 and 2 reach late stage of development and are alive at time larvae normally hatch. Type 1 has a complete nervous system, but incomplete hypoderm. Type 2 has hypoderm but a deficient nervous system. Types 3 and 4 stop developing at early stages. Type 3 has no development beyond gastrulation, and type 4 forms no blastoderm. RK2.

I(1)X27

location: 1-63.4.
origin: X ray induced.
discoverer: Auerbach.
references: Ede, 1956, Arch. Entwicklungsmech. Organ. 149: 88-100 (fig.).
phenotype: Embryos alive and in a late stage of development at normal hatching time but do not hatch. Degeneration begins at about 25 hr. Germ band irregular at beginning of gastrulation, apparently the result of defective ventral furrow formation. Consequently, hind-gut is open dorsally, nervous system irregularly developed, and ventral nerve cord interrupted in region of mid-gut. Other abnormalities from different causes are: (1) gut remains saclike; (2) ectoderm remains unsegmented; and (3) musculature of body wall is underdeveloped. RK2.

l(1)zwl°h lethal(l) reste to white

location: 1-1.1.
origin: X ray induced.
discoverer: Abrahamson, 62a1.
cytology: Salivary chromosomes appear normal; placed in region 3A5-7, on the basis of its inclusion in *Df(l)64c4 = Dt(l)3A4~6;3C3-5* but not in $Df(1)w^{rJ2}$ *= Df(l)3A6-8;3Cl-3* (Judd),

l(1)zwla2

origin: X ray induced.
discoverer: Abrahamson, 62a2.

l(1)zwlb22

origin: X ray induced.
discoverer: Judd, 62b22.
cytology: Salivary chromosomes normal (Judd).

l(1)zwld8

origin: X ray induced in z-bearing *X* chromosome.
discoverer: Judd, 64d8.

l(1)zwld13

origin: X ray induced in z-bearing *X* chromosome.
discoverer: Judd, 64dl3.

l(1)zwle6

origin: X ray induced,
discoverer: Judd, 63e6.
cytology: Salivary chromosomes normal (Judd).

l(1

origin: X ray induced,
discoverer: Abrahamson, 64f2.

l(1)zwlf5

origin: X ray induced.
discoverer: Abrahamson, 64f5.

l(1)zwlg9

origin: X ray induced.
discoverer: Judd, 63g9.

l(1)zwlg17

origin: X ray induced,
discoverer: Judd, 62gl7.
cytology: Salivary chromosomes appear normal (Judd).

origin: X ray induced.
discoverer: Judd, 63gl9.

l(1)zwlg26

origin: X ray induced.
discoverer: Judd, 62g26.

l(1)zwlg31

origin: X ray induced.
discoverer: Judd, 62g31.
cytology: Associated with *In(l)Uzwl&*^{31} *=In(l)3A;6* (Judd).

l(1)zwlk5

origin: X ray induced.
discoverer: Judd, 62k5.
cytology: Salivary chromosomes normal (Judd).

l(1)zwlk6

origin: X ray induced.
discoverer: Judd, 62k6.
cytology: Salivary chromosomes normal (Judd).

l(1)zwlk26

origin: X ray induced in z-bearing *X* chromosome.
discoverer: Judd, 63k26.

I(l)zw2a3

location: 1-1.2.
origin: X ray induced.
discoverer: Abrahamson, 62a3.
phenotype: Lethal homozygous and when heterozygous with all other alleles of *I(l)zw2* except *\(l)zw2&*^{6}. RK2.
cytology: Salivary chromosomes appear normal. Placed in region 3A7-B1, on the basis of its inclusion in *Df(l)64j4 = Df(l)3A6-8*$_t$**3Bl-2* (Judd).

I(l)zw2b26

origin: X ray induced.
discoverer: Judd, 62b26.
cytology: Salivary chromosomes appear normal (Judd).

I(1)zw2c2i

origin: X ray induced.
discoverer: Judd, 62c21.
cytology: Salivary chromosomes appear normal CJudd).

I(1)zw2c28

origin: X ray induced,
discoverer: Judd, 62c28.

l(1)zw2f3

origin: X ray induced,
discoverer: Abrahamson, 64f3.

I(1)zw2g4
origin: X ray induced,
discoverer: Lefevre, 62g4.
cytology: Salivary chromosomes appear normal (Judd).

I(1)zw2g6
origin: X ray induced.
discoverer: Lefevre, 62g6.
phenotype: Lethal homozygous and when heterozygous with all alleles of *I(l)zw2* except *I(l)zw2*^{a3}. RK2.

I(1)zw3b12
location: 1-1.3 [based on position of *I(l)zw3*^{h22}].
origin: X ray induced-
discoverer: Judd, 62bl2.
cytology: Associated with *In(l)l-zw3bl2 = ln(l)3A8-Bl;13;* placed in region 3A7-B1, on the basis of its inclusion in *Dt(l)64j4 = Df(l)3A6-8;3Bl-2* (Judd).

I(l)zw3h22
origin: X ray induced.
discoverer: Judd, 62h22.
cytology: Salivary chromosomes normal Qudd).

I(l)zw4d28
location: 1-1.1 [between *l(l)zwl* and *I(l)zw2*\.
origin: X ray induced.
discoverer: Judd, 62d28.
cytology: Placed in salivary chromosome region 3A5-7, on the basis of its inclusion in *Df(l)64c4 = Df(l)3A4-6;3C3-5* but not in *Df(l)wtJ2 = Df(l)3A6-8;3Cl-3* (Judd).

I(1)zw4e4
origin: X ray induced.
discoverer: Judd, 63e4.
cytology: Salivary chromosomes normal (Judd).

I(1)zw4s24
origin: X ray induced.
discoverer: Judd, 62g24.

I(1)zw5i1
location: 1-1.4.
origin: X ray induced.
discoverer: Judd, 62jl.
cytology: Placed in salivary chromosome region 3B3-C2, on the basis of its inclusion in both *Dt(l)62dl8 =*Df(l)3B2-Cl;3C3-5* and *Dt(1)w*^{rJ2} = *Df(l)3A6-8;3C1.3* (Judd).

I(1)zw6b23
location: 1-1.3.
origin: X ray induced,
discoverer: Judd, 62b23.
cytology: Salivary chromosomes appear normal (Judd).

I(1)zw65
origin: X ray induced,
discoverer: Judd, 63e5.

I(1)zw6e13
origin: X ray induced,
discoverer: Judd, 63el3.
cytology: Salivary chromosomes apparently normal (Judd).

I(l)zw6»2
origin: X ray induced.
discoverer: Judd, 6212.
phenotype: Lethal homozygous and when heterozygous with other alleles of *t(l)zw6*\ only allele of *I(l)zw6* that survives when heterozygous with *Dt(l)62dl8 =Df(l)3B2'Cl;3C3-5* (Judd). RK2.
cytology: Salivary chromosomes normal (Judd).

*I(l)zw7*3*
location: 1-1.4.
origin: X ray induced.
discoverer Judd, 63e3.
cytology: Salivary chromosomes normal. Placed in region 3B3-C2, on basis of its inclusion in both *Df(l)62dl8 =Df(l)3B2-Cl;3C3-5* and *Df(l)wrJ2 = Df(l)3A6'8;3Cl'3* (Judd).

I(1)zw7g20
origin: X ray induced.
discoverer: Judd, 63g20.

I(1)zw8g10
location: 1-1.1 [between *l(l)zwl* and *I(l)zw2*\.
origin: X ray induced.
discoverer: Judd, 63glO.
cytology: Placed in salivary chromosome region 3A5-7, on the basis of its inclusion in *Df(l)6464 *= Di(l)3A4-6;3C3-5* but not in Dffijw*"/^{2} *=Df(l)3A6-8;3Cl-3* (Judd).

I(l)zw9f4
location: 1-1.4.
origin: X ray induced.
discoverer: Abrahamson, 64f4.
cytology: Placed in salivary chromosome region 3B3-C2, on the basis of its inclusion in both *Dt(l)62dl8 = Df(l)3B2-Cl;3C3-5* and *Df(l)w'J2 =* D/jfl^d-S^Cl-;? (Judd).

l(2)39a
location: 2-50 (right of *Bl* ?).
origin: Spontaneous,
discoverer: Curry, 39a.
references: 1939, DIS 12: 45.

l(2)55i
location: 2-55.0 (probably to the left of the centromere).
origin: Spontaneous.
discoverer. Burdick, 55L
references: 1956, DIS 30: 69.
Mukai and Burdick, 1959, Genetics 44: 211-32.
1960, Genetics 45: 1581-93.
Schnick, Mukai, and Burdick, 1960, Genetics 45: 315-29.
Mukai and Burdick, 1961, Japan. J. Genetics 36: 97-104.
phenotype: Larvae hatch but die before pupation. Females heterozygous for *l(2)55i* have higher fecundity than homorygous wild-type females. The lethal is therefore not eliminated from laboratory populations. RK3.

l(2)$6a
tocotion: 2-90.
origin: Spontaneous.
discoverer: Burdick, 56a.
references: 1956, D3S 30: 69.

phenotype: Homozygous lethal; heterozygote shows normal viability. RK3.
other information: Crossing over normal.

l(2)57
origin: Spontaneous.
discoverer: Paik.
references: I960, Evolution 14: 293-303.
other information: A series of 11 let ha Is selected from Korean wild populations.

l(2)1076
location: 2-15 (a,bout 40 units from *Bl).*
origin: Spontaneous.
discoverer: Ives, 49h.
references: 1951, DIS 25: 70.
phenotype: Lethal homozygous and in combination with *ln(2L)Cy.* RK3.

l(2)1323
location: 2-55 (0/162 crossovers with *Bl).*
origin: Spontaneous.
discoverer: Ives, 51 g.
references: 1951, DIS 25: 70.
phenotype: Lethal homozygous and in combination with *In(2L)Cy + In(2R)Cy.* RK3.

K2)a
location: 2-64.7.
origin: Spontaneous.
discoverer Bridges, 16a 15.
'references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 286, 302.
phenotype: Almost completely lethal; body color of rare survivor pale. RK3.

K2)ax
locotion: 2-106.9.
origin: Spontaneous.
discoverer Bridges, 19b28.
references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Lethal in very early larval stage. RK3.
cytology: Located in 60B on salivary chromosome by Bridges, but not included in *Df(2R)Px = D£(2R)60B8-10;60Dl-2.*

Way
location: 2-8.3.
origin: Spontaneous.
discoverer: Bridges, 30d5.

K2)B
location: 2- [in *2L* of *In(2L)t].*
discoverer Bridges, 1930.

l(2)bh tethaK2) bluter
location: 2-43.8.
origin: X ray induced.
discoverer: Käfer, 50b.
references: Benz, 1953, DIS 27: 55.
1957, Z. Induktive Abstammungs- Vererbungslehre 88: 78-114 (fig.).
phenotype: Lethal at end of pupal stage. Homozygotes make emerging movements, but puparia have abnormally thick protein layer so that iraaginal hypodermis is punctured in attempt to eclose. Hemoljmph *is* lost and flies die. Apparently normal hocnoxygotes may be obtained by artificially opening puparium. Occasionally, a fly spontaneously escapes puparium without serious injury. Differences in content of free amino acids and peptides between *l(2)bl* and wild type can be distinguished in third instar larvae, prepupae, and early pupae. RK3,

l(2)Bld: lethal(2) from Blond
location: 2-53.1.
origin: Spontaneous.
discoverer: Bridges.

l(2)bw: lethald) with brown
location: 2-104.
origin: Spontaneous in $6w^{2b}$ mr chromosome.
discoverer: Curry, 36i.
cytology: Salivary chromosomes seem to show slight deficiency or disturbance in 59C and D (Bridges).

I(2)C: lethal(2)* o/ *Curry
location: 2-67.1.
origin: Spontaneous.
discoverer: Curry, 34a21.
phenotype: Lethal before pupation. RK3.
cytology: Placed in salivary region 49D4 through 49E5 on the basis of its inclusion in $Df(2R)v£^{B}$ = *Df(2R)49D3-4;50A2-3* and in *Di(2R)v^ = Df(2R)49Cl-2;49E2-6* (Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306).

l(2)cg: lethal(2) with comb gap
location: 2-15 (between *dp* and of).
origin: Spontaneous.
discoverer: Nichols-Skoog, 33dl9.
references: Curry, 1939, DIS 12: 46.

1(2) cn bwco-3a.* see *l(2)S3a

1(2) cn bwco-7;* see *1(2)S7

l(2)crc: lethal(2) cryptocephal
location: 2-55.
origin: Spontaneous.
discoverer: Hadorn, 1942.
synonym: crc.
references: Hadorn and Gloor, 1943, Rev. Suisse Zool. 50: 256-61.
Gloor, 1945, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 20: 209-56.
Fristom, 1965, Genetics 52: 297-318.
phenotype: Homozygotes undergo pupation but rarely eclose from puparia. Imaginal head is not everted from thorax. Except for slightly reduced eyes and shortened legs, wings, and thoracic bristles, the head and thorax are fully differentiated. Head eversion is inhibited by integument being more rigid than normal. Mutant integument contains more glucosamine than normal. Feeding glucosamine to wild-type larvae produces a phenocopy very similar to *l(2)crc.* Abdomen often shows no differentiation and internal organ development arrested at pupal stage. RK3.

***l(2)gh lethal{2) giant* /crvoe**
location: 2-0.0.
origin: Spontaneous.
discoverer Bridges, 33e9.
Synonym: *lgl.*

references: Hadorn, 1937, Proc. Soc. Exptl. Biol. Med. 36: 632-34.
1937, Proc. Natl. Acad. Sci. U.S. 23: 478-84.
1938, Rev. Suisse Zool. 45: 425-29.
Vogt, 1947, Z. Naturforsch. 26: 292-94.
phenotype: Homozygotes undergo embryogenesis and three larval instars. Larvae reach normal maximum size but fail to pupate; they then become bloated to giant size. Pseudopupae are sometimes formed but no morphogenesis occurs, and imaginal disks degenerate. Ring gland small and appears immature in third-instar larva (Scharrer and Hadorn, 1938, Proc. Natl. Acad. Sci. U.S. 24: 236-42). A third-instar *l(2)gl* host transplanted with a normal ring gland pupates but does not metamorphose. Thus a deficiency of hormones from the ring gland is probably one result of *l(2)gl* but not the only one. Faulhaber (1959, Z. Vererbungslehre 90: 299-334) finds that the abnormal development affects the quantities of the different amino acids, peptides, and proteins. Welch (1957, Genetics 42: 544—59) finds that DNA of nuclei in several tissues, especially salivary glands, is markedly reduced. RK3.
cytology: Locus lies between 21A1 and 21C1 (Lewis, 1945, Genetics 30: 137-66).
other information: The order of *1(2)0* and *net* unknown.

K2)gl2
origin: Ultraviolet induced.
discoverer: Meyer, 51a.
references: Meyer and Edmondson, 1951, DIS 25: 72.
phenotype: Like *l(2)gl.* RK3.

****I(2)$_9$I3***
origin: Spontaneous in *In(2L)Cy + In(2R)Cy.*
discoverer: Meyer, 51a.
references: Meyer and Edmondson, 1951, DIS 25: 73.
phenotype: Larvae heterozygous with $l(2)gl^2$ are like *1(2)0.* RK3A.

I(2)H: lethal(2) of Humphrey
location: 2-50.
origin: Spontaneous.
discoverer: Humphrey, 32k.
references: Dunn, 1934, DIS 1: 30.
1935, DIS 4: 9.
phenotype: Usually dies as pupa; 10—15 percent of flies survive, look normal but are weak. Homozygote usually sterile when inbred but fertile in outcrosses. RK3.

l(2)hst: lethal(2) histolytic
location: 2-56.
origin: X ray induced.
discoverer: Thompson, 59k.
phenotype: Homozygote dies in early pupal stage. Heterozygous viability good. RK3.

I(2)M: lethal(2) from Moftr
location: 2-(b«tween *dp* and 6).
origin: Spontaneous.
discoverer: Bridges, 33118.

l(2)Mad51"":* see *1(2)S

l(2)Mass38*-:* see *1(2)S

t(2)maf: tethal(2) maternal
location: 2- (near *pr).*
origin: Spontaneous.
discoverer: Redfield, 23b.
references: 1924, Am. Naturalist 58: 566—69.
1926, Genetics 11: 482-502.
phenotype: Homozygous females produce one daughter to 5.5 sons. Abnormal sex ratio caused by inviability of females. *l(2)mat* does not seem to be allelic to *da,* which has a similar effect. RK3.

l(2)me: lethal(2) meander
location: 2-72 (71-73).
origin: Spontaneous.
discoverer: Hadorn, 44g20.
synonym: *Itno.*
references: 1947, Exptl. Biol. Symp. Vol. 2: 177—95, Cambridge Univ. Press.
1947, DIS 21: 68.
Schmid, 1949, Z. Induktive Abstammungs- Vererbungslehre 83: 220-53 (fig.).
Chen and Hadorn, 1954, Rev. Suisse Zool. 61: 437-51.
1955, Rev. Suisse Zool. 62: 338—47.
phenotype: Larvae do not grow normally; die while small. Body length remains relatively shorter than tracheal stems, which become convoluted in a meandering manner. Salivary glands reach 30 percent normal size; pharyngeal development normal. Intestines lack proteolytic enzymes. RK3.

I(2)mr2: lethal(2) with morula
location: 2-70.
origin: Spontaneous,
discoverer: Bridges, 25k24.

****I(2)NS: lethal(2) Nova Scotia***
location: 2-107.0 [to the right of *l(2)ax* and to the left of *sp].*
discoverer: Bridges, 23j31.
references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Lethal when larvae are about 2 mm long. Development of tracheae and other chitinized parts abnormal. RK3A.
cytology: Exists only as *In(2R)NS, px 1(2)NS sp.* Salivary chromosome locus in 60B10-12 on the basis of its inclusion in *Df(2R)Px » D%2R)60B8' 10;60Dl-2* but not in the $2R^PX^D$ element of *T(l;2)Bld= T(1;2)1C3-4;6OB12-13* (Bridges).

l(2)pm: lethal(2) polymorph
location: 2-30,3.
origin: X ray induced,
discoverer: Käfer, 50b.
references: Benz, 1953, DIS 27: 55.
1957, Z. Induktive Abstammungs- Vererbungslehre *88:* 78-114 (fig.).
phenotype: Flies die throughout larval and pupal stages. Larvae do not contract before pupation; hence, pupae are long and thin. Imagos often cryptocephalic. Chief characteristic is a severe muscular dystrophy. Protein metabolism extremely disturbed. In larval stage, free amino acids and one peptidc are in abnormally high concentration. Prepupae only slightly different from normal in this respect. Occasional survivors viable and fertile. RK3.

l(2)pup: lethai(2) pupal
location: 2-47.
origin: Spontaneous.
discoverer: Ives, 38J25.
references: 1945, Genetics 30: 175.
1945, DIS 19: 46.
phenotype: Dies in middle or late pupal stage. External anatomy appears normal except for heavy melanization of wings and legs. RK3.

I(2)R: lethal(2) of RecHield
location: 2- [in *2L* with *In(2L)t]*.
discoverer: Redfield, 1933.

I(2)S1: lethal(2) of Seto
location: 2- (not located).
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *itfyMadSln-[1]; N-l.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity, 47: 21-27 (fig.).
1961, DIS 35: 94-95.
phenotype: Dies as larva or prepupa. Puparium elongated, often with larval segmentation, enlarged, resembling *1(2)0.*. Cephalic complex uneverted. Eye rudiment often pigmented. RK3.

I(2)S1A
location: 2- (between *Sp* and 6).
origin: Spontaneous.
discoverer: Seto, 1953.
synonym: *l(2)Mad53[n]-t[A]', N-1A.*
references: 1956, J. Heredity 47: 21-27 (fig.).
1958, DIS 32: 157-58.
1961, DB 35: 94-95.
1963, DIS 37: 128-29.
phenotype: Dies in late pupa; differentiation of external structures almost complete. Color of pupa darker, changing to deep brown after a few days; heavy melanization in thicker parts of exoskeleton; nephrocytes deeply pigmented. Respiration rate 80 percent normal (Seto, 1959, DIS 33: 159—60). Slight delay in pupation. Development ceases earlier under crowded conditions (Seto, 1957, DIS 31: 160-62). RK3.

l(2)$3
location: 2-(between c and px).
origin: X ray induced.
discoverer: Seto, 1951.
synonym: *l(2)MasB38[x]-[3];* X-3.
references: 1954, J. Exptl. ZooL 126: 17-32.
1956, J. Heredity 47: 21-27 (fig.).
1957, DIS 31: 160-62.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
1963, DJS 37: 128-29.
phenotype: Dies in prepupal stage. Puparium small and dumpy. Deformed prepupa only partly fills pupariswj; anterior structures rudimentary; rest of body saclike. Scattered small pigmented or meiamijwd artas along tracrteal trunks; appendages and cephalic complex reduced or absent. Some delay in pupation. RK3.

l(2)S3a
location: 2- (between *dp* and *Sp).*
origin: Gamma ray induced.
discoverer: Seto, 1953.
synonym: *l(2)cn bw[c]°-[3a]; Co-3A.*
references: 1956, J. Heredity 47: 21-27.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
1963, DIS 37: 128-29.
phenotype: Die predominantly in pupal stage; infrequent weak sterile survivors with normal phenotype. Death occurs earlier in crowded cultures (Seto, 1957, DIS 31: 160-62). Pupation delayed 1—2 days beyond normal. Respiration rate during pupation 50 percent normal (Seto, 1959, DIS 33: 159-60). RK3.

I(2)S4
location: 2- (near *pr).*
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51"-4; N-4.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity 47: 21-27 (fig.).
1958, DIS 32: 157-58.
1963, DIS 37: 128-29.
phenotype: Dies in prepupal and pupal stages. Puparium small and slender with fragile exoskeleton. Appearance like *l(2)crc,* with uneverted cephalic complex. Development of hypodermal derivatives and pigment variable. Pupation delayed 1—2 days. Crowding suppresses expression (Seto, 1957, DIS 31: 160-62). RK3.

I(2)S7
location: 2- (between *Sp* and *b).*
origin: Gamma ray induced.
discoverer: Seto, 1953.
synonym: *l(2)cn bw[c]°-7;* Co-7.
references: 1956, J. Heredity, 47: 21-27.
1957, DIS 31: 160-62.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Die predominantly in pupal stage. Occasional sterile adults produced. Time of pupation delayed. Respiration rate of prepupae and pupae 50 percent normal (Seto, 1959, DIS 33: 159-60). RK3.

K2)sn
location: 2- (not located).
origin: X ray induced.
discoverer: Seto, 1951.
synonym: *itfytiassSS*-[11]; X-ll.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1956, J. Heredity 47: 21-27.
1961, DIS 35: 94-95.
phenotype: Dies as pupa. Puparium normal. Development may cease before or shortly after eversion of frontal sac. Usually has melanized patches on dorsum. Wings and legs variably developed. RK3.

l(2)S13
location: 2- (not located).
origin: Spontaneous,
discoverer. Seto, 1955.

synonym: *l(2)Wau55^{n}-l3; N-13.*
references: 1957, DIS 31: 160-62.
1961, DIS 35: 94-95.
phenotype: Dies as late pupa or as adult. Puparium normal. RK3.

***I(2)S32**
location: 2- (between *dp* and *Sp),*
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n}-32; pj-32.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity 47: 21-27 (fig.).
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
1963, DIS 37: 128-29.
phenotype: Dies in early pupa. Usually no pigment or bristle formation; leg and wing sacs adhere to pupa case, resulting in appendages developing in cramped position; some melanization at extremities. Pupation delayed 1 day; pupa badly shrunken. Crowding suppresses expression (Seto, 1957, DIS 31: 160—62). Respiration rate 50 percent normal (Seto, 1959, DIS 33: 159-60). RK3.

***I(2)S42**
location: 2- (between *Bl* and L).
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n}-^{4}2; N-42.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1956, J. Heredity 47: 21-27.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Dies in late pupa. Appears well differentiated externally; eyes with little or no pigment; internal head structures poorly developed. RK3.

I(2)S42
origin: Spontaneous derivative of *1(2)S42.*
discoverer: Seto, 1954.
synonym: *l(2)Mad51^{n}-<2^{a}; N-42A.*
references: 1956, J. Heredity 47: 21-27 (fig.).
1957, DIS 31: 160-62.
1961, DIS 35: 94-95.
phenotype: Ceases development in early pupa; puparium enlarged, elongated, and larvalike; exoskeleton thin and fragile; pupa adheres to anterior end of puparium, res-t of pupa contracted anteriorly. Space between pupa and puparium filled with light, oily fluid. Time of pupation delayed 2—3 days. Imaginal disks poorly developed. RK3.

***I(2)U5**
location: 2- (between *Sp* and ô).
origin: Spontaneous.
discoverer: Seto, 1953.
synonym: *l(2)Mad53n-*3; N-45.*
references: 1956, J. Heredity 47: 21-27 (fig.).
1957, DIS 31: 160-62.
1958, DBS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Dies as late pupa just before eclosion. Slightly smaller than normal; leg sacs do not elongate, end legs develop in cramped and stunted condition. Most flies complete but only rarely able to eclose; rare adults are weak and unproductive. Time of pupation delayed about one-half day. RK3.

***l(2)S50**
location: 2- (rearrangement).
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n,S0}; N-50.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity 47: 21-27 (fig.).
1957, DIS 31: 160-62.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Dies as pupa. Puparium normal. Development ceases in early pupa; body generally unpigmented; eyes rarely pigmented; hypodermal derivatives underdeveloped; melanotic degeneration of hypodermis in region of eye, external genitalia, and appendage extremities. Pupation delayed. RK3A.
cytology: Associated with *In(2L)* and *In(2R)* with unknown break points.

***I(2)S51**
location: 2- (near pr).
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n}-^{sl}; N-Sl.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity 47: 21-27.
1957, DIS 31: 160-62.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Dies in prepupal stage. Puparium normal. Development similar to that of *1(2)S61,* but with certain tissues further developed. Pupation delayed 1—2 days. Respiration less than 50 percent normal (Seto, 1959, DIS 33: 159-60). RK3.

***I(2)SSS**
location: 2- (between *dp* and *Sp).*
origin: Spontaneous.
discoverer: Seto, 1955.
synonym: *l(2)Wau55^{n}S*; N-55.*
references: 1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
phenotype: Dies in late pupa; occasional weak adult survivors. Phenotype similar to *1(2)S45.* Crowding results in more and earlier mortality (Seto, 1957, DIS 31: 160—62). Pupation delayed about one-half day. RK3.

***I(2)$S9**
location: 2- (not located).
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n}'^^{9}; N-59.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1956, J, Heredity 47: 21-27.
1961, D^ 35: 94-95.
phenotype: Dies in late larval or prepupal stage. Puparium normal; frontal sacs uneverted; leg and wing sacs incompletely developed; body saclike. RK3.

l(2)S61
location: 2- (near *pr).*
origin: Spontaneous.
discoverer: Seto, 1951.
synonym: *l(2)Mad51^{n}-^{6}l; N-61.*
references: 1954, J. Exptl. Zool. 126: 17-32.
1954, Am. Naturalist 88: 373-78.
1956, J. Heredity 47: 21-27 (fig.).
1957, DIS 31: 160-62.
1958, DIS 32: 157-58.
1961, DIS 35: 94-95.
1963, DIS 37: 128-29.
phenotype: Dies in prepupal stage. Puparium color darker than normal. Prepupa incompletely developed; frontal sacs uneverted; wing and leg sacs everted but development curtailed; free-floating fat body fragments may fill fluid space between puparium and prepupa. Pupation delayed 1—2 days. Respiration rate normal for first day and a half then ceases (Seto,1959, DIS 33: 159-60). RK3.

l(2)Sph leihol(2) of Spiess
location: 2-35.0.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)S$_P$2b
location: 2-49.
origin: Spontaneous,
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)S$_P$6b
location: 2-50.0.
origin: Spontaneous.
discoverer. Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

I(2)S$_P$7
location: 2-3.2.
origin: Spontaneous,
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)Sp8
location: 2-61.5.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

!(2)Sp9a
location: 2-1.9.
origin: Spontaneous.
discoverer Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)Sp%
location: 2-49.
origin: Spontaneous.
dl*cov»r#r. Spiess.
r*f*r«nc«s: Spiess, Helling, and Capeno«, 1963, Getseiics 48: 1377-8S.

l(2)S$_P$9c
location: 2-55.1 (between *rl* and *stw).*
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.
phenotype: Lethal homozygous and in combination with M(2)S2; viable in combination with *l(2)Spll* and *1(2)S$_P$15.* RK3.
cytology: Placed in salivary region 41A based on its inclusion in *D{(2R)M'S2^{1} ° = Df(2R)41A* (Burdick).

l(2)S$_P$9d
location: 2-55.1 (to the right of stw).
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)S$_P$10
location: 2-37.5.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

K2)S$_P$n
location: 2-55.1 [between *rl* and *stw;* to the left of *1(2)S$_P$15* (Burdick)].
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.
phenotype: Lethal homozygous and in combination with *M(2)S2;* viable in combination with *l(2)Sp9c* and *I(2)apl5.* RK3.
cytology: Placed in salivary region 41A based on its inclusion in *Df(2RyM-S2^0 = Df(2R)41A* (Burdick).

l(2)SpU
location: 2-61.5.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)SpU
location: 2-32.0.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

i(2)$$_P$15
location: 2-55.1 (between *rl* and *stw).*
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.
phenotype: Lethal homozygous and in combination with M(2)S2; viable in combination with *l(2)Sp9c* and *l(2)Spll.* RK3.
cytology: Placed in salivary region 41A based on its inclusion in *Df(2R.)M-S2^{10} « Dt(2R)41A* (Burdick).

***I(2)S$_P$18**
location: 2-65.3.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(2)Su(H): lethal(2) from Suppressor of Hairless
location: 2-99.
origin: Spontaneous.
discoverer: Bridges, 3717.
cytology: Located in salivary region 58A1 through 58F8 on basis of its inclusion in *Df(2R)M-l = Df(2R)57Fll-58Al;58F8-S9Al.*

I(2)T: lethal(2) of Thompson
origin: Spontaneous in normal chromosome of *SM1/+* heterozygote.
discoverer: Thompson, 1956, 1957.
synonym: *I(2)56i24* through *l(2)57hlO.*
other information: A series of 13 independently occurring and genetically located lethals.

l(2)Wau55n-:* see *1(2)S

1(3)1:* see *l(3)a

1(3)26
location: 3-52.2 [between *l(3)S6* and *1(3)S7*\.
origin: X ray induced in a *cu kat* chromosome simultaneously with ry^{26}.
discoverer: Schalet.
synonym: *1(3)52.5.2.*
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Placed between *1(3)S6* and *1(3)S7*', on the basis of its inclusion in $Df(3R)ry^{K}$, $Dt(3R)tv^{Si}$, and *Df(3R)ry66* but not in $Df(3R)ry^{2}$*', *Df(3R)ry33, Df(3R)ry*^{2}, or *Df(3R)ry70*$_{f\ all\ of\ w}$which include *1(3)S6*· but none of which include *1(3)S7.*

l(3)36d!0
location: 3- (close to *D,* or rearrangement).
origin: Spontaneous,
discoverer: Bridges, 36dlO.

***l(3)36d24**
location: 3- (near centromere),
origin: Spontaneous,
discoverer: Bridges, 36d24.
references: 1937, DIS 7: 13.
Bridges and Bridges, 1938, Genetics 23: 111-14.

1(3)52.52:* see *1(3)26

***l(3)62g**
origin: Spontaneous.
discoverer: Paik.
references: 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 163-64.
other information: A series of 65 lethals recovered from Korean wild populations.

K3)a
location: 3-81.6.
origin: Spontaneous in *In(3R)C*
discoverer: Morgan, 111.
synonym: *1(3)1.*
references: Muller, 1918, Genetics 3: 422-99.
phenotype: Lethal homozygou®. Reduces recovery of *M(3)w-be&ring* daughters from *In(3R}C, l(3)s/M(3)w* females (Schultx). RK3.
other information: Results of Bridges interpreted to show allelism to $M(3)w^{B}$ (3-79.7); may have been related to maternal effect described by Schultz. Position based on crosses by Muller (1918), in which he used *l(3)a* separated from *In(3R)C.*

l(3)ac: lethal(3) accessory
location: 3- (midregion).
discoverer: Schultz, 25g.
phenotype: Enhances maternal effect of *In(3R)C, l(3)a* on recovery of *M(3)w* daughters from *M(3)w/In(3R)C, l(3)a* mothers (Schultz). RK3.

***l(3)blo-l: lethal(3) bloated larvae**
location: 3- (to the left of p).
discoverer Bridges, 25k7.
references: Chen, 1929, J. Morphol. 47: 135-99.
phenotype: Larvae become very large and transparent; die in the prepupal stage. Growth of imaginal disks irregular. RK2.

1(3)D1:* see *DP

***l(3)e: lethal(3) with ebony**
location: 3- (not located).
origin: Spontaneous in *In(3R)C,* e.
discoverer: Schultz.
phenotype: Dies as fully developed normal-appearing imago unable to eclose. RK3A.

***l(3)hd: lethal(3) head defect**
location: 3- (not located).
discoverer: Bridges, 1924.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230.
phenotype: Dies in pupal stage with black tumorlike growth in head. RK3.

I(3)PL
location: 3- (left arm).
origin: Spontaneous in *3L* carrying *Itv(3L)P.*

I(3)PR
location: 3-90.2.
origin: Spontaneous in*In(3R)P.*
phenotype: Homozygous lethal; lethal in combination with *M(3)j.* RK3.

K3)S1: lethal(3) of Schalet
location: 3-51 (to the left of *kar),*
origin: X ray induced in a kar^{3} chromosome-
discoverer Schalet.
other information: Placed to the left of *l(3)S2,* on the basis of its exclusion from $Dt(3R)ry^{76}$, which is deficient for *1(3)S2* and loci to the right.

l(3)Slo
origin: X ray induced in a kar^{2} chromosome.
discoverer: Schalet.
other information: Allelism with *1(3)S1* tentative and based on similarity in interaction with *D£(3R)ry7*.*

I(3)S2
location: 3-51.5 [between *l(3)Sl* and *kar].*
origin: X ray induced in a kar^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Placed between *l(3)St* and *kmr,* on the basis of its inclusion in $Df(3R)ty^{76}$ but not *D%3R)ry*^{29}, *D%3R)ry*^{33}, or $Df(3R)ry^{36}$. None of

these deficiencies include *1(3)S1* and all include /car and genes to its right.

I(3)S3
location: 3-51.7 (between *kar* and *mes).*
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
other information: Placed between /car and *mes,* on the basis of its exclusion from *Df(3R)ry*^{78} and its inclusion in *Df(3R)ry*^{27}, *Df(3R)ry*^{S2}, *Df(3R)ry*^{7S}, and *Df(3R)ry*^{77}. None of these deficiencies include /car and all include mes and loci to its right.

I(3)S4
location: 3-52.1 (to the right of pic).
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal, but there a few relatively normal-appearing survivors that are mostly females. RK3.
other information: Placed to the right of *ry* by recombination and to the right of pic on basis of its survival in combination with *ry*^{3}*$* which behaves as though it were deficient for *ry* and *pic.* Placed to the left of *1(3)S5* by recombination.

I(3)S5
location: 3-52.1 [between *1(3)S4* and *1(3)S6].*
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Placed to the right of *1(3)S4* by recombination analysis and to the left of *l(3)5>6,* on the basis of its inclusion in *Df(3R)ry*^{75} and *Dt(3R)ry*^{76}, which do not include *1(3)S6.*

I(3)S5o
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.

I(3)S6
location: 3-52.2 [between *1(3)S5* and *1(3)26].*
origin: X ray induced in a *kar*^{3} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Placed to the right of *1(3)S5,* on the basis of its exclusion from *Df(3R)ry*^{7S} and *D%3R)ry*^{76}, both of which include *I(3)S5* and loci to the left.

I(3)S6°
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Causes local reduction in crossing over.

I(3)S6b
origin: X ray induced in a *kar*^{2} chromosome,
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Produces local reduction in crossing over.

I(3)S7
location: 3-53 [to the right of *1(3)26].*
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Placed to the right of *1(3)26** on the basis of its exclusion from *Df(3R)ry*^{66}, which includes *1(3)26* and loci to its left.

I(3)S7o
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Extends farther to the right than *l(3)S7* since it is lethal in combination with an undescribed deficiency for *red* with which *l(3)S7* survives.

I(3)S7b
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
other information: Extends farther to the right than *1(3)S7,* by same criterion as *l(3)S7*^{a}.

****I(3)S7c***
origin: X ray induced in a *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, arid Chovnick, 1964, Genetics 50: 1261-68.

****I(3)S7d***
origin: X ray induced in *kar*^{2} chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.

****I(3)Sph !ethal(3) of Spiess***
location: 3-33.8.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88,

****I(3)S$_P$2***
location: 3-79.3.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

****K3)$p5***
location: 3-41.0.
origin: Spontaneous,
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

****I(3)S$_P$6***
location: 3-40.4.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

I(3)S$_P$9
location: 3-101.1.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(3)S$_P$10
location: 3-41.7.
origin: Spontaneous,
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(3)S$_P$17
location: 3-38.4.
origin: Spontaneous.
discoverer: Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

I(3)S$_P$19
location: 3-100.9.
origin: Spontaneous.
discoverer. Spiess.
references: Spiess, Helling, and Capenos, 1963, Genetics 48: 1377-88.

l(3)tr: lethal(3) translucida
location: 3-20 (18.1 to 22.0).
origin: Spontaneous.
discoverer: Hadorn, 40116.
references: 1947, Exptl. Biol. Symp. Vol. 2: 177-95, Cambridge Univ. Press.
1947, DIS 21: 68.
1956, Cold Spring Harbor Symp. Quant. Biol. 21: 363-73 (fig.).
phenotype: Larvae become bloated and transparent from accumulation of abnormal amount of hemolymph. Concentration of amino acids in hemolymph higher than normal; concentration of proteins reduced. Pupation delayed one day (25°C); dwarfed pupae formed in inflated puparia; death follows pupation or completion of imaginal differentiation of head and thorax; abdomen never metamorphoses. After transplantation into normal hosts, imaginal disks develop normally; ovaries also develop normally and are fully capable of producing viable eggs [Sobels, 1950, Experientia 6: 139-40 (fig.)]. In pure oxygen, frequency and extent of imaginal differentiation strongly increased [Sobels and Nijenhuis, 1953, *Z.* Induktive Abstammungs-Vererbungslehre 85: 579-92 (fig.)]. RK3.
cytology: Salivary chromosomes normal (Rosin).

l(3)W
location: 3- (right.arm).
origin: Spontaneous in *3R* carrying *In(3R)P.*

l(3)XaR
location: 3-91.8.
other information: Used to balance *T(2;3)®p^x**.

1(4)1
location: 4- [within *Df(4)Ml*
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Lethal homozygous and in combination with *Df(4)M.* No interaction with other genes in *Df(4)M.* Dies as larva. RK3.
cytology: Placed in region 101E through 102B16, on basis of its inclusion in *Df(4)M = Df(4)101E-F;102B6-17.*

I(4)Jo
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)27.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Like *1(4)1.* RK3.

i(4)n
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)28.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)1.* RK3.

1(4)1c
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)32.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)1.* RK3.

1(4)1d
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)30.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like 1(4)1. RK3.
other information: Incorrectly reported as an allele of *1(4)25* by Hochman, Gloor, and Green (1964).

1(4)1-JFC: see *1(4)9°*

1(4)2
location: 4-(not located),
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Lethal in embryo. Lethal in combination with the so-called *bt^D* fourth chromosome. RK3.

1(4)2"
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)21.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)2.* RK3.

l(4)2b
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)23.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Unlike other alleles, dies as larva. *l(4)2^b/I(4)2^h* heterozygotes survive and have narrow bodies both as pupae and imagos. Viability reduced; fertile. RK3.

l(4)2'>*^{D}: leihal(4) 2 in bent Dominant
origin: Spontaneous. Associated with supposedly bt^{D} chromosomes.
references: Fox, 1947, DIS 21: 85.
Hochman, Gloor, and Green, 1964, Genetics 35: 109-26.
phenotype: Lethal homozygous and in combination with other *1(4)2* alleles. RK3.

1(4)2*
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)29.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)2.* RK3.

l(4)2d
origin: X ray induced.
discoverer. Gloor and Green, 1957.
synonym: *1(4)37.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)2.* RK3.

*1(4)2**
origin: X ray induced.
discoverer. Gloor and Green, 1957.
synonym: *1(4)38.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)2.* RK3.

1(4)2*
origin: Spontaneous.
discoverer Hochman, 61a.
synonym: *l(4)PT-2: IeOial(4) Powell,* Tennessee-2.
references: 1961, Am. Naturalist 95: 375-82.
1963, DIS 37: 48.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)2.* RK3.

*1(4)2**
origin: Spontaneous.
discoverer; Hochman, 63kl9.
pti«rtofyp«: Like *1(4)2.* RK3.

K(4)2h
<w!§i«s Spontaneous.
discoverer: Hochman, 63122.
:Imnetyp'e: Lethal *&a* embryo. In combination with $l(4)2^{b}$, produce* a few survivors that have narrow bodies both as pupae ami imagos and are fertile.

K(4)2'
oriigin: 1 ray induced.
l i e o v m r: Gloor an-d Gr®en, 1947.
sytKMtym: *t{4)34,*
references: Hochm&n, Gloor, aad Green, 1964, Ge»@tfca 35: 109-26.

K(4)4
toe«fi«n: 4- (sot located).
•riffn: *X ny* induced,
disc»v«««*r: Gloor tad Green, 1957.
<wf«nmc«s: Hodman, Gloor, aed Green, 1964, GHMKIC* 35: 109-26.
phenotype: Homozygoit#« di® as larvae. RK3.

1(4)4"
origin: X ray induced.
discoverer. Gloor and Green, 1957.
synonym: *1(4)18.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)4.* RK3.

l(4)4b
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)20.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)4.* RK3.

l(4)4c
origin: Spontaneous.
discoverer: Hochman, 61a.
synonym: *l(4)PT-3: lethal(4) Powell, Tennessee-3.*
references: 1961, Am. Naturalist 95: 375-82.
1963, DIS 37: 45.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)4.* RK3.

l(4)4d
origin: Spontaneous.
discoverer Lipe, 62k.
synonym: *l(4)AM-2: lethal(4) Amherst, Massachusetts-2.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)4.* RK3.

1(4)5
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as embryos. RK3.

1(4)6
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as larvae. RK3.

1(4)6°
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)36.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Homozygotes die as pupae. RK3.

l(4}6t>
origin: Spontaneous.
discoverer: Hochman, 61a.
synonym: *1(4)PT-1; lethal(4) Powell, Tennessee-1.*
references: 1961, Am. Naturalist 95: 375—82.
1963, DIS 37: 48.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as pupae. RK3.

1(4)6 **c**
origin: X ray induced,
discoverer: Gloor and Green, 1957.
synonym: *1(4)15.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.

1(4)7
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as embryos. RK3.

1(4)8
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26*
phenotype: Homozygotes die as pupae. RK3.

l(4)8°
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)10.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Homozygous lethal. RK3.

l(4)8b
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)19.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)8.* RK3.

1(4)9
location: 4- [within *Df(4)ti*\.
origin: Spontaneous.
discoverer: Stowell, 62k.
synonym: *1(4)BU-1: lethal(4) Bountiful, Utah-1.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Lethal homozygous and when heterozygous with *D£(4)3, Di(4)ll, Df(4)12, Dt(4)24, Df(4)34, Df(4)G,* and *spa*^{c}«<. RK3.

****1(4)9°***
origin: Spontaneous.
discoverer: Crow.
synonym: *1(4)1-JFC: lethal(4) of* /. F. Crow.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)9.* RK3.

*1(4)9**
origin: Spontaneous.
discoverer: Hochman, 61e.
synonym: *l(4)ar: lethal(4) in chromosome containing abdomenrotaCum.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
ph*notype: Like *1(4)9.* RK3.
other information: Proof that the lethal is not at the ar locus comes from the observation that *D%4)M/ar 1(4)9*>* survives and exhibits the *ar* phenotype. Thus, whereas the *at* locus is within *Df(4)M, 1(4)9b* is not.

1(4)9-
origin: Spontaneous.
discoverer Hochman, 64a4.
phenotype: Like *1(4)9.* RK3.

1(4)10
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)33.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.

1(4)10: see *1(4)8**
1(4)11: see *Di(4)ll*
1(4)12: see *Df(4)12*

1(4)13
location: 4- [within *Df(4)M*\.
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygous lethal. Lethal in combination with *Df(4)M* and *ci*^{D} but not with *Df(4)17, Df(4)34,* or *1(4)18. 1(4)13/+* is normal. RK3.
cytology: Placed in region 101E through 102B16, on basis of its inclusion in *Dt(4)M = Df(4)101E-F;102B6-17.*

1(4)14
location: 4- (not located).
origin: X ray induced.
discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as larvae. RK3.

1(4)14"
origin: X ray induced.
discoverer. Gloor and Green, 1957.
synonym: *1(4)26.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)14.* RK3.

1(4)14*
origin: Spontaneous.
discoverer: Wrathall, 611.
synonym: *l(4)ST-2: lethal(4) Solway, Tennessee-2.*
references: Hochman, 1963, DIS 37: 48.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)14.* RK3.

1(4)15
location: 4- (not located).
origin: Spontaneous.
discoverer: Grandmann, 62b.
synonym: *l(4)ST-4: Mhal(4) Solway, Tmn@&Mee-4.*
references: Hochman, 1963, DIS 37: 49.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Most homozygotes die as pupae. A few survive, especially in uncrowded cultures. Survivors have spread wings and minor vein abnormalities such as crossveins between L2 and L3;

males lack external genitalia but produce motile sperm; both sexes sterile. RK3.

1(4)15: see *1(4)6^*

1(4)15"

origin: Spontaneous.
discoverer: Wrathall, 62a.
synonym: *1(4)SLC-1: lethal(4) Salt Lake City-1.*
references: Hochman, 1963, DIS 37: 49.
Hochman,, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)15.* RK3.

l(4)15t>

origin: Spontaneous.
discoverer: Lipe, 621.
synonym: *1(4)MW-1: lethal(4) Madison, Wisconsin-1.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Like *1(4)15.* RK3.

1(4)17: see Df(4)17

1(4)18

location: 4- [within $Df(4)M^{63}*$].
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)35.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygous lethal. *1(4)18/ci* is cf; $l(4)18/M(4)^{63a}$ is lethal; $l(4)l8/ci^{D}$ is viable. About half the $1(4)18/ci^{+}3$ flies raised at 25°C show L4 interruption. RK3A.
cytology: Placed in salivary chromosome region 101F2-102A5, on the basis of its inclusion in *Df(4)M63" =Df(4)101F2-102Al;102A2-5.* Associated with *T(3;4)l-18;* breakpoints unknown.

1(4)18: see *1(4)4°*

1(4)19: see *l(4)8b*

*1(4)20: seel(4)4^b^*

1(4)21

location: 4- (not located).
origin: Spontaneous.
discoverer: Wrathall, 611.
synonym: *1(4)ST-1: lethal(4) Solway, Tennessee-1.*
references: Hochman, 1963, DIS 37: 48.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as pupae. RK3.

1(4)21: see *1(4)2**

1(4)22

location: 4- (not located).
origin: Spontaneous.
discoverer: Wrathall, 62a.
synonym: *1(4)AM-1: lethal(4) Amherst,* Massachu-*setts-1,*
references: Hochman, 1963, DIS 37: 49.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as pupae. RK3.

1(4)23

location: 4- (not located).
origin: Spontaneous.
discoverer: Lipe, 62k.
synonym: *l(4)AM-3: lethal(4) Amherst, Massachu-setts-3.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Homozygotes die as embryos. RK3.

1(4)23: see *1(4)21>*

1(4)24: see *Df(4)24*

1(4)25

location: 4- [within *Df(4)M*\.
origin: Spontaneous.
discoverer: Hochman, 62a.
synonym: *l(4)ST-3: lethal(4) Solway, Tennessee-3.*
references: 1963, DIS 37: 48-49.
Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as larvae. RK3.
cytology: Placed in salivary chromosome region 101E through 102B16, on basis of its inclusion in *Df(4)M = Df(4)101E-F;102B6-17.*
other information: Incorrectly reported as an allele of *1(4)1** by Hochman, Gloor, and Green (1964).

1(4)26: see *1(4)14**

1(4)27: see *1(4)1**

1(4)28: see *1(4)1*>*

1(4)29

location: 4- Lwithin *Dt(4)G*\.
origin: Spontaneous.
discoverer: Hochman, 62k.
synonym: *l(4)BU-2: lethal(4) Bountiful, Utah-2.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
phenotype: Homozygotes die as pupae. Lethal when heterozygous with *Di(4)3, Dt(4)ll, Df(4)12, Df(4)24, Df(4)34,* and *Df(4)G.* Wild type when heterozygous with alleles of *1(4)9, spa,* or sv. RK3.

1(4)29: see *1(4)2°*

1(4)29°

origin: Spontaneous.
discoverer: Kidwell, 621.
synonym: *l(4)OC'l; lethal(4) Ottawa, Canada-1.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
phenotype: Like *1(4)29.* RK3.

1(4)29^

origin: Spontaneous.
discoverer: Hochman, 6319.
phenotype: Like *1(4)29.* RK3.

1(4)30: see $1(4)1^{d}$
1(4)31: see *Di(4)31*
1(4)32: see $1(4)1^{c}$
1(4)33: see *1(4)10*
1(4)34: see *Df(4)34*
1(4)34: see *1(4)2**
1(4)33: see *1(4)18*
1(4)36: see $l(4)6^{a}$
1(4)37: see *1(4)2**
1(4)38: see *1(4)2**
l(4)AM-t: see *1(4)22*
l(4)AM-2: see $l(4)4^{d}$
l(4)AM-3: see *1(4)23*
l(4)at: see *1(4)9**
1(4)BU-1: see *1(4)9*

l(4)BV-2: **see** ***1(4)29***
1(4)MW-1: **see** ***1(4)15****
l(4)OC-t: **see** ***1(4)29****
1(4)PT-1: **see** ***1(4)6****
l(4)PT-2: **see** ***1(4)2****
l(4)PT-3: **see** ***l(4)4c***
1(4)SLC-1: **see** ***1(4)15'***
1(4)ST-1: **see** ***1(4)21***
l(4)ST-2: see /f4J24*>
l(4)ST-3: see /(4J25
l(4)ST-4: see /(4Ji5
/ac: ***lacquered***
location: 1-7.3.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 87.
phenotype: Pale fly with chitin glistening as though polished. Bristles long and straggly, frequently duplicated. Eyes smaller and slightly bright. Wings often longitudinally pleated. Slightly delayed eclosion; viability and fertility reduced in both sexes. RK2.
other information: Two alleles each induced by X rays, CB. 3034, CB. 1540. One allele each induced by CB. 3025, CB. 1506, CB. 2511. Six alleles induced by CB. 1528.
lame: **see** ***Ime***
lanc&: **see** ***nw²***
lance-b: **see** **//**
lanceolate: **see** **//**
Lap-A°: Leucine aminopeptidase A-less
location: 3- (near *L,ap-D;* no recombination yet observed).
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 221-30.
phenotype: Leucine aminopeptidase A is one of six such enzymes that may be demonstrated in *Drosophila* by starch gel electrophoresis when a discontinuous Tris borate buffer is used at room temperature at 6—8 V/cm. The enzyme is stained with L-leucyl-^S-naphthylamide and Black K salt in 0.2 M Tris Maleate buffer pH 5.2. LAP A is found in homogenates of both larvae and pupae but not of adults. *Lap-A°/Lap-A°* horaogenates have no LAP A electrophoretic band. RK3.
Lap-A^F: Leucine aminopeptidase A-Fast
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 221-30 (fig.),
phenotype: *L&p-A^F/Lap-AF* and *Lap-A^/Lap-A^0* produce LAP A, which migrates faster in starch gel electrophoresis than LAP A produced by *Lap-A^s*. RK3.
Lap-A^s: Leucine aminopeptidase A-Slow
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 221-30 (fig.),
phenotype: *Lmp-A^s/Lmp-A^s* and *Lmp~A^s/L®p-A®* produce slowly migrating LAP A. *L,Mp~A$^{p'}$/L&p~A5* produce enzyme characterized by a rather wide electrophoretic zone of mobility intermediate between that of the slow and fast LAP A types. RK3.
Lap-D^F: Leucine aminopeptidase D-Fast
location: 3-98.3 (Falke and Mactntyre).
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 221-30 (fig.). Falke and Maclntyre, 1966, DIS 41: 165-66.
phenotype: Leucine aminopeptidase D is one of six such enzymes detected by the method used to demonstrate LAP A. LAP D is found in pupae and to some extent in old larvae, but not in young larvae or adults. *Lap-D^F'/Lap-D?* produces LAP D of high mobility. RK3.
Lap-D^s: Leucine aminopeptidase **D-S/ow**
origin: Naturally occurring allele.
discoverer: Beckman and Johnson.
references: 1964, Hereditas 51: 221-30 (fig.). Falke and Maclntyre, 1966, DIS 41: 165-66.
phenotype: Homozygotes produce slowly migrating LAP D. *Lap-D^F/Lap-D^s* produce equal amounts of slowly and rapidly migrating LAP D and no enzyme of intermediate mobility. RK3.
Large: **see** ***Lg***
late hatching: **see** ***Ih***
Id: loboid
location: 3-102 [between *ca* and *bv* (Lewis, 1956, DIS 30: 130)].
origin: Spontaneous.
discoverer: Curry, 39a.
references: 1939, DIS 12: 45.
phenotype: Eyes resemble *L/+*. Malformation of eyes ranges from slight dorsoventral seam across middle of eyes to a more extreme effect in which growth of anterior part is completely inhibited in most-extreme cases. Antennalike outgrowth frequent where growth of eyes is suppressed. Tends to overlap wild type. RK3.
Id52a
origin: Spontaneous.
discoverer: Edmondson, 52a.
references: 1952, DIS 26: 60.
phenotype: Like *Id.* RK3.
leg tumor: **see** ***Igt***
lem: lemon
location: 1-17.5.
origin: Spontaneous.
discoverer E. M. Wallace, 12h.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 48 (fig.).
phenotype: Body color pale yellow, with dark trident and black bristles. Wings and veins pale yellow. Easily distinguished from wild type, but viability about 70 percent wild type, and most flies sterile. RK3.
lethal(): **see** ***l( )***
Leucine aminopeptidase A: **see** **Lap-A**
Leucine aminopeptidase D: **see** ***Lap-D***
If: little fly
location: 1-68.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).

discoverer: Fahmy, 1954.
references: 1959, DIS 33: 87.
phenotype: Small fly with markedly narrow abdomen, frequently with small tumors. Low viability and fertility in both sexes, but especially females. RK3.
other information: One allele each induced by CB. 3025, CB. 3051, CB. 1592, CB. 1414, CB. 1506, and X rays. Two alleles induced by CB. 1528.

Lffll: **see** ***l(l)ffll***

****Lg: Large***

location: 1-27.
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 55.
phenotype: Heterozygote large, late eclosing, with visibly smaller hairs; viability excellent. Tendency toward shortening of L4 and L5, missing postvertical bristles, and islands of vein tissue on either side of L2. Homozygous lethal. RK2.

****Igh: long haired***

location: 1-20.7.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 87.
phenotype: Small fly; size reduction most noticeable in head and thorax. Wings short and slightly altered in shape. Anterior thorax frequently dented in the mid-dorsal line. Hairs deranged; bristles long and straggly. Abdomen nearly always abnormally pigmented, ranging from no melanization of tergites 5—7 to small, irregular underpigmented patches on these tergites. Male viability about 25 percent wild type. Males sterile. RK3.

lgl: **see** ***l(2)gl***

****lgt: leg tumor***

location: 2- (not located).
origin: Spontaneous,
discoverer: Spencer, 36c20.
references: 1937, DIS 7: 14.
phenotype: Black tumor growths inside thorax ventrally at bases of posterior legs. Sterile in both sexes; poor viability. RK3.

Ih: late hatching

location: 1-57.
origin: Spontaneous,
discoverer: Bridges, 31d6.
phenotype: Slow-developing semigiant. RK3.

light: **see** ***It***

lightoid: **see** ***ltd***

limited: **see** ***Im***

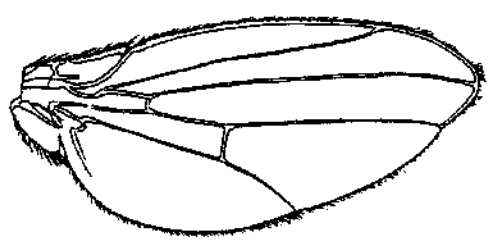
little fly: **see** ***If***

lix: little isoxanthopterin

location: 1-23.
origin: Spontaneous.
discoverer: Hessler, 1959.
references: 1960, DIS 34: 50.
Hubby, 1962, Genetics 47: 109-14.
phenotype: Flies indistinguishable from wild type; dissected testis sheath dark yellow-orange, but this character not dependable for classification; causes striking changes in compounds that fluoresce in ultraviolet light on paper chromatograms of testes. Isoxanthopterin content of testis sheath greatly reduced. A blue fluorescent compound not otherwise detected in *D. melanogaster* (the *lix* substance) is present. Drosopterins present in the testis sheath, and quantities of sepiapteridine, biopterin, "Compound A," and "riboflavinlike" are elevated. The colored pteridine gives testis sheath its darker color. Pteridine accumulation in testis sheath alone is affected. RK3.

//; lanceolate

location: 2-106.7.
origin: Spontaneous.
discoverer: Bridges, 23d3.
synonym: *lance-b.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 227.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Wings narrowed at tips and slightly divergent. Eyes slightly smaller than normal and bulging; head narrow. Waddington finds wing effect detectable in middle pupal stage. RK3.
cytology: Placed in region between 59E2 and 60B10 on the basis of its being to the right of *In&RybwW*[1] =ln(2R)41B2-Cl;59E2-4* and to the left of *Df(2R)Px = Df(2R)60B8-10;60Dl-2.*



II[2]: lanceolate-2
Edith M. Wallace, unpublished.
112
origin: Spontaneous.
discoverer: Bridges, 23d25.
phenotype: Wings pointed and narrow. Eyes small and bulging. Head narrow. Wing shape first seen in early contraction stage of wing development (23-hr pupa at 25°C), according to Waddington (1939, Proc. Natl. Acad. Sci. U.S. 25: 303). More extreme and more useful than //. RK2.

Im: limited

location: 2-50.
origin: Spontaneous.
discoverer: Bridges, 29125.
phenotype: Sternites small, rounded, or irregular; bristles sparse. Females sterile. RK3.
cytology: Not Included in *Dl(2L)64j = Df(2L)34E5-F1;35C3-D1* (E. H. Grell).

****lme: lame***

location: 1-47.8.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 150§).
discoverer: Fahmy, 1956.

references: 1959, DIS 33: 87.
phenotype: Legs weak, frequently deformed and generally shortened as a result of reduction in length of tarsal segments. Wings atypically shaped and abnormally held. Flies so crippled they cannot move; they die soon after eclosion. RK3.

lme: see ***l(2)me***
Lobe: see **L**
loboid: see ***Id***
long haired: see ***Igh***
low xanthine dehydrogenase: see ***Ixd***
lozenge: see ***Iz***
lozenge-like: see ***rstl***
lozengelike: see ***Izl***

It: light

location: 2-55.0 Oust to the left of spindle attachment).
origin: Spontaneous,
discoverer: Bridges, 24dS.
references: 1931, Eos 7: 229-48.
de Zulueta, 1931, Eos 7: 249-53.
phenotype: Eye color yellowish pink — lighter at high temperatures, darker at low. Ocelli colorless. At 25°C, eyes have 12 percent wild-type red pigment and 9 percent wild-type brown pigment (Nolte, 1954, J. Genet. 52: 127—39); with *st,* color only slightly lighter than with *It* alone; with *bw,* it is a clear lemon yellow, pinkish in old flies (Schultz and Dobzhansky, 1934, Genetics 19: 344-64; Mainx, 1938, Z. Induktive Abstammungs-Vererbungslehre 75: 256—76). Eye color autonomous when larval optic disk is transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes colorless in *It* offspring of *lt/lt* mothers; some color in tubes if mother is *lt/+*. *It stw/It stw* is completely inviable (Purdom); however, *It* stw^3/*It* stw^3 has good viability. RK1.
cytology: Placed in 40B-F on basis of breakpoints common to rearrangements that produce mottling for *It* (Hessler, 1958, Genetics 43: 395-403).

****lf2***

origin: Spontaneous.
discoverer: Bridges, 30bl4.
references: 1931, Eos 7: 229-48.
phenotype: Eye color slightly maroon, differs little from wild type. Intensified by *b&*^{2} and more extreme in females. RK3.

It3

origin: Spontaneous in *In(2L)Cy + ln(2R)Cy,* a/2 *Cy* L^4 sp2.
discoverer: Beadle, 36e23.
phenotype: Eye color of *It*^{3}/*It* darker than *lt/lt.* Larval Malpighian tubes of *U*^{3}/*lt* colorless when derived from 1/ mothers. Since *it*^{3} is in the rearranged lethal-bearing chromosome the homozygote has not been obtained. RK1A.

IH

origin: Ultraviolet induced,
discoverer: Meyer, 50d.
references: Meyer, Edmonds on, Byers, and Erickson, 19S0, DIS 24: 60.
phenotype: Like *It*^{3} in combination with other *It* alleles. Rare homozygotes obtained are short lived and sterile. RK2.

****/ts***

origin: Ultraviolet induced.
discoverer: Meyer, 51d.
references: Meyer and Edmondson, 1951, DIS 25: 73.
phenotype: Like *It**. Homozygote lethal, as is *It*$^{4'}$/*It*^{5}. *It*^{3}/*It*^{5} is viable and has mutant eye color. RK2.

****lfS6e***

origin: Spontaneous (arose together with *Atu*^{56c}).
discoverer: Meyer, 56c.
references: 1956, DIS 30: 77.
phenotype: Like *It;* has good viability. RK1.

****/*•»*:*** ***light-mottled***

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled; eyes a mixture of light and wild type ommatidia. RK2A.
cytology: Associated with *T(2;3)1P*1 = T(2;3)40B-F;63B-F.*

****ltn,2***

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled; eyes a mixture of wild type and occasional darker ommatidia. RK2A.
cytology: Associated with *In(2L)lt*™^{2} *= In(2L)22F-23A;4QB-F.*

Itm3

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like *It*"*^{2}. RK2A.
cytology: Associated with *In(2LR)W»*^{3} = *In(2LR)40B-F;60D.*

****ltm4***

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like *lt*^{m2}. RK2A.
cytology: Associated with *T(2;3)tt*$^{a\cdot4}$ ~ *T(2;3)40B-F;67E.*

****ltmS***

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *lt*^{ml}, RK2A.
cytology: Associated with *T(2;3)lt*^{m5} = *T(2;3)40B-F;98C.*

****lfn,6***

origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like *lt*^{m}*. RK2A.
cytology: Associated with f]f2;3>/*«* « *T(2;3)26E-F;4QB~F;96E.*

ltm7

origin: X my induced.
discoverer: Hessler, 1957.

references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like $It^{0}*^{1}$. RK2A.
cytology: Associated with *T(2;3)1P*>7 = T(2;3)40B-F;l00F.*

l_tm8

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with *T(2;3)lt™8 = T(2;3)40B-F;92B.*

lfm9

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with $In(2LR)lt^{m}?$ = *In(2LR)40B-F;56E.*

ffm70

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with $T(2;3)lt^{m10}$ =*T(2;3)40B-F;64E.*

l_{tm}ll

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Dark mottled like $It^{1\prime\prime 2}$. RK2A.
cytology: Associated with $T(2;3)lt^{m11}$ = *T(2;3)40B-F;96F.*

Ifm 12

origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with $ln(2LR)H^{ml2}$ = *In(2LR)40B-F;60D.*

origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with $T(2;3)lt^{m13}$ = *T(2;3)40B-F;64F.*

ltm U

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Dark mottled like tt^{m2}, RK2A.
cytology: Associated with $T(2;3)lt™^{1\prime}$* « *T(2;3)40B-F;9SF.*

IfmIS

origin: X my induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like lt^{ml}. RK2A.
cytology: Associated with $T(2;3)lt***^{s}$ = *T(2;3)40B-F;92B.*

ltm 16

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like lt^{ml}. RK2A.
cytology: Associated with $T(l;2)lt^{m16}$ = *T(1;2)11A;12F;22D;4OB-F.*

$l_t$ml7

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like lt^{ml}. RK2A.
cytology: Associated with $T(2;3)lt™^{1}7$ = *T(2;3)40B-F;95C-D.*

Ifm18

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with *T(2;3)W«18 = T(2;3)40B-F;98A.*

l_tm19

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like $It™^{2}$. RK2A.
cytology: Associated with $T(2;3)lt™^{19}$ = *T(2;3)40B-F;94B.*

ltm 20

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like $1\,t^{ml}$. RK2A.
cytology: Associated with $In(2L)lt^{m20}$ = *In(2L)32C;40B-F.*

Ifm21

origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like lt^{m2}. RK2A.
cytology: Associated with $T(2;3)lt^{m21}$ = *T(2;3)40B-F;93D,*

l_tm22

origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Dark mottled like im^{2}. RK2A.
cytology: Associated with $In(2LR)lt^{m22}$ = *In(2LR)4QB~F;59D.*

Ifm23

origin: X ray induced.
discoverer: Hessier, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *ltm2.* RK2A.
cytology: Associated with $T(2;3)lt**^{2}3$ = *T(2;3)40B-F;62F.*

l_tm24

origin: X ray induced.
discoverer Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like lt^{mI}. RK2A.
cytology: Associated with $T(2;3)lt^{m24}$ « *T(2;3)4QB-F;59F;75C*

**l$_t$m2S*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like [illegible]. RK2A,
cytology: Associated with *In(2LR)lt™25 = In(2LR)40B'F;57C-D.*

**lfm26*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *lt^{ml}*. RK2A.
cytology: Associated with *ln(2L)lt^{m26} = In(2L)27C;40B-F.*

**\fn>27*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *lt^{ml}*. RK2A.
cytology: Associated with *T(2;3)lt^{m2}7 - T(2;3)40B-F;88E-F.*

**lfn>28*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *It^{1} ^{n1}*. RK2A.
cytology: Associated with *T(2;3)lt^{m2S} = T(2;3)40B-F;97E.*

l$_t$m29
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like *lt^{ml}*. RK2A.
cytology: Associated with *T(2;3)lt^{m29} = T(2;3)40B-F;99F.*

**lfm30*
origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Dark mottled like *It™^{2}*. RK2A.
cytology: Associated with *T(2;3)Jf»30 - T(2;3)40B-F;99C.*

origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like [illegible]. RK2A.
cytology: Associated with *TXltfllP*^{31} = T(l;2)8F;28D;40B-F.*

**l$_t$m32*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *It*"**, RK2A.
cytology: Associated with *T(2;3)lt™3^{2} «* T(2;3)40B-F;97A.*

**tfm33*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *im**. RK2A.
cytology: Associated with *In(2LR)lt^{m}33 = In(2LR)40B-F;58B.*

**lfm34*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
phenotype: Pale mottled like *It™^{1}*. RK2A.
cytology: Associated with *T(2;3)lf"34 - T(2;3)40B-F;61B.*

**l$_t$m3S*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
phenotype: Pale mottled like *It^{1}*^{1}*. RK2A.
cytology: Associated with *T(2;3)lt^{m3}^ = T(2;3)40B-F;64C.*

lfmlOO
origin: X ray induced.
discoverer: Spieler, 60a25.
references: Baker and Rein, 1962, Genetics 47: 1399-1407.
phenotype: Homozygous lethal. Variegated for *It.* RK2A.
cytology: Associated with *T(2;3)lt^{ml}°0 = T(2;3)40;97F.*

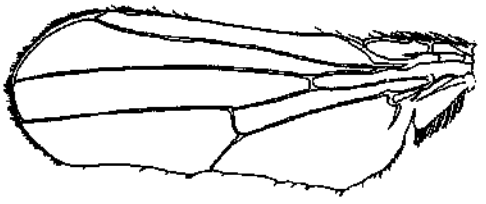
**lfpk: light-pinkoid*
origin: Spontaneous.
discoverer: Lancefield, 18cl8.
synonym: *pinkoid; pink-wing.*
references: 1918, Biol. Bull. 35: 207-10. Bridges, 1931, Eos 7: 229-48.
phenotype: Eye color like pink. Darker than *It* and lighter than *It^{2}*. Wings short and crinkled. Viability 30 percent wild type. RK3.

ltd: lightoid
location: 2-56 (cytology at variance with this location).
origin: Spontaneous.
discoverer Nichols-Skoog, 36d6.
phenotype: Eye color clear light, translucent yellowish pink. Resembles // but is lighter; darkens with age. Ocelli colorless; larval Malpighian tubes colorless. Eyes have 38 percent wild-type red pigment and 7 percent wild-type brown pigment (Nolte, 1954, J. Genet. 52: 127-39). RK1.
cytology: Placed outside the region 41A-44C, on the basis of its not being included in *Dp(2;3)P32 - Dp(2;3)41A.42D-E;44C-D$_i$89D7'El* (E. B. Lewis).

ltd^{37b}
origin: Spontaneous.
discoverer: Poulson, 37b.
references: Poulson and King, 1948, DIS 22: 55.
phenotype: Eye color of newly hatched adult bright red like v; darkens to a color like *pr* in old flies. Ocelli colorless; larval Malpighian tubes colorless. Viability excellent. RK1.

lxd: low xanthine dehydrogenase
location: 3-33.
origin: Spontaneous (naturally occurring alleie ?).
discoverer: Keller and Glassman, 61jl2.

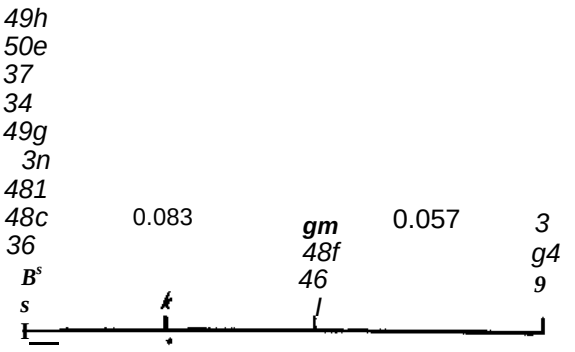
references: 1964, Genetics 49: 663—68.
1964, DIS 39: 61.
phenotype: Homozygous flies exhibit only 25 percent normal xanthine dehydrogenase activity. No obvious morphological expression. The *ma!*$^{+}$ complementation factor of Glassman (1962, Proc. Natl. Acad. Sci. U.S. 48: 1491-97) inhibited in *lxd* extracts and oxidase activity of Forrest, Hanly, and Lagowski (1961, Genetics 46: 1455-63) absent. Purine analogs more toxic to *lxd* than to Oregon-R, *mal, or ry** This might mean further derangement of purine metabolism in *lxd.* RK3.



Ly: Lyra
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 118.

Ly; *Lyra*
location: 3-40.5.
origin: X ray induced.
discoverer: Dubinin, 1929.
references: Coyne, 1935, DIS 4: 59.
Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301.
phenotype: Lateral margins of wings excised, giving narrowed shape; angle between veins L2 and L5 reduced. Bristles shortened and stubby, postscutellars frequently missing. Eyes somewhat deformed, with tufted vibrissae. Abdomen dark and narrow, with rear edge of tergites raised. Homozygous lethal. *Ly/M(3yh*^{33}*!* is lethal. Modification of wings first visible as marginal scalloping of prepupal wing buds; wing fold narrower (Waddington, 1939, Proc. Natl. Acad. ScL U.S. 25: 304; 1940, J. Genet. 41: 75-139). RK1A.
cytology: Placed in 70A3-5 on the basis of its association with *D%3L)Ly - Df(3L)7QA2-3;70A5-6* (Bridges).

lys: lysine
location: 2-22.9.
origin: Spontaneous.
discoverer: E H. Grell, 1957.
references: I960, DIS 34: 50.
1961, Genetics 46: 925-33.
phenotype: Larvae, pupae, and adults contain a higher concentration of lysine than wild type. Accumuiation of lysine is postulated to result from block in its degradation. Flies homozygous for *lys* occasionally have faintly reddish fat cells, especially ia thorax. This effect enhanced by starvation, by combining *lya* with re, *rc**$_{t}$ or *cho.* RK3.



Map of the *Iz* locus
Drawn from Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.

Iz: lozenge
location: 1-27.7.
origin: Spontaneous.
discoverer: Bridges, 16bl2.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230.
Green and Green, 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708-21.
phenotype: Eye narrower than wild type and ovoid. Irregular facets in some areas cause rough patches; areas of fused facets appear as smooth patches. Eye color appears normal, but in combination with *st* slight reduction in red pigment detectable. Tarsal claws reduced. Developmental study by Waddington and Pilkington (1942, DIS 16: 70) shows failure of middle cell layer of optic disk to penetrate between cells of outer layer; surface thus covered with primary pigment cells. Females sterile. Parovaria and spermathecae absent; some *lz/+* females have abnormal parovaria (Anderson, 1945, Genetics 30: 280-96). RK1.
cytology: Located in 8D (region 8D4 through 8E2) by Green and Green (1956). Earlier Demerec, Kaufmann, Fano, Sutton, and Sansome (1942, Carnegie Inst. Wash. Year Book 41: 191) placed locus between 8C3 and 8C17, based on its inclusion within *Dt(l)t282-1 = Df(l)8C2-3;8C14-Dl;* however, Green and Green suggest that *Df(l)t*^{a}*2-1* $_{ma}$*y* extend into 8D, a region unfavorable for cytology.
other information: The *Iz* region has been subdivided into four recombinationally separable groups (Green and Green, 1949, Proc. Natl. Acad. Sci. U.S. 35: 586-91; 1956; Green, 1961, Genetics 46: 1169—76). First three groups called *spe: spectacle, Iz: lozenge,* and *gly: glossy; lz*^{K} is sole member of fourth sublocus (see map). All double mutants show extreme phenotype resembling */2*^{s}. Several comparative studies of *Iz* alleles have been published [Gottschewski, 1936, Zool. Anz. Suppi. 9: 104—12; Anderson, 1945, Genetics 30: 280-96; Oliver, 1947, Texas Univ. Publ. 4720: 167-84; Clayton, 1952, *ibid.* 5204: 227-51; 1954, iWd. 5422: 189-209, 210-43; Chovnick and Lefkowitz, 1956, Genetics 41: 79-92 (fig.);

Chovnick, Lefkowitz, and Fox, 1956, *ibid.* 41: 589-604; Clayton, 1957, *ibid.* 42: 28—41 (fig.); 1958, *ibid.* 43: 261-73 (fig.); 1959, *ibid.* 44: 1041-52 (fig.)].

1x3

origin: Spontaneous.
discoverer: Bridges, 22bl4.
synonym: *gly*^{3}*: glossy-3.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 230.
Green and Green, 1956, Z. Induktive Abstammungs- Veyerbungslehre 87: 708-21.
phenotype: Eye size sharply reduced; surface smooth. Optic disk of mature larva and prepupa two-thirds normal size (Chen, 1929, J. Morphol. 47: 135—99). Red pigment greatly reduced; color yellowish brown; cream colored in combination with v. Malpighian tubes of mature larvae lighter than wild type; variable (Brehme and Demerec, 1942, Growth 6: 351—56). Tarsal claws vestigal. Homozygous females lack parovaria and spermathecae, and are sterile; *Iz*^{3}/+ females lack parovaria and many have abnormal spermathecae [Anderson, 1945, Genetics 30: 280-96 (fig.)]. RK1.
other information: Located in the rightmost *Q&ly) lz* sublocus.

Iz3n

origin: Spontaneous.
discoverer Green.
synonym: *spe*^{3n}*: spectacled-3n.*
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Eyes sharply reduced in size; surface smooth, red pigment sparse and confined primarily to margin of eye. Tarsal claws vestigial. Females sterile; spermathecae and parovaria absent. RK1.
other information: Located at leftmost *(spe)* sublocus of *lz* region.

I_Z34

origin: Spontaneous.
discoverer Beadle, 34k22.
synonym: *lz*^{34k}*; spe*^{34}.
references: 1935, DIS 4: 9.
Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Eye phenotype intermediate between *lz* and *lz*^{3}. Surface of eye has large areas of fused facets with a few normal facets (Clayton, 1957, Genetics 42: 28—41); eye color dark red with small yellowish spots. Larval Malpighian tubes slightly lighter than normal; variable (Brehme and Demerec, 1942, Growth 6: 351-56), Tarsal claws reduced. Spermathecae and parovaria absent from homozygous females, which are sterile; some *Iz*^{34}/+ females have abnormal parovaria (Anderson, 1945, Genetics 30: 280—96). The female-fertile stock, *lz*^{34}*; mt(lz*^{34}*)*, described by Beader and Green (1960, Genetics 45: 1563—66) also lack spermathecae and parovaria. Bender and Green's observations indicate that ovarian abnormalities are primarily responsible for sterility of *lx*^{34} females and absence of spermathecae and parovaria are only a secondary cause, *lz*^{34} ovaries, when transplanted into normal females, however, are more productive than when in *lz*^{34} females (Clancy and Welborn, 1948, Genetics 33: 606). RK1.
other information: Located in leftmost (spe) *lz* sublocus.

**I_Z35*

origin: Spontaneous,
discoverer: Gottschewski, 1935.
references: 1937, DIS 8: 12.
phenotype: Eyes reduced and diamond shaped; color opaque brown. Homozygous females sterile. *Iz*^{3}**/lz* females fertile. RK1.

1x36

origin: Spontaneous.
discoverer: Spencer, 36c.
synonym: *lz*^{36c}*; lz*^{36cS}*; spe*^{36}.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Like *lz*^{3} in texture, color of eyes, and color of larval Malpighian tubes. Parovaria and spermathecae absent from homozygous females, which are sterile, and tend to be abnormal in *Iz*^{36}/+ females. [Anderson, 1945, Genetics 30: 280-96 (fig.)]- RK1.
other information: Located in the leftmost *(spe) lz* sublocus.

**l_z3 6cD: lozenge-36c of Dempster*

discoverer: Dempster, 36c.
phenotype: Eyes small, narrow, oval, and glossy; color light brown with red rim and patches at center. Females fertile. RK1.

1x37

origin: Spontaneous.
discoverer Curry, 37hl7.
synonym: *lz*^{37h}*; spe*^{37}.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87; 708—21.
phenotype: Eye size reduced. Areas of irregular facets in posterior region of eye; eye color normal. Larval Malpighian tubes somewhat lighter than normal; variable (Brehme and Demerec, 1942, Growth 6: 351—56). Tarsal claws reduced. Spermathecae abnormal or absent from homozygous females, which are sterile; present in *Iz*^{37}/+ females [Anderson, 1945, Genetics 30: 280—96 (fig.)]-. RK1.
other information: Located in leftmost (spe) *lz* sublocus.

lx^{46}

origin: Spontaneous,
dIscoverer Green.
references: Green and Green, 1949, Proc. Natl. Acad. ScL U.S. 35: 586—91.
1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708-21.
phenotype: Eye size reduced; surface rough; color near normal. Tarsal claws reduced. Spermathecae and parovaria absent from females; females sterile. RX1.
other information: Located in *lz* sublocus of lozenge region.

**f_z48c*

origin: X ray induced.
synonym: spe^{48c},
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Eye size sharply reduced; surface smooth; red pigment reduced and largely confined to margin of eye. Tarsal claws vestigial. Females sterile; lack spermathecae and parovaria. RK1.
other information: Located in leftmost *(spe) lz* sublocus.

l_z48f

origin: Induced by mustard gas.
discoverer: Lindsley, 48f.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Like /z-*«^{c}. RK1.
other information: Located in *lz* sublocus.

**I_z481*

origin: X ray induced.
synonym: $spe*^{81}$.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Like lz^{4S}*. RK1.
other information: Located in the leftmost *(spe) lz* sublocus.

**l_z49g*

origin: Spontaneous.
synonym: *$pe*9<3.*
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Like *lz**<=.* RK1.
other information: Located in the leftmost (spe) *lz* sublocus.

**l_z49h*

origin: X ray induced.
discoverer: W. K. Baker, 49h.
synonym: ape^{49h}.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Eye size sharply reduced; surface smooth; red pigment distributed over entire eye. Tarsal claws normal. Spermathecae and parovaria present and normal in females, which are fertile. When heterozygous with all lozenge alleles except tz^{*9li}, phenotype is wild type or very nearly so. RK1.
other information: Located in the leftmost (spe) *lz* sublocus.

IzSOd

origin: X ray induced.
discoverer: Ritterhoff, 50d.
references: Glass, 1951, DIS 25: 77.
phenotype: Like lz^s. Females sterile. RK1.

l_z50e

origin: Recovered among progeny of male fed P32. containing medium.
discoverer R. C. King, 50e30.
synonym: l_z50e30; $_{spe)}$ *50e.*
references: 1950, DIS 24: 58.
Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708-21.
phenotype: Like $lz*?*^1$ in all respects. Eyes reduced in size, and almond shaped; no indication of facets; covered with indentations, giving a pock-marked appearance. Hairs on eye surface sparse or absent; eye surface glossy with many large black or brown flecks. Tarsal claws normal. Females fertile; spermathecae and parovaria present and normal. lz^{SOe}/*lz* has normal eyes except for a few flecks. Complements most other *lz* alleles except $lz*^{9fl}$, lz^{S2c}, and those associated with rearrangements or deficiencies. RK1.
other information: Located in the leftmost (spe) *lz* sublocus.

**l_zSId*

origin: Spontaneous.
discoverer: Mossige, 51dl0.
references: 1951, DIS 25: 69.
phenotype: Eye size extremely reduced; surface smooth and glossy; color light yellow with brownish margin and spots. Females sterile. RK1.

**/$_z$52c*

origin: Recovered among progeny of male fed H3BO3 and exposed to thermal neutrons.
discoverer: R. C. King, 52c28.
references: 1951, DIS 26: 65.
phenotype: Eyes mottled; yellowish brown, darker at rim; facets fused. Males setnisterile, with missing tarsal claws, although pulvilli and endopodia normal. Third antennal segment slightly reduced. $_{lz}$*S2c/i$_z$50e* f_{em}ales resemble /z^°*. RK1.

**l_z55d*

origin: X ray induced.
discoverer Clark, 55d.
references: 1956, DIS 30: 71.
phenotype: Eyes smaller than wild type and oval in shape; all facets run together. Females sterile. RK1.

/$_z$55/

origin: Spontaneous.
discoverer: Masters on, 551.
references: Clancy, 1960, DIS 34: 48.
phenotype: Like lz^8. Paper chromatography reveals trace of red eye pigments. RK1.

l_z57j

origin: X ray induced,
discoverer Mayo, 57j.
references: 1958, DIS 32: 82.
phenotype: Like lz^a. RK1.

l_z58d

origin: Spontaneous.
discoverer: Schreckengost, 58d.
references: Clancy, 1960, DIS 34: 48.
phenotype: Like lz^a. Paper chromatography reveals trace of red eye pigments. RK1.

**/$_z$59*

origin: X ray induced.
discoverer: Polivanov, 1959.
references: 1963, DES 38: 30-31.

phenotype: Eyes reduced in size, and ovoid; facets fused; surface slightly rough and almost or completely hairless; color light brown with darker, slightly reddish rim; almost colorless in combination with v. Tarsal claws practically absent as in lz^{cl}. Males sterile; transmit no motile sperm to females; therefore homozygous females not observed. lz^{S9}/lz^{37} females intermediate between the two mutants in eye phenotype, have reduced tarsal claws, and are weakly fertile. RK2.

l_z61f

origin: Spontaneous.
discoverer: Moynehan, 61f.
references: Burdick, 1963, DIS 37: 47.
phenotype: Facets completely fused; eye color dark, but pigment unevenly distributed and concentrated at margin. Females fertile. $Iz^{6}*^{l}/lz$ females more normal than either mutant, with facets disrupted and fused only in posterior third of eye; also fertile. RK1.

l_z62k

origin: X ray induced.
discoverer: Mickey, 62kll.
references: 1963, DIS 38: 28.
phenotype: Like lz^{a}. RK1.

I_z63

origin: X ray induced.
discoverer: Halfer, 1963.
phenotype: Eye shape oval; color brown, darkest at margin; surface smooth and glossy. Viability and fertility of both sexes good. RK1.

l_z63f

origin: Spontaneous.
discoverer Burdick, 63fl7.
references: Seiger and Bender, 1963, DIS 38: 31.
phenotype: Eye size moderately reduced; surface smooth; color brownish with darker margin. Tarsal claws and pulvilli strongly reduced. Spermathecae and parovaria absent; female reproductive capacity strongly reduced. lz^{63t} complements lz^{50e} but not lz^{34}, lz^{D}, or lz^{61t} (Klingele). Spermathecal number *o£i$_z$63i/i$_z$K* 0-3. RK1.

$*l_z268$-29

origin: X ray induced.
discoverer: Hoover, 38d.
phenotype: Lethal, but not shown that lethality is at *Iz* locus. Fertile in combination with *lz.* RK2A.
cytology: Associated with $T(l;3)lz^{26l}$*-29 = *T(1;3)8D8-9;81F.*
other information: Induced simultaneously with ct^{268-29}.

lz^{BS}: lozenge from Bar-Stone

origin: X ray induced,
synonym: *spe*^^.
references: Oliver, 1947, Texas Univ. Publ. 4720: 167-84.
Green and Green, 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
phenotype: Eye size reduced; surface rough with scattered fused facets; color nearly normal; some reduction of red pigment detected in combination with *st.* Tarsal claws reduced; spermathecae and parovaria absent from females, which are sterile. RK1.
other information: Located in the leftmost *(spe) lz* sublocus.

/$z^{c'}$: lozenge-clawless

origin: Appeared as a male from an ovary treated *in vitro* with $CuSO_4$.
discoverer: Hadorn, 45b27.
references: Hadorn and Anders, 1946, DIS 20: 65.
Anders, 1955, Z. Induktive Abstammungs-Vererbungslehre 87: 113-86 (fig.).
phenotype: Eyes narrow and small, without facets; surface has rough spots; color amber; both pteridines and ommochromes affected; darker at rim. Tarsal claws absent. Third antennal segment reduced; sensillae on antennae abnormal. Phenotype similar in both sexes. Females infertile and lack spermathecae and parovaria. Autonomous in transplants. RK1.

lz^{D}: lozenge-Dominant

origin: Spontaneous.
discoverer: Novitski, 47i.
references: 1949, DIS 23: 61.
phenotype: Males and homozygous females resemble lz^{a}. Heterozygous females sometimes have roughened eyes. Apparent dominance shown by H. Bender to be caused by the presence of $spa^{e}(^{lz})$; heterozygous expression additionally enhanced by presence of $In(2LR)bw^{vl}$. RK1 as recessive; RK3 as dominant.

$*lz^{f}$: lozenge-fertile

origin: Spontaneous.
discoverer: Muller.
references: 1946, DIS 20: 67.
phenotype: Intermediate allele like *lz.* Female moderately fertile. RK2.

Izs: lozenge-glossy

origin: X ray induced.
discoverer: Oliver, 31a7.
synonym: ily^{1}.
references: 1935, DIS 4: 15.
Green and Green, 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
phenotype: Eyes smaller than wild type; surface glossy from fused facets; a few normal facets also present; color dark blood red, bright red in combination with *st* or v. Larval Malpighian tubes slightly lighter than normal (Brehme and Demerec, 1942, Growth 6: 351-56). Tarsal claws reduced. Spermathecae and parovaria absent from homozygous females, which have reduced fertility; *Iz6/+* females tend to have abnormal parovaria [Anderson, 1945, Genetics 30: 280-96 (fig.)]. RK1.
other information: Located in rightmost *(jffty) lz* sublocus. $lz6/lz^{B}$ provided probably the first recorded case of intra-allelic recombination (Oliver, 1940, Proc. Natl. Acad. Sci. U.S. 26: 452-54; 1940, DIS 13: 73).

****lz9>: lozenge-glued***

origin: X ray induced.
discoverer: M. A Bender, 53k.
references: 1955, DIS 29: 69.

phenotype: Eyes of male reduced and roughened like *Gl;* color dark; female eyes somewhat less extreme. *Iz6^{1}/lz* intermediate between *lz&^{1}* and *Iz* and sterile. Homozygous females fertile. RK1.

lzgM: lozenge-glossy of Muller

origin: Spontaneous.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
phenotype: Eye size reduced; surface rough; red pigment distributed over entire eye. Tarsal claws reduced. Spermathecae and parovaria absent. Females sterile. RK1.
other information: Located in the *Iz* sublocus of the lozenge region.

lz^{K}: lozenge of Krivshenko

origin: Spontaneous.
discoverer: Krivshenko, 55k9.
synonym: *amx^{ss}: almondex-55; lz^{k}.*
references: 1956, DIS 30: 74.
Green, 1961, Genetics 46: 1169-76 (fig.).
phenotype: Eyes narrow and moderately rough; facets irregular; eyes of homozygous females more nearly normal than those of males. Tarsal claws normal. Females fertile; spermathecae and parovaria present. Interactions of *lz^{K}* with other *Iz* alleles described by Green (1961). RK1.
other information: Located between the *spe* and *Iz* subloci.

lz$^{K'}$; lozenge of Kill

origin: Spontaneous.
discoverer: Kiil, 45kl4.
references: 1946, DIS 20: 66.
phenotype: A less extreme allele of *Iz.* Some females fertile. RK1.

/xM58ч lozenge of Meyer

origin: X ray induced.
discoverer: Meyer, 58k.
references: 1959, DIS 33: 97.
phenotype: Eyes small and oval; surface glossy; color brownish. Tarsal claws missing. Homozygous females moderately fertile, although spermathecae absent; *lz^{M}5*/lz** also fertile. RK1.

Iz*: /oxenge-spectacled

origin: *X* ray induced.
discoverer Patterson, 1928.
synonym: *ape^{1}*.
references: Patterson and Muller, 1930, Genetics 15: 495-577.
Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21,
phenotype Eye size reduced; narrower titan normal; no true facets and whole eye has glossy surface; color yellow-brown with darker rim, creamy in combination with *v.* Tarsal claws vestigial. Homozygous females lack spermathecae and parovaria and are sterile. *lz^{a}/+* females tend to have abnormal parovaria (Anderson, 1945, Genetics 30: 280—96), RK1.
other information: Located in the leftmost (spe) *Iz* •ubloctts. *lz*/lz$* provided probably the first recorded case of intz*-*llelic recombination (Oliver, 1940, Proc. Natl. Acad. Sci. U.S. 26: 452-54; 1940, DIS 13: 73).

lz*^{B}: lozenge-spectacled of Bishop

origin: X ray induced.
references: Oliver, 1947, Texas Univ. Publ. 4720: 167-84.
phenotype: An extreme lozenge allele similar to *lz^{s}*. Eye color yellowish brown. Homozygous females lack spermathecae and parovaria and are sterile; *lz^{aB}/+* females have reduced numbers of spermathecae and parovaria (Anderson, 1945, Genetics 30: 280-96). RK1A.
cytology: Associated with *In(l)lz^{sB} = In(l)8;20* (Green).

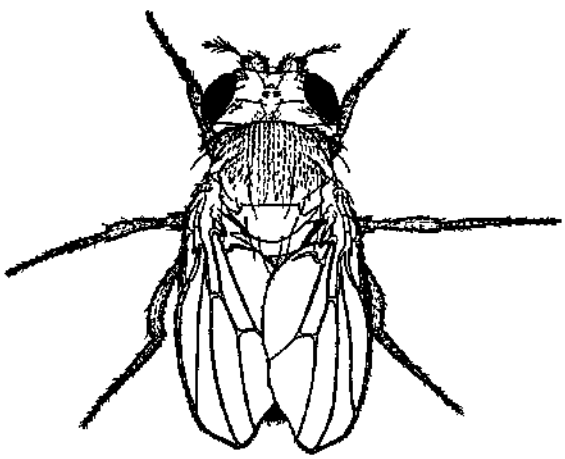
IZY*: lozenge in yellow-4

origin: X ray induced.
synonym: £\yY*-
references: Oliver, 1947, Texas Univ. Publ. 4720: 167-84.
Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708-21.
phenotype: Similar to *lz^{a}* but eye color redder. Homozygous females lack spermathecae and parovaria and are sterile; *lzVt/+* females have abnormal parovaria and tend to lack spermathecae and parovaria (Anderson, 1945, Genetics 30: 280-96). RK1.
other information: Located in the rightmost *(gly) Iz* sublocus.

lz-1:* see *rstl

lzl: lozengelike

location: 1-11.
discoverer: Oliver, 29k24.
references: 1935, DIS 3: 28.
phenotype: Eyes rough. Both sexes fertile. RK3.
other information: Possibly an allele of *rg* (1-11.0).



m: miniature

From Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237.

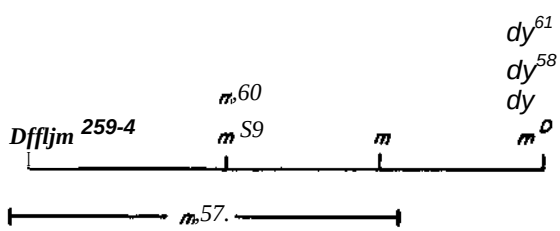
m: miniature

location: 1-36.1.
origin: Spontaneous,
discoverer Morgan, lOh.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 26 (fig.).

phenotype: Wing size reduced; only slightly longer than abdomen and with normal proportions. Angle between L2 and L5 reduced. Wings dark gray and less transparent than normal. Wing cells smaller than normal (Dobzhansky, 1929, Arch. Entwicklungsmech. Organ. 115: 363—79). In poor cultures, wings may become divergent and stringy. Cell expansion inhibited in prepupae and pupae [Waddington, 1940, J. Genet. 41: 75-139 (fig.)]. Different m mutants complement slightly; *m/dy* is wild type. RK1.

cytology: Locus probably lies in 10E1-2 and extends to the right for a short distance. Salivary chromosome studies by Demerec and Sutton show the locus to lie in region 10C3 to 10E2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191); however, Dorn and Burdick (1962, Genetics 47: 503-18) showed that $Dt(l)m^{259-4}$ (the basis for the Demerec and Sutton location) is deficient for only part of the *m* locus, and some alleles are located by recombination to the right of the deficiency.

other information: The miniature-dusky region has been divided into four recombinationally separable sites (Dorn and Burdick 1962); m occupies the third site from the left. No reverse mutations among 2 X 10^5 progeny of *m/m* females (Gagné).



Map of the *m-dy* region

Drawn from Dorn and Burdick, 1962, Genetics 47: 503—18.

m2

origin: X ray induced in *In(l)dl-49.*
discoverer. Glass, 1929.
references: 1935, DIS 4: 9.
phenotype: Like *m.* RK1A.
other information: Has not been separated from *In(l)dl-49.*

m57

origin: X ray induced.
discoverer:. Mayo, 57i.
synonym: *m^?*.*
references: 1958, DIS 32: 82.
phenotype: Like *m.* RK1.
other information: Recombines with *dy, $dySSk_f$ (fy61* and m^D but not with m, m^{59}, m^{60}, or $Df(l)m^{aS9-4}$. May be a submicroscopic rearrangement. No reverse mutation among 2 X 105 progeny of m^{S7}/m^{57} females (Gagné).

m*»

origin: Spontaneous,
discoverer: Krawinkel, 59a.
synonym: $m^{\wedge 9m}$.
references: Burdick, 1961, DIS 35: 45.
phenotype: Like *m,* but females poorly fertile. RK2.
other information: Recombines with $Df(l)m^{2S9-4}$ to its left and with *m,* m^D, and the *dy* alleles to its right (Dorn and Burdick, 1962, Genetics 47: SOS-IS).

m60

origin: Gamma ray induced.
discoverer: Ives, 601.
synonym: m^{601}.
references: 1961, DIS 35: 46.
phenotype: Like *m.* RK1.
other information: Recombines with $Df(l)m^{2S9-4}$ to its left but has not been extensively tested for recombination with other m alleles.

m61

origin: Gamma ray induced.
discoverer: Ives, 61e.
synonym: m^{61a}.
references: 1962, DIS 36: 38.
phenotype: Like m. RK1.

m2S9-4

origin: X ray induced.
discoverer: Demerec, 33i.
synonym: $Df(l)m^{259-4}$.
phenotype: Heterozygote with m has miniature phenotype. Lethal and cell lethal. RK2A.
cytology: Associated with *Df(l^S9-4 = Df(l)10C2-3;10E2-3* (Demerec).
other information: This deficiency must be for only part of the *m* region since it recombines with *m,* m^{59}, and m^D, all of which are to its right (Dorn and Burdick, 1962, Genetics 47: 503—18).

m^D: miniature-Dominant

origin: X ray induced (discovered as a mosaic).
discoverer: Slatis, 48kl7.
references: 1949, DIS 23: 63.
Slatis and Willermet, 1954, Genetics 39: 45—58 (figO-
phenotype: Wings of homozygote smaller than *m/m.* m^D/+ wings intermediate between homozygote and wild type. Viability 20—50 percent normal in males and 5 percent in homozygous females; most die in embryo. Fertility low in homozygous females. Wing size of m^D/m and m^D/dy intermediate between m^D/+ and m^D/m^D. RK2.
other information: Recombines with m alleles to its left but not *dy* alleles (Dora and Burdick, 1962, Genetics 47: 503-18).

m^K: miniature* of *KriYshenko

origin: X ray induced.
discoverer: Krivshenko, 5513.
references: 1956, DIS 30: 75.
phenotype: Wings thin textured, smaller than normal, sometimes crumpled, with tips bent slightly upward or downward. Sometimes, fly has m phenotype. *m^/m* female varies from m-like to nearly normal. Viability and fertility high. RK2A.
cytology: Associated with $In(I)m^K$ *^In(t)10E;20B,*

m^{ps}: miniature-Penn State

origin: Gamma ray induced.
discoverer: Keller and Nash.

references: 1960, DIS 34: 51.
1961, DIS 35: 47.
phenotype: Like m^D. Homozygous females produce very few progeny. RK2.

m-Hke: see *dy3i*^{d}

M-prd: see *T(l;4)M-pro*

M: Minute

A class of genes lethal in homozygous or hemizygous condition, producing smaller (short, fine) bristles and increasing developmental time in heterozygotes. Heterozygotes often exhibit secondary effects such as small body size, large and somewhat rough eyes, missing aristae, thin-textured wings with tendency to plexus venation, missing bristles (usually postverticals), and low fertility, especially in females. Certain Minutes increase somatic crossing over (Stern, 1936, Genetics 21: 625—730). Most Minutes enhance dominance of such venation characters as *px* and *net* or of such bristle characters as *sc.* Complementary dominant lethal effects are frequent, in combination with *Dl, J,* and occasionally *D.* Recessive to two wild-type alleles in triploids; lethal when two doses are present.

K. C. Atwood has suggested that Minute loci are the sites of synthesis of soluble or transfer RNA. He argues that the best estimate of the number of Minute loci agrees with the probable number of different soluble RNA types; furthermore, the slow rate of development and the weakness of the *M/+* fly is a reasonable manifestation of the reduced rate of protein synthesis that might be expected to result from decreased production of a particular transfer RNA; and the lethality *oiM/M* is the expected result from the absence of a transfer RNA.

***M(1)3E:** Minute(l) in region 3E*

location: 1-5.
discoverer Demerec, 1938.
references: Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191.
phenotype: Slight Minute; barely distinguishable from wild type. RIGA,
cytology: Found and located in salivary chromosome bands 3E3-4, on basis of slight M phenotype of females heterozygous for *D^iy>]264-76 « Di(i)3B4-Cl;3E4-5* and non-Af phenotype of females heterozygous for *DffiyV*^{6}*-** = *Df(l)2D3-4;3E2-3* and *Df(1)N*$^{264-11}$ *7 m Dt(l)3A6~7;3E2-3.*

M(1)4BC**: Minutc(l) in region **4BC

location: 1-6.8.
discoverer: Demerec, 1938.
references: Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191.
phenotype: Strong Minute; easily distinguishable frota wild type. RK.2A.
cytology: Found and located in salivary gland chromosome region 4B5 through 4C6, on basis of extrero© *M* phettotype of females heterozygous for *Df(l)N264-73 = Df(l)3C3-4;4C6-7* versus slight *M* phenotype *\M(1)3E]* of *Df(l)N*$^{264-42}$ *= Df(l)3C4-5;4B4-6.*

****M(l)30***

location: 1-14 (to the left of cv).
origin: Spontaneous.
discoverer: Schultz.
references: 1929, Genetics 14: 366-419.
cytology: Associated with *Di(l)M-30;* breakpoints unknown. Placed in region 5D3-7B2, on the basis of the Minute phenotype of *Df(l)ct*^{2}*$^{8-37}$ = *Dt(l)5D2-3;7B2-3.*

M(l)34i28: see *M(1)O*^{S}*P*

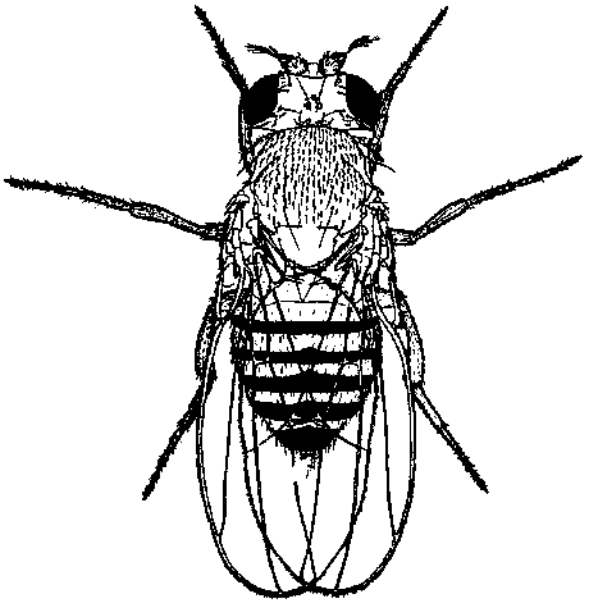
M(l)36f: see *M(l)n36*

M(l)Bld: Minuted) Blond

location: 1-0.1.
origin: Synthetic.
discoverer: Patterson.
synonym: Vi: *Viability.*
references: 1932, Z. Induktive Abstammungs-Vererbungslehre 60: 125-36.
Stern, 1936, Genetics 21: 630.
phenotype: Extreme Minute of low viability. In Patterson's work, the nonappearance of Minutes led him to postulate a factor for viability (Vi). Stern (1936, Genetics, 21: 625-730) found it increased frequency of somatic crossing over. RK3A.
cytology: Locus in region 1B11 to 1C2-3 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Associated with the *2R*^{D}*X*^{p} element of *T(l;2)Bld = T(1;2)1C3-4;6OB12-13* when the *X&2R*^{P} element is replaced by a normal second chromosome.

****M(J)k***

location: 1-36.3.
discoverer: Bridges, 23d28.
phenotype: A strong Minute. Male lethal. RK2.



M(l)n: Minuted) n

Edith M. Wallace, unpublished.

M(1)n

location: 1-62.7.
origin: Spontaneous.
discoverer: Bridges, 1923.
references: Morgan, Sturtevant, and Bridges, 1924, Carnegie Inst. Wash. Year Book 23: 231-36. Bridges, 1925, Proc. Natl. Acad. Sci. U.S. 11: 701-5.
phenotype: Heterozygous females have Minute bristles. Lethal in males. Viability and fertility low. Pupation delayed about 42 hr at 25°C (Brehme). Wing cells smaller than normal (Brehme, 1941, J. Efcptl. Zool. 88: 135-60). Increases somatic crossing over in *X* chromosome (Stern, 1936, Genetics 21: 625-730). RK2.

***M(1)n36**

origin: Spontaneous in attached *X*.
discoverer: Curry, 36flO.
synonym: *M(l)36f.*
references: 1937, DIS 7: 14.
phenotype: A slight Minute. RK3.
other information: Allelism inferred from location of *M(l)n36* at 62.

M(1)o

location: 1-56.6.
origin: Spontaneous.
discoverer Bridges, 24b4.
phenotype: Heterozygous females have Minute bristles. Normal in combination with the duplication for 15 through 16A7 formed by combining the distal portion of the *X* from *TCl^B*[3] *= T(1;4)15F9-16A1;16A7-B1;1O2F* with the proximal portion of the *X* from *T(l;4)l-vll = T(l;4)15;101* (Von Halle). Increases somatic crossing over (Kaplan, 1953, Genetics 38: 630-51). Lethal in males. RK2.
cytology: Demerec and Sutton place locus between 15B1.-2 and 15E7 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

M(1)O[S]*P: Minute(l)* o of Spencer
origin: Spontaneous as mosaic female.
discoverer. Spencer, 34i28.
synonym: *M(l)34i28; M(l)Sp.*
references: 1935, DIS 3: 28. 1937, DIS 7, 14.
phenotype: Moderate Minute. Normal in combination with the duplication for 15 through 16A7 formed by combining the distal portion of the *X* from *T(1;4)BS = T(1;4)15F9-16A1;16A7-B1;1O2F* with the proximal portion of the *X* from *T(l;4)l-vll = T(l;4)15;101* (Von Halle). Lethal in males. RK2.

M(l)Sp: see *M(l)oSp*

M(2)21Cl-2: Minufe(2) in 21C1-2
location: 2-0.0.
phenotype: Extreme Minute. RK2A.
cytology: Placed in 21C1-2, on basis of inclusion in *Dt(2L)al = Dt(2L)21B8'Cl;2lC8-Dl* but not in *Dt(2L)S5 »Dt(2L)21C2-3;22A3'4* (Lewis, 1945, Genetics 30: 137-66).
other information: Exists only as *Df(2L)al* and various aneuploid deficiencies for the tip of *2L.*

***M(2)28**

location: 2-(not located).
discoverer: Schultz.
references: 1929, Genetics 14: 366-419.
phenotype: Moderate Minute. Survives in combination with *M(2)e,* and *M(2)l*[2]. RK2.
cytology: Occurred in chromosome with *In(2R)Cy.*

M(2)33et: see *M(2)c33**

***M(2)33d**

location: 2- (not located).
origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Oliver, 33dl4.
references: 1939, DIS 12: 48.

***M(2)34b**

location: 2- (not located).
origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Oliver, 34b3.
references: 1939, DIS 12: 48.

***M(2)34d**

location: 2- (not located).
origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Oliver, 34d25.
references: 1939, DIS 12: 48.
phenotype: Associated with rough eye variegation. RK3.

***M(2)34k**

location: 2- (not located).
origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Oliver, 34k22.
references: 1939, DIS 12: 48.

***M(2)38b**

location: 2-57.
origin: Spontaneous.
discoverer: Curry, 38bl8.
phenotype: Extreme Minute with small bristles and compact body. Viability varies with modifiers. *M(2)38b/stw* is non-sttv; *M(2)38b/M(2)p* viable. RK3.

***M(2)38k4**

location: 2- (not located).
origin: Spontaneous.
discoverer Mossige, 38k4.
phenotype: Medium Minute. RK2.

***M(2)40c**

location: 2-65.
origin: Spontaneous.
discoverer. Ives, 40c.
references: 1941, DIS 14: 39.
phenotype: Medium Minute with probable eye effect. RK2.
other information: Crossing over normal.

M(2)50j: see *M(2)S2soj*

*M(2)U5: seeM(2)c*3**

M(2)173
location: 2-92.3.
discoverer: Csik.
references: 1930, Magy. Biol. Kut. Int. Munk. (Tihany) 3: 438-53. Gottschewskl, 1935, DIS 4: 15.
phenotype: Moderate Minute. RK2.
cytology: Salivary chromosomes apparently normal (Bridges).

U(2)At* see *M(2)c

****M(2)b***

location: 2-87.5.
discoverer Bridges, 19k22.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
phenotype: Bristles extremely small. Abnormal abdomen effects in 90 percent of females and 40 percent of males. RK2.
other information: First Minute found in chromosome *2.*

M(2)B:* see *M(2)zB

****M(2)c***

location: 2-108 [based on location of $M(2)c^{33a}$].
discoverer: Sturtevant, 20a7.
synonym: *M(2)a.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Extreme Minute. Very late hatching. Low fertility. RK3.
cytology: Placed in salivary gland chromosome region 60E3-11, on basis of *Dt(2R)M-c33a = Df(2R)60E2'3;60El 1-12.*

M(2)c^{33a}

discoverer: Schultz, 33a7.
synonym: *M(2)115; M(2)33a.*
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Fairly strong Minute. Late hatching, but with good fertility and viability. RK2A.
cytology: Associated with *Di(2R)M-c33a = Df(2R)60E2-3;60El 1-12.*
other information: Allelism inferred from location of *M(2)c* at 107 and $M(2)c^{3}3$* at 108,

M(2)C:* see *M(2)zC

****M(2)d***

location: 2-72.
discoverer: Bridges; 20b25.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 231-34.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
phenotype: Heterozygote has no effect except when also heterozygous for *M(3)d.* The double heterozygote has Minute bristles in about 95 percent of flies. Probably lethal in homozygote. RK3.

M(2)D:* see *M(2)S2*>

****M(2)m***

location: 2-43 [based on location of $M(2)e^{s}$],
origin: Spontaneous.
discoverer: Bridges, 2Ob25.
references: Morgan, Bridges, and Sturtevant, 1925, BibUog. Genet. 2: 231.
phenotype: Medium Minute with delayed hatching. Fifty percent of females and 10 percent of males show abnormal abdomen effect. Most females sterile and remainder produce few progeny, RK3(A>.
other information: Useful as balancer for recessive male-sterile genes in the second chromosome. Crossing over probably reduced.

M(2h^{s}: Minute(2) e of Schultz

origin: X ray induced.
discoverer: Schultz, 34k21.
synonym: *M(2)S11.*
phenotype: Bristles almost normal. Not late hatching. RK3.
other information: Allelism *to M(2)e* inferred from location of *M(2)e* at 40±5 and *M(2)e$* at 43.

****M(2)e^{t}***

origin: Spontaneous.
discoverer: Bridges, 24116.
synonym: *M(2)t.*
phenotype: Medium Minute. RK2.
other information: Allelism to *M(2)e* inferred from location of *M(2)e** at 46±5.

M(2)H: Minute(2) from T(Y;2)H

location: 2-53.5 [based on location of $M(2)H.^{S}$^; between *M(2)m* and *It].*
origin: Synthetic.
discoverer: Schultz.
references: Morgan, Bridges, and Schultz, 1931, Carnegie Inst. Wash. Year Book 30: 408—15.
Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 284-91.
phenotype: Weak Minute. RK3A.
cytology: Located in salivary region 37B2 through 4OB2, on basis of its association with deficiency from *T(Y;2^i = T(Y;2)37Bl-2;40B2-3.*

M(2)H*S: Minuted) H of Schultz

origin: X ray induced.
discoverer: Schultz, 33a9.
synonym: *M(2)S5.*
phenotype: Medium Minute. RK2.
other information: Allelism with *M(2)H.* inferred from location at 53.5 and its survival in combination with $M(2Xn^{S6}$ (Schultz).

M(2)H^{S12}

origin: X ray induced.
discoverer: Schultz, 33b7.
synonym: *M(2)S12,*
phenotype: Slight Minute. Bristles nearly normal. RK3.
other information: Allelism with *M(2)H* inferred from slight phenotype and inseparability from *pr.*

****M(2)l***

location: 2-101.2 [based *on* $M(2)l^{2}$].
origin: Spontaneous.
discoverer: Bridges, 23gl5.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
Bridges, 1937, Cytologia (Tokyo),Fujii Jub. Vol. 2: 745-55.
phenotype: Fairly strong Minute. Flies eclose about 2 days late (at 25°C) because of delay in puparium formation (Dunn and Mossige, 1937, Hereditas 23: 70—90). Eyes somewhat rough; veins often show plexus. Abdominal sclerites often abnormal. Ocelli often reduced. Viability 80—90 percent wild type and fertility low. Homozygote dies in egg stage;

eggs recognizable by a thin chorion (Li, 1927, Genetics 12: 1-58). RK2A.
cytology: Associated with *Df(2R)M-l = Df(2R)57Fll-58AI;58F8-59A1.* Location further restricted to 58F on the basis of its inclusion in *Dp(2;3)P* from *T(2;3)P = T(2;3)58E3-F2;60D14-E2;96B5-Cl* (Bridges, 1937).

M(2)l2
origin: Spontaneous.
discoverer: Schultz, 26a7.
synonym: *M(2)l'.*
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 298-305.
phenotype: Medium Minute. Puparium formation delayed about 13 hr at 25°C (Brehme, 1939, Genetics 24: 131—61); slight delay in time of second larval molt. Viability, fertility, and classification excellent. Homozygote lethal in first larval instar. Increases somatic crossing over (Kaplan, 1953, Genetics 38: 630-51). RK2.
cytology: Salivary chromosomes apparently normal (Bridges).

M(2)l': see *M(2)P*

***M(2)m**
location: 2-54.
discoverer: Bridges, 23gl2.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
phenotype: Rather strong Minute with viability about 60 percent wild type. RK3.
cytology: The deficiency from *T(Y;2)G = T(Y;2)36B5-C1;4OF* with the duplication from *T(Y;2ya = T(Y;2)37Bl-2;40B2-3* (i.e., a deficiency for 36B6 through 37B2 and from 40B3 into 40F) in combination with a normal second chromosome produces an extreme Minute (Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 284—91). Because of its genetic location and extreme phenotype, *M(2)m* is assumed to be the type mutant at the locus revealed by the above deficiency, although the appropriate genetic tests cannot be made.

***M(2)m'**
origin: Spontaneous.
discoverer: Bridges, 24128.
synonym: *M(2)s.*
references: Schultz, 1929, Genetics 14: 366—419.
phenotype: Medium Minute. RK2.
other information: Allelism inferred from location at 54.4, but could equally well be an allele of *M(2)H.*

***M(2)mS*: Minute(2) m of Schultz**
origin: X ray induced,
discoverer: Schultz, 33al2.
synonym: *M(2)S6.*
phenotype: Medium Minute. Survives in combination with $M(2)H^{S}5$ (Schultz). RK2.
cytology: Included in duplication from *T(Y;2)G = T(Y;2)36B5-C1;4OF* but not that from *T(Y;2)H » T(Y;2)37Bl-2;4QB2-3;* thus occurs in cytological region assumed to contain *M(2)m,*

***M(2)m^{S13}**
origin: X ray induced.
discoverer: Schultz, 33b3.
synonym: *M(2)S13.*
phenotype: Small-bristled Minute with chunky body. RK2.
other information: Allelism with *M(2)m* inferred from phenotype and location at 50.

***M(2)p**
location: 2- (to the right of *msf).*
discoverer: Bridges, 24b6.
references: Curry, 1939, DIS 12: 46.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
phenotype: Bristles small. Survives in combination with *M(2)e, M(2)38b,* or $Df(2R)M\text{-}S2^{v}6ll$. RK3(A).
other information: May also have a second Minute factor to left of *pr.* Crossing over possibly reduced.

M(2)pt>: see *M(2)§2»*

M(2)s: see *M(2)m**

***M(2)S1: Minute(2) of Schultz**
location: 2-15.0 (between *dp* and *tkv).*
origin: X ray induced.
discoverer: Schultz, 33al2.
references: Curry, 1939, DIS 12: 46.
phenotype: Small-bristled Minute with heavy body. Classification good. Viability and fertility fairly good. RK2.
other information: Not deficient for neighboring loci.

M(2)S2
location: 2-55.1.
origin: X ray induced.
discoverer: Schultz, 33al2.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—9.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77.
Morgan, Schultz, and Curry, 1940, Carnegie Inst. Wash. Year Book 39: 251-55.
phenotype: Moderate Minute with relatively good viability. Pale body color. RK2(A).
cytology; Placed in region 41A, on basis of *Df(2R)M~S2lO = Df(2R)41A.* Salivary gland chromosomes of *M(2)S2* apparently normal, but locus in difficult chromocentric region.
other information: Gives mutant phenotype in combination with *stw* but not with *Jag, It, rl, ap, tk, std,* or *mat;* thus genetic evidence suggests deficiency.

M(2)S23
origin: X ray induced.
discoverer: Schultz, 33a.
synonym: *M(2)S3.*
phenotype: Medium Minute. RK2(A).
other information: May be associated with an inversion, since there is no crossing over between *b* and *pr.*

M(2)S24
origin: X ray induced.
discoverer: Schultz, 33a5.
synonym: *M(2)S4.*

references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—9.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Lost. Wash. Year Book 38: 273-77.
Morgan, Schultz, and Curry, 1940, Carnegie Inst. Wash. Year Book 39: 251-55.
pbemotype: Medium Minute bristles. Large pale body with heavy, malformed, bloated abdomen. Female fertility low. RK2A.
cytology: Salivary chromosomes apparently normal, but the region is in chromocentric part of *2R*.
ether information: Gives mutant phenotype in combination with *l(2)Sp9c, l(2)Spll, l(2)Spl5, atw,* and *up* btit not with/a||, *It, tl, tk, std,* or *mat.* Thus geaetic evidence suggests deficiency.

M(2)S2[8]

origin: X ray induced.
dlseeverer: Schulte, 33a3.
synonym: *M(2)S8.*
references: Morgan, Bridges, and Schultz, 1938, Cft«*gi@ fast. Wasa. Year Book 37: 304-9.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie lust, W«»h. Yea* Bo@k 3& 273—77.
phmtmtypmi Long-bristled Minute; readily classifi- •Me. P®I© body color. Eyes often deformed; postscutellar bristle* may be erect or abs«st. RO(A),
cytology: No detectable change in salivary chromososses, bat region, is in cbremioceotrk: part of *2M.*
other information: Give® mutant pfcenotyp® in *c&mtl-wdttlm* with *I(2pp9c, l(2)SplI, l(2)Spl5,* sad *ntw* bat not *rl or ap.* Then ges*tic evWenc* »»gfe*t» dWicie-nc?.

M(2)S2[9]

®rl§ft*: X *mf* iodoced.
itmtsmmmr. Sefento, *32U31.*
synonym: *M(2)S9.*
phenotype: Leag-b«s!ied Minnie, RKJ.

M(2)S2[10]

origin: X ray induced.
discoverer: Setato* 32k22.
synonym: *M(2)S10.*
references: Morgan, Bridges, Schultz, and Cwtf, 1939, C«ittrgi« test. l%sk, T«» Botk 38, 273-77,
Morgan, Srfcutlc, and Curry, 1940, Carnegie Inst. Wash.
1941, C«*a»gMt last, Wa»k. Y««r »»r* 4§; 283—87.
phenotype: Long-bristled Minute, but readily classifiable. Enhances variegation of white-mottled aad brown-Variegated to sa-*e extent as removal of *Y* chromosome. Causes abnormal development bytwMs wlf% *D.* f<'<•>*,far* <f»f., melanotic tumors, extra organs, v«*»g «§#»*, death). RK2A.
cytology: Associated with *Df(2R)M-S2[10]* = *Df(2R)41A*; fc «««itstir metaphase, *2R* about three-fourths normal size.

M(2)S2[10]

origin: Spontaneous.
discoverer: Mossige, 50j7.
synonym: *M(2)S0*.
references: Tano, 1966, Japan J. Genetics 41: 299-308.

phenotype: Medium Minute. RK2(A).
other information: Gives nonmutant phenotype in combination with *rl* and *stw.* Recombination between *pr* and *en* reduced to 1.5 map units.

***M(2)S2D: Minuted) of Schultz 2 in T(Y;2;3)D**

origin: X ray induced with *T(Y;2;3)D.*
discoverer: Schultz, 1934.
synonym: $M(2)p^D$; *M(2)D.*
references: 1937, DIS 7: 14.
phenotype: Bristles almost normal. Bristle and body color pale. Presence of $M(2)S2^D$ enhances variegated position effects to same extent removal of *Y* from male. RK3A.
cytology: Presumably associated with deficiency of salivary chromosome regions 41A-C found by Whittinghill in *T(Y;2;3p* (1937, DIS 8: 82).

***M(2)S2vg": Minuted) of Schultz 2 from vestige!-11**

origin: X ray Induced; arose simultaneously with

discoverer: Ruch, 1931.
synonym: $M(2)v^{l}$.
references: Morgan, Bridges, and Schultz, 1938, Cana«gie last. Wash. Year Book 37: 304-9.
Morgan, Scimitar, Bridges, and Curry, 1939, Carnegie fast. Wash. Year Book 38: 273-77.
phenotype: Slight Minute of good viability. Pale body color. RK2A.
cytology: Associated with Df2R)M-S2^" « *Di(2R)40F-41Al;42Al 9-Bt.*
other infamcrtt©* Originally considered to be part ©f FJJ** pt*@»otyp@ but Bridges and Curry showed it to be separable,

M(2)S3:* »ee *M(2)S2[3]
M(2)S4i* me *M(2)S2[4]
M(2)S5:* see *M(2)HSs
M(2)S6:* see *M(2)m[S6]

M(2)S7

l©csrt®n: 2-77.5.
®#ij|!»s X ray iaiaced (©ce«rr©d as a «©»aic).
discoverer: Schultz, 33a2.
phenotype: ftristle*verytsiall,aristaeoftenreduced; veaation plexasltfee. Hatches late. Viability *mbctxt* 70 percent wild type, btut fariafel«. Fertility good, toeffasrs somatic er©»«i»g over (K»p!«B_p 1953, Ge»#tic» 3S; 630-51), Rati© of total »ac!#te acid coatenl to total nitrogen content less than normal (*Altmttt,* 1953, Experieotia fft 463—65). RK2.
cyteAeffy: SaSi*ary cfere?r2%ea'*'s apparently ttenm!, Placed t® t»e right *of* ?2D, ce the basis ©f its technique ia ttw duplicated s««t*^fl of chr«/jros'jes* 2 cst»«ei ia *nkfomrn'me 3* in T'i.:Ijlo.f = 7*'*;.1'??-40;42A2-3;52D-F;80;81.

M(2)S8:* see *M(2)S2[8]
M(2)S9:* see *M(2)S2[9]
M(2)S10:* see *M(2)S2[10]
MQ)SJ3t:* me *Mtj)**
M(2)S12:* see *M(2)H[S12]
M(2)S13:* see *M(2)m[S13]

M(2)t: see *M(2)e**
M(2)vg[11]: see *M(2)S2vg11*
M(2)z
location: 2-12.9.
origin: Spontaneous.
discoverer: Schultz.
references: 1929, Genetics 14: 366—419.
phenotype: Medium Minute with good characteristics. About 2 days delay in puparium formation (Dunn and Mossige, 1937, Hereditas 23: 70—90). Increases somatic crossing over (Kaplan, 1953, Genetics 38: 630-51). RK2.
cytology: Located between 24E2 and 25A2, based on its inclusion in *Df(2L)M-z[B] = Df(2L)24E2-Fl;25Al-2* (Morgan, Schultz, Bridges, and Curry, 1939, Carnegie List. Wash. Year Book 38: 273—77).
other information: Carries dp^+ and tkv^+.

***M(2)zB:** Minute(2) z of Bridges*
origin: Spontaneous.
discoverer: Bridges, 38dl2.
synonym: *M(2)B.*
references: Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
Curry, 1939, DIS 12: 46.
Curry, 1941, DIS 14: SO.
phenotype: Medium Minute. RK2A.
cytology: Associated with *Df(2L)M-z[B] = Df(2L)24E2-Fl; 25A1-2.*

M(2)zC: *Minute(2) z of Curry*
origin: Spontaneous,
discoverer: Curry, 37g27.
synonym: *M(2)C.*
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304-9.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
phenotype: Fairly strong Minute. Late hatching. Eyes rough. Viability and fertility low. RK2A.
cytology: Associated with *Df(2L)M-z[c] = Dt(2L)24D2-5;25A2-3* (Bridges).

M(3)1
location: 3-101.0.
origin: Spontaneous.
discoverer. Bridges, 19b8.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 206—7 (fig.).
phenotype: Bristles slender and shorter than wild type. Somewhat late hatching. *M(3)l/M(3)g* survives. RK2.
other information: First Minute found.

M(3)6: see *M(3)h33l*

M(3)32l
location: 3- (not located),
origin: X ray induced,
discoverer: Oliver, 32122.
references: 1939, DIS 12: 48.
other information: Permits no crossing over with *3-p!@* except In spindle-fiber region.

M(3)33d: see *M(3)h33d*
M(3)33j: see *M(3)h33j*
M(3)364: see *M(3)be36e*

**M(3)39b*
location: 3- (not located but probably in *3R).*
discoverer: Curry, 39bl7.
references: 1939, DIS 12: 45.
phenotype: Short-bristled Minute of low viability. Females infertile except in mass culture. RK3.

M(3)54c
location: 3- (rearrangement),
origin: Neutron induced.
discoverer: Mickey, 54clO.
references: 1963, DIS 38: 29.
cytology: Associated with *In(3LR)M-54c = In(3L)73A9-10;75D7-El + In(3LR)61C2-3;80C4-5;93B4-5;100B8-9.*

M(3)124: seeM(3)wi24
M(3)B: see *M(3)wB*
M(3)B2; see *M(3)wB2*

**M(3)bb*
location: 3- (not located).
origin: Spontaneous.
discoverer: Mossige.
references: 1946, DIS 20: 68.
phenotype: Medium Minute. RK2.

M(3)be: Minute(3) beta
location: 3-84.5 [based on location *of M(3)be[36e]$_m$*
origin: Spontaneous.
discoverer: Stern, 26a20.
references: 1927, Naturwissenschaften 15: 740—46. 1934, DIS 1: 35-36.
phenotype: Medium Minute of excellent viability. Increases somatic crossing over (Stern, 1936, Genetics 21: 625-730). RK2.

M(3)be[36e]
origin: Spontaneous.
discoverer Bridges, 36e22.
synonym: *M(3)36e.*
phenotype: Medium Minute. Good viability and fertility. Wing shows plexus effect along vein L2 and at posterior crossvein. RK2.
other information: Allelistn to *M(3)be* based on the location of *M(3)be* at 87± and *M(3)be[36]** at 84.5.

M(3)d
location: 3-95.
discoverer: Bridges, 20b25.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 231.
phenotype: Part of digenic Minute. Produces no effect except when *M(2)d* is also heterozygous. Homozygote probably lethal. RK3.

**M(3)f*
location: 3-105.
discoverer: Bridges, 20i9.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 236.
phenotype: Small bristles. Poorly viable; females infertile. RK3.

M(3)f: see *M(3)S35[f]*
M(3)Fla: see *M(3)w[Fla]*

***M(3)g**

location: 3-106.2.
origin: Spontaneous in *M(3)d* strain.
discoverer: Bridges, 20i27.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 236.
phenotype: Very slight Minute. Stronger in presence of an enhancer located near p. Survives in combination with *M(3)l*. RK3.
cytology: Schultz found it to be in the deficiency for the tip of *3R* from *T(3;4)d* (cytology not recorded); Dobzhansky (1930, Genetics IS: 347-99) claimed otherwise.
other information." May be same as *M(3)d*.

***M(3)h**

location: 3-40.2 (to the left of D).
origin: Spontaneous as a mosaic male.
discoverer: P. R. Sturtevant.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 244.
Coyne, 1935, DIS 4: 59.
Mossige, 1938, Hereditas 24: 110-16.
phenotype: Medium Minute. Delayed about 2 days in puparium formation (Dunn and Mossige, 1937, Hereditas 23: 70-90). *M(3)h/Ly* survives. RK2.

***M(3)h^{33d}**

origin: Recovered among progeny of heat-treated flies.
discoverer: Ives, 33d30.
synonym: *M(3)33d.*
references: Plough and Ives, 1934, DIS 1: 33.
1935, DIS 2: 35.
phenotype: Bristles thin and short. Eyes small and rough. Wings broad and waxy. Viability poor. RK3.
other information: Allelism inferred from location at 41.

***M(3)h^{33i}**

origin: X ray induced.
discoverer: Demerec, 33j25.
synonym: *M(3)6; M(3)33j.*
references: 1935, DIS 3: 27.
Coyne, 1935, DIS 4: 59.
Mossige, 1938, Hereditas 24: 110-16.
phenotype: Medium Minute. Prolongs larval life 2 days at 25°C (Dunn and Mossige, 1937, Hereditas 23: 70-90). Good viability and fertility. *M(3)h33}/Ly* and *M(3)h^{3}3i/M(3)ti* are lethal. Increases somatic crossing over in *X* (Stern, 1936, Genetics 21: 625-730). RK2A.
cytology: Genetic data on lethal interaction with both *M(3^i* and *Dt(3h%,y = Df(3L)70A2-3;70A5-6* suggest that *M(3]h^{33}i* is a deficiency that includes bands in 70A.

Mf3)'ri«7; *Mhute(3) h of Schultz*

origin: X ray induced.
discoverer- Schultz, 33al2.
synonym: *M(3)$37.*
phenotype: Extreme Minute with fine bristles and small body. RK3.
other information: Allelism based on lethal interaction with *M(3$iy* (Von Halle).

***Ul(3)hS38**

origin: X ray induced.
discoverer: Schultz, 33a12.
synonym: *M(3)S38.*
phenotype: Rather extreme Minute. Wings flimsy, with plexus effect along vein L2 and at posterior crossvein. Low viability and fertility. RK3.
other information: Allelism inferred from location 3.6 units to the left of *st* (Schultz).

***M(3)h^v**

origin: Spontaneous.
discoverer Bridges, 25dl8.
synonym: *M(3)v.*
phenotype: Medium Minute. RK2.
other information: Allelism based on lethal interaction with *M(3)h.*

***M(3)h^y**

origin: Spontaneous.
discoverer: Sturtevant, 25gl9.
synonym: *M(3)y.*
references: Stern, 1927, Naturwissenschaften 15: 740-46.
Mossige, 1938, Hereditas 24: 110-16.
phenotype: Medium Minute. Good viability and fertility. Increases somatic crossing over in *X* (Stern, 1936, Genetics 21: 625-730). RK2.
other information: Allelism based on lethal interaction with ***M(3)h.***

***M(3)i**

location: 3-28.9.
discoverer: Bridges, 23d23.
phenotype: Medium Minute of good viability. RK2.

***M(3)ii**

discoverer: Bridges, 24b28.
synonym: *M(3)q.*
phenotype: Extreme Minute. Very late hatching. Poor viability; females infertile. RK3.
other information: Allelism to *M(3)i* inferred from its published position of 30±10.

***M(3)i^{S33}**

origin: X ray induced.
discoverer: Schultz, 33a6.
synonym: *M(3)S33.*
references: 1940, DIS 13: 51.
phenotype: Extreme Minute. Females usually sterile. RK3.
other information: Allelism with *M(3)i* inferred from its published location near ft.

***M(3)j**

location: 3-90.2.
discoverer: Bridges, 23dl2.
phenotype: Extreme Minute. Late hatching. Females sterile or of low fertility. RK3(A).
other information: Lethal in combination with *1(3)PR;* possibly a deficiency.

M(3)J*P: *Minute(3) j* of *Spencer

origin: Spontaneous.
discoverer: Spencer, 36c21.
synonym: *M(3)Sp.*
references: 1937, DIS 7: 14.

phenotype: Extreme Minute with very small bristles. Wings broad with plexus of veins. Abdominal bands somewhat abnormal. Female almost never fertile and then only sparingly. Male has fair viability and fertility. RK3.
other information: Allelism with *M(3)j* inferred from phenotype and published location of 90±10.

M(3)q: see *M(3)ii*

M(3)S31: Minute(3)* of *Schultz
location: 3-50.0.
origin: X ray induced.
discoverer: Schultz, 33alO.
references: 1940, DIS 13: 51.
phenotype: Fine-bristled Minute of medium viability. RK3(A).
other information: Gives mutant interaction with *cu* but not *ma.* May reduce crossing over in sf-sr region.

M(3)S32
location: 3- (not located).
origin: X ray induced.
discoverer: Schultz, 33a5.
phenotype: Medium Minute. Most flies thickset. RK3.

M(3)S33: see *M(3)is3 3*

M(3)S34
location: 3-44.3 [3.2 units to the left of *Dfd* (Schalet, 1960)J.
origin: X ray induced.
discoverer: Schultz, 33a6.
references: Schalet, 1960, DIS 34: 55.
phenotype: Slight Minute. Overlaps wild type. In existing lines bristles appear normal, but recessive lethal effect at 44.3 remains. RK3.

****M(3)S35***
location: 3-64.
origin: X ray induced.
discoverer: Schultz, 33all.
phenotype: Extreme Minute with small body. RK3.

****M(3)S35f***
discoverer: Moriwaki, 38f2.
synonym: *M(3)L*
references: 1939, DIS 12: 50.
phenotype: Minute bristles. RK2.
other information: Allelism to *M(3)S35* based on its location at 62.4.

M(3)$36
location: 3- (not located).
origin: X ray induced.
discoverer: Schultz, 32k26.
phenotype: Variable phenotypes appear in stock; Minute and variegated for ss-like. Not studied. RK3.

M(3)S37: see *M(3)h*3 7*

M(3)S38: see *M(3)hsss*

****M(3)S39***
location: 3-47.
origin: X ray induced.
discoverer: Schultz, 33a3.
phenotype: Extreme Minute with small body. Low viability and fertility. RK3.

M(3)Sp; see *M(3)JSP*

M(3)v: see ***M(3)h^{v}***

M(3)w
location: 3-79.7.
discoverer: Schultz, 1925.
references: Stern, 1927, Naturwissenschaften 15: 745.
Schultz, 1929, Genetics 14: 366-419.
phenotype: Strongly reduced bristles. Good viability and fertility. Delays puparium formation about 42 hr at 25°C; first and second instars also delayed (Brehme, 1941, Growth 5: 183-95). Homozygote dies in first instar. *M(3)w* enhances *L, B* (Dunn and Coyne, 1935, Biol. Zentr. 55: 385-89), *Bx3, Co, fa, ap*^{4}, *Jag, Ser, Ly,* and *ap*^{Xt}» (Bryson, 1940, Genetics 25: 113). Treanor (1962, Ph.D. Thesis, Univ. Buffalo) suggests that the mitochondria1 membrane is defective and labile phosphate formation is disturbed. Recovery of *M(3)w* from *M(3)w/In(3R)C, l(3)a* mothers is reduced (Schultz). RK2.

M(3)w^{124}
discoverer: Csik.
synonym: *M(3)124.*
references: 1930, Magy. Biol. Kut. Int. Munk. (Tihany)3: 438-53.
Gottschewski, 1935, DIS 4: 15.
phenotype: Bristles shorter than average Minute. Hatching later. Viability good. RK2.
other information: Allelism based on lethal interaction with *M(3)w, M(3)w*^{B}, *M(3)w*^{B}^, and *M(3)w*^{F}*l*.*

M(3)w^{B}: ***Minute(3)*** **w of *Burkarf***
discoverer: Burkart.
synonym: *M(3)B.*
references: 1935, DIS 4: 15.
phenotype: Moderate Minute. Good viability and fertility. RK2(A).
other information: Interacts lethally with *l(3)a* (Bridges), whereas *M(3)w* does not (Schultz). Possibly indicates that *M(2)w*^{B} is a deficiency. Allelism based on lethal interaction with *M(3)w, M(3)w*^{124}, *M(3)*$_{w}$*B2*$_{t}$ and *M(3)w*^{F}**.*

M(3)w^{B2}; ***Minute(3) w of Bridges***
discoverer. Bridges, 38c6.
synonym: *M(3)B^.*
phenotype: Bristles quite small. Body size reduced. Medium late hatching. RK2.
other information: Allelism based on lethal interaction with *M(3)w, M(3)w*^{124}, *M(3)w*^{B}, and *M(3)w*^{F}*l*.*

M(3)w^{FI}°: ***Minute(3)*** **w-F/orit/o**
discoverer. Mossige, 35d.
synonym: *M(3)Fta.*
references: Bryson, 1937, DIS 7: 18.
1939, DIS 12: 50.
phenotype: Strongly reduced bristles. Good viability and fertility. *M(3)Fta/+* females form puparia at 129 hr after hatching; 41 hr after in wild type. Larval molts also delayed to a lesser extent (Brehme, 1940, Genetics 26: 141), RK2.
other information: Allelism based on lethal interaction with *M(3)w, M(3)w*2*, M(3)w*^{B}, and *M(3)w*^{B}**.*

M(3)x: ***Minuto(3) with C(3)x***
location: 3- (on the left arm).

origin: Spontaneous in *In(3L)P*.
discoverer: Muller, 1929.
phenotype: Rather extreme Minute; expression reduced by *H*. RK3A.

M(3)y: see *M(3)hv*

m location: 4-0.
origin: Spontaneous.
discoverer: Bridges, 25128.
references: 1935, Biol. Zh. (Moscow) 4: 401-20. 1935, Tr. Dinam. Razvit. 10: 463-74.
phenotype: Medium Minute. Viability good; development only slightly delayed. *M(4)/+/+* triplo-fours are non-Minute (Mohr, 1933, Hereditas 17: 317-32). Homozygotes die in embryonic stage (Farnsworth, 1951, Genetics 36: 550). RK2A.
cytology: Placed in salivary gland chromosome section 1O1F2-102A5, on the basis of $Df(4)M^{63B}$ = *Di(4)101F2-102Al;102A2-S* (Fahmy and Hochman). Associated with *Df(4)M = Df(4)101E-F;102B6-17*.

*$M(4)^2$
origin: X ray induced.
discoverer: Schultz, 32k29.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
phenotype: Like *M(4)* but more extreme; a slight grooveless phenotype. Viability and fertility lower than *M(4)*. RK2A.
other information: Gives mutant phenotype in combination with *at, d,* and ci^D; therefore probably a deficiency.

*M(4)3
origin: X ray induced.
discoverer Schultz, 33a8.
phenotype: Similar to *M(4)*. RK2A.
cytology: Associated with $Dt(4)M^3$, which looks like *Df(4)M* (Bridges, 1935, Tr. Dinam. Razvit. 10: 463-74).

M(4)4
origin: X ray induced.
discoverer: Glass, 42hl2.
references: 1944, DIS 18: 40.
phenotype: Like *M(4)*. RK2A.
other information: Gives mutant interaction with *d* and Ce and therefore probably associated with a deficiency.

H(4)S7$_9$
origin: X ray induced.
discoverer. Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Geoetica 35: 109-26.
phenotype: Like *M(4)*. RK2.
cytology: Salivary chromosomes apparently normal (Hochman).
other information: No interaction with *ci* or ci°.

M(4)62e
origin: Recovered among progeny of male injected with homologous DNA.
discoverer. Fahmy, 62e.
phenotype: Small fly with extremely Minute bristles. Eyes large and slightly rough. Wings frequently divergent or upheld. Development severely retarded; viability low. RK3A.
cytology: Associated with $Df(4)M^{63e}$ = *Df(4)10lE;102D13-El* (Fahmy).

M(4)62f
origin: Gamma ray induced.
discoverer: Fahmy, 62f.
phenotype: Medium Minute. Development slightly retarded; viability good. RK2A.
cytology: Associated with $Di(4)M^{62t}$ = *Dt(4)101E;102B10-17* (Fahmy); *Df(4)101E-F;102B2-5* (Hochman).

$M(4)^{63o}$
origin: Recovered from progeny of male injected with thymus extract from leukemic mice (Gross Factor).
discoverer: Fahmy, 63a.
phenotype: Medium Minute. Development slightly retarded; viability good. RK2A.
cytology: Associated with $Df(4)M^{63a}$ = *Df(4)101F2-102Al;102A2-5* (combined from observations of Fahmy and Hochman).

m(B): see *su(B)*

m(g): see *e(g)*

ma: maroon
location: 3-49.7.
origin: Spontaneous.
discoverer: Bridges, 12cl3.
references: 1918, Proc. Natl. Acad. Sci. U.S. 4: 316-18.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 53 (fig.).
phenotype: Eye color dull ruby, approaching wild type with age; classification slow. Larval Malpighian tubes pale yellow (Beadle, 1937, Genetics 22: 587—611). Eye color autonomous in transplant into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Eyes contain 31 percent normal red pigment and 59 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1-10). RK2.

ma49d
origin: Spontaneous.
discoverer: Oftedal, 49d.
references: 1951, DIS 25: 69.
phenotype: Eye color like *bw*, darkening with age. RK1.

**Ma:* Mo *dominigene*
location: 1- (not located).
origin: Spontaneous.
discoverer: Goldschmidt, 1935.
references: Gardner, 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 95.
phenotype: In combination with Ma, *vg/+* is strongly scalloped. RK3.

macrofine: see *mf*

mah: mahogany
location: 3-88.
discoverer: Beadle, 36b26.
references: Beadle and Ephrussi, 1937, Am. Naturalist 71: 91-95.
phenotype: Eye color translucent brown in young flies, changing toward wild type and becoming dark

brown with age. Eyes contain 77 percent normal red pigment and 102 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1-10). Larval Malpighian tubes wild type in color (Beadle, 1937, Genetics 22: 587-611). RK3.

mal: maroon I ike

location: 1-64.8 (Schalet, 1963, DIS 38: 82).
origin: X ray induced.
discoverer: Oliver, 3011.
references: 1935, DIS 3: 28.
phenotype: Eye color brownish purple. Larval Malpighian tubes short, bloated, and irregularly formed; contain yellow to orange pteridine globules (Schwinck, 1960, DIS 34: 105). Lacks detectable amounts of xanthine dehydrogenase and the products of its activity, uric acid and isoxanthopterin (Forrest, Glassman, and Mitchell, 1956, Science 124: 725—26; Glassman and Mitchell, 1959, Genetics 44: 153—62; Hubby and Forrest, 1960, Genetics 45: 211—24). Accumulates the enzyme's substrates (Mitchell, Glassman, and Hadorn, 1959, Science 129: 268—69). *mal* progeny of *mal*$^{+}$ mothers appear normal in both eye color and Malpighian tube morphology, but not chromatographically (Glassman and Mitchell, 1959, Genetics 44: 547—54; Glassman and McLean, 1962, Proc. Natl. Acad. Sci. U.S. 48: 1712-18; Schwinck, 1960). *mal/mal*^{bx} heterozygotes appear normal in eye color and Malpighian tube morphology but show only about 10 percent the normal amount of xanthine dehydrogenase activity and accumulate enzyme's substrates (Glassman and Mitchell, 1959; Schwinck, 1960). *In vitro* complementation of *mal* and *mal*^{bz} has not been demonstrated, *mal* and ry extracts complement to produce xanthine dehydrogenase activity (Glassman, 1962, Proc. Natl. Acad. Sci. U.S. 48: 1491-97); they do not complement intercellularly *in vivo,* however, since reciprocal eye-disk or Malpighian-tube transplants behave autonomously with respect to drosopterin formation (Schwinck, 1960; 1963, DIS 38: 87). *mal* is nonautonomous in mosaics with wild-type tissue (Glassman, 1957, DIS 31: 121—22) and in transplants of eyes into wild-type hosts (Ursprung, 1961, Z. Vererbungslehre 92: 119-25). Xanthine dehydrogenase level the same in flies with 1—3 doses of nja/$^{+}$(Grell, 1962, Z. Vererbungslehre 93: 371—77; Glassman, Karam, and Keller, 1962, Z. Vererbungslehre 93: 399-403. RK3.
other information: One allele each induced by CB. 1414, CB. 3007, CB. 3025, CB. 3051, and X rays (Fahmy, 1958, DIS 32: 68).

***mal*^{2}**

origin: X ray induced.
discoverer: Schalet, 1961.
references: 1961, DIS 35: 46-47.
phenotype: Brownish red eye color like *mel;* does not complement with mal, *mat*^{3}, *or mml*^{blt}, RK3.

***mal*^{3}**

origin: X ray induced.
discoverer: Schalet, 1961.
references: 1961, DIS 35: 47.
1963, DIS 38: 82.
phenotype: Male lethal. RK3A.
other information: Shows mutant interaction with sw, *mal, su(f),* at least one lethal locus left of *sw,* and at least five lethal loci between *mal* and *su(f)* but not *bb.* Therefore, associated with a deficiency.

*$_{mal}$*60*

origin: Induced by DNA.
discoverer: Fahmy, 60j.
synonym: *mal*^{bz60}*L*
phenotype: Resembles *mal.* Noncomplementing with *mal* and *mal*^{bz}. RK3.

mal*^{bx}: *maroon like-bronzy

origin: Induced by DL-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
synonym: *bz: bronzy.*
references: 1958, DIS 32: 68.
phenotype: Morphologically and biochemically like *mal.* Shows maternal effect like *mal. mal/mal*^{bz} heterozygote appears normal in eye color and Malpighian tube morphology, but produces only 10 percent normal level of xanthine dehydrogenase activity (Glassman and Pinkerton, I960, Science 131: 1810—11; Ursprung, 1961, Z. Vererbungslehre 92: 119-25; Schwinck, 1960, DIS 34: 105). Produces *in vitro* complementation with *ry* (Glassman, 1962, Proc. Natl. Acad. Sci. U.S. 48: 1491-97). Behaves nonautonomously in transplants (Ursprung, 1959, DIS 33: 174-75). RK3.

malbzeoj; *see* *mal^o*

Mal: Malformed

location: 2- (near right end of *2R)* and 4- (multigenic, according to Bridges),
origin: Spontaneous.
discoverer: Steinberg, 36kl3.
references: 1937, DIS 7: 15,20.
phenotype: Heterozygote has either malformed pit in middle of eye or, oftener, nick at front edge of eye, with bristle or antennalike outgrowth. Penetrance low; enhanced by addition of extra brewer's yeast to medium. Homozygote shows larger nick and antennal outgrowth, with 100 percent expression in *pr Mal* stock. RK3.

male and female sterile( ): **see** ***mfs( )***
male sterile( ): **see** ***ms( )***
Malformed: **see** ***Mal***
maroon: **see** ***ma***
maroonlike: **see** ***mal***

Mas: Masculinizer

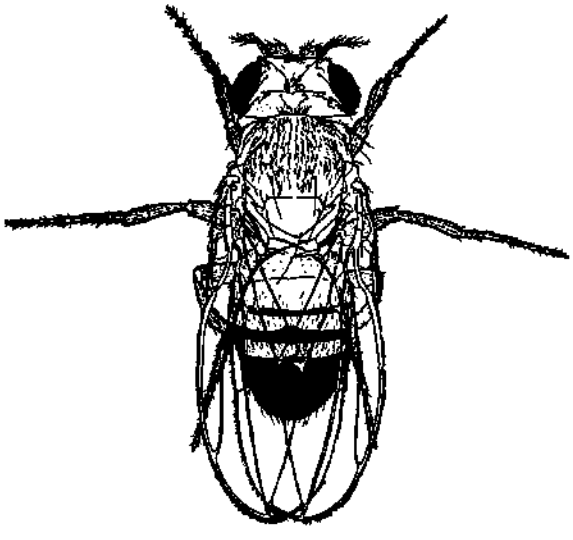
location: 3- (not located).
origin: Spontaneous.
discoverer. Mischaikow, 581.
references: 1959, DIS 33: 98.
phenotype: Heterozygous female transformed into sterile malelike fly. Last abdominal segments show male-type pigmentation; external genitftlia essentially mal©, sometimes completely absent. Sex combs may be present, but vary in size. Internal sex organs degenerate; ovaries and uterus

rudimentary; spermathecae seldom present. Heterozygous male normal. Homozygous lethal. RK2.
other information: May be allele of *tra* such as tra^D of Gowen.

matt brown:* see *mtb

****mb: minus bar***
location: 3-43.4.
discoverer: Nordenskiöld, 33a30.
references: 1934, DIS 2: 7.
phenotype: Modifies Bar in such a way that *B/B* resembles *B/+*, and *B/+* appears almost wild type; *B* male modified to resemble *BK* Homozygous female highly infertile. RK3.

****mbs: miniature blistered***
location: 2-56.
origin: Spontaneous.
discoverer: Neel, 41cl3.
references: 1942, DIS 16: 51.
phenotype: Wings small, curled, blistered, and plexate. Bristle positions irregular, and bristles often bent and twisted. Viability and fertility poor. RK3.



me: *microchaete*
Edith W. Wallace, unpublished.

me: *microchaete*
location: 1-54.0.
origin: X ray induced.
discoverer: Demerec, 28f20.
synonym: *tb-53.*
references: 1935, DIS 3: 13.
phenotype: Hairs on thorax fewer than wild type, more irregular, and frequently doubled. Bristles smaller, more sparse on scute Hum and occasionally on head. Eyes rough. Wings ovoid and short; marginal bristles disarranged. Abdominal sclerites ridged. RK1.

****mc²***
origin: Induced by D-p-NN-dH2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
synonym: *molike.*
references: 1958, DIS 32: 71.
phenotype: Thoracic hairs irregularly distributed; occasionally reduced in number. Bristles small; sparse on scutellunu Eyes small and rough. Wings ovoid and short. Tergites in female sometimes dis* arranged. Viability and fertility good in both sexes, me^2/mch is wild type. RK2.
other information: Allelism inferred from location of me^2 at 52.1 and from phenotype.

Me: *Microcephalus*
location: 3-59.0 (about 0.2 unit to the right of *bx).*
origin: Spontaneous.
discoverer: Bateman.
references: 1944, DIS 18: 40.
1945, DIS 19: 47.
phenotype: Eyes of heterozygote small or absent. Scutellars curve upward. Viability and fertility good. Homozygote usually more extreme than heterozygote, but not reliably distinguishable. Viability of homozygote varies from 100 down to 40 percent. RK1A.
cytology: Probably associated with a minute rearrangement, perhaps a tandem repeat, of one or more bands in 89E7-11 (E. B. Lewis).

***mc-tik6:* see me^2**

****mch: minute chaetae***
location: 1-52.0.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 87.
phenotype: Extremely short, fine bristles. Hairs and body also small; delayed eclosion. Male viable and fertile, mch/mc^2 is wild type. RK2.
other information: One allele each induced by CB. 1246, CB. 1356, and CB. 3026.

****md: melanotic lesions***
location: 3-38.0.
origin: Found in experiments using benzopyrene.
discoverer: Gowen, 1933.
phenotype: Lesions occur in many places throughout head, thorax, and abdomen. RK3.

****mdg: midgoid***
location: 1-64.7.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 71.
phenotype: Small in all dimensions; frequently underpigmented. Male infertile; viability about 20 percent wild type. RK3.

me: *focal melanosis
location: 1-29.0.
origin: X ray induced.
discoverer: Gowen, 1928.
references: 1934, Arch. Pathol. 17: 638-47 (fig.).
1934, Cold Spring Harbor Symp. Quant. Biol. 2: 128-36 (fig.).
phenotype: Melanotic degeneration occurs at junction of tibia and femur. Lethal at end of pupal stage or shortly after eclosion. RK2.

Me: Moiré
location: 3-19.2 (to the left of *jv;* based on location of Me<S5d).
origin: X ray induced.
discoverer: Muller, 1929.
synonym: Mo.
references: 1930, J. Genet. 22: 299-334 (fig.). Glass, 1933, J. Genet. 28: 69-112 (fig.). 1934, Am. Naturalist 68, 107-14.
phenotype: Eye has watered-silk, shimmering, iridescent pattern owing to a ring of six flecks around normal fleck. Eye color brownish and translucent; 79 percent normal red pigment and 85 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1—10). Larval Malpighian tubes considerably lighter in color than normal but mutant classifiable with difficulty (Brehme and Demerec, 1942, Growth 6: 351—56). Contains a modifier of dominance of *dp* such that *dp/+; Me/+* has truncated wings. Classifiable in single dose in triploids (Schultz, 1934, DIS 1: 55). Homozygous lethal. *Me/In(3L)P* is viable. RK1A.
cytology: Placed in region 64C12-65E1, on the basis of its inclusion in *Df(3L)Vn ~ Df(3L)64C12-D1;65D2-E1* (Mohr, 1938, Avhandl. Norske Videnskaps-Akad. Oslo, I. Mat.-Naturv. Kl. No. 4: 1-7). Associated with *In(3L)P = In(3L)63C;72El-2* (Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).

***Me^2**
origin: X ray induced.
discoverer: Moore, 1929.
references: Glass, 1933, J. Genet. 28: 69—112.
phenotype: Like *Me.* RK1A.
cytology: Arose with *T(2;3)Me^2 (2L* broken near centromere).

Me^{65d}
origin: Induced by ethyl methanesulfonate.
discoverer: E. H. Grell, 65d.
phenotype: Like *Me.* Eyes brownish with watered-silk effect. Tips of large bristles slightly lighter than wild type. Homozygote and *Me^{6Sd}/Me* lethal. *dp^{olv}/+; Me^{65d}/+* occasionally has truncated wing tips. RK1.
other information: Crossing over normal in *3L. Me^{6Sd}* apparently not associated with a gross chromosomal rearrangement like other *Me* alleles.

Me*°; Moiré of *Sytko
discoverer: Sytko.
references: Agol, 1936, DIS 5: 7.
phenotype: Like *Me.* RK1A.
cytology: Arose with *T(2;3)Me^{So}* (breaks in *2R* and *3R).*

**meg: megaoculus*
location: 1-61.9.
origin: Induced by DL-p-NN-di-(2-chlaroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 71.
phenotype: Eyes large, abnormally shaped, and rough. Wings abnormally shaped and sometimes extremely small. Wing surface irregularly curved. Inner margin removed to various degrees and venation abnormal. Viability good, but both sexes infertile. RK2.
other information: One allele induced by CB. 3025.

me/: *melanized*
location: 1-64.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 71.
phenotype: Body color darker than normal, especially in thorax; trident pronounced. Eye color dull red. Wing tips frequently curve upward. Classification rather difficult; best in young fly. Viability and fertility good in both sexes. RK3.
other information: One allele induced by CB. 3025.

melanoscutellum: see msc
melanotic lesions: see *md*
melanotic tumor-A: see *tu-bw*

mes: messy
location: 3-51.9.
origin: X ray induced in a *kar^2* chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Extra head and thoracic bristles. Wings inflated, turned somewhat upward and outward, and shorter and broader than normal. Posterior cross-vein with a gap or missing. Setnilethal; male considerably less viable than female; sterile. *mes/mes^2* like *mes/mes but mes/mes^3, mes/mes^4, mes/messt,* and mes/mes*' appear normal. RK3.
other information: mes locus subdivisible into two functional units by complementation analysis; mes placed in the left unit, on the basis of its being wild type when heterozygous with *Df(3R)ry^{74}.*

'"*mes
origin: X ray induced in a *kar^2* chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Similar to *mes.* Mutant homozygous and in combination with *mes* but normal in combination with mes^5, *mes^4,* mes$^{5'}$, and *mes^{61}.* RK3.
other information: In the left complementing unit.

mes^3
origin: X ray induced in a *kar^2* chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Similar to mes. *mes^3/mes* and *mes^3/mes^2* normal; *mes^3/mes^4,* and *mes^3/messt, mes^3/mes^{61},* and *mes^3/ry^{74}* mutant. RK3.
other information: Placed to the right of mes and *mes^2,* on the basis of its mutant interaction with *Dt(3R)ry^{74}.*

mes^4
origin: X ray induced in a *kar^2* chromosome.
discoverer. Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.

phenotype: Similar to mes. *mes*^{4}/*mes* and *mes*^{4}/*tnes*^{2} **normal;** *mes*^{4}/*mes*^{3}, *mes*^{4}/*mes*^{sl}, *mes*^{4}/*mes*^{61}, and *mes*^{4}/*ry*^{74} mutant. RK3.

other information: Placed to the right of *mes* and mes^{2}, on the basis of its mutant interaction with *Df(3R)ry*^{74}.

mes*^{51}: *messy-S lethal

origin: X ray induced in a /car^{2} chromosome.

discoverer: Schalet.

phenotype: Lethal homozygous and in combination **with** *mes*^{61} **.and** *Df(3R)ry*^{74}. *mes*^{sl}/*mes*^{3} mutant; *mes*^{si}/*mes*^{4} mutant but with low viability; *mes*^{si}/*mes and mes*^{51}/*mes*^{2} normal. RK3.

other information: In the right complementing unit.

***mes*$^{6'}$**

origin: X ray induced in a *kar*^{2} chromosome.

discoverer: Schalet.

phenotype: Lethal homozygous and in combination with *mes*^{5i} and *Df(3R)ry*^{74}. *mes*^{61}/*mes*^{3} **and** *mes*^{6l}/*mes*^{4} mutant; *mes*^{6l}/*mes* **and** *mes*$^{61'}$/*mes*^{2} normal. RK3.

other information: In the right complementing unit.

Mef:** ***Metatarsi irregular

location: 2- or 3- (rearrangement).

origin: X ray induced.

discoverer: Jonsson, 56alO.

references: Liining, 1956, DIS 30: 73.

phenotype: First and second tarsal joints fused and swollen, with extra hairs. Male sex combs enlarged. Fully penetrant when balanced with *Cy;* however, *Met/ss* is wild type or nearly so. RK2A.

cytology: Associated with *T(2;3)Met.*

****mf: macrofine***

location: 1-5.5.

origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).

discoverer: Fahmy, 1955.

references: 1958, DIS 32: 71.

phenotype: Fly slightly smaller than normal with short, thin, bristles. Male viable and fertile. Female slightly delayed in eclosion and reduced in viability. RK3.

mfs(3)G: male and female sterile of Gill

location: 3-59.

origin: X ray induced,

discoverer: Gill, 59a.

synonym: *fs(3)4*^{S9a}.

references: 1960, Anat. Record 138: 351.
1961, Ph.D. Thesis, Yale Univ.
1962, DIS 36: 37.
1963, J. Exptl. Zool. 152: 251-77 (fig.).

phenotype: Oogenesis incomplete; follicles usually cease development early in vitellogenesis (at or before stage 9); occasional breakthrough produces adult fly. Primary compound chambers in which two, occasionally three, incipient cysts are enclosed occur in about 10 percent of the cases. Male sterile. Adult fat body hypertrophied; body size reduced. Occasionally, metathcracic legs with tibiae more curved than normal, and tarsi crooked. Viability low. RK3.

mgt: midget

location: 1-48.7.

origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).

discoverer: Fahmy, 1954.

references: 1958, DIS 32: 71.

phenotype: Small fly with delayed eclosion. Not easily classified. Male fertile, but viability about 20 percent wild type. Expression more extreme in female and viability further reduced. RK3.

other information: One allele each induced by CB. 3025 and X rays; two alleles induced by CB. 1506.

mi: minus

location: 2-104.7.

discoverer: Biddle, 281.

references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.

phenotype: Bristles almost as small as hairs, and hairs reduced in number and size. Body size small. Eclosion delayed. Viability low and erratic. Female entirely sterile; male fertile. RK2.

cytology: Locus is in 59E1-2 of salivary gland chromosome (Schultz), on the basis of its being between the right breakpoints of *In(2R)bw*$^{VD\wedge 1}$ = *In(2R)41B2-Cl;59E2-4* and *In(2R)bwVDe2* = ***In(2R)41A-B;59D6-El.***

****mib: miniature bristles***

location: 1-8.7.

origin: X ray induced.

discoverer: Fahmy, 1956.

references: 1959, DIS 33: 88.

phenotype: Short, thin bristles. Body slightly darker than normal, particularly thorax and posterior border of tergites. Wings occasionally upheld and inner margins frequently incised. Male viable but sterile. RK3.

micro-oculus: **see mo**

M/crocep/io/us: see Me

microchaete: **see me**

microptera: **see *mp***

midget: **see *mgt***

midgoid: **see *mdg***

miniature: **see m**

minus: **see *mi***

minus bar. **see *mb***

Minute-producer: **see *T(l;4)M-pro***

minute chaetae: **see me**

MinuteO; **see M( )**

minutelike: **see *ml***

Mio: **see *Dt*^{i}o***

****mis: misproportioned***

location: 1-1.3.

origin: Induced by l:4-dimethanesulfonoxybut-2-yne (CB. 2058).

discoverer: Fahmy, 1951.

references: 1938, DIS 32: 71.

phenotype: Abdomen deformed: in male, large and broad; in female, tergites abnormal and hairs disarranged. Wings shortened in both sexes. Bristles thin and body color rather pale. Eclosion slightly delayed. Male viability and fertility normal; female viability 50 percent wild type. RK3.

other information: One allele each induced by CB. 1540 and CB. 3034.

misformed: see *msf*

misheld wings: see mwi

misproportioned: see *mis*

missing: see *msg*

mk: murky
location: 1-0.8.
origin: Induced by triethylenenielamine (CB. 1246).
discoverer: Fahmy, 1950.
references: 1958, DIS 32: 71-72.
phenotype: Small fly with dull red eyes and extra body pigmentation; trident pattern especially marked. Delayed eclosion. Male fertile but viability 50 percent wild type; female sterile. RK3.
other information: One allele each induced by CB. 1414, CB. 1506, CB. 1540, CB. 3007, and CB. 3034; two alleles induced by CB. 3025.

**ml: minutelike*
location: 3-46.
discoverer: Mohr, 24c3.
synonym: *sb: short-bristle.*
references: 1924, Brit- J. Exptl. Biol. 2: 189-98 (fig-).
phenotype: Bristles small, as in Minute. Late hatching and poorly fertile. RK3.

**ml2*
origin: Spontaneous.
discoverer: Nichols-Skoog, 36c.
phenotype: Like *ml.* RK3.
other information: Allelism inferred from phenotype and location on third chromosome.

mti: see *dwx*[mn]

mo; m?cro-ocu/us
location: 1-6.7.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 72.
phenotype: Eyes small. Wings narrow and frequently pleated longitudinally, with irregular hairs, giving slight opacity. Body size slightly reduced. Not easily classified. Viability and fertility good in both sexes. RK3.
other information: Two alleles each induced by CB. 3007 and CB. 3026; four induced by CB. 1528; one each induced by CB. 1506, CB. 1540, CB. 1592, and CB. 3025.

mti: see *moo*

Mti: see *Me*

Mo«: see *Mot-K*

modifier ol Bat: see *su(B)*

modifier of garnet: see *e(g)*

Moire: see Me

**moo: moorish*
location: 3-48.3.
origin: X ray induced,
discoverer: Thompson.
synonym: *too* (preoccupied).
references: 1959, DIS 33: 99.
phenotype: Body color black. Homozygous lethal in male; female viability about 10 percent normal. RK3.

morula: see *mr*

**moh28: mottled*
location: 3-46.0.
origin: Found among progeny of males given supersonic treatment.
discoverer: Hersh, 28il9.
references: Hersh, Karrer, and Loomis, 1930, Am. Naturalist 64: 552-59.
Hersh, 1934, DIS 1: 30.
Surrarrer, 1935, Genetics 20: 357—62 (fig.)-1938, Genetics 23: 631-46 (fig.).
1940, DIS 13: 51.
phenotype: Eyes mottled with patches of dark brown or black on wild-type background. Sensitive to temperature. Always mottled at 18°; almost never above 25°C. Temperature-effective period is 25—35 hr after beginning of pupation. Mottling more easily seen in presence of *v;* also manifested in *w* homozygotes (Schultz). RK1 at 18°C, RK3 above 25°.

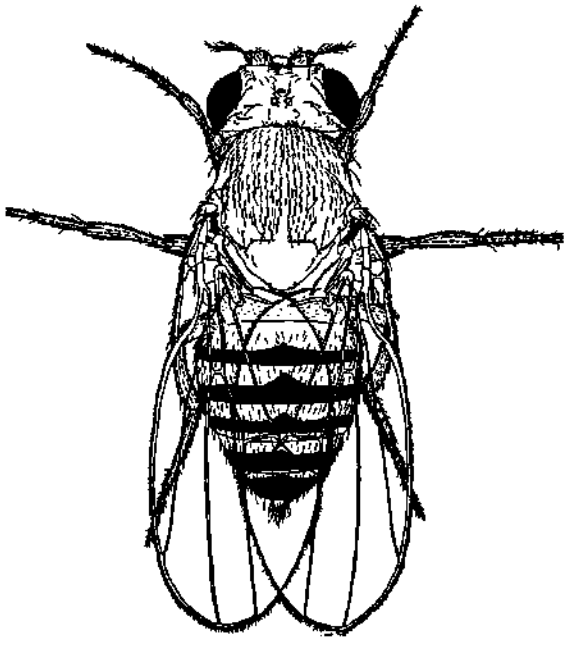
**mot-32l*
location: 1- (not located).
origin: X ray induced.
discoverer: Oliver, 32128.
references: 1937, DIS 7: 19.
phenotype: Eye color mottled in female only. RK3.

**mot-36e*
location: 3- [left arm, with *In(3L)p].*
discoverer: Bridges, 36ell.
references: 1937, DIS 7: 12.
phenotype: Eyes mottled with translucent spots and roughness. Bristles twisted and stubby; hairs irregular. Wing venation plexoid around posterior crossvein. Female sterile. Enhances somatic crossing over in first, second, and third chromosomes. RK3.

Mot-K: Mottled of Krivshenko
location: 2- or 3- (rearrangement).
origin: X ray induced,
discoverer: Krivshenko, 54c25.
synonym: Mo^K.
references; 1954, DIS 28: 75.
1955, DIS 29: 76.
phenotype: Eyes liberally mottled with dark color on wild-type background; character barely noticeable in young flies but striking in older ones; number and size of spots variable. Homozygous lethal. Viability and fertility of heterozygotes good. RK2A.
cytology: Associated with *T(2;3)Mot-K = T(2;3)41;60D;80~81.*

motiler of white: see *mw*

mp: microptera
location: 3-0.0.
discoverer: Serebrovsky, 40g8.
references: 1941, DIS 15: 19.
phenotype: Wings small and spoonlike; veins irregular. Tarsi four jointed (rarely 3 or 5); joints 3 and 4 usually fused. Antennae shortened. Ecloses somewhat late. Viability and fertility low. RK2.



mr: mowla

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ, No. 552: 132.

mr: morula

location: 2-106.7.

discoverer: Bridges, 13c8.

references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 230 (fig.).
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.

phenotype: Eyes rough. Bristles irregularly reduced in size and number. Abdominal sclerites often smaller. Developmental study by Lees and Waddington [l942, Proc. Roy. Soc. (London), Ser. B 131: 87-100] shows that effect on bristles results from general slowing of bristle growth. Female entirely sterile, with underdeveloped ovaries. At 19°C, bristles nearly normal and eyes nearly wild type. RK2 at 25°C and above.

cytology: In salivary chromosome region between 59E2 and 60B10 based on its being to the right of *ln(2R)bwyD«l –In(2R)41B2-Cl;59E2'4* and to the left of *Df(2R)Px = Df(2R)6QB8-10;6QDl-2* (Bridges, 1937).

mr²

origin: Spontaneous.

discoverer: Bridges, 25k24.

phenotype: Less extreme than *mr.* Nearly wild type at 19°C. Female entirely sterile. Oogenesis normal through stage 4; then compound nurse cell chromosomes fall apart and degenerate. Karyosome of oocyte also disappears. Oogenesis does not proceed beyond sixth stage (King, 1964, Royal Entomol. Soc. London Symposium 2, Insect Reproduction pp. 13-25). RK2 at 25°C or above.

m&: see msc

ms(2}h male stcri!e(2)

location: 2-65.5.

origin: Ultraviolet induced.

discoverer: Meyer, 48c.

references: Meyer, Edmondson, Byers, and Erickson, 1950, DIS 24: 60.

phenotype: Male sterile; female fertile. Sperm present but not motile. RK3.

ms(2)2

location: 2-44.0 (Meyer).

origin: Spontaneous.

discoverer: Muller, 1951.

synonym: *ms.*

references: Meyer, 1959, DIS 33: 97.

phenotype: Homozygous male completely sterile; female fairly fertile. RK3.

****ms(2)E3: male sterite(2) of Edmondson***

location: 2-28.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *ms2,3.*

references: 1952, DIS 26: 61.

phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E2* (2-22.0). RK3.

****ms(2)E4***

location: 2-47.9.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *ms2.4.*

references: 1952, DIS 26: 61.

phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ts(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *is(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)B7* (2-54.8), *ts(2)E7* (2-55.2), and *ms(2)E8* (2-55.6). RK3.

****ms(2)E5***

location: 2.54.8.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *ms2.5.*

references: 1952, DIS 26: 61.

phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

****ms(2)E6***

location: 2-54.8.

origin: Ultraviolet induced.

discoverer: Edmondson, 1951.

synonym: *ms2.6<*

references: 1952, DIS 26: 61.

phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *is(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *(s(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *m&(2^;7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

****ms(2)E7***

location: 2-54.8.

origin: Ultraviolet induced.

discoverer. Edmondson, 1951.

synonym: *ms2.7.*

references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), and *ms(2)E9* (2-57.0). RK3.

***ms(2)E8**
location: 2-55.6.
origin: Ultraviolet induced.
discoverer: Edmondson, 1951.
synonym: *ms2.8.*
references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E9* (2-57.0), and *fs(2)E8* (2-62.6). RK3.

***ms(2)E9**
location: 2-57.
origin: Ultraviolet induced.
discoverer: Edmondson, 1951.
synonym: *ms2.9.*
references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E3* (2-47.5), *ms(2)E4* (2-47.9), *fs(2)E4* (2-48.5), *fs(2)E5* (2-50.4), *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), *fs(2)E8* (2-62.6), *ms(2)E10* (2-66.5), *ms(2)Ell* (2-68.0), *and ms(2)El2* (2-68.2). RK3.

***ms(2)E10**
location: 2-66.5.
origin: Ultraviolet induced.
discoverer: Edmondson, 1951.
synonym: *ms2.10.*
references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *ia(2)E7* (2-55.2), *ms(2)E8* (2-55.6), *ms(2)E9* (2-57.0), *fs(2)E8* (2-62.6), *ms(2)Ell* (2-68.0), and *ms(2)E12* (2-68.2). RK3.

***ms(2)EU**
location: 2-68.
origin: Ultraviolet induced.
discoverer: Edmondson, 1951.
synonym: *ms2.ll.*
references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fa(2)E6* (2-54.4), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *ia(2)E7* (2-55.2), *ms(2)Es* (2-55.6), *ms(2)E9* (2-57.0), *fs(2)E8* (2-62.6), *ma(2)E10* (2-66.5), and *met(2)E12* (2-68.2). RK3.

***ms(2)E12**
location: 2-68.2.
origin: Ultraviolet induced,
discoverer: Edmondson, 1951.
synonym: *ms2.I2.*
references: 1952, DIS 26: 61.
phenotype: Male sterile. Fertile in heterozygotes with *fs(2)E6* (2-54.5), *ms(2)E5* (2-54.8), *ms(2)E6* (2-54.8), *ms(2)E7* (2-54.8), *fs(2)E7* (2-55.2), *ms(2)E8* (2-55.6), *ms(2)E9* (2-57.0), *fs(2)E8* (2-62.6), *ms(2)E10* (2-66.5), and *ms(2)Ell* (2-68.0). RK3.

ms(Y)Ll: male sferile in long arm of Y
location: F.
origin: X ray induced in *y+Y.*
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-2, kl-3, kl-4,* and *kl-5.* One of four such induced changes in *KL* among 35.

ms(Y)L3
location: F.
origin: X ray induced in $y^{+}Y$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
1960, DIS 34: 48.
phenotype: Male nearly sterile. RK3.
other information: Affects complementation group *kl-5.* Three such changes of *KL* among 35 tested.

ms(Y)L4
location: F.
origin: X ray induced in $y^{+}F$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: One of three noncomplementing changes among 35 induced changes of *KL.*

ms(Y)L7
location: F.
origin: X ray induced in $y^{+}F$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-3, kl-4,* and *kl-5.* Nine such changes among 35 induced in *KL.*

ms(Y)L10
location: F.
origin: X ray induced in $y^{+}Y$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-1* and *kl-3.* The only change induced in *KL* affecting nonadjacent complementation groups.

ms(Y)Ul
location: F.
origin: X ray induced in *y*Y.*
discoverer. Brosseau.
references: 1960, Genetics 45: 257-74.
1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation group *kl-3.* Four such changes in *KL* among 35.

ms(Y)U2
location: F.
origin: X ray induced in $y^{+}Y$.

discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-2* and *kl-3*. Two such changes in *KL* among 35.

ms(Y)L13
location: F.
origin: X ray induced in *y+Y*.
discoverer Brosseau.
references: 1960, Genetics 45: 257—74. 1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation group *kl-1*. Five of 35 *KL* changes were like *ms(Y)L13*.

ms(Y)L32
location: *Y*.
origin: X ray induced in $y^{+}Y$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-1*, *kl-2*, and *kl-3*. Unique among 35 induced *KL* changes.

ms(Y)L36
location: *Y*.
origin: X ray induced in *y+Y*.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74. 1960, DIS 34: 48.
phenotype: Male nearly sterile. RK3.
other information: Affects complementation groups *kl-4* and *kl-5*. Unique among 35 induced changes of *KL*.

ms(Y)L37
location: *Y*.
origin: X ray induced in $y^{+}Y$.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74. 1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation group *kl-2*. Unique among 35 *KL* changes.

ms(Y)L38
location; F.
origin: X ray induced in *y+Y*.
discoverer Brosseau.
references: 1960, Genetics 45: 257-74. 1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation groups *kl-3* and *kl-4*. Unique among 35 induced changes of *KL*.

ms(Y)S2: male sterile in short arm of *Y*
location: F.
origin: X ray induced in *y+Y*.
discoverer: Brosseau.
references: 1960, Genetics 45: 257—74. 1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation group *k*-I*. One of nine such changes among 11 induced *KS* alterations.

ms(Y)S5
location: F.
origin: X ray induced in *y+Y*.
discoverer Brosseau.
references: 1960, Genetics 45: 257—74. 1960, DIS 34: 48.
phenotype: Male sterile. RK3.
other information: Affects complementation group *ks-2*. Unique among 11 induced changes *of KS*.

**ms(Y)S14*
location: F.
origin: X ray induced in *y+Y*.
discoverer: Brosseau.
references: 1960, Genetics 45: 257-74.
phenotype: Male sterile, *bb* deficient. RK3.
other information: The only noneomplementing *KS* change found among 11.

ms2.: see *ms(2)E*

**msc: melanoscutellum*
location: 1-52.6.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
synonym: *ms* (preoccupied).
references: 1958, DIS 32: 72.
phenotype: Extra pigmentation confined to scutellum. One or more thoracic bristles duplicated. Eyes slightly more oval than normal. Wings slightly abnormal in shape and position. Characters not always penetrant. Viability and fertility good in both sexes. RK3.
other information: One allele each induced by CB. 1506 and CB. 3025; two induced by CB. 3007.

Msc: Multiple sex comb
location: 3-48.0.
origin: Spontaneous.
discoverer: Tokunaga, 64a.
references: 1966, DIS 41: 57.
phenotype: Extra sex combs on second and third legs of male. Fewer teeth on sex comb of first leg. Homozygote lethal; heterozygote with *Pc Sex* survives. RK1A.
cytology: Associated with *In(3R)Msc* = *In(3R)84B;84F*.

msh mistormed
location: 2-55.2 (originally located at 55.6 but arbitrarily placed at 55.2 to be consistent with cytological indication that it is to the left of *pk)*.
discoverer: Bridges, 30b8.
references: Curry, 1939, DIS 12: 46.
phenotype: Eyes misshapen. Wings short and crumpled; legs shortened. Characteristics variable and overlap wild type. RK3.
cytology: Placed between 41A and 42A3 on basis of its inclusion in *Df(2R)bwVE>°2LQ$_y$R = Di(2R)41A-B.-42A2-3* (Schultz). Certainly included in *Dt(2RyU-S2**^{11} z*Di(2R)40F-41Al;42A19'Bl* (Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 275).

**msg: missing*
location: 2- (not located),
origin: Spontaneous.

discoverer: Mossige, 50b4.
references: 1951, DIS 25: 69.
phenotype: Bristles greatly reduced or missing. In extreme cases, almost like sv. Female sterile; male sparingly fertile. RK2.

tnt^A: see *tu-bw*

**mtb: matt brown*
location: 1-3.6.
origin: Induced by e'thyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 88.
phenotype: Eye color flat and browner than normal with greatly reduced reflection spots. Wing position varies from slightly to completely outspread; sometimes upheld. Male sterile, and viability about 30 percent wild type. RK2.

**mu: mussed*
location: 3-50.
origin: Spontaneous.
discoverer: Mohr, 37121.
references: Mossige, 1939, DIS 12: 47.
phenotype: Wings thin textured. Dorsal surface of thorax arched. RK1.

**mu-F: mutability factor from Florida*
location: 2- (not located).
origin: Spontaneous in Florida wild stock.
discoverer: Demerec, 1936.
references: 1937, Genetics 22: 469—78.
phenotype: Homozygote shows increase in lethal and visible mutation rate. Factor acts during development of germ cells in both male and female. RK3.

**mul: multiple*
location: 1-0.0.
origin: Spontaneous.
discoverer: Neel, 41cl3.
references: 1942, DIS 16: 51.
phenotype: Eyes rough and oval. Wings weak and held out. Bristles occasionally missing or disarranged. Body may show abnormal protuberances covered with hairs. Female sterile. After a few generations in stock, only the eye abnormality showed. RK2.

multiple wing hairs: see *mwh*

Multiple sex *comb:* see *Msc*

**mur: murrey*
location: 1-14.3.
origin: Spontaneous as one mosaic male.
discoverer: E. H. Grell, 57c.
references: 1957, DIS 31: 81.
phenotype: At 25°C, eye color reddish purple, bristles very small, and body size reduced. At 17°C, eye color and body size normal, but bristles rather small. Original mosaic male transmitted only an *X* containing *mur.* He was mated to his daughters to produce homorygous mur females. *mur/mur* female and *mut* male are sterile. RK3.

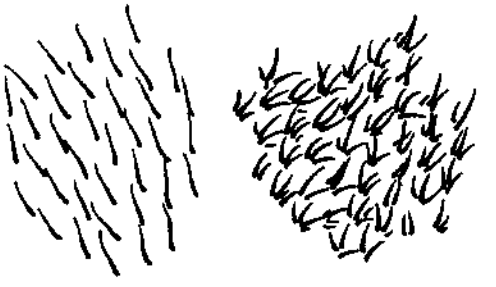
murky: see *mk*

murrey, see *mur*

mussed: see *mu*

mutability factor from Florida: see *mu~F*

mw: mottler of white
location: 1- (slightly to the right of *ct).*
origin: Spontaneous.
discoverer: Muller, 1946.
references: 1946, DIS 20: 88-89.
phenotype: Normal by itself. A specific dilutor of w^a and other intermediate alleles at the *w* locus. Eyes assume a lighter mottled appearance. Expression not affected by dosage of *Y* chromosome (Oster, 1957, DIS 31: 150). RK1.
cytology: Not associated with chromosome aberration (Oster, 1957).



mwh: multiple wing hairs
Wing hairs. Left: wild type. Right: ***mwh.***
A. Di Pasquale, unpublished.

mwh: multiple wing hairs
location: 3-0.0 (order with m and ve not tested).
origin: Spontaneous.
discoverer: Di Pasquale, 501.
references: 1951, DIS 25: 70.
1952, Rend. 1st. Lombardo Sci. Lettere, Ser. B 85: 1-8.
phenotype: Wing cells contain groups of 2—5 hairs instead of one hair per cell as in wild type. Transplants of mutant wing disks to wild-type hosts develop autonomously (Ursprung and Hadom, 1962, Develop. Biol. 4: 40-60). RK1.
cytology: Salivary chromosomes apparently normal.

**mwh^semi: multiple wing hairs-semi*
origin: Spontaneous derivative of mwh.
discoverer: Di Pasquale, 51e.
phenotype: Like *mwh* except that the groups of wing hairs are restricted to wing margins. Wing surface between second and fifth longitudinal veins has single hair with only an occasional group. $_m wh^{*mml}/mwh$ is likemwfi^{semi}/mH'/i«$^{e\,'n'}$. RK1.

**mwi: misheld wings*
location: 1-0.4.
origin: Induced by DL-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 72.
phenotype: Wings diverge upward and outward at various angles. Eye shape oval. Viability and fertility good in male but reduced in female. RK2.

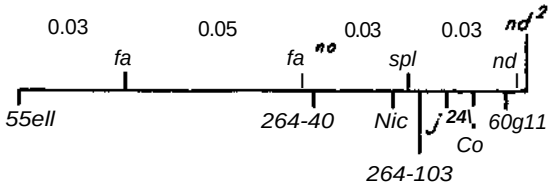
nfah; see *ml*

N: Notch
location: 1-3.0.

phenotype: Wings of heterozygote incised at tips and often along edges. Veins L3 and L5 thickened. Thoracic hairs irregularly distributed. Male and homozygous female lethal. Heterozygotes for any two *N* alleles lethal. *fa/N, spI/N,* and *nd/N* heterozygotes express both the *N* phenotype and the phenotype of the recessive. N/fa^{no} is lethal. For developmental studies of *N* male embryo, see Poulson, 1939, DIS 12: 64-65; 1940, J. Exptl. Zool. 83: 271-325; Poulson and Boell, 1946, Anat. Record 96: 508; Counce, 1961, Ann. Rev. Entomol. 6: 295-312. RK1.

cytology: Heterozygosity for a deficiency including salivary chromosome band 3C7 produces the *N* phenotype (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Many but not all *N* alleles are associated with chromosome rearrangements.

other information: The TV alleles and the recessives *ia*, fa^{no}, *spl,* and *nd* belong to a pseudoallelic complex (Welshons and Von Halle, 1962, Genetics 47: 743-59).



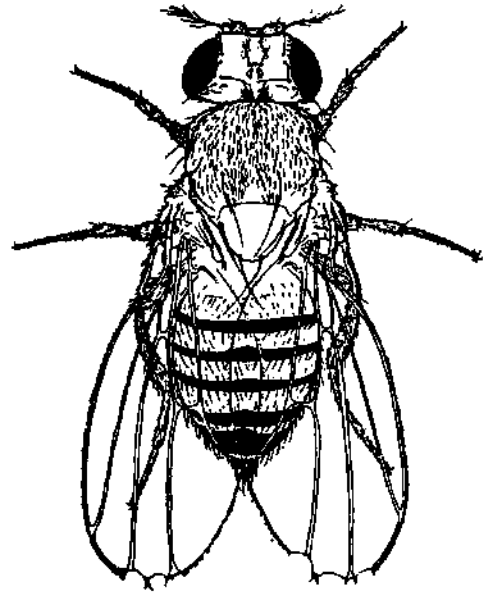
Map of the *N* region

Showing relative positions of dominant (below the line) and recessive (above the line) mutants at the Notch locus.

From Welshons and Von Halle, 1962, Genetics 47: 743-59.

N8

origin: Spontaneous.
discoverer: Mohr, 18j7.
references: 1919, Genetics 4: 275-82.
1923, Z. Induktive Abstammungs- Vererbungslehre 32: 108-232 (fig.).
1932, Proc. Intern. Congr. Genet., 6th. Vol. 1J 190-212.
Mackensen, 1935, J. Heredity 26: 163-74.
Gottschewski, 1937, Z. Induktive Abstammungs- Vererbutigslehre 73: 131—42.
Slizynska, 1938, Genetics 23: 291-99.
phenotype: Typical Notch. Hemizygous male lethal in egg (Li, 1927, Genetics 12: 1-58). Nervous system hypertrophied; ventral and cephalic hypoderm missing; mesodermal organs absent; fore-gut rudimentary, and mid-gut incomplete [Poulson, 1940, J. Exptl. Zool. 83: 271-325 (fig.); 1941, Proc. Intern. Congr. Genet., 7th. pp. 240—4l]. Cholinesterase activity higher in N^s than in normal embryos (Poulson and Boell, 1946, Biol. Bull. 91: 228; 1946, Anat. Record 96: 508). RK1A.
cytology: Associated with $Df(I)N^s$ = Df(1)3B4-



N8; *Notch-8*

From Mohr, 1924, Z. Induktive Abstammungs- Vererbungslehre 32: 118.

N24: see Ni24

***N25**

origin: Spontaneous.
discoverer: Mohr, 28k22.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N25,* breakpoints not known (Sutton).

***N26**

origin: Spontaneous.
discoverer: Mohr, 28k29.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N26 = Df(l)3C4-5;3C8-9* (Sutton).

***N27**

origin: Spontaneous.
discoverer: Mohr, 30115.
phenotype: Like/V. RK1.
other Information: N^{27}/w not white.

**N29*

origin: Spontaneous.
discoverer: Eker, 36el2.
phenotype: Like *N.* RK1(A).
cytology: Association with $Df(l)N^{29}$ inferred from its mutant interaction with *w.*

***N30**

origin: Spontaneous.
discoverer: Mohr, 38b21.
phenotype: Like *N.* RK1.
other information: N^{3G}/w not white.

***N33h**

origin: Spontaneous.
discoverer: Ives, 33h29.
synonym: $N^{*64'}$!*.
references: Plough and Ives, 1934, DIS 1: 31. 1934, DIS 2: 10, 34.
phenotype: Like *N.* RK1A.

cytology: Associated with *Df(l)N33h = Df(l)3C6-7;3D2-3*(Sutton).

***N34b**

origin: X ray induced.
discoverer: Oliver, 34b3.
references: 1937, DIS 7: 19.
phenotype: Like *N.* RK1(A).
cytology: Association with $T(l;3)N^{34b}$ suspected. Basis of suspicion not mentioned.

***N38g**

origin: Spontaneous.
discoverer: Curry, 38g.
phenotype: Like /V. RK1A.
cytology: Associated with *Df(l)N38g = Df(l)3C4-5.-3C7-8*(Sutton).

***N40j**

origin: Spontaneous.
discoverer: Sismanidis, 40j.
references: Mather, 1942, DIS 16: 49.
phenotype: Like *N.* RK1.
other information: N^{4}®)/*w* not white.

***N47i**

origin: Ultraviolet induced.
discoverer: Meyer, 47i.
references: 1952, DIS 26: 67.
phenotype: Expression less extreme than *N;* about 70 percent of heterozygotes wild type. N^{47i}/*spl* has wild-type eye, but bristles are like *spl.* N^{47i}/*fa* has wild-type eye. Homozygous lethal. RK3.

***N50k11**

origin: X ray induced.
discoverer: Lefevre, 50kll.
references: 1951, DIS 25: 71.
1952, DIS 26: 66.
Ratty, 1954, Genetics 39: 513-28.
phenotype: Like *N.* RK1A.
cytology: Associated with $T(l;3)N^{S0k11}$ = ***T(1;3)1E3-4;3C6-7;3C8-9;89A.* 3C7 and 8 missing.**

***NSld**

origin: Ultraviolet induced.
discoverer: Byers, 51d.
references: Meyer and Edmondson, 1951, DIS 25: 73.
Meyer, 1952, DIS 26: 67.
phenotype: Like *N,* but whereas *N^l ^/ia* has characteristic *fa* phenotype, N^{5id}/*spl* has no *spl* characteristics. RK1.

NS4I9

origin: Spontaneous.
discoverer: Mohler, 5419.
references: 1956, DIS 30: 78.
phenotype: Weak Notch. Deltas of long veins reliable in classification when wing tips not notched. RK2.

N55e11

origin: Spontaneous.
discoverer: Mohler, 55ell.
references: 1956, DIS 30: 78.
phenotype: Weak Notch. Deltas on wing veins most reliable character for classification. Lethal when heterozygous with /a^{no}, *N^°Stl,* and N^{c}°. RK2.
cytology: Salivary chromosomes normal (Welshons).
other information: Located to the left of *fa* (Welshons, Von Halle, and Scandlyn, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 1—2). Does not show mutant interaction with *w, rst, dm,* or ec.

N60f10

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N.* RK1.
other information: Recombines with *fa* and *spl.* Located to the right of *spl* (Welshons and Von Halle, 1962, Genetics 47: 743-59). N^{60}*U0/w* not white.

H60$_g$ll

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Wings seldom notched; veins thickened; deltas at tips. $N^{60\wedge 1}$ */+ has rough eyes resembling *spl.* $N^{60}6^{11}$ */spl* has extremely rough eyes. *N60gll/[$_{a\ eyes}$* like f_{am} Semilethal with fa"°; poor viability with nd. RK2.
cytology: Salivary chromosomes normal (Welshons).
other information: Located to the right of N^{c}° and probably to the left of *nd* (Welshons, Von Halle, and Scandlyn, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 1-2).

N60h21

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N.* Lethal in combination with ***ta"°.* RK1.**
other information: Located to the right of *spl* (Welshons and Von Halle, 1962, Genetics 47: 743-59). *N60h21/$_{w\ not\ w}$*hite.

N60jJ4

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N. N^{6}°)*^{4}/fa^{no} lethal.* RK1.
other information: Located to the right of *apt* (Welshons and Von Halle, 1962, Genetics 47: 743-59).

N6U19

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N.* $N^{61}M^{9}/fa^{n}$° lethal. RK1.
other information: Located to the right of *spl* (Welshons, Von Halle, and Scandlyn).

N61hlO

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N. N<"t>*°/fa"°* lethal. RK1.
other information: Located to the right of *spl* (Welshons, Von Halle, and Scandlyn).

N62b10

origin: Gamma ray induced.
discoverer: Ives.
phenotype: Like *N. N<>2til 0/$f_a$no* lethal. RKl.
other information: Located to the right of *spl* (Welshons, Von Halle, and Scandlyn).

N62I

origin: Found among progeny of male treated with radiofrequency waves.
discoverer: Mickey, 6213.

references: 1963, DIS 38: 29.
phenotype: Like *N.* RK1.

N63b

origin: X ray induced.
references: Lefevre and Wilkins, 1966, Genetics 53: 175-87.
phenotype: Typical Notch; inseparable from w^{63b}.
cytology: Associated with *Df(l)N63b = Df(l)3C2-3;3E2-3.*

***N218**

origin: X ray induced in *R(l)2.*
discoverer: Barigozzi.
references: 1939—40, Rend. 1st. Lombardo Sci. Lettere, A 73: 382-87.
1940, DIS 13: 69.
1942, Rev. Biol. (Perugia) 34: 59-72.
phenotype: Notching variable, N^{218}/fa and N^{218}/spl show variable expression for *fa* and *spl,* respectively. Few *X/Y* males survive below 23°C and are sterile. RK2A.
cytology: Associated with *In(l)N2l8—* l_n*(l)3C;20.* Since inversion was induced in ring, position of centromere uncertain.

N264.2

origin: X ray induced.
discoverer: Demerec, 33j.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N264-2 —D%1)3C6-7;3C7-8,*

N264.6

origin: X ray induced.
discoverer: Demerec, 33k20.
phenotype: Heterozygous female like *N/+;* $N^{264\sim6}/Y$ male usually lethal; $N^{364\sim6}/Y/Y$ male usually viable but sterile (Schultz). RK1A.
cytology: Associated with $T(1;3)N2^{64}$-* = ***T(1;3)3C9-D1;62A;73B;80C.***

***N264-7**

origin: X ray induced,
discoverer: Demerec, 33k.
phenotype: Like AT. Lethal and cell lethal. RK1A.
cytology: Associated with $In(l)N^{26}$*-^{7} = *In(l)3C6' 7;3C8-9;8C5-7.* 3C7 and 8 missing (Hoover).

***N264.8**

origin: X ray induced.
discoverer: Demerec, 33k.
references: Slizynska, 1938, Genetics 23: 291-99.
phenotype: Like *N,* Developmental abnormalities of male same as N^{a} (Poulson, 1939, DIS 12: 64-65). RK1.
cytology: Salivary chromosomes apparently normal (Slizynska).
other information: *w, rst,* and ec not affected.

***N264-9**

origin: X ray induced.
discoverer: Demerec, 3315.
phenotype: Variegated for/V. *X/Y* male lethal. *X/Y/Y* male viable and almost normal in appearance but sterile (Schultz). RK2A.
cytology: Associated with $T(l;2)N^{2}64$-» » ***T(1;2)3C;41.***

N264-10

origin: X ray induced.
discoverer: Demerec, 3319.
phenotype: Heterozygous female like *N/+. X/Y/Y* male viable but sterile; has slight *rst* variegation. *X/Y* male lethal (Schultz). RK1A.
cytology: Associated with $T(l;2yN^{264}$-^{10}*;* breakpoints not known.

N264.12

origin: X ray induced.
discoverer: Demerec, 34a.
synonym: N^{aS}.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
Judd, 1955, DIS 29: 126-27.
phenotype: Expression weak but not variegated. RK2A.
cytology: Associated with *T(1;4)N264.12 =* ***T(l;4)3C6-7;101F* (Sutton).**

***N264-13**

origin: X ray induced.
discoverer: Demerec, 34a.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N264-l3 = Df(l)3C6-7;3C10-ll* (Demerec and Hoover).

***N264.1S**

origin: X ray induced.
discoverer: Demerec, 34c.
phenotype: Like *N.* RK1A.
cytology: Associated with *Di(l)N264-l S = Df(l)3C6-7;3C7-8* (Sutton).

N264-18;* see *N33h

N264.19

origin: X ray induced.
discoverer: Demerec, 34k.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like *N.* Embryonic development of *iy264~19* male similar to N^{8} (Poulson, 1941, Proc. Intern. Congr. Genet., 7th. pp. 240—41). RK1A.
cytology: Associated with *D^1)N264-19 = Df(l)3C6-7;3C7-8.*

***N264.20**

origin: X ray induced.
discoverer: Demerec, 34g.
phenotype: LikeJV. RK1A.
cytology: Associated with $T(1;4)N^{264}$-^{20} = ***T(l;4)3C4-5;3C7-8;101F;* deficient for 3C5-7** (Sutton).

***N2 64-23**

origin: X ray induced.
discoverer: Demerec, 35h.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N,* but overlaps wild type. Occasional male with normal phenotype survives. RK2A.
cytology: Associated with $T(1;2)N^{264}$-^{23} = *T(1;2)3C8-9;41A* (Demerec and Hoover).

***N2 64.24**

origin: X ray induced.
discoverer: Demerec, 35h.

references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Notch not expressed in all heterozygous females. Males not observed. RK2A.
cytology: Associated with *T(1;2)N$^{264-24}$ = T(l;2)3C8-9;40F* (Demerec).

**N264.29*

origin: X ray induced.
discoverer: Demerec, 36d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Notch not expressed in all heterozygous females. A few males with normal phenotype survive. RK2A.
cytology: Associated with *T(1;3)N$^{264-29}$ = T(l;3)3D4-5;80* (Hoover).

***N264.30**

origin: X ray induced,
discoverer: Demerec, 36d.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like *N.* RKlA.
cytology: Associated with *Df(l)N$^{264-30}$ = Df(l)3A4-5;3C7-9.*

***N264.31**

origin: X ray induced,
discoverer: Demerec, 36d.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like /V. RKlA.
cytology: Associated with *Df(iyN^{264,3}* = Df(l)3B4-Cl;3D2-3.*

***N264-32**

origin: X ray induced.
discoverer: Demerec, 36h.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like *N.* RKlA.
cytology: Associated with *Dt(l)N^{264,32} =Df(l)3C3-5.-3C7-8.*

**N264.33*

origin: X ray induced.
discoverer: Hoover, 36h.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype: Like *N.* RKlA.
cytology: Associated with *Df(l)N$^{264-33}$ = Df(l)3C6-7;3C7-8.*

***N264-34**

origin: X ray induced.
discoverer Demerec, 37a.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N.* Male shows same abnormalities in embryonic development as *N^{s}* (Poulson, 1939, DIS 12: 64-65). RKlA.
cytology: Associated with *T(1;3W^{264}~^{34} » 7Xl;3)3C3-5;70e2-3* (Hoover).

**N264.36*

origin: X ray induced,
discoverer: Demerec, 37b.
references: Slizynska, 1938, Genetics 23: 291—99.
phenotype; Like *N.* RKlA.
cytology: Associated with *DXiyt^{TM4,36} » Df(l)3A3-4;3D2-3.*

**N2 64.37*

origin: X ray induced.
discoverer: Demerec, 37b.
references: Slizynska, 1938, Genetics 23: 291-99.
phenotype: Like *N.* RKlA.
cytology: Associated with *DI(1)N$^{264-37}$ = Df(i)3C6-7;3C7-8.*

N264.38

origin: X ray induced.
discoverer: Demerec, 37b.
references: Slizynska, 1938, Genetices 23: 291—99.
phenotype: Like *N.* Male embryo shows same abnormalities as *N^{8}* (Poulson, 1941, Proc. Intern. Congr. Genet., 7th. pp. 240-41). RKlA.
cytology: Associated with *Df(l)N^{264-3S} =Df(l)2D3-4;3E2-3.*

N264.39

origin: Spontaneous in *X* carrying *w^{ch}.*
discoverer: Slizynska, 1937.
references: 1938, Genetics 23: 291—99.
phenotype: Like *N. N^{264}~^{39}/fa^{no}* lethal. RK1(A).
cytology: Associated with *Df(l)N^{264}~^{39} = Df(l)3C6' 7;3C7-8* (Slizynska, 1938; Welshons, 1958, Proc. Natl. Acad. Sci. U.S. 44: 254-58). Later reexamination of chromosomes of males from lines carrying *w^{ch}* and marked *N^{264,39}* revealed the presence of 3C7 (Welshons).
other information: Recombines with both *fa* and *spl* and lies between them (Welshons, Von Halle, and Scandlyn, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 1-2).

N264-40

origin: X ray induced.
discoverer: Demerec, 37d.
phenotype: Like *N.* Male embryos have abnormalities like *N^{a}* (Poulson, 1939, DIS 12: 64-65). Lethal with /a"°. RK1.
cytology: Salivary chromosomes apparently normal (Hoover).
other information: Located between *fa^{no}* and *N^{Nlc}* (Welshons and Von Halle, 1962, Genetics 47: 743-59). w, *rat,* and *dm* not affected.

**N264.41*

origin: Spontaneous in chromosome containing w.
discoverer: Slizynska, 37e.
phenotype: Like iy. RKlA.
cytology: Associated with *DfCljN$^{264-4}$* =D%1)3C6-7;3C8-9* (Sutton).

***N264.42**

origin: X ray induced.
discoverer. Demerec, 37e.
phenotype: Like *N.* RKlA.
cytology: Associated with *Dt(l)N$^{264-42}$ = Dt(l)3C4' 5;4B4~6* (Hoover).

**N264.46*

origin: X ray induced.
discoverer: Demerec, 37f.
phenotype: Like *N.* RKlA.
cytology: Associated with *D^lfi^{364,4}^ * Df(1)3C6-7;3C7-8.*

H264.47

origin: X ray induced.

discoverer: Demerec, 37f.
phenotype: Like *N.* Lethal with ia^{no}. Male embryos show same developmental abnormalities as *N&* (Poulson, 1939, DIS 12: 64-65). RK1.
cytology: Salivary chromosomes apparently normal (Sutton).
other informotion: Probably located to the right of *spl,* but wild-type progeny from $N^{264,47}$*/spl* females are frequently nonrecombinant (Welshons, 1958, Proc. Natl. Acad. Sci. U.S. 44: 254-58). *w, rst,* and *dm* not affected.

+N264.48

origin: X ray induced.
discoverer: Demerec, 37f.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N.* RK1A.
cytology: Associated with $In(l)N^{264\text{-}4a}$ =*In(l)IB6-7;lB10-ll;3C7-8.* 1B7-10 missing (Hoover).

**N264.49*

origin: X ray induced.
discoverer: Demerec, 37j.
phenotype: Like *N* but also slight Minute. RK1A.
cytology: Associated with $Df(l)N^{264\text{-}49}$ = *Dt(l)3C4* S;3E8'F1* (Sutton).
other information: Minute phenotype results from inclusion of *M(1)3E* in deficiency.

**N264-50*

origin: X ray induced.
discoverer: Demerec, 37k.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Notching of wings variable and not always penetrant. $N^{264}\sim^{S0}$*/fa* shows variegation for *fa.* RK2A.
cytology: Associated with $T(l;2)N^{264\text{-}S0}$ = *T(l;2)3C7-9;20Cl-F;22A2-3* (Hoover).

**N264-51*

origin: Found among progeny of radium-treated male.
discoverer: Demerec, 37k.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(1)N*$^{264-51}$ = *D%l)3C6-7;3C7-8* (Sutton).

**N264.52*

origin: X ray induced.
discoverer: Demerec, 38a.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Notch in wings not always present. $N^{364,S2}$*/ia* shows variegation for *fa.* RK2A.
cytology: Associated with $In(I)N^{264,52}$ * *In(t)3C3-5;2OB2-C1.*

**N2 64.53*

origin: X ray induced.
discoverer: Demerec, 38d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N.* $N^{264,53}$*/fa* is not facet. Developmental abnormalities differ from other *N* alleies (Poulson), RK1A.
cytology: Associated with *7*7,-2)N*$^{264-53}$ = *T(1;2)3C6'7;34C7-D1.*

**N264-54*

origin: X ray induced.
discoverer: Demerec, 38b.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264,54}$ = *Df(l)3C3-5;3C7-8* (Hoover).

*/\/264-55

origin: X ray induced.
discoverer: Demerec, 38b.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Variable Notch. $N^{264}\sim^{ss}$*/fa* variegates for *fa.* RK2A.
cytology: Associated with $T(1;3)N^{264\text{-}55}$ = *T(l;3)3D4'5;80F9-81Fl.*

*/s/2 64-56

origin: X ray induced.
discoverer: Demerec, 38c.
phenotype: Probably variegated for *N.* RK2A.
cytology: Associated with $T(1;3)N^{264\text{-}56}$ = *T(l;3)3D4-5;80* (Sutton).

•f/264.57

origin: X ray induced.
discoverer: Demerec, 38d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Notch variable. $N^{264}\sim^{S7}$*/fa* not facet. RK2A.
cytology: Associated with $In(l)N^{264\text{-}57}$ = *In(l)3C9-11;2OD2-E1* (Hoover).

N264-58

origin: X ray induced.
discoverer: Demerec, 38d.
references: 1940, Genetics 25: 618-27.
phenotype: Like *N.* $N^{264\text{-}58}$*/fa* variegates for *fa.* RK1A.
cytology: Associated with $T(1;3)N^{264\text{-}58}$ = *T(l}3)3B2'3;3D6^7;80D-F* (Sutton).

**N264.59*

origin: X ray induced.
discoverer: Demerec, 38d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Weak Notch. $N^{264}\sim^{S9}$*/spl* variegates for *spl.* RK2A.
cytology: Associated with $T(1;2\text{^}SI^{264\text{-}S9}$ = *T(l;2)3C8-9;40F* (Hoover).

**N264-60*

origin: X ray induced.
discoverer: Demerec, 38d.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes appear normal.
other information: *w, dm,* and ec not affected.

**N264-62*

origin: X ray induced.
discoverer: Demerec, 38e.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like /V. N^{264}*-62/*f_a variegates for *fa.* RK1A.
cytology: Associated with $T(1;2)N^{364}\sim^{62}$ = *T(1;2)3C7~8;41A-B* (Sutton).

**N264.63*

origin: X ray induced,
discoverer: Demerec, 38e.
references: Sutton, 1940, Genetics 25: 534—40. Demerec, 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Weak Notch. Overlaps wild type. RK2A.
cytology: Associated with *Tp(l)N^{264}-^{63} = Tp(l)3C7-9;13C;19F* (Hoover).

**N264.64*

origin: X ray induced.
discoverer: Demerec, 38e.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Overlaps wild type. *N^{264}~^{64}/ia* variegates for *fa.* RK2A.
cytology: Associated with *T(1;3)N^{264}-^{64} = T(l;3)3E5-6}80C-F* (Hoover).

**N264-6S*

origin: X ray induced,
discoverer: Demerec, 38e.
phenotype: Overlaps wild type. *N^{264,65}/ fa* variegates for *ia.* RK2A.
cytology: Associated with *T(1;3)N^{264}-^{65} = T(l;3)2B10-16}3D4-5;8lF;96C4-5* (Hoover).

N264.66

origin: X ray induced.
discoverer: Demerec, 38e.
phenotype: Notching of wings weak and rarely visible. *N^{2}64-66/f$_a$* variegates for *fa.* Some males viable; have cream-colored eyes with spots of normal red pigment. RK3A.
cytology: Associated with *T(1;2)N^{264}-^{66} = T(1;2)3C6-7;41 + T(1;2)7C9-D1;53F* (Hoover).

**N264.68*

origin: X ray induced.
discoverer: Demerec, 38k.
phenotype: Like *N* but with slight Minute effect. RK1A.
cytology: Associated with *D^iyN^{264,,68} = Df(l)3A10-Bl;3E8-Fl* (Demerec).
other information: Minute phenotype results from inclusion *of M(1)3E* in the deficiency.

***N264-69**

origin: X ray induced.
discoverer: Demerec, 38k.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like JV. RK1A.
cytology: Associated with *T(1;2)N^{264}~69* » *T(l;2)3C7-8;44C4-5* (Demerec).

***N264-70**

origin: X ray induced.
discoverer: Demerec, 33k.
references: Sutton, 1940, Genetics 25: 534—40.
phenotype: Wing notching overlaps wild type. *pj264-70/f$_m$* variegates for /a. Male viable and mottled for *w* and *rmt.* RK2A.
cytology: Associated with *7X1,3)N^{264}-$^{?O}$ » Ttl;3)3C4-5;B0D-F + T(l;3)6F2-7Al;lWB2-3* (Sutton).

***N264.71**

origin: X ray induced.
discoverer: Demerec, 38k.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Strong Notch. RK1A.
cytology: Associated with *In(l)N^{264}-^{71} =ln(l)3C6-7;20D-B* (Sutton).

HI 6 4.12

origin: X ray induced.
discoverer: Demerec, 38k.
phenotype: Like /V. RK1A.
cytology: Associated with *Df(iyN^{264}-^{72} =Df(l)3C6-7;3C7-9* (Sutton).

**N264.73*

origin: X ray induced.
discoverer: Demerec, 381.
phenotype: Heterozygous females both Notch and Minute. RK1A.
cytology: Associated with *Df(l)N^{264}-^{73} =Df(l)3C3~4;4C6~7* (Demerec).
other information: Minute phenotype results from inclusion of *M(1)3E* and *M(1)4BC* in the deficiency.

**N264.74*

origin: X ray induced.
discoverer: Demerec, 38k.
references: Sutton, 1940, Genetics 25: 534—40.
phenotype: Like *N. N^{264,,74}/fa* variegates for *fa.* RK1A.
cytology: Associated with *TXl;2;3yN^{264,,74} = T(1;2;3)3C10-ll;20D-E;40C-D;92E6-8* (Sutton).

**N264.76*

origin: X ray induced.
discoverer: Demerec, 39b.
phenotype: Like *N.* Also slight Minute. RK1A.
cytology: Associated with *Df(iyN^{264}*^{76} =Df(l)3B4-Cl;3E4-5* (Sutton).
other information: Minute phenotype results from inclusion of *M(1)3E* in the deficiency.

***N264.77**

origin: X ray induced.
discoverer: Demerec, 39b.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N^{264,,77} = Df(l)3B4-Cl;3C7-8* (Sutton).

**N264.79*

origin: X ray induced.
discoverer: Demerec, 39c.
phenotype: Like *N* but overlaps wild type. RK2A.
cytology: Associated with *Df(l)N^{264}-^{79} = D£Cl)2C10-Dl;3C6-7* (Sutton).

+N264.80

origin: X ray induced.
discoverer: Demerec, 39d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N.* RK1A.
cytology: Associated with *IXl^W^{264}-*^{0} » T(l;2)3C6-7;36;40.* An inversion with breakpoints in 11 and 20 induced at same time (Sutton).

***N264.81**

origin: X ray induced.

discoverer: Demerec, 39d.
phenotype: Like *N.* RK1A.
cytology: Associated with *Dt(l)N^{264,81} = Df(l)3C6-7;3C7-8* (Sutton).

*N264.82
origin: X ray induced.
discoverer: Demerec, 39d.
phenotype: Like *N. N^{264,82}/fa* variegates for *fa.* RK1A.
cytology: Associated with *T(1;2)N$^{264-82}$ = T(1;2)3C3-4;41A + T(l;2)20A;57.* Tip of *2L* in chromocenter and may be involved (Sutton).

*N2645B
origin: X ray induced.
discoverer: Demerec, 39d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N.* RK1A.
cytology: Associated with *T(1;3)N$^{264-83}$ = T(l;3)3C6-7;12F2-4;79E2-3 + In(3R)81;88.*

N264.84
origin: X ray induced.
discoverer Demerec, 39c.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
phenotype: Like *N. N^{264,84}/fa* variegates for *fa.* RK1A.
cytology: Associated with *In(l)N$^{264-84}$ = In(l)3C6-7;20A-B* (Sutton).

*f{2 64.85
origin: X ray induced.
discoverer Demerec, 39d.
references: 1940, Genetics 25: 618-27.
phenotype: Like *N. N^{264,85}/fa* variegates for *fa.* RKlA.
cytology: Associated with *T(l;2;4y<$^{264-85}$ = T(l;2;4)3B4-Cl;6A2-Bl;60A4-5;101F-102A* (Sutton, 1940, Genetics 25: 534-40).

*N264.86
origin: X ray induced simultaneously with *rst^{264,86}.*
discoverer: Demerec, 39i.
references: 1940, Genetics 25: 618—27.
Demerec and Sutton, 1940, Proc. Natl. Acad. Sci. U.S. 26: 532-36.
Sutton, 1940, Genetics 25: 534-40.
phenotype: Like *N. N^{264,86}/fa* variegates for *ia.* RK1A.
cytology: Associated with *T(l;4^^{264,86} = T(l;4)3C6-.7;3C7-8i3E5-6;l01F.*

•/SJ264-87
origin: X ray induced.
discoverer: Demerec, 39j.
references: Sutton, 1940, Genetics 25: 534—40.
phenotype: Like *N.* RK1A.
cytology: Associated with *T(l;2;3^l^{364m87} * T(l;2;3)3C7-9;10A2'Bl;45F-46A;59F-60A;97C-D;100E-F.*

*N264-88
origin: X ray induced.
discoverer: Demerec, 39j.
phenotyp*: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

*N264.89
origin: X ray induced.
discoverer: Demerec, 39j.
phenotype: Like /V. Also slight Minute. RKlA.
cytology: Associated with *Dt(l)N$^{264-89}$ = Df(l)3B2-3;3F2-3* (Sutton).
other information: Minute phenotype results from inclusion of *M(1)3E* in deficiency.

*N264.90
origin: X ray induced.
discoverer: Demerec, 39j.
phenotype: Like *N.* Also slight Minute. RKlA.
cytology: Associated with *Df(l)N$^{264-90}$ = Df(l)3C7-8;3E8-F1* (Sutton).
other information: Minute phenotype results from inclusion of *M(1)3E* in the deficiency.

*N264.91
origin: X ray induced.
discoverer: Demerec, 39g.
phenotype: Like N. RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

*N264.93
origin: X ray induced.
discoverer: Demerec, 39k.
phenotype: Like *N.* Slight Minute. RKlA.
cytology: Associated with *Df(l)N$^{264-93}$ = Df(l)3B4-Cl;3F3-4* (Sutton).
other information: Minute phenotype results from inclusion of *M(1)3E* in the deficiency.

*N264.94
origin: X ray induced,
discoverer: Demerec, 39k.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

*N264.9S
origin: X ray induced,
discoverer: Demerec, 39k.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

*N2 64.96
origin: X ray induced.
discoverer: Demerec, 39k.
phenotype: Like *N.* RKlA.
cytology: Associated with *Df(l)N$^{264-96}$ = Df(l)3C6-7;3C7-8* (Sutton).

*N264.97
origin: X ray induced.
discoverer: Demerec, 39k.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

*N264-99
origin: X ray induced,
discoverer. Demerec, 40a.
phenotype: Like *N.* RKlA.
cytology: Associated with *Df(iyN^{264,99} = Dt(l)2D2-3;3C11-12* (Sutton).

***N264.100**

origin: X ray induced.
discoverer: Demerec, 391.
references: 1940, Genetics 25: 618-27.
phenotype: Like *N.* $N^{264,100}/ta$ variegates for *fa,* RK1A.
cytology: Associated with $T(1;3)N^{264,100}$ = *T(l;3)3B4-Cl;4B4-5;80* (Sutton, 1940, Genetics 25: 534_40).

N26 4-ioo$_T$2: see In(3L)100r^2

***N264.101**

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264}$-^{1Q1} = *Df(l)3C4-5;3C7-8* (Sutton).

***N264-102**

origin: X ray induced.
discoverer: Demerec, 391.
phenotype: Like *N.* RK1A.
cytology: Associated with $Tfl\&yN^{264,1}$ *02* = *T(l;2)3C6-7;50E;56C* (Sutton).

N264.103

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like *N.* $N^{264ml03}/spl$ shows variable expression of *spl,* as though mottled. *[y264~lO3/f$_a$* is facet. RK1.
cytology: Salivary chromosomes appear normal.
other information: Located between *spl* and Ni^{24} (Welshons and Von Halle, 1962, Genetics 47: 743—59). *pn, w, r$t,* and *dm* not affected.

+N264.104

origin: X ray induced.
discoverer: Demerec, 39j.
phenotype: Like TV. RK1A.
cytology: Associated with $T(1;3)N^{264}$-^{104} = *T(1;3)3C7-9;87D1-E1 + In(l)lB4-5;18-19* (Sutton).

N264-10S

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like /V. RK1A.
cytology: Associated with $Df(l)N^{264}$-^{105} = *D£(l)3C6~7;3D2-3*(Sutton).

+N264.106

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like/V. RK1A.
cytology: Associated with $Df(l)N^{264,106}$ = *Df(l)3C6-7;3C7-8* (Sutton).

N264-/07

origin: Spontaneous.
discoverer: Demerec, 40a.
phenotype: Like AT. RK1.
cytology: Salivary chromosomes apparently normal.
other information: Locus seems to lie to the right of •p/. Analysis complicated by a lethal between *w«* and N^{264}-*07* (Welshons, 1958, Proc, Natl. Acad, Sci. U.S. 44: 254-58). *rmt* and *tin* not affected.

***H264.10S**

origin; X ray induced,
discoverer: Demerec, 40a,
phenotype: Heterozygous females Notch and slight Minute. RK1A.
cytology: Associated *with* $In(l)N^{264,108}$ = *In(l)3C3-5;3E7-8;20A4-5* (Sutton).
other information: Minute phenotype results from absence of section 3C5-3E7, which contains *M(1)3E,* from the inversion.

N264.109

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like *N,* but semilethal with fa^{no}. RK1.
cytology: Salivary chromosomes normal.
other information: Located to the right of *spl* (Welshons, Von Halle, and Scandlyn). *w, rst,* and *dm* not affected.

***N264-1JO**

origin: X ray induced.
discoverer: Demerec, 40a.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{2}6^{4}$-*110* = *Df(l)3B4-Cl;3D2-3* (Sutton).

***N2 64.111**

origin: X ray induced.
discoverer: Demerec, 40b.
phenotype: Like *N.* RK1A.
cytology: Associated with $D^iyN^{264,111}$ = *Df(l)3C3-5;3C12-Dl* (Sutton).

***N264-112**

origin: X ray induced.
discoverer: Dotnerec, 40b.
phenotype: Like *N.* RK1A.
cytology: Associated with $ln(l)N^{264}$-^{112} = *In(l)3C6-7;3F5-6* (Sutton).

N264-113

origin: X ray induced.
discoverer: Demerec, 40c.
references: Sutton, 1940, Genetics 25: 628—35.
phenotype: Variegates for *N* and *apl.* RK2A.
cytology: Associated with $T(1;4)N^{264}$-^{113} = *TX1;4)3C10-D1;101* (Sutton).

N264-114

origin: Spontaneous.
discoverer: Kaufmann, 40d.
phenotype: Like *N.* RK1A.
cytology: Associated with $Dt(l)N^{364}$-^{114} = *Df(l)3C6-7;3D4~S* (Sutton).

***H264.11S**

origin: X ray induced,
discoverer: Sutton, 40e.
phenotype: Like *N.* RK1A.
cytology: Associated with $Dl(l)N^{264,115}$ = *D$1)3C3-5;3E2'3* (Sutton).

***N264-116**

origin: X ray induced,
discoverer: Sutton, 40e.
phenotype: Like *N.* RK1A.
cytology: Associated with $In(1)N^{264}$-^{li6} = *In(l)2C8-10;3C7-9* (Sutton).

N264-117

origin: X ray induced,
discoverer: Demerec, 40g.
phenotype: Like *N.* RK1A.

cytology: Associated with $Df(l)N^{264,117}$ = *Df(l)3A6-7;3E2-3* (Sutton).

**N264-118*

origin: Spontaneous.
discoverer: Demerec, 40h.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264-118}$ = *Df(l)3C6-7;3C7-9* (Sutton).

**N264.119*

origin: X ray induced.
discoverer: Demerec, 40i.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *kz, w, rst,* and *dm* not affected.

**N264-120*

origin: X ray induced.
discoverer: Demerec, 40j.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264-120}$ = *Dt(l)3C6-7;3D2-3* (Sutton).

**N264.121*

origin: X ray induced.
discoverer: Demerec, 40j.
phenotype: Like *N.* RK1A.
cytology: Associated with *T(1;3)N264.121* = *T(1;3)3C7'9;81F;86B6'C1* (Sutton).

**N264.122*

origin: X ray induced.
discoverer: Demerec, 40j.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *kz, w, rst, dm,* and ec not affected.

**N264.123*

origin: Ultraviolet induced.
discoverer: Demerec, 40k.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst, dm,* and ec not affected.

**N264.U4*

origin: X ray induced.
discoverer: Demerec, 41a.
phenotype: Like/V. RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

**N264.125*

origin: X ray induced.
discoverer: Demerec, 41a.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{2e\text{-},t,12S}{}_{m}$ *Df(l)3C4-5;3C7~8* (Sutton).

**N264.126*

origin: Spontaneous,
discoverer: Bishop, 401.
phenotype: Like *N.* RK1A.
cytology: Associated with $DffiyN^{264,126}$ = *Df(l)3C3-S;3D4-5* (Sutton).

**N264-127*

origin: X ray induced.
discoverer: Demerec, 41b.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264,127}$ = *Df(l)3C6-7;3C7-8* (Sutton).

**N264-128*

origin: X ray induced.
discoverer: Demerec, 41b.
phenotype: Like iV. RK1A.
cytology: Associated with $Di(l)N^{26*-128}$ = *Df(l)3C6-7;3C7-8* (Sutton).

**N264.129*

origin: X ray induced.
discoverer: Demerec, 41c.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and dm not affected.

+N2 64-130

origin: Spontaneous.
discoverer: Neel, 41c.
references: 1942, Genetics 27: 530.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{264,i30}$ = *Di(l)3C6-7;3C7-8* (Sutton).

**N264-131*

origin: X ray induced.
discoverer: Demerec, 41c.
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal (Sutton).
other information: *w, rst,* and *dm* not affected.

/V^a:* see *N264-12*

**N*: Notch of Aronson*

origin: Spontaneous.
discoverer: Aronson, 57gll.
references: 1958, DIS 32: 67.
phenotype: Like *N.* RK1A.
cytology: Several bands to the right of 3C4 deranged.

**WS; Notch of Bernstein*

origin: Spontaneous.
discoverer: Bernstein, 28a7.
phenotype: Like *N.* RK1A.
cytology: Associated with $Df(l)N^{B}$ = *D((1)3C4-5;3C12-D1* (Sutton).

$N^{c\circ}$: Notch-Confluens

origin: Spontaneous.
discoverer: Welshons, 1955.
references: 1956, DIS 30: 79.
1958, Cold Spring Harbor Symp. Quant. Biol. 23: 171-76.
phenotype: Wing tips seldom notched; veins thickened; deltas present at juncture of longitudinals and marginal vein. Acrostichal rows irregular. $N^{c\circ}$/*fa* and N^{Co}/*$pl* are facet and split, respectively. N^{Co}/la^{n} wings more deeply notched than $/V^{Co}$/+. N^{Co}/ta^{no} lethal; rare survivors sterile and weak. N^{Co}/*Dp(t;l)Co* similar to *Dp(l;l)Co/ Dp(l;l)Co.* RK1.
cytology: Salivary chromosomes appear normal.
other Information: Located between Ni^{24} and *N&Ogll* (Welshons, 1958; Welshons and Von Halle, 1962, Genetics 47: 743-59).

**NEZ*

origin: Spontaneous.
discoverer: Morgan, 1929.

references: 1937, DIS 7: 7.
phenotype: Like *N.* RK1A.
cytology: Associated with *Df(l)N^{EZ} =Df(l)3C6-7;3C7-8* (Sutton).

**HG: Notch of Goidschmidt*
origin: Found among progeny of heat-treated flies.
discoverer: Goidschmidt.
references: Gottschewski, 1935, DIS 4: 15, 16.
1937, Z. Induktive Abstammungs- Vererbungslehre 73: 131-42 (fig.[1]),
phenotype: Like *N.* RK1.
cytology: Salivary chromosomes normal.

Ni24
origin: Spontaneous (as cluster of two maternal chromosomes carrying *fa).*
discoverer: Welshons, 1955.
synonym: *N^{22}* (Welshons, 1958).
references: 1958, Cold Spring Harbor Symp. Quant. Biol. 23: 171-76.
phenotype: Like *N. fa Ni^{24}/fa"* ° *lethal.* RK1.
cytology: Salivary chromosomes normal (Welshons).
other information: Located between *N264-103* $_{an(}$j *N^{Co}* (Welshons and Von Halle, 1962, Genetics 47: 743-59). iv not affected.

N^{M}: Notch of M/sc/ia*tkow*
origin: Spontaneous in the *In(l)dl-49, y w f* component of *C(1)DX.*
discoverer: Mischaikow, 561.
references: Cicak and Oster, 1957, DIS 31: 80.
phenotype: Wings notched at tips and occasionally at sides. Veins thickened, with deltas. Eyes slightly smaller than normal; occasionally, one eye extremely small. RK1.

NNic: Notch of NicoIetti
origin: X ray induced.
discoverer: Nicoletti.
phenotype: Like *N. N^tc/fano* lethal. RK1.
cytology: Salivary chromosomes normal (Welshons).
other information: Located between *spl* and *N$^{264'40}$* (Welshons and Von Halle, 1962, Genetics 47: 743-59). wnot affected.

*NP: Notch from P*2*
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
phenotype: Like *N.* RK1A.
cytology: Associated with *In(l)N^{p} = ln(l)3C;8E* (Darby).

N: Notch of Williams*
origin: Spontaneous in the *In(l)sc^{s}, I* component of *C(1)DX.*
discoverer: Williams, 56j.
references: Cicak and Oster, 1957, DIS 31: 80.
phenotype: Like *N.* RK1.

N-: see *1(2)S*

N-2G: Notch-2 from Gallup
location: 2-72.0.
origin: Spontaneous.
discoverer: Ives, 41117.
synonym: /V-2.
references: 1943, DIS 17: 50.
1957, DIS 31: 83.
phenotype: Wings notched apically. Sometimes overlaps wild type. Homozygous lethal. RK2A.
cytology: Associated with *In(2R)G = In(2R)50E;54D* (T. Hinton). May be inseparable.

**N-b: Notch-b*
location: 2- (not located).
origin: Spontaneous.
discoverer: Mann, 1921.
synonym: *Notch* J2.
references: 1923, Genetics 8: 27—36.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 232.
phenotype: Resembles Notch. Wing nicked in about 10 percent of heterozygous flies. Homozygote probably lethal. RK3.
other information: Possibly a *vg* allele.

na: narrow abdomen
location: 1-45.2.
origin: X ray induced.
discoverer: H. M. Miller, 34c.
references: 1934, DIS 2: 9.
1935, DIS 4: 9.
phenotype: Abdomen long and cylindrical in both sexes. Viability low; female fertility low. Ovaries in juvenile condition (Brehme). RK2.

**na2*
origin: Ultraviolet induced.
discoverer: Edmondson, 51g.
references: 1952, DIS 26: 60.
phenotype: Like *na.* RK2.

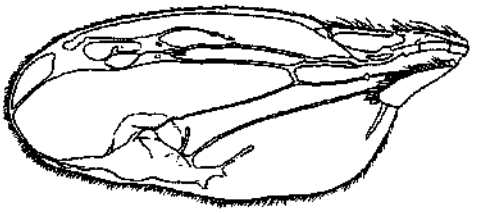
narrow: see *nw*
narrow abdomen: see na
narrow eye: see ney
narrow scoop: see *nrs*

nd: notchoid
location: 1-3.0.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1951.
synonym: *n^{tah}; notch-Fahmy**
references: 1958, DIS 32: 72.
phenotype: Wings notched; veins thickened. At low temperature, wings not notched. Viability and fertility of both sexes excellent, nd heterozygotes with *N^{2}<S4-39$_{t}$ $_{N}$C$_{Oi}$ $_{OTN}$264-40* $_{have}$ extremely notched and strap like wings, small rough eyes, low viability and fertility (Welshons). *fa^{no}/nd* has slightly thickened wing veins, with deltas. About 10 percent of *fa/nd* flies have small notches in one or both wings, *spl/nd* lacks a few bristles, like spl/+* Eyes sometimes smaller than normal and roughened, *spl nd* males have rough eyes, ncf-like wings, and irregular, bushy sex combs. RK1.
cytology: Salivary chromosomes normal (Fahmy). Placed in band 3C7, on basis of interaction with *N.*
other information: Member of Notch pseudoallelic series; located at or to the right *otN^{60}^^{11}* (Welshons and Von Halle, 1962, Genetics 47: 743-59).

*nd**
discoverer: R. M. Valencia, 62dl6.

phenotype: *nd^/nd*^{2} and *nd*^{2}*/nd* like *nd/nd.* Normal in combination with other visible mutations at the *N* locus. RK1.
other information: Close to but to the right of *nd* (Welshons).

***ne: nicked* eye**
location: 2- (not located).
discoverer: Kfil.
references: 1946, DIS 20: 66.
phenotype: Eye margin nicked. Overlaps wild type. RK3.
other information: Probably an allele of *L.*



net: net
Edith M. Wallace, unpublished.

net: net
location: 2-0.0 [to the left of *al;* order with *l(2)gl* not known].
origin: Spontaneous.
discoverer: Bridges, 31cl0.
phenotype: Wing veins form plexus like net; first posterior cell between L3 and L4 widens toward tip; branch missing from posterior crossvein; all veins fused at base of wing, like *bi.* According to Waddington [l940, J. Genet. 41: 75-139 (fig.)], spaces form between epithelial layers owing to inadequate contraction during pupal period; spaces later fuse and form extra veins. RK1.
cytology: Locus of net lies between 21A1 and 21C1 (Lewis, 1945, Genetics 30: 137-66).

net
origin: Spontaneous.
discoverer: Braun, 1937.
phenotype: Like net. RK1.

***net*^{3}**
origin: Spontaneous.
discoverer: Williams, 56f.
references: 1956, DIS 30: 80.
phenotype; Wings have extreme plexus of veins, but otherwise less abnormal than nef. RK1.

***net*^{4}**
origin: Probably spontaneous.
discoverer: Meyer, 56c.
references: *1956,* DIS 30: 77.
phenotype: Like *net*^{3}*;* less extreme than *net,* RK1.

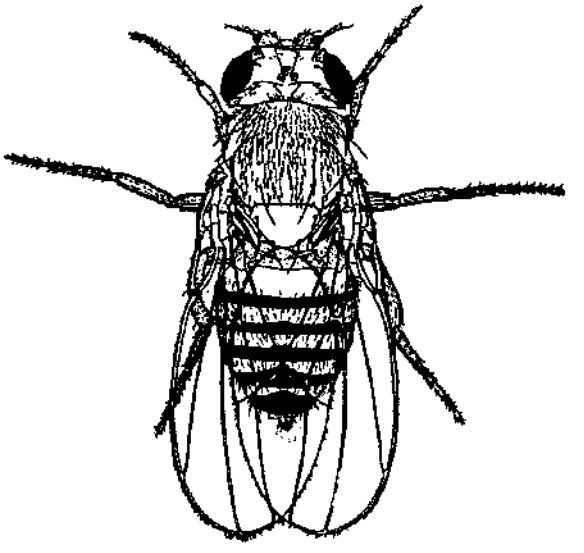
JMW; *neuter
location: Autosomal.
origin: Spontaneous.
discoverer: Travers, 1955.
reference*: Clarke, 1957, DIS 31; ISO.
phenotype: Homozygous female intersex; homozygous male normal. RK3.
other information: Not an allele of *ix* (Maynard Smith).

ney: narrow eye
location: 1- (rearrangement).
origin: X ray induced.
discoverer: Becker, 1950.
references: 1952, DIS 26: 69.
phenotype: Homozygote has narrow eyes haliway between *B* and wild type. Heterozygote usually normal. RK1A.
cytology: Associated with *In(l)ney = In(l)10A;16D.*

ni: nicked
location: 3-40 (35 to 45).
origin: Spontaneous.
discoverer: Neel, 41c26.
references: 1942, DIS 16: 51.
phenotype: Small notches or nicks in wing tips of 60—90 percent of homozygous males and 80—100 percent of homozygous females. RK3.

ni-2: nicked* on *chromosome 2
location: 2- (not located).
origin: Spontaneous,
discoverer: Travers, 1955.
references: Clarke, 1957, DIS 31: 80.
phenotype: Wing tips deeply emarginate between L2 and L4 and occasionally between L4 and L5. Penetrance and viability good. RK3.

nicked:* see *ni
***nicked eye:* see ne**
***no-wings:* see *ap*^{3}**
Notch:* see *N
Notch 2:* see *N-b
notchoid:* see *nd
notchy:* see *ny
Notopleural:* see *Np



Np: Notopleural
From Bridges, Skoog, and Li, 1936, Genetics 21: 788-95.

Np; Notopleural
location: 2-58.7 to 60.2 (between *en* and en; inseparable from Wo).

origin: Spontaneous.
discoverer: Nichols-Skoog, 33b20.
references: Bridges, Skoog, and Li, 1936, Genetics 21: 788-95 (fig.).
Li, 1936, Peking Nat. Hist. Bull. 11: 39-48.
phenotype: Notopleural, humeral, presutural, and pretarsal bristles shorter and blunter than normal. Wings short and broad. Female produces few or no progeny. Viability fair. Development retarded. More extreme at 19°C than at 25°, also more extreme in female. Lethal over *T(2;3)dp,* Homozygous lethal. RK2A.
cytology: Locus lies between 44F1 and 45E2, on basis of its association with *Df(2R)Np = Df(2R)44Fl-2;45El-2* (Bridges).

nts: narrow scoop
location: 1-54.2.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 88.
phenotype: Wings narrow and slightly shorter than normal; frequently scooped. Slightly thinner bristles. Eyes large and dull red. Eye and body colors darken with age. Viability and fertility good in male; fertility low in female. RK2.

Ns: Nasobemia
location: 3-48.0. (No recombinants with *pP* among 1472 flies.)
origin: Spontaneous.
discoverer: Gehring.
phenotype: In extreme cases *Ns/+* forms, in place of an antenna, a complete leg including sternopleura, coxa, trochanter, femur, tibia, and tarsus. Antennal leg has no sex comb in male, and bristle pattern is that of a middle leg. Eyes smaller; whole head tends to be malformed. Expression variable but penetrance complete. Hotnozygous lethal. iVs *ss″/+ ss″* indistinguishable from *Ns/+*. *Ns/Antp*^{B} viable; phenotype like extreme *Ns/+*. RK1.
cytology: Salivary chromosomes appear normal,
other information: Allelism with *Antp* not excluded since all *Antp* alleles are associated with inversions that eliminate recombination in this region. However, all heterozygotes of *Antp* alleles are lethal, unlike *Ns/Antp*^{B}.

Nu: Nude
location: 2- or 3- (rearrangement).
origin: X ray induced.
discoverer: Sutton, 41a27.
phenotype: Many bristles missing from head and thorax; postscuteliars, notopkurals, verticals, and postverticals usually present. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)Nu* - Tf2;3)24;J6-*37;39-40;73-74;7$-76;77-78;8l-82;8S-86;89-90.*

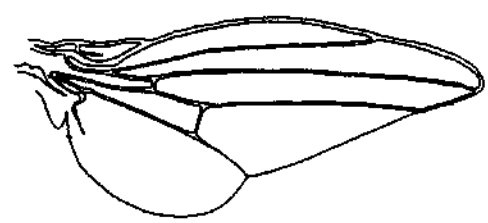
nub: nubbin
location: 2-47.0.
origin: Spontaneous.
discoverer: Mickey, 48elO.
references: 1949, DIS 23: 61.
phenotype: Wings very small, opaque, curved spoonlike up or down; inflated at eclosion. Wing margins interrupted. Only one vein (L2 or L3) present. Halters somewhat reduced. Viability excellent. RK1.
cytology: Not included in *Di(2L)64j = Df(2L)34E5-F1.-35C3-D1* (E. H. Grell).

*nub**
origin: Probably X ray induced.
discoverer: R. F. Grell, 56fl.
references: 1956, DIS 30: 71.
phenotype: Wings small and spoonlike but less extreme than *nub.* Patches of dried blood on wings. Veins LI to L4 almost indiscernible; L5 and alula frequently absent. Viability and fertility excellent. RK1.

***nub*^{62d}**
origin: X ray induced.
discoverer Seiger, 62d.
references: 1963, DIS 37: 53.
Abbadessa and Burdick, 1963, DIS 37: 54.
phenotype: Wings very small and spoonlike. RK1.

Nude: **see** *Nu*

**nw: narrow*
location: 2-83.
origin: Spontaneous.
discoverer: Bridges, 16b7.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
phenotype: Wings long, narrow, and somewhat pointed. Low viability and fertility in both sexes. At 25°C may overlap wild type; at 19° nearly all flies approach wild type but have longer wings. RK2.

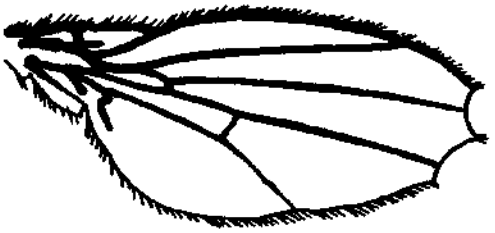


nw^{2}: *narrow-2*
From Payne, 1924, Genetics 9: 327-42.

origin: Spontaneous.
discoverer: Payne, 1615.
synonym: *l&nce.*
references: Payne, 1924, Genetics 9: 327-42 (fig.). Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 227.
phenotype: Wings like *nw.* Classification easier in females. Slight notching or tufting of marginal hairs on tip of wings. Both sexes nearly sterile. Ovaries tumorous at eclosion [King, Burnett, and Staley, 1957, Growth 21: 239-61 (fig.); King, 1964, Roy. Entomol. Soc. (London) Symp. Insect Reproduction pp. 13—25]. Oogonia proliferate asynchronously within ovariole; follicle development inhibited [Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70 (fig.)]. RK2.

nw^D: narrow-Dominant
origin: X ray induced.
discoverer: E. H. Grell, 59f.
references: 1962, DIS 36: 37.
phenotype: Wings of heterozygote longer and narrower than normal. Expression variable and sometimes approaches wild type. Viability *oi* $nw^D/+$ low. Homozygous lethal, as is nw^D/nw^2. RK2.

NX: Notch Xasta
location: 3- (between *st* and *Dfd;* 44.0-47.5).
origin: X ray induced.
discoverer: Ohnishi, 49116.
references: 1950, DIS 24: 61.
1951, DIS 25: 79.
Schalet, 1960, DIS 34r 55.
phenotype: Resembles Notch but more extreme. Homozygote resembles Xasta. Viability of heterozygote fair; homozygote semilethal. Enhanced by *Dl* and suppressed *byH.* Combination *of NX* and ap^{Xa} produces small wings, like *vg,* and lower viability. RK2 as heterozygote.



ny: notchy
From Griinberg, 1929, Biol. Zentr. 49: 680-94.

ny: notchy
location: 1-32.
origin: X ray induced.
discoverer: Grüneberg, 28j29.
references: 1929, Biol. Zentr. 49: 680-94 (fig.).
1934, DIS 2: 8.
phenotype: Wing tips slightly nicked. Expression variable; overlaps wild type in some females and most males. Viability about 70 percent wild type. RK3.

***ob: oblique**
location: 1-37.2.
origin: Spontaneous,
discoverer: Neel, 41f30.
references: 1942, Genetics 27: 532.
1942, DIS 16: 51.
phenotype: Wings obliquely truncated from inner margin outward. Venation disturbed. Viability about 20 percent wild type. RK3.

obl: oblique wings
location: 1-60.1.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 72.
phenotype: Wings slightly upheld and outspread; small blister occasionally present. Body color slightly darker. Male viability and fertility good; female viability about 40 percent wild type and fertility reduced. RK2.
other information: One allele induced by CB. 1506

oblique:* see *ob

oblique wings:* see *obl

obt: obtuse
location: 3-77.5.
discoverer: E. M. Wallace, 35gl.
phenotype: Wings shorter and blunter, but overlap wild type slightly. Thorax somewhat humpy; body chunky; eyes slightly bulging. RK3.

oc: *ocelliless*
Edith M. Wallace, unpublished.

oc *ocelliless*
location: 1-23.1.
origin: X ray induced.
discoverer: Bedichek, 30cl5.
references: 1934, DIS 2: 9.
phenotype: Ocelli completely absent. Bristles in ocellar area and on top of head irregular and more numerous; postverticals usually absent. Eyes somewhat reduced and body size dwarfed. Viability about 90 percent wild type. Females sterile. According to Beatty Ll949, Proc. Roy. Soc. Edinburgh, B 63: 249-70 (fig.)J, oocytes often misshapen, eggs abnormal in appearance, and parovaria nearly always absent. RK2.
cytology: Salivary chromosome studies by Demerec and Sutton show locus to lie between 7C4-5 and 8C1-2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Further restricted to 7E1 through 8C2, on the basis of its exclusion from *Df(l)sn = D%1)7B2-3;7D22-E1* (Hinton and Welshons, 1955, DIS 29: 125-26).

Oce: Ocellarless
location: 1-5.7.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer. Fahmy, 1953.
references: 1958, DIS 32: 72.
phenotype: One or both ocellar bristles and frequently postverticals missing; other bristles, especially the scutellars, sometimes absent. Wings frequently positioned abnormally, with incised margins; effect more marked in homozygous females. Bristle effect dominant. Good viability and fertility in both sexes. RK1.
other information: One allele induced by each of the following: CB. 3025, CB. 1592, CB. 1540, and CB. 1528.

***ocelliless:* see oc**

***ocr:** *ochracea*
location: 2-0.
discoverer: Serebrovsky, 40g25.
references: 1941, DIS 15: 19.
phenotype: Eye color lighter at eclosion, darkening with age. RK1.

od: **see** ***os°***

Odh^F: Octanol dehydrogenase-Fast
location: 3-49.2.
origin: Naturally occurring allele.
discoverer: Ursprung.
references: Ursprung and Leone, 1965, J. Exptl. Zool. lo4V): 147-54.
Courtright, 1966, DIS 41: 59.
Courtright, Imberski, and Ursprung, 1966, Genetics 54: 1251-60.
phenotype: Produces octanol dehydrogenase that migrates more rapidly to cathode in agar gel electrophoresis at pH 8.7 than *Odh^S*. *OdhF/Odh^S* heterozygote produces enzyme of intermediate mobility in addition to fast and slow types. Hexanol and heptanol, as well as octanol, are substrates for the enzyme. RK3.

Odh^S: Octanol dehydrogenase-Slow
origin: Naturally occurring allele.
discoverer: Ursprung.
references: Ursprung and Leone, 1965, J. Exptl. Zool. 160: 147-54.
Courtright, 1966, DIS 41: 59.
Courtright, Imberski, and Ursprung, 1966, Genetics 54: 1251-60.
phenotype: Produces octanol dehydrogenase that migrates less rapidly to cathode in agar gel electrophoresis at pH 8.7 than *OdhF*. RK3.

odsy: **see** ***os***

Of: see Diof

****Off:Off***
location: 2-82.
origin: Spontaneous.
discoverer: Bridges, 23el4.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 232.
phenotype: Some bristles missing in heterozygotes, especially from side of abdomen; basal rings remain as in *H*. Homozygote lacks more bristles. Eyes large, creased, and roughened. RK2.
other information: Agrees with *abr* in locus and description; may have been an allele.

ol-2: **see** ***sp***

olive-2; **see** ***sp***

olv^D: **see** ***dp°***

****om;ommatidia***
location: 1-0.1 (to the right of sc).
origin: X ray induced in (or with) *ac^3*.
discoverer: Muller.
references: Muller, Prokofyeva, and Raff el, 1935, Nature 135: 253-55.
Muller, 1935, DIS 3: 30.
phenotype: Ommatidia disarranged, giving a slight eye roughness difficult to classify. RK3.
cytology: Thought by Muller to be in or very close to1CI.

omm: *ommatoreductum*
location: 1-12.8.
origin*. Induced by triethylenemelamine (CB. 1246).
discoverer. Fahmy, 1953.
references: 1958, DIS 32: 72.
phenotype: Some peripheral ommatidia absent, frequently in an irregular manner, giving a rough eye and a notched border. Shape of head abnormal; head bristles deranged or absent. Palps absent or deformed. Thoracic bristles deranged. Wings often unexpanded. Good viability and fertility in both sexes. RK2.
other information: One ^llele each induced by CB. 1246, CB. 1522, CB. 1592, CB. 1528; two alleles induced by CB. 3026.

ommatidia: **see** ***o/n***

ommatoreductum: **see** ***omm***

***0n:** *Open*
location: 3-26.
origin: X ray induced.
discoverer: Tanaka, 36c26.
references: 1937, DIS 7: 21.
1937, DIS 8: 11.
phenotype: Wings spread, Homozygous viable. RK2.

***op:** *opaque*
location: 1-50.
origin: X ray induced.
discoverer: H. M. Miller, 33k.
references: 1934, DIS 2: 9.
1935, DIS 3: 14.
1935, DIS 4: 10.
phenotype: Wings opaque and whitish, usually divergent and slightly convex. Viability and fertility good in male, poorer in female. RK3.

****opb: opaque broad***
location: 1-28.3.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 88.
phenotype: Short, broad, and opaque wings, with slightly convex or concave membranes. Slightly brownish eye color. Legs short with long segments frequently bowed. Abdomen slightly abnormal in shape, and genitalia deformed. Males fertile; viability about 10 percent wild type. Females sterile. RK3.

Open: **see On**

***op/i;** *ophthalmopedia*
location: 2-45.
origin: Spontaneous.
discoverer: Gordon, 1934.
references: 1936, J. Genet. 33: 25—60.
1941, DIS 14: 39.
phenotype: In extreme form, an appendage grows from eye; in less extreme form, eye is kidney shaped. Expression sensitive to genetic and environmental modification. Effect caused by enlargement and abnormal folding of eye-forming portion of optic disk in late larvae IWaddingtan and Pilkington, 1943, J. Genet. 45: 44-50 (fig.)]. RK3.

opt: **see** ***eyopt***

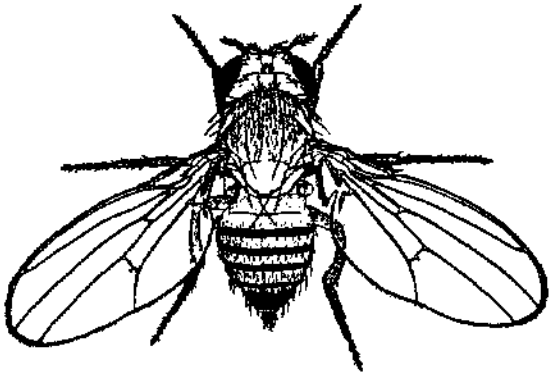
or: orange
location: 2-107.2 (to the left of *Fo).*
origin: Spontaneous.
discoverer: Mossige, 1942.
references: 1950, DIS 24: 61.
phenotype: Eye color bright orange, *or/pd* wild type (Von Halle). RK1.

or45a
origin: Spontaneous in *In(2L)Cy + In(2R)Cy, Cy en^{3} sp^{a}*, probably simultaneously with *bw^{45a}*.
discoverer Ives, 45a.
references: 1951, DIS 25: 70.
phenotype: Eye color like *or,* RK1.

or-m
origin: Spontaneous,
discoverer: Ives, 49h31.
references: 1951, DIS 25: 70.
phenotype: Eye color like *or.* RK1.

os: outstretched small eye
location: 1-59.2.
origin: X ray induced.
discoverer: Abrahamson, 1953.
synonym: *odsy.*
references: Verderosa and Muller, 1954, Genetics 39: 999.
phenotype: Wings held virtually at right angles to body. Eye small and rounded. *os/os°* has wing effect but eyes normal, *os/os^{8}* has eye effect but wings normal. RK1.
cytology: Placed in region 16E-17A, on the basis of its being to the right of *Dt(l)C-PL = Dl(l)15F;16E* and to the left of *Dp(l;l)Bx^{r}4*^{k} =Dp(l;l)17A;17C.*

$_{os}$bdw; outstretched small eye-bending wings
origin: X ray induced.
discoverer: Halfer, I960,
synonym: *bdw.*
phenotype: Wings divergent and drooping; size and shape normal. Males sterile. RK2A.
cytology: Associated with *T(l;3)os^{bdw} = T(l;3)16E;80C.*



os°: outstretched small eye-outstretched
Edith M. Wallace, unpublished.

os°: *outstretched small eye-outstretched*
origin: X ray induced.
discoverer: Muller, 1930.
synonym: *od.*
references: 1930, J. Genet. 22: 303 (fig.).
1935, DIS 3: 30.
Verderosa and Muller, 1954, Genetics 39: 999.
phenotype: Wings extremely divergent, often at right angles to body. *os°/os^{8}* is wild type. RK1.

os^{s}: outstretched small eye-small eye
origin: Spontaneous.
discoverer: Bridges, 19g3.
synonym: *sy.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 236.
phenotype: Eyes small and rounded, high on the head, but not bulging. RK1.

****osh: outshifted***
location: 1-33.0 (no crossover with v in 997 chromosomes).
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 73.
phenotype: Wings shortened and often slightly divergent. Body and wings pale in color. Eyes somewhat smaller and browner than normal. Viability and fertility good in both sexes. RK2.

ot: outhefd
location: 1-65.7.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer Fahmy, 1952.
references: 1958, DIS 32: 73.
phenotype: Wings held horizontally; inner margin slightly cut away in many males. Ocellar bristles usually absent or reduced; effect variable. Hairs sparse, especially in posterior midthoracic region. Males sterile; viability about 20 percent wild type. RK3.

outshifted: see *ash*
outstretched small eye: see os
outstretched: see *os°*

****ov: oval***
location: 1-17.5.
discoverer: Steinberg, 37hl5.
phenotype: Eye somewhat oval and quite rough. RK1.

ovaless: see ov/
over *overetherized*
location: 2- (not located).
origin: Spontaneous,
discoverer Plaine and Aubele, 64b.
references: 1965, DIS 40: 36.
phenotype: Wings held vertically within 1 hr after eclosion; vibrate feebly but are incapable of supporting flight. Movements of first two pairs of legs uncoordinated. Viable and fertile although ove male often unsuccessful in mating with ove^{+} female. RK2.

Overflow: see *Dl°t*

ov7: *ovioculus
location: 1-0.9.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer Fahmy, 1953.
references: 1958, DIS 32: 73.

notype: Eyes small, egg shaped, and rough. Ings spread or elevated to varying degrees; edges cised, especially inner margin. Eclosion slightly ilayed. Males sterile. Viability 20—60 percent Lid type. RK2.

ivaless

ation: 2- (not located).
Iin: Spontaneous.
coverer: Bridges, 21a3.
srences: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 232.
notype: Rough eyes. Males fertile; females itirely sterile. Small groups of cells in place of raries, but ducts and genitalia normal. Abdomen female grayish and translucent. RK3.

>k

ation: 3-48-.0.
Iin: Spontaneous.
:overer: Morgan, lOg.
irences: Bridges and Morgan, 1923, Carnegie [nst. Wash. Publ. No. 327: 44 (fig.).
notype: Eye color dull ruby with purplish tone, res contain 40 percent normal red and 33 percent >rmal brown pigment (Nolte, 1959, Heredity, 13: •3—41). Larval Malpighian tubes colorless irehme and Demerec, 1942, Growth 6: 351—56). K2.
>logy: Tentatively placed in region 85A6-B3, on e basis of position of the breakpoint common to *(3)pl 00.48 =ln(3)80Sl;85A6-Bl* and *(3R)p^1(>0.290 = in(3R)85B3-4;85D12-15* (Ward and Lexander, 1957, Genetics 42: 42—54).

Iin: Spontaneous.
coverer: Thoday, 53h.
srences: 1954, DIS 28: 78.
notype: Like *pP.* RK1.

|in: Spontaneous.
coverer: Williams, 56h.
trences: 1956, DIS 30: 80.
notype: Like *pP.* RK1.

48

jin: X ray induced.
coverer Alexander.
»rences: Ward and Alexander, 1957, Genetics 42: 42-54.
tfiotype: Pink eye color. RK1A.
ology: Associated with *ln(3)pi00.48 = in(3)8Q-';85A6-B1.*

88

jin: X ray induced.
coverer: Alexander.
srences: Ward and Alexander, 1957, Genetics 42: 42-54.
notype: Eye color pink. Homozygous semilethal. K2A.
ology: Induced with *ln{3)plOO.i8 m 1^3)80-';94D11-EI,* which does not involve the pink gion.

290

jin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Eye color pink. RK1A.
cytology: Associated with *In^Rfe^1 00.290 - In(3R)85B3-4;85D12'15.*

p<"; see *Pu&**

pp: pink-peach

discoverer: Bridges, 13a24.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 82 (fig.).
phenotype: Eye color lighter and more orange than p. Eyes have 9 percent normal red and 15 percent normal brown pigment (Nolte, 1959, Heredity 13: 233—41); become brown with age. In combination with en, eyes orange-red in young flies, darkening toward deep red with age; with *bw,* eyes light reddish yellow to rose-brown, darkening with age; color autonomous in larval optic disk transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes colorless (Beadle, 1937, Genetics 22: 587-611). Females heterozygous for *pP* and for a white allele (e.g., *w, w^h, w^bf)* have brownish eye (Judd, 1955, DIS 29: 126). RK1.

pPS6

origin: Spontaneous.
discoverer: Williams, 56c.
references: 1956, DIS 30: 80.
phenotype: Eye color light ruby with orange tone. RK1.

P: Pale

location: 2- or 3- (rearrangement).
origin: Spontaneous.
discoverer: Bridges, 17jl6.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 184 (fig.).
phenotype: Heterozygote a specific dilutor of the *w°* series of white alleles; tends to darken eye color of *w"* series. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)P = T(2;3)58E3-F2;60D14-B2;96B5-Cl* (Morgan, Bridges, and Schultz, 1934, Carnegie Inst. Wash. Year Book 33: 278).

pa; *patulous*

location: 2-101,0.
origin: Spontaneous.
discoverer: Edmondson and Meyer, 49d.
references: 1949, DIS 23: 61.
phenotype: Wings spread wide apart. Excellent viability; fair fertility. RK1.
cytology: Placed to the right of 58F2, on the basis of its being covered by *Dp(2;3)P* from *T(2;3}P* » *T(2;3)58E3-F2;60D14-E2;96B5-Cl.*

p&:* see *pt

***pads: pads**

location: 2-55.
origin: Spontaneous.
discoverer: Bridges, 17e9.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.), 232.
Stern, 1934, DIS 1: 36.

phenotype: Wings malformed; often remain in condition of those of newly emerged flies. RK2.

***pads*²**
origin: Spontaneous.
discoverer: Mohr, 20b15.
references: 1929, Z. Induktive Abstammungs- Vererbungslehre 50: 126.
phenotype: Like *pads.* RK2.

pads-b: see *pu*

Pale: see P

pale ocelli: see po

pale wing: see *plw*

pallid: see *pld*

parted: see a&²

****pat: patchytergum***
location: 1-32.4.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 73.
phenotype: Wings divergent. Pigmentation of anterior border of fifth tergite patchy. Ocelli light. Male sterile; viability about 10 percent wild type. RK3.
other information: One allele induced by CB. 3007.

**** patch: patched***
location: 2- (not located).
origin: Spontaneous.
discoverer: Bridges, 13k25.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 241.
phenotype: Abdominal sclerites fewer or sharply cut into triangular segments obliquely fitted together. Overlaps wild type. RK3.

patchytergum: see *pat*

patulous: see pa

pb: proboscipedia
location: 3-47.7.
origin: Spontaneous,
discoverer: Bridges, 31d27.
references: Bridges and Dobzhansky, 1933, Arch. Entwicklungsmech. Organ. 127: 575—90 (fig.).
phenotype: Oral lobes changed to tarsus like or arista like appendages. Cold (15°C) shifts expression toward arista like, heat (29°) toward tarsus like [Villee, 1944, J. Exptl. Zool. 96: 85-102 (fig.)]. Temperature sensitive period in last larval instar [Vogt, 1946, Z. Naturforsch. 1: 469-75 (flg.)L Very short lived because adults cannot feed. Male fertile; female sterile. Ovaries normal but few if any eggs formed (Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70). RK2.

pbx: postbithorax
location: 3-58.8 (to the right of *bxd).*
origin: X ray induced (arose simultaneously with *Cbx).*
discoverer: E. B. Lewis.
references: 1954, Proc. Intern. Congr. Genet., 9th. Pt. 1: 100-5.
1954, DIS 28: 76.
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 33-56 (fig.).
phenotype: Transforms posterior metathoracic segment into a posterior mesothoracic structure. Transformation suppressed by *Cbx. bx*^{3} *pbx* homozygotes show virtually complete mesothoracic transformation of the metathorax. *bx*^{3} *+/+ pbx* is wild type. *bxd pbx/+ +* is wild type but *bxd +/+ pbx* shows moderate p6x-like transformation. RK3.
cytology: Locus probably in 89E3-4 (Lewis).
other information: The rightmost member of the pseudoallelic series including, from left to right, *bx, Cbx, Ubx, bxd,* and p6x.

Pc: ***Polycomb***
location: 3-48 (0.3 unit to the left of *Sex).*
origin: X ray induced.
discoverer: P. H. Lewis, 1947.
references: 1947, DIS 21: 69.
Lewis, 1956, DIS 30: 76.
Hannah-Alava, 1958, Genetics 43: 870-905.
phenotype: Presence of sex combs (1—4 teeth) on second and third legs of male is most conspicuous effect. Other effects are elevated, divergent, or crinkled wings, bent humeral and anterior notopleural bristles, abnormal sternopleurals, terminal gaps in L4, and leglike antennae — all are less extreme in male than in female (or are absent in male). Homozygous lethal and lethal with *Pc*^{2} but not with *Sex.* Enhances the Antennapedia phenotype when mutually heterozygous with *Antp*^{Yu} and *Antp*^{B}*;* in the latter, antennal leg is completely expressed only in Pc *ss*^{a}*/Antp*^{B} *ss*^{B} compound (Stern). Possibly lethal with *Antp*^{49} but not with *Antp*^{50}. Expression of Pc enhanced in male heterozygous for *bx, bxd,* and *Ubx;* enhancement more extreme when mutants (at least *bx* and *bxd)* are in coupling than in repulsion (Hannah-Alava, 1964, Z. Vererbungslehre 95: 1-9). RK2.

***Pc*²**
origin: X ray induced.
discoverer: Puro, 61j.
phenotype: Similar to *Pc,* but sex combs of male are larger and resemble those of *Sex.* Other pleiotropic effects more extreme than in *Pc.* Enhances expression of *Antp*^{49} *and Antp*^{50}*;* reduces viability of *Antp*^{50}. RK2.

Pch: see *pyd*

pd: purpleoid
location: 2-106.4.
origin: Spontaneous.
discoverer: Bridges, 16h31.
references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Eye color dark pink or maroon, like *pt* but less extreme; 20 percent normal red pigment and 61 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1—10). Semidominant; eye color of heterozygote duller than wild type; color autonomous in larval optic disk transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Malpighian tubes wild type (Beadle, 1937, Genetics 22: 587-611). RK2.
cytology: Placed in region between 59E2 and 60B10 by Bridges (1937), on basis of its being to the right

of *In(2R)bwVDel = I_n(2R)41B2-Cl;59E2-4* and to the left of *Df(2R)Px = Df(2R)60B8-10;60Dl-2.*

pdf: pod foot
location: 1-57.0.
origin: X ray induced.
discoverer: Welshons, 57h6.
references: 1960, DIS 34: 54.
phenotype: Terminal tarsus swollen in one or more legs. Classification, viability, and fertility good. RK2A.
cytology: Associated with *In(l)pdf = In(l)16B;19F-20A.* Tentatively placed in 16A and at 57.0 since *pdf* is covered by $B^S Y$, but not by *Ymal*$^+$*2.*

Pdr: Purpleoider
location: 3-46.
origin: Spontaneous.
discoverer: Bridges, 22f20.
phenotype: The combination *pd/pd; Pdr/+* gives lighter, yellower eye color than *pd* alone. *pd/+; Pdr/Pdr* has eye color like *pd/pd. pd/pd; Pdt/Pdr* is lethal. *Pdr/Pdr* is rosier than wild type. *Pdr/Pdr* and *pd/pd; Pdr/+* JMalpighian tubes normal (Brehme and Demerec, 1942, Growth 6: 351—56). RK3.

****pe: petit***
location: 3- (not located).
origin: Spontaneous in *In(3Li)P.*
discoverer: Mohr, 38k30.
references: 1939, DIS 12: 47.
phenotype: Body small. Eyes small and rough. Viability good, but female fertility low. RK2A.

Pearl:* see *PI

peb: pebbled
location: 1-7.3 (0.4 unit to the right of *bi).*
discoverer: Dubinin.
phenotype: Eyes markedly rough at 28—30°C, slightly rough (like S) at 25°, and wild type at 19°. RK2 (28-30°C).
cytology: Placed in salivary chromosome region 4C7 through 4D2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

pebbled:* see *rg*

pentagon:* see *ptg

pers: persimmon
location: 3- (left arm).
origin: X ray induced.
discoverer: Demerec, 3712.
references: 1940, DIS 14: 40.
phenotype: Eye col6r dull orange. Larval Malpighian tubes colorless (Brehme, 1942, Genetics 27: 133). Viability and fertility good. RK2A.
cytology: Associated with *In(3L)pmm • In(3L)63C2-5;73B2-5.*

petit:* see *pe

Pfd; Pufdi
location: 2-70.8.
discoverer: Brkwley, 1935,
references: Shall, 1937, DIS 8: 10.
1938, Proc. Michigan Acad. ScL 23: 647—49.
Baker, 1950, Am. Naturalist 84: 51-70.
phenotype: Wings spread; fluid often accumulates between membranes. Degree of wing divergence inversely correlated with temperature; wings more divergent in male. In transfers from 19°C to 31°, temperature-effective period begins 6—8 hr before eclosion in male and 4—6 hr before eclosion in female and ends with eclosion. In transfers from 31°C to 19°, the temperature-sensitive period begins 8—10 hr before eclosion and ends 2—4 hr before eclosion (P. H. Baker, 1950). RK2.

****pg: prong***
location: 2-40.
discoverer: Mohr, 19e.
references: 1923, Z. Induktive Abstammungs-Vererbungslehre 32: 218.
phenotype: Extra crossveins distal to anterior crossvein; usually incomplete. Overlaps wild type in at least 10 percent of flies. RK3.

pg:* see *pig

Pgd*: Phosphogluconate dehydrogenase-A
location: 1-0.9.
origin: Naturally occurring allele.
discoverer: Young.
references: Kazazian, Young, and Childs, 1965, Science 150: 1601-2.
Young, 1966, J. Heredity 57: 58-60 (fig.).
phenotype: Produces phosphogluconate dehydrogenase that migrates faster in starch gel than that produced by Pgd^B. Pgd^A/Pgd^B produces, in addition to the fast and slow bands, a hybrid band of intermediate mobility; hybrid enzyme may also be produced *in vitro.* Male and female produce equivalent enzyme levels. RK3.

PgdB
origin: Naturally occurring allele.
discoverer: Young.
references: Kazazian, Young, and Childs, 1965, Science 150: 1601-2.
Young, 1966, J. Heredity 57: 58-60 (fig.),
phenotype: Produces a slow-migrating phosphogluconate dehydrogenase. Enzyme level same in male and female. RK3.

pi: pied
location: 2-17.
origin: Spontaneous.
discoverer: Harnly, 38k31.
phenotype: Eyes like 5 but more extreme, smaller and rougher, with facets jumbled. Wings larger, flimsy, arched, and fringed. Male usually sterile, with abnormal genitalia. Viability erratic, varying from 20 to 80 percent. RK3.

pic: piccolo
location: 3-52.1.
origin: X ray induced in a kar^2 chromosome.
discoverer: Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetic® 1261-68.
phenotype: Bristles short and fine; fergite morphology abnormal as In fab. Inviable in combination with pic^{21} and pic^{31}, Homosygottt sterile. RK2.

pic*h picco/o-2 lethal
origin: X ray induced in a *kar%* drome*orae.

discoverer: Señalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Lethal homozygous and in combination with *pic* and *pic^t*. RK3.

pic* I
origin: X ray induced in a *kar*^{2} chromosome.
discoverer Schalet.
references: Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Lethal homozygous and in combination with *pic* and *pic*^{21}. RK3.

pied: see *pi*

****pig: pigmy***
location: 1-29.
origin: X ray induced.
discoverer. Muller, 2618.
synonym: *pg* (preoccupied).
references: 1935, DIS 3: 30.
phenotype: Fly small and melanotic. Viability about 25 percent wild type. RK3.

Pigmentless: see *Ps*

pigmy: see *pig*

****pil-3: pilosus in third chromosome***
location: 3- (near or identical with Ira).
discoverer Goldschmidt.
references: 1953, J. Exptl. Zool. 122: 53-96 (fig.).
phenotype: Produces setae on sixth sternite of male or transformed female. Semidominant. Enhanced by *pil-X*. RK3.

****pil-X: pilosus in X***
location: 1- (left of *w*).
discoverer: Goldschmidt.
references: 1953, J. Exptl. Zool. 122: 53-96 (fig.).
phenotype: Produces setae of varying numbers and sizes on the sixth sternite of male and of *X/X; tra/tra* female. Effect enhanced by presence of *pil-3* and also by *Y* chromosome of *tra* stock. RK3.

Pin: Pin
location: 2-107.3 (to the right of *sp*).
origin: Spontaneous,
discoverer Ives, 39a9.
references: 1940, DIS 13: 50.
phenotype: Thoracic bristles, especially dorsocentrals and scutellars, shortened and thick at base but tapering sharply. Strong in homozygote; heterozygote reliably classified. RK1.
cytology: Located between 60C5 and 60D2, on the basis that *Pin*^{3} is lethal in combination with *Df(2R)Px –Df(2R)6QB8-10rfODl-2* and *Df(2R)Px*^{2} = *D%2R)60CS-6f60D9-10*.

Pin^2
origin: Spontaneous.
discoverer: E. H. Grell, 57b.
references: 1960, DIS 34: 50.
phenotype: Thoracic bristles of heterozygote very short. At low temperature (17°C), heterozygote appears normal. Homozygote usually lethal; rare survivors have virtually no thoracic bristles. *Pin*^{2}*/Pin* has smaller bristles than *Pin*^{2}/+ and low viability. *Pin*^{2}*/Pin*^{Yt} is lethal. *Df(2R)Px/Pin*^{2}, *D%2R)Px*^{2}{*Pin*^{2}, *undD§C2R)Px*^{4}*/Pin*^{2} are also lethal. *bw*$^+$ *Y; Pin*^{2}/+ has bristles intermediate in length between *Pin*^{2}/+ and wild type. RK1.

PinTac: Pin-Tack
origin: Spontaneous.
discoverer: Weiskettel, 571.
synonym: *Tac*.
references: Kadel, 1958, DIS 32: 80.
phenotype: At 22°C, thoracic bristles very small; other bristles not so small. At 18°, phenotype is nearly wild type* Older female holds wings in abnormal position. Homozygous lethal. RK1.

PinY*: Pin-Yellow tip
origin: Spontaneous as one-half of a mosaic male.
discoverer: E. H. Grell, 57e.
synonym: *Ylt*.
references: 1957, DIS 31: 81.
phenotype: Distal third of thoracic bristles pale yellow, thin, and slightly twisted. Lethal homozygous and in combination with *Pin* and *Pin*^{2}) survives in combination with *Df(2R)Px* and resembles *PinY*/+*. RK1.

pink: see p

pink wing: see *pw*

pink-wing: see *ltP*^{k}

pinkish: see *pkh*

pinkaid: see *ltP*^{k}

pk: prickle
location: 2-55.3 (between *ap* and *tuf*).
origin: Spontaneous.
discoverer: Ives, 38k.
references: 1947, DIS 21: 68-69.
phenotype: Posterior acrostichals irregularly erect and whorled. Lateral costal hairs of wing regularly slanted anteriorly instead of posteriorly. Flies slightly larger than wild type. Occasional extra dorsocentral and scuteliar bristles appear at temperatures above 23°C. RK1.
cytology: Placed in salivary chromosome region 42A3-19, on the basis of its inclusion in *In(2R)Cy = In(2R)42A2-3;58A4-Bl* and its being to the left of *tuf*, which is within *Df(2R)MS2y6lt = Df(2R)40F-41Al;42A19-Bl* (Sturtevant, 1949, DIS 23: 98).

****pkh: pinkish***
location: 2-100.
discoverer: Bridges, 14g27.
references: 1919, J. Exptl. Zool. 28: 365.
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 247 (fig.),
phenotype: Specific dilutor of *w*^{e}. RK3.

pi: pleated
location: 1-47.9.
origin: X ray induced.
discoverer: Moore, 31cl5.
references: 1935, DIS 3: 27.
phenotype: Wings folded lengthwise in pleats. Overlaps wild type at 25°C, more extreme at 19°. RK3.
cytology: Placed in salivary chromosome region 13B2-F17, on basis of its being included in *Dp(l;f)A12 ^Dp(l;f)lB-C;13Bl-S* but not in the proximal part of the *X* derived from *T(1;4)A4 = T(l;4)13F6-14Al;102F* (inferred from Patterson,

1938, Am. Naturalist 72: 193-206, also frontispiece of Texas Univ. Publ. 4032).

pi: see *pld*

****PI: Pearl***

location: 2-6.
origin: Spontaneous,
discoverer: Rosin, 1948.
references: 1951, DIS 25: 75.
1952, Rev. Suisse Zool. 59: 261-68.
Nef, 1958, Z. Vererbungslehre 89: 272-319 (fig.).
phenotype: Heterozygote has pearl-like nodes in wings. Wing margins often snipped; venation disturbed. Bristle pattern defective. Eyes small and rough. At 28°C, at least one of these characters always present; at 18°, phenotype virtually normal. Viability good; fertility of male slightly reduced. Fraction of cells die in all imaginal disks. In wing disks, dead cells surrounded by epithelial cells and produce pearl-like structures in adult wing. Homozygote dies as pupa (Tschanz). RK2.

platinum: see ***pt***

****pld: pallid***

location: 1-0.
origin: Found in progeny of flies treated with Janus green.
discoverer: Muller, 28e20.
synonym: *pi.*
references: 1935, DIS 3: 30.
phenotype: Body and wings pale. Viability about 10 percent wild type. RK3.

pleated: see ***pi***

Plexate: see **Px**

plexus: see **px**

Plum: see *bwvi*

p/w: *pale wing

location: 1-37.2.
origin: Spontaneous,
discoverer: Fahmy, 1952.
references: 1959, DIS 33: 88.
phenotype: Body, wings, and bristles pale silvery yellow. Eclosion delayed; viability low. RK3.

Pm: see ***bwV1***

Pra*: see ***bwV32g***

Pm^{D1}: see ***bw^{A}***

Pro*[1]; see *Pu**

pn: prune

location: 1-0.8.
discoverer: Bridges, 16dl4.
phenotype: Eye color of newly emerged fly transparent brownish red, darkening with age to brownish purple. Lethal with *K-pn.* Eye color autonomous in larval optic disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Eyes contain 26 percent normal red and 110 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Larval Malpighian tube color normal (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
cytology: Salivary chromosome locus placed at 2D5-6 by Deraerec and Sutton (Deroerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191) and by J. I. Valencia.

pn^{2}

origin: X ray induced.
discoverer: Demerec, 28f30.
synonym: *se-like 62.*
phenotype: Eye color like *pn* but lighter and more ruby. Eyes contain 18 percent normal red pigment and 114 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Larval Malpighian tube color normal (Beadle, 1937, Genetics 22: 587-611). RK1.

pn^{3}

discoverer: Weinstein.
phenotype: Like *pn.* RK1.

****pn^{5}***

origin: X ray induced.
discoverer: Glass, 1929.
references: 1934, DIS 2: 7.
1935, DIS 3: 14.
phenotype: Like *pn.* RK1.
other information: Induced in, but separable from, *In(l)dl-49.*

****p_n26-20***

origin: X ray induced.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 85.
phenotype: Eye color like *pn.* RK1.

pn27.9

origin: Induced by mustard gas.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 84.
phenotype: Like *pn.* RK1.

****$_{pn}$27.22***

origin: Induced by mustard gas.
discoverer: Sobels, 57j.
references: 1958, DIS 32: 84.
phenotype: Like *pn.* RK1.

V[51b]

origin: Induced by P^{32}.
discoverer: R. C. King, 51b.
references: 1952, DIS 26: 65.
phenotype: Like *pn.* RK1.

$_{pn}$STh8

origin: X ray induced.
discoverer: W. K. Baker, 51h8.
references: 1956, DIS 30: 69.
phenotype: Like pn. RK1.

pn^{55}

origin: Spontaneous.
discoverer: Kivett, 1955.
references: Clancy, 1959, DIS 34: 48.
phenotype: Like pn. RK1.

pn^{62}

origin: X ray induced in $Y^{S}X$-Y^{L}, *In(l)EN+dl-49, y v t.*
discoverer: Petty, 62d,
phenotype: Like pn. *K-pn* sensitive. RK1A.

pn^{H0Ac4}

origin: X ray induced in Jn(i>cSJl^$_{c}$«K+d3-49.
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with ***Df(1)pn^{H0Ac4}*** = *Di(l)2C8-9;3Al-2* (J. I. Valencia).

po: ***pate ocelli***
location: 2-65.2.
origin: Spontaneous.
discoverer: Bridges, 38dl.
phenotype: Ocelli virtually colorless; some pigment bordering inner margins. Eye color slightly brighter than wild type. RK2.

origin: Spontaneous.
discoverer: Bridges, 20jl3.
synonym: *do: dilute ocelli.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 224.
phenotype: Ocelli pale. RK3.

pod foot: see *pdf*

****pod-G: podopiera of Goldschmidt***
location: Multifactorial.
origin: Spontaneous.
discoverer Goldschmidt, 1943.
references: 1945, Science 101: 389-90.
1945, J. Morphol. 77: 71-103 (fig.).
Goldschmidt, Hannah, and Piternick, 1951, Univ. Calif. (Berkeley) Publ. Zool. 55: 67-294.
phenotype: Wing transformation into legs varies from almost wild type to three-jointed leglike appendages. Penetrance of 1—2 percent was increased to 2—4 percent by selection. Scalloped, blistered, and unexpanded wings and various abnormalities of legs are pleiotropic effects. RK3.
other information: Podoptera may be similar to tetaltera effects.

****pod-H: podoptera of Hannah***
location: Multifactorial (principal factor on chromosome *2).*
origin: Spontaneous.
discoverer: Hannah, 1943.
references: Goldschmidt, Hannah, and Piternick, 1951, Univ. Calif. (Berkeley) Publ. Zool. 55: 67-294.
phenotype: Wings transformed into leglike appendages. Legs characteristically changed, with parts often duplicated. Average penetrance of 2.5 percent increases to 5 percent in selected lines. Somatic elimination *o(X* chromosome produces more than 2 percent gynandromorphs. RK3.
other Information: Claimed to have a maternally inherited component.

****pod-K: podoptera of Kellen-Pitemick***
location: Multifactorial.
origin: Spontaneous,
discoverer. Kellen-Piternick, 1944.
references: Goldschmidt, Hannah, and Piternick, 1951, Univ. Calif. (Berkeley) Publ. Zool. 55: 67-294.
phenotype: Like pod-G. Wing sometimes replaced by palpus like structure. Average penetrance 30 percent in *X/X/Y* females and *X/Y* males. Females without *Y* or Y^L do not show podoptera phenotype. Rough eyes, notched wings, and absence of postverticals occur. RK3.

****pod~M: podoptera in M(3)»-124***
I©cotion: MultifactorlaL
origin: Spontaneous.
discoverer: Piternick, 1944.
references: Goldschmidt, Hannah, and Piternick, 1951, Univ. Calif. (Berkeley) Publ. Zool. 55: 67-294.
phenotype: Wings transformed into leglike structures. Penetrance of 15 percent in selected stocks is increased by presence of Y^L. RK3.

poi: see $svrP^{oi}$
Pointed wing: see *Pw*
Pointedaid: see *BxJ*
pot: see $speP^{oi}$
poliert: see $spaP^{o1}$
polychaetoid: see *pyd*
polychaetous: see *pys*
Polycomb: see Pc
polymorph: see *pym*
polyphene: see *pyp*
polyphenic: see *pph*

****pop: popeye***
location: 1-0.4.
origin: Induced by p-NN-di-(2-chloroethyl)amino-phenylbutyric acid (CB. 1348).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 73.
phenotype: Eyes small, round, bulging, and rough. Often some central ommatidia protrude. Small body. Wings short, broad, and frequently blistered. Male sterile; viability less than 10 percent wild type. RK3.

****port: port***
location: 3- (not located).
discoverer: Morgan, 14c.
references: Bridges and Morgan, 1923, Carnegie List. Wash. Publ. No. 327: 125.
phenotype: Eye color slightly diluted. RK3.

****port-b: port-b***
location: 3- (not located).
discoverer: Bridges, 19ill.
references: Bridges and Morgan, 1923, Carnegie List. Wash. Publ. No. 327: 214.
phenotype: Eye color maroon. RK3.

postbithorax: see *pbx*
postverticalless: see *pvt*

****pph: polyphenic***
location: 1-60.8 (originally located at 61.0 but genetic location arbitrarily interchanged with that of *sby* for consistency with cytological observations).
origin: Induced by D-l:6-dimethanesulfonyl mannitol (CB. 2511).
discoverer. Fahmy, 1959.
synonyms *pph-61: polyphene 61.*
references: 1964, DIS 39: 58.
phenotype: Body small. Eyes brighter than normal. Wing size and shape slightly altered. Scuteliar bristles occasionally kinked. Both sexes viable; fertility of homozygous female low. RK3.
cytology: Not included in deficiency for 18A4 through 18B8 produced by combining left end of $In(l)y^4$ ***In(l)lA8-Bl;18A3-4*** and right end of In(7>sc* ***In(l)lB2-3;l8B8-9*** (Norton and Valencia, 1965, DIS 40: 40).

pr: purple

location: 2-54.5.

discoverer: Bridges, 12b20.

references: 1919, J. Exptl. Zool. 28: 264-305.
Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 169 (fig.).
Sturtevant and Beadle, 1939, *An Introduction to Genetics*, Saunders, p. 64 (fig.).

phenotype: Eye color ruby at hatching, darkening to purplish ruby with age; orange in combination with *st*, reddish brown in combination with *bw* (Mainx, 1938, Z. Induktive Abstammungs- Vererbungslehre 75: 256—76). Eye color autonomous in larval optic disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes normal (Beadle, 1937, Genetics 22: 587-611). A lethal interaction of pr and *ey* reported by Clemente (1941, Proc. Intern. Congr. Genet., 7th. p. 90) could not be confirmed by Green (1955, DJB 29: 121). RK1.

cytology: Placed in salivary chromosome region 37B2 through 40B2, on the basis of its being within the deficiency from *T(Y;2)H = T(Y;2)37B1-2;40B2-3*.

V^2

discoverer: L. V. Morgan.

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 233.

phenotype: Eye redder than in *pr*. RK1.

$_{pr}$42d

origin: Spontaneous.

discoverer: Nolte, 42d.

references: 1957, DIS 31: 84.

phenotype: Eye color somewhat more transparent than *pr* and with a redder tone; less brown pigment than *pr* (Nolte, 1955, J. Genet. 53: 1-10). RK1.

prfew; *purple-brown*

origin: Spontaneous.

discoverer: Bridges, 38d20.

phenotype: Eye color brownish pink; lighter in female. RK2.

p$_r$IM60: purple-lethal of Meyer

origin: Spontaneous.

discoverer: Meyer, 60g.

references: 1963, DIS 37: 51.

phenotype: Homozygous lethal. pr^{1M60}/pr has purple eye. RK2.

other information: May be a small deficiency.

$_{pr}$M60

origin: X ray induced.

discoverer: Meyer, 60f.

references: 1963, DIS 37: 51.

phenotype: Eye color dark brown in pr^^/pr; light apricot in $pr^{\wedge 60}$ *en* homozygote at eciosion. RK1.

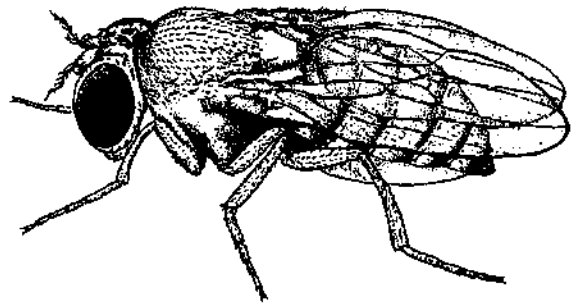
****pr*; purple-sterile***

origin: Spontaneous.

discoverer: Ives, 38k.

references: 1937, DIS 13: 50.

phenotype: Eye color weak *pr*. Eggs of pr'/pr* female do not hatch; eggs of heterozygote and pr^m/pt female develop normally. Viability good. Male fertile. RK2.



Pr: Prickly

From Muller, 1930, J. Genet. 22: 299-334.

Pr: Prickly

location: 3-90.0.

origin: X ray induced.

discoverer: Muller, 27e17.

references: 1930, J. Genet. 22: 299-334 (fig.).
1935, DIS 3: 30.

phenotype: Bristles very short; tips thin and twisted. Postdorsocentrals and scutellars usually missing; dark granule present beneath normal bristle location. Homozygote has low viability. RK1.

P/-J-; *Prickly-Long*

origin: Spontaneous derivative of *Pr*.

discoverer: E. H. Grell, 65f.

phenotype: Bristles of $Pr^L/+$ one-third as long as wild type; longer than *Pr/+*. Enhanced by *H/+* so that it resembles *Pr/+*. Homozygote viable, with small vestiges of bristles. RK1.

****pra: prawny abdomen***

location: 1-15.2.

origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).

discoverer: Fahmy, 1954.

references: 1959, DIS 33: 88.

phenotype: Thorax narrow. Abdomen slender, often flexed between fourth and fifth segments. Wings short, rather broad, and often held atypically. Eciosion delayed. Viability about 15 percent wild type. RK3.

prickle:* see *pk

Prickly:* see *Pr

proboscipedia:* see *pb

prong:* see *pg

Protein 7:* see *Pt-1

prune:* see *pn

Ps: Pigmentless

location: 2-57.5 (inseparable from en),

origin: X ray induced.

discoverer: Krivshenko, 56115.

references: 1959, DIS 33: 95.

phenotype: Black stripes on last abdominal segments of female reduced; expression variable. Male unaffected. Homozygous lethal. RK2.

cytology: Salivary chromosomes apparently normal.

pt: platinum

location: 1-23.1.

origin: Deuteron induced.

discoverer: Hildreth, 51h.

synonym: *pa* (preoccupied).

references: 1953, DIS 27: 56.
phenotype: Body color very pale yellow, almost colorless. Bristles colorless and translucent except for dark bases. Male sterile and short lived. Tyrosinase forms in adult (Horowitz and Fling). RK2.

pt:* see *abz

***Pt-V-Oh Protein* 7 *with mobility of* 7.07**
location: 3- (10 crossovers with gl^3 among 43 tested).
origin: Naturally occurring allele.
discoverer: Hubby.
references: 1963, Genetics 48: 871-79 (fig.).
phenotype: Protein 1 is one of about 10 bands found after electrophoresis on acrylamide gel of the 40—50 percent ammonium sulfate cut of whole fly homogenates. Protein 1 produced by $Pt\text{-}1^{1,01}$ has a relative electrophoretic mobility of 1.01 under conditions used by Hubby (1963). RK3.
other information: May be the same locus as *Pt-8* described by Duke (1966, Genet. Res. 7: 287-94).

Pf-71.13
origin: Naturally occurring allele.
discoverer: Hubby.
references: 1963, Genetics 48: 871—79 (fig.).
phenotype: $Pt\text{-}1^{1,13}/Pt\text{-}1^{1,13}$ produces protein 1 with electrophoretic mobility 1.13. $Pt\text{-}1^{1}\text{-}^{01}/Pt\text{-}1^{1,13}$ produces both protein types but none with intermediate mobility. RK3.

Pt-4": Protein ^negative
location: 1- (not located).
origin: Naturally occurring allele.
discoverer: Pantelouris and Duke.
references: 1963, Genet. Res. 4: 441-45 (fig.).
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph [fraction A according to Pantelouris and Duke (1963); fraction 4 according to Duke (1966, Genet. Res. 7: 287-94)]. RK3.

Pt-5*
location: 2- (not located).
origin: Naturally occurring allele.
discoverer: Pantelouris and Duke.
references: 1963, Genet. Res. 4: 441-45 (fig.)-
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph [fraction B of Pantelouris and Duke (1963); fraction 5 of Duke (1966, Genet. Res. 7: 287-94)]. RK3.

Pt-Sp^n: Protein* 5 *prime-negative
location: 2- (not located).
origin: Naturally occurring allele.
discoverer: Pantelouris and Duke.
references: 1963, Genet. Res. 4: 441—45 (fig.).
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph [fraction C of Pantelouris and Duke (1963); fraction 5'of Duke (1966, Genet. Res. 7: 287-94)]. RID.

Pt-8"
location: 3- (not located).
origin: Naturally occurring allele.
discoverer: Duke.
references: 1966, Genet. Res. 7: 287-94 (fig.).
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph (fraction 8). RK3.
other information: May be the same locus as *Pt-1* described by Hubby (1963, Genetics 48: 871-79).

Pt-9"
location: Autosomal.
origin: Naturally occurring allele.
discoverer: Duke.
references: 1966, Genet. Res. 7: 287-94 (fig.).
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph (fraction 9). RK3.

Pt-13"
location: Autosomal.
origin: Naturally occurring allele.
discoverer: Duke.
references: 1966, Genet. Res. 7: 287-94 (fig.).
phenotype: Homozygote apparently lacks detectable amount of one of a number of protein fractions demonstrable by starch gel electrophoresis of larval lymph (fraction 13). RK3.

***pta:* see $sldP^{ta}$**

Ptd:* see *BxJ

pte: pterygion
location: 1-1.4.
origin: Induced by l:4-dimethanesulfonoxybut-2-yne (CB. 2058).
discoverer: Fahmy, 1951.
references: 1958, DIS 32: 73.
phenotype: Wings shortened, usually spread, and slightly drooping. Eyes misshapen and somewhat rough. Abdomen disproportionately large. Eclosion slightly delayed and viability about 20 percent wild type. RK3.

ptg: pentagon
location: 1-23.2.
discoverer: Bridges, 2218.
phenotype: Thoracic trident darker than wild type, especially the pentagonal spot just ahead of scutelium; more extreme at 19°C. Hard to classify in young flies. RK3.
cytology: Located in salivary chromosome region 7C4-8C2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Further restricted to 7E1 through 8C2, on the basis of its exclusion from *Dt(l)sn – Di(l)7B2-3;7D22-El* (Hinton and Welshons, 1955, DIS 29: 125-26).

ptg2
discoverer: L. V. Morgan, 24j21.
references: 1935, DIS 3: 14.
phenotype: Pentagonal spot darker and sharper than in *ptg.* Scute Hum often dark and prongs of trident

sometimes so. Best classification at lower temperatures. RK2 at 19°C.

ptg[3]
discoverer: Kaliss, 351.
synonym: cro; crown.
references: 1937, DIS 7: 6, 18.
Felsenstein, 1937, DIS 7: 21.
phenotype: Trident darker than in *ptg;* dark color extends to head, sides, and abdomen. RK2.
other information: Occasionally reverts to wild type or *weak ptg.* Allelism with *ptg* shown by Bridges.

ptg[4]
origin: Spontaneous in *In(l)AM.*
discoverer: Curry, 38b8.
phenotype: Darkness of pentagon intermediate between that of *ptg* and *ptg*[2]. RK2A.

pu: pupal
location: 2-51.
discoverer: Duncan, 20d.
synonym: *pads-b.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 232.
phenotype: Wings unexpended or incompletely expanded. More extreme at 19°C. RK2.
cytology: Placed in region between 34E5 and 35D1 on basis of its inclusion in *Df(2L)64j = Df(2L)35E5-Fl;35C3-Dl* (E. H. Grell).
other information: Not allelic to *pada.*

Pu: Punch
location: 2-97 (location of *Pu*[2]).
origin: X ray induced.
discoverer: Oliver, 28k4.
references: Muller, 1930, J. Genet. 22: 326 (fig.).
Oliver, 1932, Z. Induktive Abstammungs-Vererbungslehre 61: 484.
1935, DIS 3: 14.
phenotype: Eye color dilute purple. Gives normal eye color when heterozygous with *T(2;4)A34 = T(2;4)56F6-7* (Oliver, 1943, Anat. Record 87: 461). Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)Pu = T(2;3)40F-41A;70D-E + T(2;3)57B5-C1;79F.* Tentatively placed in region 57B-C, on basis of breakpoint common to *T(2;3)Pu, T(2;3)Pu*[Or] ~ *T(2;3)57C;81F,* and *T(2;3)Pu*[w] = *T(2;3)57B-C;80.*

***Pu*[2]**
origin: Spontaneous.
discoverer: E. H. Grell, 57b.
references: 1960, DIS 34: 50.
phenotype: Heterozygote has purplish eye color resembling *pr.* Homozygous lethal. *Pu*[2]*/Pu, $p_u 2/p_u Or_t$* and *Pu*[2]*/$p_u W$* also lethal. RK1.
cytology: Apparently not associated with a chromosomal rearrangement.

***Pu*[Gr]** *Punch-Grape*
origin: X ray induced,
discoverer: Muller, 291.
synonym: *p*[Or]*: pink-Grape.*
references: Glass, 1933, J. Genet. 28: 69—112 (fig.).
1934, Am. Naturalist 68: 111.
phenotype: Eye color rosy purple. With *st,* eyes show patchwork of light to deep orange areas. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)PU*[GT] ~ *TX2;3)57C;81F* (Lewis, 1956, DIS 30: 130).

Pu*[K]: *Punch* of *Krivshenko
origin: X ray induced.
discoverer: Krivshenko, 53k24.
synonym: *Pni*^-.
references: 1954, DIS 28: 75.
Rowan, 1966, DIS 41: 166-67.
phenotype: Like *Pu*[Gr]. RK1A.
cytology: Associated with *In(2R)Pu*[K] = *In(2R)41;S7E-F.*

**Pu*™*: Punch-reversed*
origin: X-ray-induced derivative of Pu.
discoverer: Oliver, 32127.
references: 1941, Proc. Intern. Congr. Genet., 7th. p. 228.
phenotype: Eye color appears wild type at 25°C; frequently homogeneous brownish shade in young flies at 16°. *Pu/Pu*[TV] flies viable but sterile; eye color like *Pu/+'*$_f$ often wings are opaque, bristles thin, trident dark, eyes rough, dark, and sometimes variegated. Homozygous lethal. RK3A.
cytology: Reportedly associated with *T(2;3)Pu*[rv] = *T(2;3)S7B5-C1;79F* superimposed on *T(2;3)Pu – T(2;3)40F-41Al;70D-E + T(2;3)57B5-C1;79F,*

P«[w]: *Punchline*
origin: X ray induced.
discoverer: E. B. Lewis, 55h.
phenotype: Like *Pu* with variegated appearance. Homozygous lethal. RK2A.
cytology: Associated with *T(2;3)Pu*[w] = *T(2;3)S7B-C;80.*

pub:* *pubescent
location: 1-63.
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 55.
phenotype: Hairs and bristles M-like; black pigment on terminal abdominal segments nearly absent; male sterile. Tendency toward short, fat, gnarled legs, shortened L2, and posterior nicking of wings. After several generations, only bristle effect and male sterility remained. RK3.

****Pub: Pub***
location: 1- (rearrangement),
discoverer. P. Famsworth.
references: Lefevre, 1954, DIS 28: 75.
phenotype: Eye size of heterozygote variably reduced, ranging from something like Bty+ to wild type. Eyes of homozygote greatly reduced, similar to double Bar. Interacts with *B* to give small, glazed, almost facetless eyes. RK2A.
cytology: Associated with *In(l)Pub;* breakpoints unknown.

pubescent: see *pub*

put: puff
location: 2-58.
origin: Spontaneous.
discoverer: Nichols-Skoog, 35kl9.

phenotype: Wings puffed or blistered, effect centering in third posterior cell; wings warped and creased longitudinally along vein L3. Penetrance usually 90—100 percent in female and 20—40 percent in male. RK3.

Pufdh see ***Pfd***

puff: see ***puf***

pun: puny

location: 1-41.1.
origin: Induced by triethyleriemelamine (CB. 1246).
discoverer: Fahmy, 1950.
references: 1958, DIS 32: 73.
phenotype: Body small. Wings slightly shorter than normal. Eyes occasionally deformed. Eclosion delayed. Both sexes fertile; viability about 50 percent wild type. RK3.
other information: One allele each induced by CB. 1356 and CB. 3025.

Punch: see ***Pu***

puny: see ***pun***

pupal: see ***pu***

purple: see ***pr***

purpleoid: see ***pd***

Purpleoider. see ***Pdr***

pvf:** ***postverticalless

location: 1-20.9.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 88.
phenotype: Wings either divergent or slightly held up. Thoracic hairs sparse, and one or both postvertical bristles almost invariably absent. Shape of head and eyes varies from almost normal to anteroposterior flattening of head and deep grooving of eyes. Male viable and fertile; female sterile. RK2.

****pw: pink wing***

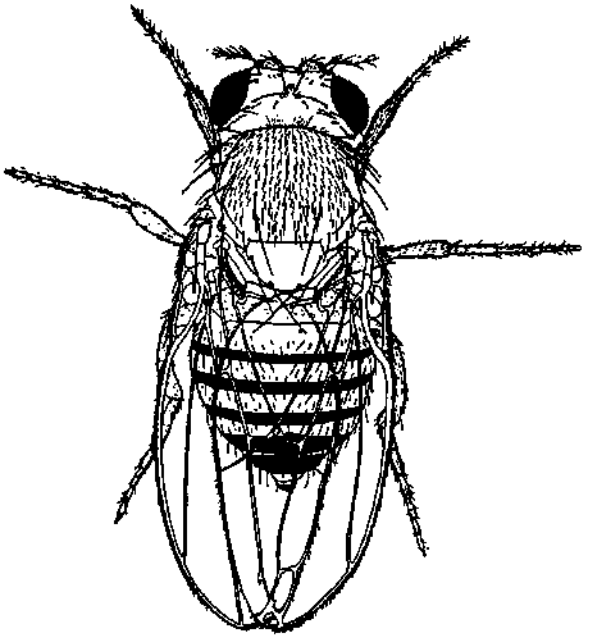
location: 2-14.
discoverer: Bridges, 2Obi7.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 213.
1931, Eos 7: 229^»8.
phenotype: Eye color like pink. Wings shorter than normal and crumpled. Viability low. RK3.

****Pw: Pointed wing***

location: 3-94.1.
discoverer: Bridges, 21c29.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 238 (fig.),
phenotype: Wings narrowed slightly at tips; extra venation near tips of L3 and L4. Homozygous lethal. RK3.
other information: Not an allele of *Bd* (3-93.8).

pw-c: pink wing-c

location: 2-79.
discoverer: Bridges, 31cl8.
phenotype: Eye color lighter than normal. Wings short and blunt. Overlaps wild type. RK3,

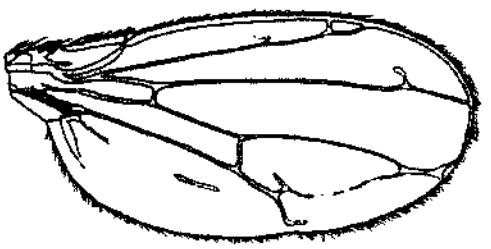


Pw: Pointed wing

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 239.

px: plexus

location: 2-100.5.
discoverer: Bridges, 14h20.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 251 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 212 (fig.), 233.
phenotype: Wings have network of extra veins, especially toward tips and margins; *LA* bent near tip. Semidominant with some Minutes. Suppressed by S (Bedichek, 1936, DIS 5: 24). Venation effect caused by inadequate contraction of wing during pupal stage, leaving spaces between epithelial layers (Waddington, 1940, J. Genet. 41: 75-139). RK1.
cytology: Placed in 58F, on basis of its inclusion in *Dl(2R)M-l m Df(2R)57Fll-58Al;5SF8'59Al* and *Dp(2;3)P* from *T(2;3)P = T(2;3)58E3-F2;60D14-E2;96BS-C1* [Bridges, 1937, Cytologia (Tokyo), Fuji! Jub. Vol. 2: 745-55],



px; ***plexus***

Edith M. Wallace, unpublished.

****px****

origin: Spontaneous.
discoverer: Villee, 40a.

references: 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 125-84.
phenotype: Like px. RK1.

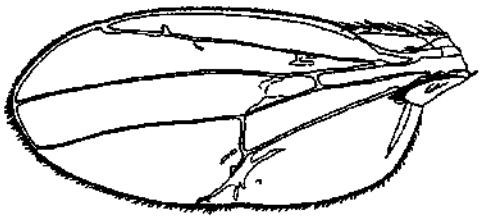
px3i^d: see *bs^*

pX^S2 9
origin: X ray induced.
discoverer: Iyengar, 52g.
references: Iyengar and Meyer, 1956, DIS 30: 73.
phenotype: Like px. RK1A.
cytology: Induced simultaneously with *In(2LR)px^S2&* breakpoints not determined.

**px54h*
origin: Spontaneous.
discoverer: Meyer, 54h.
references: 1954, DIS 28: 77.
phenotype: Like px. RK1.

**pxSSk*
origin: Spontaneous.
discoverer: Williams, 55k.
references: 1956, DIS 30: 80.
phenotype: Like px. RK1.

px^bs: see *bs^3*



Px: Plexate
Edith M. Wallace, unpublished.

Px; *Plexate*
location: 2-107.2 (107.0-107.4 inclusive).
origin: Spontaneous.
discoverer: Bridges, 22f6.
references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Wing veins of heterozygote have plexus-like or deltalike thickenings, most often near posterior crossvein, and free fragments of veins, most often in third posterior cell; L4 bent near margin. Wings smaller and narrower than wild type and dusky textured. Closely resembles 6s. Expression more extreme in female and enhanced by cold (19°C). Homozygote lethal in egg stage (Li, 1927, Genetics 12: 1-58). RK1A.
cytology: Associated with *Dt(2R)Px - Df(2R)60B8-10;60Dl-2.* Locus placed in salivary chromosome region 60C6 through 60D1, on basis of the region of overlap of *Di(2R)Px* and *Df(2R)Px^ « Dg2R)60CS-6}60D9'10* (Bridges, 1937).
other information: May be part of a pseudoallelic complex with 6a and 6s.

Px^2
origin: X ray induced.
discoverer: Schultz, 3211.
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
phenotype: Like Px. *Px^2/Px* is lethal. Homozygote dies as embryo. RK1A.
cytology: Associated with *Df(2R)Px2 = Df(2R)60C5-6;60D9-10* (Bridges, 1937).

*Px**
origin: Synthetic.
discoverer: Thompson, 56f.
references: Burdick, 1956, DIS 30: 69.
phenotype: Wing venation like Px. Thickening of L5 at posterior crossvein produces a vesicle, as in 6s. More extreme in female. Homozygous lethal. RK1A.
cytology: Associated with *In(2LR)Px^4 - In(2LR)22A3-Bl;60B-CL;21 C8-Dl;60Dl-2^R* derived from single recombinant between *ln(2LR)bw^vl* and *SMI,* which is deficient for 60B-60D1.

**PxS*
origin: Spontaneous in *In(2LR)bw^vl.*
discoverer: Thompson, 1957.
references: 1963, DIS 38: 28.
phenotype: Sacs or vesicles in wing but little irregularity of venation. Lethal in homozygote and in heterozygote with other Px alleles. RK1A.
other information: 6s and 6a affected but not *sp.*

pyd: polychaefoid
location: 3-39.
origin: Spontaneous.
discoverer: Spencer, 39h31.
synonym: Pch.
references: 1935, DIS 3: 28.
1937, DIS 7: 15.
Neel, 1939, Genetics 24r 81.
1941, Genetics 26: 52-68.
1943, Genetics 28: 49-68.
phenotype: Extra bristles present in homozygote at or near almost all normal bristle locations but most frequently in dorsocentral and scutellar regions. Heterozygote in some stocks occasionally shows extra bristles, especially vibrissae. Character expressed better at low temperatures and in large flies. Combinations with *h* and *Hw* generally superadditive for bristle number. RK3.

**pym: polymorph*
location: 2- (not located).
origin: Spontaneous.
discoverer: Bryson, 1939.
references: 1940, DIS 13: 49.
phenotype: Eye color translucent dull ruby. Wings small; may be absent. Bristles slightly Minute. Posterior crossvein often missing. Both sexes sterile. Viability low, especially in female. RK3.

**pym^2*
origin: Spontaneous.
discoverer: Neel, 1941.
references: 1942, Am. Naturalist 76: 630-34.
phenotype: Eyes ruby; ocelli pale. Body small and abnormally shaped. Wings small, thin, and wavy; second crossvein often interrupted or missing; plexus often present near wing tip or in third posterior cell; marginal hairs irregular, shallow incisions present in posterior margin. Bristles slender

and either increased or decreased in number. External genitalia normal in both sexes, but internal genitalia abnormal. Viability about 80 percent normal. RK3.

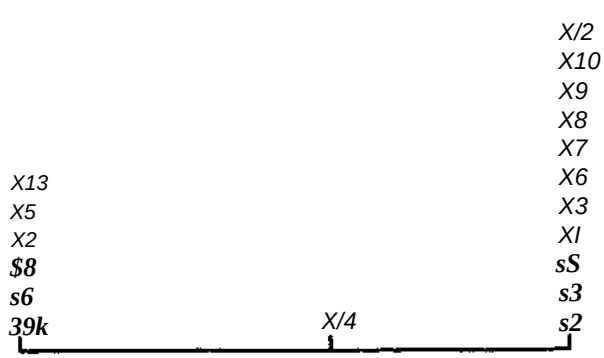
pyp: polyphene
location: 1-53.5.
origin: Spontaneous.
discoverer: Bridges, 37126.
phjenotype: Wings spread, yellowish, and with uneven surface. Trace of extra vein in third posterior cell, near second crossvein. Eyes rough, pitted, bulging, and smaller than wild type. Trident more darkly pigmented in male. Female sterile. Viability about 70 percent wild type. RK3.

pys: polychaetous
location: 2-52.
discoverer Curry, 37kl5.
phenotype: Extra or double bristles present; most easily seen are scutellars, dorsocentrals, orbitals, and vibrissae. Extra bristles on scutellum curve upward. Overlaps wild type at 19°C, but classification good at 28-30°. RK3.

Q: Queer wing
location: 2- (not located).
discoverer: E. M. Wallace, 1931.
phenotype: Wings irregularly incised; marginal bristles irregular. Heterozygote has low penetrance; homozygote better. RK3.

Qd: Quadroon
location: 1-6.8.
origin: Spontaneous.
discoverer: Thompson, 58k.
references: 1959, DIS 33: 99.
phenotype: Broad dark band on margins of all abdominal tergites, giving abdomen superficial appearance of uniform darkness. Viability of heterozygous female normal, of homozygous female 40 percent normal, and of male 30 percent normal. RK2.

Queer wing: see Q



Map of r locus
From Green, 1963, Genetfca 34: 242-53.

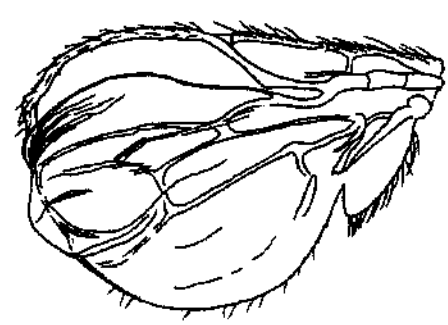
***r: rudimentary**
location: 1-54.5.
discoverer: Morgan, lOf.
references: 1915, Am. Naturalist 49: 240—50.
Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 25 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 24, 56-57, 234 (fig.).
phenotype: Wings obliquely truncated to about tip of abdomen; marginal hairs sparse and ruffled; veins L4 and L5 generally shortened. Wings usually arc-like and often blistered. Viability irregular. Female usually sterile in cross with r male but occasionally gives a few offspring (mostly daughters) in outcross; for morphology of female sterility see *t3$*. RK2.
other information: The r locus was subdivided into six complementation groups by Fahmy and Fahmy (1959, Nature 184: 1927-29) and into at least three groups, on the basis of both complementation and recombination analysis, by Green (1963, Genetica 34: 242-53). Unfortunately, the two analyses were performed on different groups of mutants, and the maps cannot be correlated. Complementation varies from partial to complete and the degree may be related to distance apart on the complementation map.

V
discoverer: Bridges, 14g.
references: 1916, Genetics 1: 151.
phenotype: Like r. RK2.

r^{2L}: rudimentary of Lancefield
discoverer: Lancefield.
references: 1918, Am. Naturalist 52: 264-69.
phenotype: Like r. RK2.

***$_{f}$3**
discoverer: Sturtevant, 17J30.
phenotype: Like r except that about one-third of females are fertile (Lynch, 1919, Genetics 4: 501—33). RK2.

r?: see r»



r^{9}: rudimentary~9
Edith M. Wallace, unpublished.

r*
origin: Spontaneous.
discoverer: Bridges, 20b3.
synonym: r^{7}.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 234.
phenotype: Wings truncated. Veins sometimes incomplete; slight deltas at crossveins; marginal hairs uneven. Female usually fertile. RK1.

r U

origin: Spontaneous.
discoverer: E. M. Wallace, 22k8.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 234.
phenotype: Much less extreme than r and somewhat less so than r^9; female more fertile. Overlaps wild type in female. RK3.

discoverer. Bridges, 24d4.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 234.
phenotype: Formerly more extreme than r; later less extreme. RK2.

r35

origin: Spontaneous.
discoverer: Gottschewski, 1935.
phenotype: Strong allele of r. RK2.

r3Sa

origin: X ray induced.
discoverer Oliver, 35alO.
references: 1939, DIS 12: 48.
phenotype: Like r, but less viable. RK3.

*r39

origin: Induced by mustard gas.
discoverer: Auerbach, 1951.
references: Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 482—92.
phenotype: Wings like r. Homozygous female sterile in cross to r^{39} male; fertile in outcross, producing mostly daughters (1—3 percent of progeny are male). Homozygous female produces many malformed eggs and unfertilized eggs with normal morphology. Ovarian development often retarded or fails. Yolk deposition affected. Lethal effect in progeny results from generalized disturbance in differentiation 13-16 hr after fertilization at 25°C. Surviving embryos hatch late and may produce larvae that neither move nor feed. RK2.

r39k

origin: Recovered among progeny of cold-treated female.
discoverer. L. V. Morgan, 39k9.
synonym: r^{*1} (Green, 1963, Genetica 34: 242—53).
references: 1940, DIS 13: 51.
phenotype: Wing short and crumpled; legs weak. Homozygous female sterile, but r/r^{35}* female partially fertile. RK2.
other information: Complements completely with r^{*2}, partially with $i^{*7'}$, r**, r^{X9}, $r^{X}\wedge 0_i$ and *jX14* and slightly with r**. Genetically to the left of r^{*2}, *rX7t rX8f rX9t rXl0>* and *,JU4* (Green, 1963).

V»

origin: Induced by mustard gas.
discoverer: Auerbach, 1951.
references: Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 482—92.
phenotype: Like r^{39}, but slightly more extreme. RK2.

rS3l

origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenyialanine (CB. 3025).
discoverer: Fahmy, 531.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation group III of the Fahmys.

,54 c

origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 54c.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation group I of the Fahmys.

r54d

origin: Induced by L-p-NN-di-(2-chloroethyI)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 54d.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation groups I and II of the Fahmys. Complementation group II inferred from its interaction with r^{SSa}.

rS4f

origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 54j.
references: 1959, Nature 184: 1927-29.
phenotype: Typical *r.* RK2.
other information: A noncomplementing allele. Fourteen such alleles found among 31 tested by the Fahmys.

rSSa

origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahmy, 55a.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation groups II and m of the Fahmys.

rSSk

origin: Induced by p-NN-di-(2-chloroethyI)amino-phenylethylamine (CB. 3034).
discoverer: Fahmy, 55k.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation group V of the Fahmys. Seven such alleles among 31 tested by the Fahmys.

rS6d

origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 56d.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation groups IV and V of the Fahmys.

rS6j

origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 56j.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.

other information: Occupies complementation groups I through IV of the Fahmys.

rS6k

origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 56k.
references: 1959, Nature 184: 1927-29.
phenotype: Typical r. RK2.
other information: Occupies complementation group VI of the Fahmys. Four such alleles among 31 tested by the Fahmys.

r580

origin: X ray induced.
discoverer: M. Burdick, 1958.
references: A. B. Burdick, 1961, DIS 35: 45.
phenotype: Like r and t^9. Females sterile. RK2.

r63c

origin: Spontaneous.
discoverer: Clancy, 63c.
references: 1964, DIS 39: 65.
phenotype: Like r. Female conditionally sterile. RK2.
other information: Does not complement with *i39k* Of r^*.

r^G: rudimentary of Goldschmidt

origin: Spontaneous.
discoverer: Goldschmidt.
synonym: rP^x *>*;
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 501-3.
phenotype: Like r. RK2.

**rH*

origin: Induced by formaldehyde.
discoverer: Auerbach, 1951.
references: Counce, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 482—92.
phenotype: Like r^{39}. RK2.

r^K: rudimentary of Krivshenko

discoverer: Krivshenko.
references: Agol, 1936, DIS 5: 7.
phenotype: Wings like r. Semilethal; female sterile. RK2A.
cytology: Associated with/nfl^r^; proximal break in chromocenter.

$rP^{x\ bl}$: see r^G

r^{sl}: see r^9k

r*2; *rudimentary-spontaneous*

origin: Spontaneous.
discoverer: Green, 59k22.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: Complements with r^{35}*, $r^{"8}$, r^{xs}, r^{X13}, an<j r^*. Genetically to the right of r^{39}*, r^{X5}, r^{X13}, and r^{X14}.

**r*3*

origin: Spontaneous,
discoverer Green, 58b.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complements slightly with r^{X14}. Genetically to the right of r^{39k}.

**r*4*

origin: Spontaneous.
discoverer: Green, 59b.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: A noneomplementing allele.

**r*5*

origin: Spontaneous,
discoverer: Green, 60i7.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the right of r^{39k} by recombination.

**r*6*

origin: Spontaneous.
discoverer: Green, 60112.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the left of r^{*2} by recombination.

rs7

origin: Spontaneous.
discoverer: Green, 60112.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: A noncomplementing allele.

**r*8*

origin: Spontaneous.
discoverer: Green, 61g2.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complements like r^{39k}. Genetically to the right of r*-* 0.

r^s: rudimentary-Swiss

origin: Spontaneous.
discoverer: Hadorn, 59d.
references: Rohr, 1962, DIS 36: 39.
phenotype: Like r. Wings smaller in homozygous female than in male. Duplicated bristles often arising from same socket. Lateral marginal wing bristles of r^{12}, but not $r^s/t39k$ or rS/r9(occa. sionally normal. Female sterile. RK2.

rSn; rudimentary of Silberman

discoverer: Silberman.
references: Agol, 1936, DIS 5: 7.
phenotype: Like *r*. RK2.

r*1: rudimentary from X irradiation

origin: X ray induced.
discoverer: Green, 60bl3.
references: 1963, Genetics 34: 242—53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the right of r^{39k} by recombination.

**rX2*

origin: X ray induced.
discoverer: Green, 60cl5.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the left of r^s? by recombination.

rX3

origin: X ray induced.

discoverer: Green, 60c 15.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complements slightly with r^{39k}, $_{T}a8_{i}\ _{T}X5_{f\ aru}$j $rX13_{m}$ Genetically to the right of r^{39k}.

*$_{r}X4$
origin: X ray induced.
discoverer: Green, 60cl5.
references: 1963, Gfenetica 34: 242—53.
phenotype: Like r. RK2.
other information: A none complementing allele.

*$_{r}X5$
origin: X ray induced.
discoverer: Green, 60cl5.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complementation behavior like r^{39k}. Genetically to the left of *r*2* and r^O.

$_{r}X6$
origin: X ray induced.
discoverer: Green, 60dl.
references: 1963, Genetica 34: 342—53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the right of r^{39k} by recombination.

*$_{r}$X7
origin: X ray induced,
discoverer: Green, 60e24.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Shows partial complementation with r^{35}*, r^{a8}, and r^{X5}. Genetically to the right of r^{39k}.

*$_{r}X8$
origin: X ray induced,
discoverer: Green, 58a.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complements completely with *rX13*, partially with r***, r««, r**, and r**'. Genetically to the right of r^{5}**.

*$_{r}X9$
origin: X ray induced.
discoverer: Gloor, 57a.
references: Green, 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complementation pattern like r^®. Genetically to the right of t^{39k}.

*$_{r}X10$
origin: X ray induced.
discoverer: Gloor, 57a.
references: Green, 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: Complementation pattern like r^{xs}. Genetically to the right of r^{9}*.

*$_{r}$Xll
origin: X ray induced.
discoverer: Green, 60k27.
references: 1963, Genetica 34: 242—53.
phenotype: Like r. RK2.
other information: A noncomplementing allele.

*$_{r}X12$
origin: X ray induced.
discoverer: Green, 60k27.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: A noncomplementing allele located to the right of r^{39k} by recombination.

*$_{r}X13$
origin: X ray induced.
discoverer: Green, 60k27.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: Complements completely with r^{s2}, r*«, r^{X9}, and r*-*<\ partially with *t*l**, and slightly with $r^{\wedge 3}$. Genetically to the left of *t*2.

$_{r}X14$
origin: X ray induced.
discoverer: Green, 62j7.
references: 1963, Genetica 34: 242-53.
phenotype: Like r. RK2.
other information: Complements completely with r^{a}^, partially with r^{39k}, r««, r*-*, r*«, T^{*9}, &*<>, and r^{*13}, and slightly with t^{*3} and r^{aS}. Genetically between r^{39k} and r^{a2}.

R: Roughened
location: 3-1.4.
discoverer E. M. Wallace, 35i.
phenotype: Eyes of *R*/+ rough with some large dark facets. Male genitalia frequently rotated and male sometimes sterile; viability about 80 percent wild type. Homozygote semilethai; wings spread. Thorax short; acrostichal hairs deranged, some missing; eyes small. Homozygous female fertile. RK1.

R^{3}(+): see *T(2;3;4)+3*

*RS1b
origin: Recovered among progeny of female treated as embryo with cold shock.
discoverer: Mickey, 51b21.
references: 1951, DIS 25: 74.
1951, Genetics 36: 565-66.
phenotype: Eyes of heterozygote small, oblong, and rough; facets and eye hairs irregular. Viability good. Homozygote lethal. R^{sib}/*R* has very small eyes; much fusion of facets; resembles *gl* and *Gl.* RK1.

ra: rase
location: 3-97.3.
origin: Spontaneous.
discoverer: Beadle, 34d.
references: 1935, DIS 4: 10.
phenotype: Bristles and hairs small; irregularly absent, especially from head and thorax. Viability good; developmental time normal. RK2.

*ra2
origin: Spontaneou* in *In(3R)P.*
discoverer: Mossige, 36k21.
synonym: *bd; bald.*
references: 1937, DIS S: 9.
phenotype: Homozygote lacks all head bristles and some scutellars* Heterozygote has extra anterior scutellars in about 30 percent of flies. RK2A.

cytology: Occurred in and probably inseparable from *In(3RyP = In(3R)89C2'4;96A18-19.*

***rab: rabbit**

location: 1-58.
origin: Induced by P^{32}.
discoverer Bateman, 1950.
references: 1950, DIS 24: 55.
phenotype: Hairs on mesonotum near dorsocentral bristles turned inward toward midline. Air bubbles occasionally in thorax, beneath dorsocentrals, and scutellum. Wiags rarely held up. Viability and fertility normal. RK2(A).
other information: Slight disturbance of crossing over proximally.

radius incompletus:* see *ri

***rag: ragged**

location: 3-37 (Steinberg).
discoverer: Charles, 1932.
references: Dunn, 1934, DIS 1: 30.
phenotype: Hairs missing from sections of wing margin. RK3.

***rai: raisin**

location: 3-17 (Stanley).
origin: Spontaneous.
discoverer Hersh.
references: 1953, DIS 27: 55.
phenotype: Eye color deep brown, like se. Eclosion delayed 1 or 2 days. RK2.

raised:* see *rsd

***raised wing:* see rw**

raisin:* see *rai

***ras: raspberry**

location: 1-32.8.
origin: Recovered among progeny of heat-treated flies.
discoverer: Muller, 28dl7.
references: 1935, DIS 3: 30.
phenotype: Eye color dark ruby; 25 percent normal red pigment, 114 percent normal brown pigment (Nolte, 1959, Heredity 13: 233-41). Color autonomous in larval optic disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes nearly wild type, not useful for classification (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
cytology: Placed in 9E-F, on the basis of its being included in the section of the *X* translocated into the base of *3R* by *7X1,-3)1*8* « T(1;3)9E;13Q;81F* and its genetic position to the left of v in 10A1-2.

ras

discoverer: Grossman, 1932.
references: Dtinn, 1934, DIS 1: 30.
phenotype: Eye color translucent ruby, lighter than *ras;* darkens less with age. Eyes contain 15 percent normal red pigment and 103 percent normal brown pigment (Nolte, 1959, Heredity 13: 233—41). RKI.

ras^3

origin: Spontaneous.
discoverer: Iveii, 37bl8.
phenotype: Eye color of male maroon, light and translucent immediately after eclosion but becomes nearly wild type after 1 day. Female wild type. RK3.

ras^4

origin: Spontaneous.
discoverer: Ives, 38f.
phenotype: Like ras, but female sterile. RK2.

ras^y: raspberry-variegated

origin: Fast neutron induced.
discoverer: E. B. Lewis, 1953.
references: Brokaw, 1954, DIS 28: 73.
phenotype: Variegates for *ras.* Homozygous viable. RK2A.
cytology: Associated with *T(l;3)ras^ = T(1;3)9E;13C;81F* (Lewis).

ras4:* see *ra

***raspberry:* see ras**

rauhig:* see *gl^3

***raven:* see rv**

***rb: ruby**

location: 1-7.5.
discoverer: Bridges, 14;18.
phenotype: Eye color clear ruby, white in combination with *w^a,* orange with *st,* and brownish red with *bw* (Mainx, 1938, Z. Induktive Abstammungs-Vererbungslehre 75: 256—76). Development of pigment autonomous in *rb* eye disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes pale yellow (Beadle, 1937, Genetics 22: 587-611). RKI.
cytology: Salivary chromosome location between 4C8 and 4D1 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191; J. I. Valencia). Located at 4C7-8 or possibly 4C6 by Hannah.

***rb48a**

origin: X ray induced.
discoverer Fox, 48a7.
references: 1948, DIS 22: 53.
1949, Genetics 34: 647-64.
phenotype: Like *rb.* Fly lacks an antigen produced by wild type; the same antigen removed by *v^{48}*.* rfr***^{a} fly has no antigen not shared with wild type or v*«*. RKI.
cytology: Salivary chromosomes normal.

rbm48aH5: ruby-mottled

origin: X ray induced in *ln(l)&c^{slL}8c^{8R}+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with *In(l)rb°"*8aH5 x*i_n(l)3E3-4;11A7-8;2OF.* Euchromatic section of *X* inserted into JO? in reverse order,

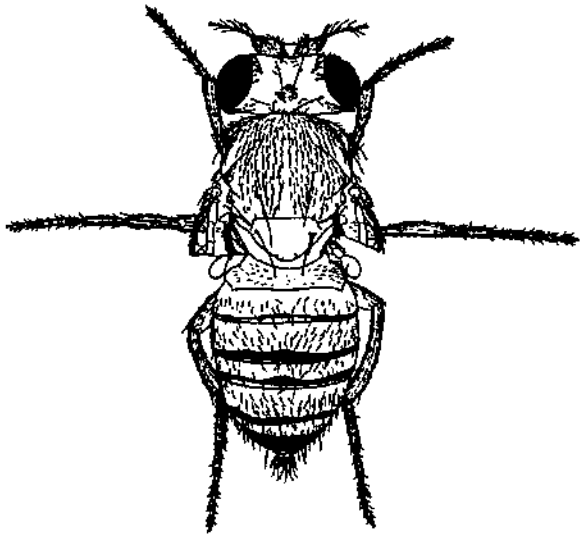
,t>RlSBH3

origin: X ray induced in *R(l)2.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with *Df(1)rb^{R15BH3} = Df(l)4B4-5;4D5-6* O- I. Valencia).

rbc: see re

re: *red cells*
location: 2-36.8 (between *d* and /).
origin: Spontaneous.
discoverer: E. B. Lewis, 1946.
synonym: *rbc: zed blood cells.*
references: 1950, DIS 24: 59.
Jones and Lewis, 1957, Biol. Bull. 112: 220-24 (fig.).
Grell, 1961, Genetics 46: 925-33.
phenotype: *rc/rc* normal; in *lys rc/lys* re, fat cells of head and thorax acquire brownish red pigment. Effect most prominent in one or more rows of pigmented cells along mid-dorsal line of thorax just beneath chitin. Pigment is ommochrome since *lys re bw* cells are pigmented, whereas v; *lys re* cells are colorless except in kynurenine-fed flies. RK3.

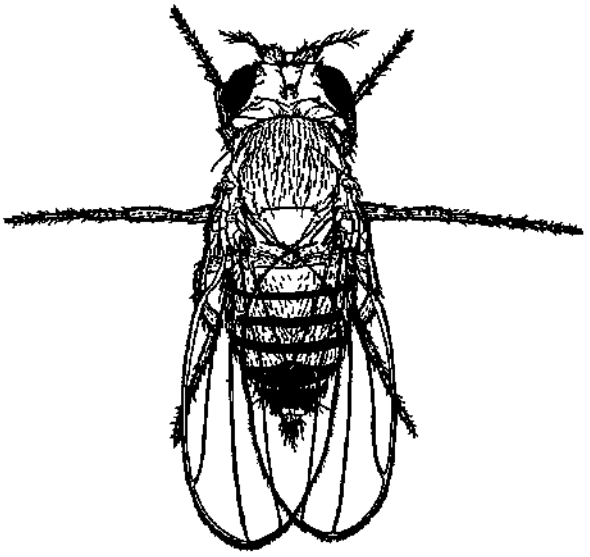
rc²
origin: Spontaneous.
discoverer: R. F. Grell, 1957.
references: Grell, 1961, Genetics 46: 925—33.
phenotype: Wild type at 25°C on standard medium; at 17° a few red fat cells are visible. Early third instar larvae placed on glucose-agar medium produce flies with numerous red cells, *lys re²* has red cells under any condition. RK3.



rd: reduced
Prom Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 157.

rd: reduced
location: 2-51.2.
origin: Spontaneous.
discoverer: Bridges, 17gl5.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 233.
phenotype: Bristles, in varying numbers and positions, strongly reduced in size; others unaffected. Reduced bristles usually curved and pointing in odd directions. Sternopieurals best criterion. Male more extreme than female. Female usually sterile (Lynch, 1919, Genetics 4: 501-33). RK2.

cytology: Placed in region between 35C3 and 36B5 on the basis of being to the right of *Df(2L)64j = Dt(2L)34E5'Fl;35C3-Dl* and to the left of the deficiency from *T(Y;2)G = T(Y;2)36B5-C1;4OF.*



re/*: *reduced-scraggly*
Edith M. Wallace, unpublished.

rd*: reduced-scraggly
origin: Spontaneous.
discoverer: Bridges, 18j2.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235.
phenotype: More bristles reduced and remaining ones more irregular than in *rd.* More extreme in male. Abdominal banding abnormal in female. Both sexes fertile. RK1.

RD(1): Recovery Disrupter (1)
location: 1-62.9 [lO percent of the distance between car and suf/)].
origin: Found in a chronically irradiated population obtained from B. Wallace.
discoverer: Hanks, 1957.
references: Novitski and Hanks, 1961, Nature 190: 989-90.
Erickson and Hanks, 1961, Am. Naturalist 95: 247-50.
phenotype: Males containing this factor, *RD(2),* and certain other factors produce approximately 67 percent female and 33 percent male progeny. The effect is not produced by zygotic mortality but by a mechanism that operates during meiosis, leading to fragmentation of the *Y* chromosome, and production of fewer than 64 sperm heads per sperm bundle (Erickson, 1965, Genetics 51: 555-71). The effect is maximal at 25°C and less pronounced at both 18° and 27°. Viability good but fertility reduced both sexes. RK3.

RD(2)
location: 2- (not located).
origin: Found in a chronically irradiated population obtained from B. Wallace.

discoverer: Hanks, 1960.
references: Novitski and Hanks, 1961, Nature 190: 989-90.
phenotype: Males with this factor, *RD(1),* and certain other factors produce about 67 percent female progeny. RK3.

***rdi>: reddish brown**
location: 1-21.7.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 89.
phenotype: Eye color deep reddish brown. Wings frequently curve slightly upward at tips. Body somewhat small. Male sterile. Viability about 30 percent wild type. RK3.

***rdm: reduced macros**
location: 1-59.8.
origin: Induced by 2-fluoroethyl methanesulfonate (CB. 1522).
discoverer: Fahmy, 1957.
references: 1959, DIS 33: 89.
phenotype: Most bristles thin and short. Eye shape slightly abnormal. Body short; wings short, broad, and frequently pleated. Male fertile. Viability about 10 percent wild type. RK3.

rdo: reduced ocelli
location: 2-53.
origin: Spontaneous.
discoverer E. M. Wallace, 37113.
phenotype: Ocelli small and colorless, often missing, leaving top of head smooth and sometimes pigmented. Hairs between ocelli fewer than wild type. Eye surface irregular. RK2.

***rdo*[2]**
origin: Spontaneous.
discoverer Bridges, 38bl 0.
phenotype: Like *rdo.* RK2.

***rdp: reduplicated**
location: 1-34.7.
discoverer: Hoge-Richards, 12k.
references: Hoge, 1915, J. Exptl. Zool. 18: 241-97.
phenotype: At low temperatures, most flies have malformed or branched legs, often with mirror image reduplication. At 25°C most flies normal. RK3.

***rdt: reduced thorax**
location: 1-54.4.
origin: Induced by p-NN-di-(2-chloroethyl)atnino-phenylethylamine (CB. 3034).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 89.
phenotype: Head and thorax disproportionately small compared to abdomen. Wings short, reaching only to tip of abdomen; frequently incompletely expanded or misheld. Male inviable and usually sterile. RK3.

re: *reduced eyes*
location: 3- (not located).
origin: Spontaneous.
discoverer: Rapoport.
references: 1940, Dokl. Acad. Nauk SSSR 27: 1030-32.
phenotype: Eye size reduced from the normal 750 to about 180 facets. Reduction more extreme in combination with £?; some flies have no facets and are sterile. RK2.

re:* see *rey
re*: see rey^

***re-b: reduced eyes-b**
location: 3-45.
origin: Spontaneous.
discoverer: Whittinghill, 53g.
references: Schacht, 1954, DIS 28: 78.
phenotype: Eyes reduced in 80 percent of homozygotes. Expression varies independently in each eye from absence of facets to wild type. RK2.
other information: Possibly allelic to re.

rea: rearranged tergites
location: 1-25.4.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 73.
phenotype: Tergites highly abnormal, partly missing, and different segments united. Expression variable. Viability and fertility inversely related to tergite abnormality. RK2.
other information: One allele induced by CB. 3025.

Recovery Disrupter:* see *RD

red: red Malpighian tubules
location: 3-53.6.
origin: Spontaneous.
discoverer: Muller, 49a.
synonym: *bw-1: brown-like.*
references: Oster, 1954, DIS 28: 77-78.
Aslaksen and Hadorn, 1957, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 32: 464—69.
phenotype: Malpighian tubes of larva and adult rusty red. Eye color brown, darkening with age. Malpighian tubes of *v; red* and *en; red* colorless; *bw; red* tubes red; pigment therefore an ommochrome. Eyes contain less drosopterin and isoxanthopterin but more of the other pteridines than normal. Eye color autonomous in *red eye* disks transplanted into wild-type hosts. Wild-type Malpighian tubes acquire some red pigment after transplantation into *red* hosts. RK1.
cytology: Placed in region 88A through 88C, based on its inclusion in duplication derived from *T(l;3)OS = T(1;3)4F2-3;62B-C;88A-C;92C-D* (Lindsley and Grell, 1958, DIS 32: 136) and its genetic position to the left of cv-c (C. Hinton), which has been placed in region 88A-C.

red blood cells:* see *re
***red cells:* see re**
red Malpighian tubules:* see *red
reddish brown:* see *rdb
reduced:* see *rd
***reduced eyes:* see re**
reduced macros:* see *rdm
reduced ocelli:* see *rdo

reduced pigment: see rg/
reduced size: see *rsi*
reduced tarsi: see *rta*
reduced thorax: see *rdt*
reduplicated: see *rdp*
reduplicated sex combs: see *rsc*
re/: *refractaire*
location: 2-52.8.
origin: Spontaneous.
discoverer: Ohanessian-Guillemain, 53b.
references: 1953, DIS 27: 59.
phenotype: Morphologically normal. Growth of the carbon dioxide-sensitivity virus inhibited in *ref/ref.* RK3.
refringent: see *rfr*
Resistancef): see *Rst( )*
**ret: reticulated*
location: 1- (rearrangement).
origin: Induced by L-p-NN-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958. DIS 32: 73.
phenotype: Wing veins increased to anastomosing reticulated areas. Wings shortened, deformed, and blistered. Eyes large and rough. Postvertical bristles usually absent. Male sterile; viability about 20 percent wild type. RK2A.
cytology: Associated with *T(l;2)ret¬ T(l;2)20A5-B2;2R.*
Rev: Revolute
location: 2- (rearrangement),
origin: X ray induced,
discoverer Dobzhansky, 31b5.
phenotype: Wings of heterozygote spread at 45° from midline; edges curled, giving spoon shape. Sense organs along veins enlarged. Eyes mottled in *Rev/It.* Homozygote viable and fertile; somewhat more abnormal than heterozygote. Phenotype suppressed by extra *Y'&;* probably a variegated position effect. RK2A.
cytology: Associated with *In(2LR)Rev = In(2LR)40F;52D10-El* (Bridges and Li, in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293).
Rev: Revolute of Bridges*
origin: Spontaneous as a single homozygous female in a culture with no heterozygote.
discoverer: Bridges, 36e22.
synonym: *Rvd: Revotutoid.*
references: Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293.
phenotype: Wings spread and curved. Extreme Rev allele. Homozygous lethal but *Rev/Rev*® viable (E. B. Lewis). RK2A.
cytology: Associated with *In(2LR)Rev^{B} •» In(2LR)40;52C-E* (Lewis).
Revolutaick see *Rev&*
**rey: rough eye*
location: 1-0.6 (from combined measurements on rey, *rey^{3}*, and rey^{3})*
origin*. Spontaneous.
discoverer: Neel, 41g7.
synonym: re (preoccupied).
references: 1942, DIS 16: 52.
phenotype: Eyes small and rough. RK3.
rey; see *rey?*
**rey^{2}*
origin: Spontaneous.
discoverer: Sturtevant, 1948.
synonym: Described as *rey.*
references: 1948, DIS 22: 55-56.
phenotype: Eyes extremely small and rough in male, less extreme in female. Areas of thorax often undeveloped; sometimes hemithoracic. RK1.
other information: Allelism inferred from similarity of phenotype and location to rey.
rey^{3}
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
synonym: re^{2}: *rougheye'like.*
references: 1958, DIS 32: 73.
phenotype: Eyes small and rough. Homozygous female viable but infertile. RK2.
other information: One allele induced by CB. 3007. Allelism to rey inferred from phenotype and genetic position.
**rf: roof wings*
location: 2-81.
discoverer: Bridges, 1921.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 233.
phenotype: Wings rotated on long axis so that inner margins are raised and costal margins lowered. Overlaps wild type. RK3.
rV
origin: Spontaneous.
discoverer. Redfield, 1926.
references: Franke, 1933, Ph.D. Thesis, Univ. Berlin.
phenotype: Like *rf.* RK3.
Rf: Roof
location: 3-59.
origin: Spontaneous.
discoverer: Waddington, 38a.
references: 1939, DIS 12: 48-49.
phenotype: Wing position normal at eclosion; becomes rooflike in 12-hr imagos. RK1.
**Rf-c: Roof-c*
location: 3- (to the left of se).
discoverer: Bridges, 20al.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 228 (fig.).
phenotype: Wings slanted at rooflike angle. RK3.
rfr: refringent
location: 1-67.9.
origin: Induced by D-p~NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
synonym: *ret* (preoccupied).
references: 1959. DIS 33: 89.
phenotype: Wing surface yellowish and iridescent; occasionally, one or both wings held out; inner margins may be incised. Expression more extreme

in male than female. Male viable and fertile; female has reduced viability and is sterile. RK2.
other information: One allele each induced by CB. 3026 and CB. 3034.

rg: rugose
location: 1-11.0.
discoverer: Demerec, 28f23.
synonym: *rough-64.*
phenotype: Eyes rough. Wings thin, with margins somewhat frayed. Viability excellent. RK2.
cytology: Locus at 4E1-3 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

***rg 0**
discoverer: Bridges, 21c4.
synonym: *roughish**
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 234.
phenotype: Eyes uniformly rough. Viability 70 percent wild type. RK2.

***rg2**
discoverer: Bridges, 30d24.
synonym: *pebbled.*
phenotype: Eyes slightly rough; occasionally overlaps wild type. Viability 80 percent wild type. RK3.

rg*
discoverer: Ives, 33g22.
synonym: *rg33*.*
references: Plough and Ives, 1935, Genetics 20: 42-69.
1934, DIS 2: 34.
phenotype: Eyes somewhat rough. Viability excellent. RK2.

*** 5**
rg
origin: Spontaneous.
discoverer: Bridges, 38c9.
phenotype: More extreme than *rg.* Viability low. RK2.

***rg7**
origin: X ray induced.
discoverer: Cantor, 46d20.
references: 1946, DIS 20: 64.
phenotype: Eyes rough and smaller than wild type. Eclosion delayed. Viability and fertility excellent. RK1A.
cytology: Associated with *In(l)rg7 =*ln(l)4E;7A* (J. I. Valencia).

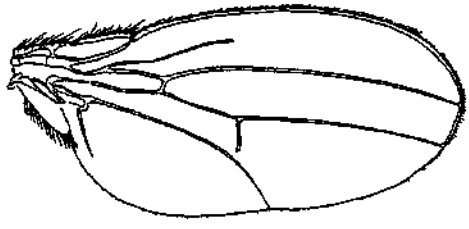
rg938: see *t£**

rg^p: rugose from P^32
origin: Induced by P^{32}.
discoverer. Bateman, 1950.
synonym: *tes: facetious.*
references: 1950, DIS 24: 54.
1951, DIS 25: 77-78.
phenotype: Eyes small and rough; body pale; wings often curled upward. RK2A.
cytology: Associated with *ln(l)rg^p ^In{l)3C;4E* (Darby).

rgt: reduced pigment
!©cation: 1-11.5.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 89.
phenotype: Characteristic pigmentation of fifth tergite reduced or absent in male. Body color yellowish. Eyes bright red. Male sterile. RK2.

rh: roughish
location: 2-54.7.
origin: Spontaneous.
discoverer: Bridges, 21a3.
phenotype: Eyes moderately rough. At 19°C, bristles slightly wavy and wings broad. RK2.

rh:* see *gt^3



ri: radius incompletus
Edith M. Wallace, unpublished.

ri: radius incompletus
location: 3-47.0; to the left of the centromere, based on mapping to left of *Dp(l;3)sn^13al* = *Dp(l;3)6C;7C9-Dl;79D2-El* (Muller, 1958, DIS 32: 140) and *Dp(l;3)N264-58 — Dp(l;3)3B2-3;3D6-7; 80D-F* (Gersh, 1966, DIS 41: 89).
origin: Spontaneous.
discoverer: Tshetverikov, 1926.
phenotype: Vein L2 interrupted. Wings slightly warped and' blunt. Acts during contraction period in *Droaophila simulans,* inhibiting fusion of small spaces into a vein (Waddington, 1940, J. Genet. 41: 75-139). RK1.
cytology: Tentatively placed salivary region 77 (Hannah, Arajarvi, and Puro).

***,/2**
discoverer: Nordenskiöld, 36c5.
references: 1937, DIS 7: 18.
phenotype: Like ri. RK1.

***ri51k**
origin: Spontaneous,
discoverer: Meyer, 51k.
references: 1952, DIS 26: 67.
phenotype: Less extreme than *ri,* RK1.

ri53i
origin: Spontaneous.
discoverer: Meyer, 53j.
references: 1953, DIS 27: 58.
phenotype: Like *ri.* RK1.

RIDDT:* see *Rst(2)DDT
RI":* see *Rst(2)DDT
rickets:* see *rk
rimy:* see *rm

rk: rickets
location: 2-48.2.
origin: Ultraviolet induced.
discoverer. Edmonds on, 48h.

references: 1948, DIS 22: 53.
phenotype: Legs, especially hind ones, flattened and bent. Femora and tibiae bowed in middle; first two tarsal joints shortened, bent and flattened; last three tarsal joints almost a unit, shortened and flattened; tarsal claws disarranged. Wings not expanded, sometimes partially extended, sometimes drooping. Postcutellar bristles crossed. Body small. Viability about 90 percent wild type. RK2.
cytology: Placed in region between 34E5 and 35D1 on basis of its inclusion in *Df(2L)64j = Df(2L)35E5-Fl;35C3-Dl* (E. H. Grell).

rk
origin: Ultraviolet induced.
discoverer: Erickson, 50a.
references: Meyer, Edmondson, Byers, and Erickson, 1950, DIS 24: 60.
phenotype: Tarsi weak, but usually not deformed. At 21°C, wings curved downward and held out slightly; may be crumpled or unexpanded. Expression more extreme at 27°C; overlaps wild type at 17°. Viability fair at 17°, low at 27°. rk^2/rk intermediate between the two homozygotes. RK2.

rk3
origin: Ultraviolet induced.
discoverer: Meyer, 54d.
references: 1955, DIS 29: 74.
phenotype: Wings unexpanded; legs warped; body small; bristles fine. Viability low. RK2.

rk*
origin: Spontaneous.
discoverer: Jackson, 54c.
synonym: *cq: creeper.*
references: 1954, DIS 28: 74.
Meyer, 1958, DIS 32: 83.
phenotype: Wings unexpanded, spread, and drooping. Posterior legs malformed. Both sexes fully viable and fertile, rk^4 male mates with wild-type female only if wings removed from female. Viability 60 percent wild type. RK2.

rk*
origin: Spontaneous.
discoverer: Mischaikow, 59a.
references: 1959, DIS 33: 98.
phenotype: Less extreme than *rk.* No leg abnormality. Wings sometimes fully expanded but held out. RK3.

rk6
origin: X ray induced.
discoverer: Thomas, 60g.
references: Meyer, 1963, DIS 37: 51.
phenotype: Legs weak. Wings unexpanded. Viability higher at higher temperature. RK2.

***rfe^{e}y':** *rickets-cylindrical*
origin: Spontaneous.
discoverer Ströher, 1958.
synonym: *cyl.*
references: Mainx, 1958, DIS 32: 82.
phenotype: Abdomen cylindrical; terminal segments thickened. Posterior scutellars erect. Wings fail to expand; halteres small and melanotic. Legs as in *bal,* but less deformed. Subnormal viability, fertility good. RK2.

rl: rolled
location: 2-55.1 [between centromere and *stw* (Sturtevant); 0.03 unit to the left of *stw* (Tano, 1966, Japan. J. Genet. 41: 299-308)].
discoverer: Bridges, 22f23.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 233.
phenotype: Wing edges rolled downward, margins somewhat frayed, L4 interrupted distal to posterior crossvein. Eyes small, dark, and rough. Most extreme at 25°C, less extreme above and below that temperature (Lakovaara, 1963, Proc. Intern. Congr. Genet., 11th.Vol. 1: 175). RK2.
cytology: Placed in 41A, on basis of its inclusion in $Df(2R)M\text{-}S2^1$ ° *=Df(2R)41A* (Morgan, Schultz, and Curry, 1941, Carnegie Inst. Wash. Year Book 40: 284).

***r/G29;** *rolled of Goldschmidt*
origin: Recovered among progeny of heat-treated flies.
discoverer: Goldschmidt, 1929.
references: 1929, Biol. Zentr. 49: 437-48.
1939, Am. Naturalist 73: 547-59.
phenotype: Like *rl.* RK2.

rlu: rolled up
location: 1- (rearrangement).
origin: Spontaneous in $In(l)sc^{sl}$ + *dl-49.*
discoverer: Reddi.
references: 1963, DIS 37: 53.
phenotype: Wings rolled. Good viability and fertility. RK2A.

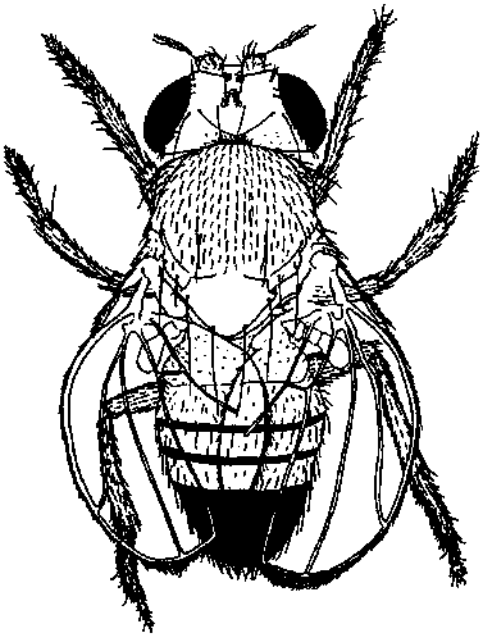
rm: rimy
location: 1-48.1.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 74.
phenotype: Eyes often dull brownish red with conspicuous white hairs between ommatidia. Wings longitudinally pleated. Viability and fertility good. RK2.
other information: One allele each induced by CB. 1540 and CB. 1592.

TJQ: see *rmp*

****rmp: rumpled***
location: 1-14.4.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer Fahmy, 1955.
synonym: *rm.*
references: 1959, DIS 33: 89.
phenotype: Wings variably unexpanded. Bristles deranged; postvertica Is frequently crossed. Derangement of bristles correlated with degree of wing abnormality. Viability and fertility good in both sexes. RK2.

m: rotund
location: 3-47.7 [from location of rn^3 (Carlson, 1956, DIS 30: 109)].
origin: X ray induced.

discoverer: Glass, 1929.
references: 1934, DIS 2: 8.
phonotype: Wings shortened but of normal width; nearly round. Tarsi three jointed. Sex combs absent. Both sexes sterile; ovaries, follicles, oocytes, and eggs small (Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70). Viability 50 percent normal. RK3A.
cytology: Associated with *T(2;3)rn;* breakpoints not determined but probably chromocentral.



rn: rotund
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 159.

***rm2**
origin: Spontaneous.
discoverer: Carlson.
references: 1956, DIS 30: 70, 109.
phenotype: Wings round and tarsi small, like rn. *Ul* usually interrupted. Male sterile; female fertility low. Viability good. RK2.

ro: *rough*
location: 3-91.1.
discoverer: Muller, 13f.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 93 (fig.).
phenotype: Eyes rough, with facets irregular in size and arrangement. Eyes slightly smaller and narrower than wild type. RK1.

ro-63: see *tm*^{3}

me: *roughened eye*
location: 3-47.6.
origin: Spontaneous.
discoverer: Maxkowitz, 61 g.
references: 1963, DIS 38: 31.
phenotype: Eyes rough and slightly smaller than wild type. RK1.

Roi: Rough eye
location: 2- [left arm, not separated from *In(2L)t*\.
origin: Spontaneous in *In(2L)t.*
discoverer: Ives, 47kl8.
references: 1952, DIS 26: 65.
1956, DIS 30: 72.
phenotype: Eye facets of *Roi/+* irregularly rounded, sometimes enlarged; eyes sometimes bulge. *Roi/Roi* lethal, *Roi/S* viable. Acts as a partial suppressor of *B* (E. H. Grell). Viability good. RK2A.

rolled: see *rl*
rolled up: see *rlu*
Roof: see *Rf*
roof wings: see *rf*
rose: see *rs*
rosy: see *ry*
Rosy: see *hwy**
rotated abdomen: see *rt*
rotated penis: see *rp*
rotund: see *rn*
rough: see *ro*
rough eye: see *rey*
Rough eye: see *Roi*
rough III: see *dli*
Rough wing: see *Rw*
rough-64: see *rg*
roughened eye: see roe
Roughened: see *R*
roughest: see *rst*
roughestlike: see *rstl*
roughex: see *rux*
rougheye-likd: see *rey3*
roughish: see *rgo*
roughish: see *rh*
roughoid: see *ru*

****rp: rotated penis***
location: 3-41.7.
origins Spontaneous,
discoverer: Bridges, 29cl5.
references: Morgan, Sturtevant, and Bridges, 1929, Carnegie Inst. Wash. Year Book 28: 339.
phenotype: As viewed from behind, external genitalia of male rotated counterclockwise from 0° to 270°, usually about 180°; overlaps wild type in 30 percent of flies. Eyes rough. Ply small; legs weak; tergites ridged; abdomen narrowed. Male sterile, even when genitalia not rotated. RK3.

****rs: rose***
location: 3-35.0.
origin: Spontaneous.
discoverer: Bridges, 23c10.
references: Morgan, Bridges, and Sturtevant, 1925, Bib Hog. Genet. 2: 234.
phenotype: Eye color translucent purplish pink but approaches wild type. Often sterile, especially male. Viability 80 percent wild type. RK2.

r*2
origin: Spontaneous.
discoverer. Bridges, 38d5.
phenotype: Eye color translucent pink. Viability and fertility excellent. Larval Malplghian tubes

pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

rsc;** ***reduplicated sex combs

location: 1- (between *y* and cv).
origin: X ray induced,
discoverer: Yanders, 56f6.
referencei: 1957, DIS 31: 85.
phenotype: Sex combs present on all six legs of males. Overlaps wild type in crowded cultures. Wings droop. Male fertile but viability only 15 percent wild type; female lethal. RK2.

rsd: raised

location: 3-95.4.
origin: Spontaneous,
discoverer: Ives, 40i5.
references: 1945, DIS 19: 46.
1947, DIS 21: 69.
phenotype: Wings held straight up, nearly meeting over thorax. Viability and fertility normal. RK1.
other information: Possibly an allele of *tx: taxi* (3-91).

rsi: reduced size

location: 1-0.6 (no crossovers with *br* in 1038 flies).
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 89.
phenotype: Body small; eclosion delayed; viability reduced. RK3,
other information: One allele each induced by CB. 1506 and CB. 3026.

****rst: roughest***

location: 1-1.7.
origin: X ray induced.
discoverer: Ball, 32b25.
phenotype: Eyes rough and bulging; facets irregular in size and arrangement. Body small. Viability 70 percent wild type. Male sterile. RK2A.
cytology: Associated with *T(l;3)rst;* breakpoint unknown in chromosome *3, X* chromosome breaks near *w* and *bb* (Beadle), *rat* locus in 3C4 (Slizynska, 1938, Genetics 23: 291—99; confirmed by Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash, Year Book 41: 191).

rst^2

origin: Spontaneous.
discoverer: Bridges, 33d7.
references: Gersh, 1965, Genetics 51: 477—80.
phenotype: Eyes extremely rough and bulging; facets irregular in size and arrangement. Body small. Some bristles absent; hairs sparse and irregular. Viability about 50 percent wild type. Fertility low. RK2A.
cytology: Associated with *Di(l)mt^a *aD£(l)3C3-4;3C6~7* (Schultz; confirmed by Gersh, 1965).
other information: *Di(l)mt^3* deficient for loci of both *mt* and *vt;* bristle abnormalities of *rmt^3* associated with tfa* deficiency for *vt* (Gersh, 1965).

rst^3

©ri-fln: X my Jtadoced.
discoverer: Grüneberg, 33116.
references: 1935, DIS 3: 27.
1935, J. Genet. 31: 163-84.
1937, J. Genet. 34: 169-89.
phenotype: Eyes rough; more extreme in male than female. Less extreme than other *rst* alleles. RK2A.
cytology: Associated with *In(l)rst^3 =In(l)3C3-4;20B* (Emmens, 1937, J. Genet. 34: 191-202; Kaufmann, 1942, Genetics 27: 537-49).

****$_{rst}$264.S7***

origin: X ray induced simultaneously with *N264-57,*
discoverer: Demerec, 38d.
references: 1941, Prdc. Intern. Congr. Genet., 7th. pp. 99-102.
phenotype: Described only as not variegated. RK3A.
cytology: Associated with *In(iyN™4-57 =l$_n$(l)3C9-11;2OD2-E1* (Hoover).

****$_{rs}$f264-86***

origin: X ray induced simultaneously with *N264-86$_m$*
discoverer: Demerec, 39i.
references: 1940, Genetics 25: 618-27.
Demerec and Sutton, 1940, Proc. Natl. Acad. Sci. U.S. 26: 532-36.
Sutton, 1940, Genetics 25: 534-40.
phenotype: Like *rst.* RK2A.
cytology: Associated with *T(1;4)N264~86 - T(l ;4)3 C6-7;3C7-8;3E5-6}101F.*

Rst: Resistance

A term used to denote genes that confer resistance to the killing effects of insecticides. The symbol *Rst* is followed by parenthetical designation of the chromosomal location of the gene and then by an indication of the insecticide. Both dominant and recessive genes for insecticide resistance are conceivable. Several investigators have exposed populations to insecticides for numerous generations and selected resistant lines. In most cases, the genetic basis of resistance is polygenic, and these strains are not included in this list.

Rst(2)DDT: Resistance{2) DDT

location: 2-65 (64.5-66).
origin: Naturally occurring allele..
discoverer: Tsukamoto and Ogaki, 1953.
synonym: *RI^{DDT}: Resistance to Insecticide-DDT; RI^{11}; Resistance* to *Insecticide* on chromosome 2.
references: 1954, Botyu-Kagaku 19: 25.
Tsukamoto, 1958, DIS 32: 87.
Kikkawa, 1961, Ann. Rept. Sci. Works, Fac. Sci., Osaka Univ. 9: 1-20.
phenotype: Median lethal dose of DDT for *Rst(2)DDT* lines is about 4000 ptg/cc of medium; that for sensitive lines is 50—100 ptg/cc. Also resistant to BHC (benzene hexachloride) and organophosphorus insecticides such as parathion and malathion. Median lethal dose of parathion is 2 pptn for resistant line and 0.08 ppm for sensitive. Sensitive to phenylthiourea (Ogita, 1958, Botyu-Kagaku 23: 188-204). Shows maternal effect in that progeny of *Rat(2)DDT/+* female crossed to +/+ male are more resistant than those of reciprocal cross. Larva more resistant than adult. RK3.

other information: Strains selected for resistance to DDT found to be resistant to parathion and to carry a factor for resistance in the same region of *2R* as resistance factors found in strains from the same population selected for resistance to parathion and subsequently shown to be resistant to DDT. Thus the resistance factors selected by exposure to DDT and parathion have been judged to be the same.

Rsi(3)ns: Resistance(3) nicotine sulfate

location: 3-49.5.
origin: Spontaneous.
discoverer: Tsukamoto, 1954.
references: 1955, Botyu-Kagaku 20: 73.
1956, Botyu-Kagaku 21: 71.
1958, DIS 32: 87.
phenotype: Median lethal dose to homozygote is 600 pptn of nicotine sulfate added to culture medium (from first instar larva through eclosion); to heterozygote, it is 300 ppm; to susceptible strains, 40 ppm. RK3.

rsth roughestIike

location: 1- (rearrangement),
origin: X ray induced,
discoverer: Oliver, 29d3.
synonym: *lz-1: lozenge-like.*
references: 1935, DIS 3: 28.
phenotype: Eyes rough; more extreme than *lz.* Viability low. RK2A.
cytology: Associated with *In(l)rstl;* breakpoints unknown.

rt: rotated abdomen

location: 3-37 (based on location of it^2).
discoverer: Bridges, 18g28.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 190 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 54 (fig.).
phenotype: Abdomen twisted clockwise through 60° to 90°, as viewed from behind. Both sexes sterile. Viability low. RK2.

rf2

origin: Spontaneous,
discoverer: Bridges, 25114.
phenotype: Abdomen twisted as is *rt.* Viability erratic, usually about 50 percent wild type. Male fertile; female not tested. RK2.

***rt*: rotated abdomen of Vfallbrunn**

origin: Gamma ray induced.
discoverer: Wallbrunn, 61126.
references: 1964, DIS 39: 59.
phenotype: Like *rt.* RK2.

rta: reduced tarsi

locations 1-4.5.
origin: Induced by methyl methanesulfonate (CB. 1540),
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 89.
phenotype: Tarsi short and sometimes deformed. Body small. Eyes and wings small and abnormal. Bristles often waved or bent, postscuteliars often held upright. Male sterile. RK2.

ru: roughoid

location: 3-0.0 [Actually about 4 units to the right of the end of the chromosome, based on the location of *y ** in *T(l;3)scJ*].*
discoverer: Sturtevant, 19bl4.
references: Strong, 1920, Biol. Bull. 38: 33—37.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 212 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 215 (fig.), 234.
phenotype: Eyes small and rough, with irregular facets and hairs; black specks from erupted facets. Expression variable; sometimes overlaps wild type. RK2.
cytology: Placed in 61F5-62A3, on basis of its inclusion in *Df(3L)ru-K2 = D%3L)61F4-5;62A10-Bl* (Krivshenko, 1958, DIS 32: 81) and $Df(3L)ru^{300\,r23}$* = *Df(3L)61E;62A2-4* (Ward and Alexander, 1957, Genetics 42: 42—54).

***$_{ru}$40k**

origin: Spontaneous.
discoverer: Steinberg, 40k.
references: 1942, DIS 16: 54.
phenotype: More extreme than *ru.* RK1.

***$_{ru}$100.392**

origin: X ray induced.
discoverer. Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
cytology: Associated with *Df(3L)ml00.392 = Df(3L)61Ei62A10'Bl.*

***$_{ru}$100.393**

origin: X ray induced.
discoverer: Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
cytology: Associated with $Df(3L)Tu^{100\,r3}93$ = *Df(3L)61F2-3;62A4-6.*

***$_{ru}$300.234**

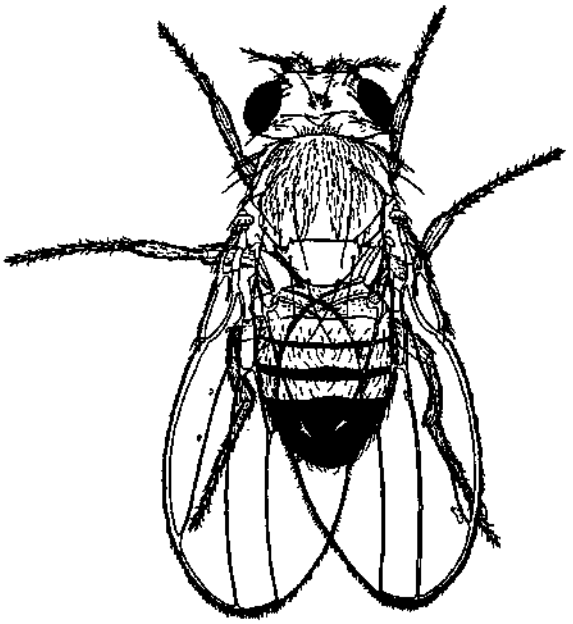
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
cytology: Associated with $Df(3L)ru^{3}00.234$ = *Dt(3L)6lE;62A2-4.*

ru9

origin: Spontaneous.
discoverer Glass.
references: 1934, DIS 2: 8.
phenotype: Eyes small and extremely rough. More reliable in classification than ru. RK1.

rub: rubroad

location: 2-5.0 (to the right of ho).
origin: Spontaneous.
discoverer: Mohr, 31k20.
phenotype: Eyes rough and kidney shaped. Wings broad and somewhat arc like. Abdomen short and bloated; tergites irregular. External genitalia of male rotated in varying degrees. Overlaps wild type. RK3.



rub: rubroad
Edith M. Wallace, unpublished.

***rub48d**
origin: Spontaneous,
discoverer: Chute, 48d.
references: Sturtevant, 1948, DIS 22: 56.
phenorype: Like *rub* but also wings show slight network of extra veins and thickening present between L3 and L4. RK3.

rubroad: see *rub*

ruby: see *rb*

rud: ruddle
location: 1-3.3.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 74.
phenotype: Eye color dull reddish brown. Classification best in newly eclosed flies. Good viability and fertility. RK2.
other information: One allele each induced by CB. 1528, CB. 3026, and X rays.

rudimentary: see r

rugose: see *rq*

rumpled: see *rmp*

nix: rougbex
location: 1-15.0.
discoverer: Bridges, 33d24.
phenotype: Eyes smaller than wild type and uniformly rough. Male sterile. RK2.
cytology: Locus from 5D3 through 6A2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie lost. Wash. Year Book 41: 191).

rux*
discoverer: Curry, 3711.
phenorype: Eyes small and rough like *rux.* Both sexes fertile. RK1.

rux60d
origin: Spontaneous.
discoverer: Rolfes, 1960.
references: Hollander, 1960, DIS 34: 50.
phenotype: Eyes variably roughened; little reduction in size. Both sexes fertile; viability about 50 percent wild type. RK2.
other information: Males of $rux^{60<t}$ stock mated to attached-.^ females produced 17 homozygous rux^{60d} exceptional daughters among 9447 progeny (Hollander and Festing, 1962, DIS 36: 79). This production of equational exceptions has been shown to be caused by a factor near f, probably an allele of *eq,* by Thompson.

rv: raven
location: 1-4.4.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 89.
phenotype: Body small and heavily melanized. Eye color dark. Wings short and frequently divergent or not fully expanded. Male fertile but viability reduced; female more inviable and infertile. RK2.

Rvd: see *Rev&*

rw: raised wing
location: 2-93.2.
origin: Spontaneous,
discoverer: Gomes, 55a.
references: Bur dick, 1955, DIS 29: 70.
phenotype: Wings held vertically; venation normal. Legs morphologically normal but fly has difficulty walking. Penetrance and expressivity good. Viability poor. RK2.

****Rw: Rough wing***
location: 2-56 [locus from crossing over in triploids (Schultz)].
discoverer: Harnly.
phenotype: Wings notched and veins irregular. An occasional extra antenna. *Rw/+/+* triploid female slightly fertile. *Rw/+* female sterile. RK3.

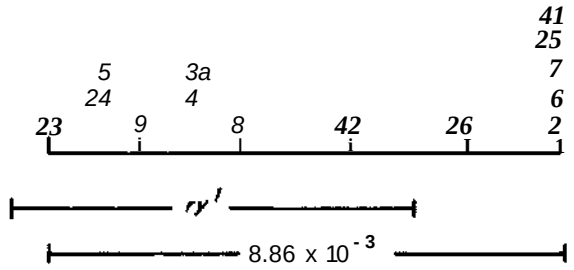
rwg: see hdp*"'*^

ry: rosy
location: 3-52.0 [0.3 unit to the right of *kar* (Schalet)].
origin: Spontaneous,
discoverer: Bridges, 38c4.
references: Glassman and Mitchell, 1959, Genetics 44: 153-62.
Hubby and Forrest, 1960, Genetics 45: 211-24.
Chovnick, Schalet, Kemaghan, and Talsma, 1962, Am. Naturalist 96: 281-96.
Chovnick, Schalet, Kemaghan, and Krauss, 1964, Genetics 50: 1245-59.
phenotype: Eye color reddish brown; contains about 35 percent normal red pigment and 82 percent normal brown pigment (Nolte, 1955, J. Genet. 53: 1—10). Lacks detectable amount of xanthine dehydrogenase, like *mat* (Forrest, Glassman, and Mitchell, 1956, Science 124: 725-26; Glassman and Mitchell, 1959; Hubby and Forrest, 1960). Accumulates enzyme's substrates, hypo::anthine and 2-amino-4-hydroxypteridirse and lacks its products, uric acid and isoxanthopterin (Mitchell, Glassman,

and Hadorn, 1959, Science 129: 268-69). *In vitro* and *in vivo* complementation between ma/$^{+}$ and *ry** demonstrated (Glassman, 1952, Proc. Natl. Acad. Sci. U.S. 48: 1491-97; Glassman and McLean, 1962, Proc. Natl. Acad. Sci. U.S. 48: 1712-18). Pigmentation nonautonomous in *ry* eye disks transplanted into wild-type hosts (Hadorn and Schwink, 1956, Nature 177: 940-41). RK1.

cytology: Placed in region 87D-F, on basis of its inclusion in *Df(3R)ry = Df(3R)87D-E;87E-F* (Grell, 1962, Z, Vererbungslehre 93: 371-77).

other information: Separable into at least six noncomplementing but recombinationally separable sites (Chovnick, Schalet, Kernaghan, and Krauss, 1964). *ry* recombines with *ry*^{26} and *ry*^{2} but not with *ry*^{33}, *ry*^{9}, *ry*^{8}, or *ry*^{42} and has been interpreted as an intracistronic rearrangement.



Map of ry locus
From Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.

ry2

origin: Spontaneous.
discoverer: Hadorn and Schwinck, 55c.
references: 1956, Nature 177: 940-41.
1956, Z. Induktive Abstammungs- Vererbungslehre 87: 528-53.
phenotype: Eye color reddish brown, like *ry;* color of ocelli and testes approximately normal. Malpighian tubes slightly lighter than normal, short and malformed, and contain large pteridine globules in lumen. Lacks xanthine dehydrogenase, like *ry* (Forrest, Glassman, and Mitchell, 1956, Science 124: 725—26). Pigmentation nonautonomous in transplants of *ry*^{2} eye anlage into wild-type hosts and in eyes of *ry*^{2} hosts transplanted with wild-type fat bodies, Malpighian tubes, and eye disks. Wild-type eye disks transplanted into *ry*^{2} hosts form reduced amount of red eye pigment. Reciprocal transplants of eye disks or Malpighian tubes between *ry*^{2} and *tattl* did not increase drosopterin formation (Schwink, 1960, DIS 34: 105). Survival of *ry*^{2} temperature sensitive in early pupa; low at 25°C but normal at *18°*. Drosopterin formation at 18°C during late *pmpm* and early imago about twice that at 25°. RK1.
ottar information: To the right of *ry*^{26} (Chovnick, Schalet, Keraagbein, and Krauss, 1964, Genetics 50: 1245-59).

ry^{3}

origin: Spontaneous.
discoverer: Hubby.
references: Hubby and Forrest, 1960, Genetics 45: 211-24.
Hubby, 1961, DIS 35: 46.
phenotype: Eye color reddish brown. Produces traces of uric acid and isoxanthopterin but xanthine dehydrogenase activity not demonstrable in extracts. RK1.

,y3a

origin: X ray induced in cu *kar* chromosome,
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of *ry*^{23} and *ry*^{24} and to the left of *ry*^{26}. No crossovers recovered with *ry*^{s}, *ry*^{9}, *ry*^{4}, or *ry*^{s}.

ry*

origin: X ray induced in *cu kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: Between *ry*^{24} and *ry*^{26}. No crossovers recovered with *ry*^{9}, *ry*^{3a}, *ry,* or *ry*^{8}.

ry-^{5}

origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the left of *ry*^{s}. No crossovers recovered with *ry*^{23}, *ry*^{24}, *ry*^{9}, or *ry*^{3}*.

ry^{*3}

origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right *of ry*^{26}.

ry^{7}

origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of *ry*^{26}.

ry^{8}

origin: X ray induced in cu *kar* chromosome,
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of *ry*^{23}, *ry*^{24}, *ry*^{s}, and *ry*^{9} and to the left of *ry*^{26}. No crossovers recovered with *ry*^{3}* or *ry*^{4}.

ry^{9}

origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.

Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: Between ry^{23} and *ry&.* No crossovers recovered with ry^{24}, ry^{s}, ry^{3a}, or *ry*.*

***ry>" 0**
origin: X ray induced in *1(3)26 Sb Ubx* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{ry}$n**
origin: X ray induced in *1(3)26 Sb Ubx* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{ry}$12**
origin: X ray induced in *1(3)26 Sb Ubx* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{r}$y13**
origin: X ray induced in *1(3)26 Sb Ubx* chromosome,
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{ry}$14**
origin: X ray induced,
discoverer: Schalet.
references: 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RK1.

***ry1S**
origin: X ray induced,
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{r}$y16**
origin: X ray induced,
discoverer: Schalet.
references: 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RK1.

ry17
origin: X ray induced.
discoverer: Schalet,
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

ry 78
origin: X ray induced.
discoverer Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry,* RK1.

ry19
origin: X ray induced.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

ry20
origin: X ray induced.
discoverer: Schalet.
references: 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RK1.

ry$_{ll}$
origin: X ray induced,
discoverers Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

***$_{r}$y22**
origin: X ray induced.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.

$_{r}$y23
origin: X ray induced in *cu kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the left of ry^{9}. No crossovers recovered with ry^{2}* or *ry$.*

$_{r}$y24
origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of ry^{3a}. No crossovers recovered with ry^{23}, ry^{5}, or ry^{9}.

$_{ry}$25
origin: X ray induced in *cu kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of ry^{26}.

$_{r}$y26
origin: X ray induced in cu *kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RK1.
other information: To the right of ry^{42} and to the left of ry^{2}. Used as a reference point for locating mutants to the right or left portions of the *ry* cistron.

ry27
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of $ry^{2}?/ry^{2}$ like *ry.* RK2A.
cytology: Association with $Df(3R)ry^{27}$ (breakpoints unknown) inferred from genetic data.

•^28
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62—64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of $ry^{2}8/ry^{2}$ like *ry.* RK2A.
cytology: Association with $D§(3R)ry^{2S}$ (breakpoints unknown) inferred from genetic data.

**ry29*
origin: X ray induced in a cu *kar* chromosome.

discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry29/ry2 like ry_m* RK2A.
cytology: Association with ***Dt(3R)ry^{29}*** (breakpoints unknown) inferred from genetic data.

***ry30**
origin: X ray induced in a cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry^{30}/ry2* like *ry.* RK2A.
cytology: Association with ***Df(3R)ry^{30}*** (breakpoints unknown) inferred from genetic data.

***$_{ry}$31**
origin: X ray induced in a cu *kar* chromosome,
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry^{31}/ry^{a}* like *ry.* RK2A.
cytology: Association with ***Df(3R)ry^{31}*** (breakpoints unknown) inferred from genetic data.

***ry32**
origin: X ray induced in a cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry^{3a}/ry^{2}* like *ry.* RK2A.
cytology: Association with ***Df(3R)ry^{3}2*** (breakpoints unknown) inferred from genetic data.

***$_{r}$y33**
origin: X ray induced in a cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry^{33}/ry2* like *ry.* RK2A.
cytology: Association with ***Df(3R)ry^{33}*** (breakpoints unknown) inferred from genetic data.

***ty34**
origin: X ray induced in a *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *ry^{34}/ry2* like *ry.* **RK2A.**
cytology: Association with ***D£[3R)ry^{34}*** (breakpoints unknown) inferred from genetic data.

$_{r}$y3S
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *$_{ry}$^{3}S/$_{T}$y2* like *ry.* RK2A.
cytology: Associated with ***T(l;3)ry^{3S}*** = *T(l;3)20;87C-E;91B-C* (Lindsley).

ryU
origin: X ray induced in a cu *kar* chromosome.
discoverer Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of ***ry^{3}6/ry2*** like ry. RK2A.
cytology: Association with ***Df(3R)ry^{36}*** (breakpoints unknown) inferred from genetic data.

***$_{ry}$37**
origin: X ray induced in a cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

***$_{ry}$38**
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

$_{ry}$40
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

$_{ry}$4l
origin: X ray induced in *cu kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.
other information: To the right of *ry26*

ry42
origin: X ray induced *in cu kar* chromosome.
references: Chovnick, Schalet, Kernaghan, and Krauss, 1964, Genetics 50: 1245-59.
Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.
other information: To the left of *ry26.* Position to the right of *ry^{8}* inferred from low rate of recombination of *ry^{43}* compared to *ry^{s}* with *ry26.*

ry43
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RKl.

***$_{ry}$44**
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

$_{ry}$4S
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.

references: 1964, DIS 39: 62—64.
phenotype: Eye color like *ry,* RKl.

*$_{r}$*y46*
origin: X ray induced in *cu kar* chromosome,
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

*$_{r}$*y47*
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

$_{r}$y48
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

ry49
origin: X ray induced in cu *kar* chromosome,
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

rySO
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

**rySl*
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *rySl/ry2* like *ry.* RK2A.
cytology: Association with *Df(3R)ry^{5i}* (breakpoints unknown) inferred from genetic data.

ry52
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of *rySl/ry** like ry. RK2A.
cytology: Association with *Df(3R)ry^{S2}* (breakpoints unknown) inferred from genetic data.

ryS3
origin: X ray induced in *cu kar* chromosome,
discoverer Schalet.
references: 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

ryS4
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 5(h 1261-68.
phenotype: Homozygotes almost completely lethal; a few homozygous females, which are also pic, survive. Eye color of *ry$^{\wedge 4}$/ry^{3}* like *ry.* RK2(A).

$_{ry}$SS
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RKl.

$_{ry}$S6
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

ry57
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
phenotype: Eye color like ry. RKl.

ry58
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

ry59
origin: X ray induced.
discoverer Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

^{ry} 60
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry.* RKl.

ry61
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RKl.

ry62
origin: X ray induced,
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
phenotype: Eye color like *ry.* RKl.

ry63
origin: X ray induced,
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry** RKl.

ry64
origin: X ray induced,
discoverer Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
phenotype: Eye color like ry. RKl.

ry65
origin: X ray induced.
discoverer Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like ry. RKl.

**r/66*
origin: X ray induced,
discoverer. Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.

phenotype: Homozygous lethal. Eye color of ry^{66}/ry^{3} like ry. RK2A.
cytology: Association with $Dt(3R)ry^{66}$ (breakpoints unknown) inferred from genetic data.

*ry67

origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

*ry68

origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

*ry69

origin: X ray induced,
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

*ry70

origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
phenotype: Homozygous lethal. Eye color of ry^{70}/ry^{3} like *ry*. RK2A.
cytology: Association with $Df(3R)ry^{70}$ (breakpoints unknown) inferred from genetic data.

*ry71

origin: X ray induced,
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

ry72

origin: X ray induced.
discoverer Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

Vy73

origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
phenotype: Eye color like *ry*. RK1.

*ry74

origin: X ray induced.
discoverer: Schalet.
phenotype: Homozygous lethal. Eye color of ry^{74}/ry^{a} like *ry*. RK2A,
cytology: Association with $Df(3R)ry^{7}$* (breakpoints unknown) inferred from genetic data.

*ry75

origin: X ray induced in kar^{3} chromosome.
discoverer: Schalet.
phenotype: Homozygous lethal. Eye color of ry^{75}/ry^{3} like *ry*. RK2A.
cytology: Association with $Df(3R)iy^{7S}$ (breakpoints unknown) inferred from genetic data.

*ry76

origin: X ray induced in kar^{3} chromosome.
discoverer. Schalet.
phenotype: Homozygous lethal. Eye color of $rylt/ry^{3}$ like *ry*. RK2A.
cytology: Association with $Df(3R)ry^{76}$ (breakpoints unknown) inferred from genetic data.

*ry77

origin: X ray induced in kar^{3} chromosome.
discoverer: Schalet.
phenotype: Homozygous lethal. Eye color of ry^{77}/ry^{3} like ry. RK2A.
cytology: Association with $Df(3R)ry^{77}$ (breakpoints unknown) inferred from genetic data.

*ry78

origin: X ray induced in kar^{3} chromosome.
discoverer: Schalet.
phenotype: Homozygous lethal. Eye color of ry^{78}/ry^{3} like *ry*. RK2A.
cytology: Association with $Df(3R)ry^{78}$ (breakpoints unknown) inferred from genetic data.

ry«t-F; rosy-electrophoretic Fast

origin: Naturally occurring allele.
discoverer: Yen.
references: Yen and Glassman, 1965, Genetics 52: 977-81 (fig.).
1966, Genetics 54: 369-70.
phenotype: Specifies a xanthine dehydrogenase molecule that migrates relatively rapidly in polyacrylamide gel electrophoresis. Kinetic parameters of enzyme same as those of other xanthine dehydrogenase isozymes. In hybrids with $ry^{ei\,nS}$, enzymes with at least three mobilities formed; strongest activity found in a position intermediate between mobilities of the enzymes specified by the two parental types. RK3.

ryl'h rosy-electrophoretic Intermediate

origin: Naturally occurring allele.
discoverer: Yen.
references: Yen and Glassman, 1965, Genetics 52: 977-81 (fig.).
1966, Genetics 54: 369-70.
phenotype: Specifies a xanthine dehydrogenase molecule whose mobility is intermediate between mobility of molecules specified by $ry^{ei\sim F}$ and $ry^{*}t\sim^{s}$. Kinetic parameters same as those for other xanthine dehydrogenase isozymes. RK3.

ry«l-S; rosy-electrophoretic Slow

origin: Naturally occurring allele.
discoverer: Yen.
references: Yen and Glassman, 1965, Genetics 52: 977-81 (fig.).
1966, Genetics 54: 369-70.
phenotype: Specifies a xanthine dehydrogenase molecule that migrates relatively slowly in polyacrylamide gel electrophoresis. Kinetic parameters of enzyme same as those of other xanthine dehydrogenase isozymes. In hybrids with $ry^{ol\,nF}$, enzymes with at least three mobilities formed; strongest activity found in a position on the gel intermediate between the positions of the enzymes specified by the two parental types. RK3.

rymt-Sl; rosy-electrophoretic Slow Intermediate

origin: Naturally occurring allele.
discoverer. Yen.

references: Yen and Glassman, 1965, Genetics 52: 977-81 (fig.).
1966, Genetics 54: 369-70.
phenotype: Specifies a xanthine dehydrogena se molecule whose mobility is intermediate between mobility of molecules specified by ry^{el}~^{s} and *ryel-*I_t Kinetic parameters same as those for other xanthine dehydrogenase isozymes. RK3.

ry^{K}: rosy of Kernaghan
origin: X ray induced in *cu kar* chromosome.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62—64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68
phenotype: Homozygous lethal. Eye color of *ryK/ty2* like *ry** RK2A.
cytology: Association with *Df(3R)ty^{K}* (breakpoints unknown) inferred from genetic data.

s: sable
location: 1-43.0.
discoverer Bridges, 12gl9.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 34.
phenotype: Body color dark with prominent trident. Classification good at 19°C; overlaps wild type increasingly with higher temperatures. Viability sometimes reduced, s is nonautonomous in gynandromorphs containing both s and + tissue (Lewis, 1955, DIS 29: 134). Tyrosinase formed in adult (Horowitz and Fling), s/s^{2} easily classified. RK1 at 19°C.

*s**
discoverer: Bridges, 17e9.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 234.
phenotype: Body color less dark than s but trident more prominent. Expression best at 19°C; overlaps wild type at 25° and 30°. Viability excellent. RK1 at 19°C.

S: Star
location: 2-1.3 (0.02 unit to the left of *ast).*
origin: Spontaneous.
discoverer: Bridges, 15bl2.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 259 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 213 (fig.).
Lewis, 1945, Genetics 30: 137-66.
1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (f%.).
phenotype: Eyes slightly smaller and narrower than wild type; texture somewhat rough from rounded, irregular facets. Arrangement of hairs on surface of eye irregular. *S/aat* has small rough eyes; *S m*t/+ +* is like S/+. Enhanced by *B(S);* partially suppresses px and net (Bedichek, 1936, DIS 5; 24; Lewis, 1945). Hooozygote dies in late embryonic stag® (Slvert*@v~DobKb*»sky, 1927, Arch. Eotwickluogsiaech. Organ. 109: 535—48; Sotwienblfcfc and Hoettoar, 1938, Genetics 23: 169). RK1.
cytology: Salivary glands normal. Placed in the 21E1-2 doublet, on basis of its inclusion in the synthetic deficiency derived by combining *Y*-centric portion of *T(Y;2)21E = T(Y;2)21D4-E1* and 2-centric portion of *T(2;4)ast^{v} = T(2;4)21E2-3;101.* Heterozygosity for deficiencies including 21E1-2 produces S phenotype (Lewis, 1945).
other information: A pseudoallele of *ast.* In crossover tests, 5 localizes to the left of *ast* (Lewis, 1941, Proc. Natl. Acad. Sci. U.S. 27: 31-35; Lewis, 1945, 1951).

S2
origin: Spontaneous in *In(2L)Cy + Jn(2R)Cy* and not separated from inversions.
discoverer: Redfield, 25k.
references: Stern and Bridges, 1926, Genetics 11: 507-8.
phenotype: Like *S.* RK1A.

SSlb
origin: Ultraviolet induced.
discoverer: Meyer, 51b.
references: 1952, DIS 26: 67.
phenotype: Eyes of S*-*^{6}/+ rough but not reduced in size. RK1.

SS6f
origin: Synthetic.
discoverer: Thompson, 56f.
references: Burdick, 1956, DIS 30: 69.
phenotype: Like S. *S5**/S* lethal. RK1A.
cytology: Associated with *In(2LR)SS6i-In(2LR)21 C8-Dl;60Dl-2^22A3-Bl;60B-CR* derived from single recombinant between *In(2LR)bwV** and *In(2LR)SMl,* which is deficient for 21D1-22A3.

**S^{D}": Star-Deficiency*
origin: X ray induced,
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147-51.
phenotype: Less extreme than S. RK1A.
cytology: Associated with *Df(2L)Sl = Df(2L)21C3-4;22A2-3.*

$Df2
origin: X ray induced,
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147-51.
phenotype: Like 5. RK1A.
cytology: Associated with *Dt(2L)S2 « Df(2L)21C6-D1;22A6-Bt.*

$Df3
origin: X ray induced,
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
phenotype: Less extreme than S. RK1A.
cytology: Associated with *Df(2L)S3 - Df(2L)21D2-3.21F2-22AI.*

**$Df4*
origin: X ray induced,
discoverer E. B. Lewis, 1940.
references: 1945, Genetics 30: 147-51.
phenotype: Like S. RK1A.
cytology: Associated with *Dl(2L)S4 **Df(2L)21C3-4;22B2-3.*

origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147-51.
phenotype: Less extreme than S. RK1A.
cytology: Associated with *Df(2L)S5 = Df(2L)2lC2-3.-22A3-4.*

***$D f7**

origin: X ray induced *in net ho.*
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
phenotype: Like 5. RK1A.
cytology: Associated with *Df(2L)S7 =Df(2L)21C3-4,-21F2-22A1.*

S^K: Star of Krivshenko

discoverer: Krivshenko.
references: 1936, DIS 5: 8.
phenotype: Eyes rough like S. Reported to be homozygous viable. RK2A.
cytology: Associated with *In(2LR)S^K;* breakpoints near ends of *2L* and *2R.*

$*-; *Star of Lewis

origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
phenotype: Like 5. RK1A,
cytology: Associated with *T(2;3)SL = T(2;3)21E2-3;81F;88D6-8.*

S*: Star of duller

origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer: Muller, 1928.
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
phenotype: Eyes like *S,* but perhaps more variable. RK1A.
cytology: Associated with *T(2;3)SM = T(2;3)21E2-3;79D2-E1.* Superimposed on *In(2L)Cy = In(2L)22Dl-2;33F5-34Al +ln(2R)Cy = In(2R)42A2' 3;58A4-B1;* separable from the latter.

S^r:* see *ast

S"; *Star of Whittinghitt

origin: X ray induced in *Cy.*
discoverer: Whlttinghill, 47b.
phenotype: Like S but somewhat more extreme. RK1A.
other information: Inseparable from *In(2L)Cy.*

$X. Star from X irradiation

origin: X ray induced simultaneously with *ast^x.*
discoverer: E. B. Lewis,
references: 1945, Genetics 30: 157.
phenotype: Eyes of *S^x* asr*/+ + slightly smaller than S/+; L2 occasionally interrupted distally; resembles S +/+ *ast^x,* except for L2 abnormality. RK1.
cytology: Salivary chromosomes appear normal.
other information: *ast^x* but not *S^x* has been recovered alone from *S^x ast*^.

S-i:* see *e(S)

****Sa: Salmon***

location: 2- or 3- (rearrangement).
origin: X my induced.
discoverer: Van Atta, 30kl.
references: 1932, Am. Naturalist 66: 93—95.
1932, Genetics 17: 637-59.
1935, DIS 3: 15.
phenotype: Eye color wine at eclosion; becomes dark salmon with age. Homozygous lethal. RK1A.
cytology: Associated with *T(2;3)Sa;* breaks proximal in *2L* and *3L.*

****sab: straight abdomen***

location: 1-58.9.
origin: Induced by D-l:6-dimethanesulfonyl mannitol (CB. 2511).
discoverer: Fahmy, 1958.
references: 1964, DIS 39: 58.
phenotype: Abdomen long, narrow, and straight. Bristles somewhat fine. Male viable and fertile. RK3.

***sable:* see s**

sable duplication:* see *su(s)

safranin:* see *sf

***salmon:* see £**

Salmon:* see *Sa

****saw: sawtooth***

location: 1-0.0 (very close to right of *sc).*
origin: Ultraviolet induced,
discoverer: Edmonds on, 51 g.
references: 1952, DIS 26: 60.
phenotype: Hairs along wing edge so arranged that edge appears serrated. Wings may warp, especially in female. Fertility and viability excellent. Classification originally easy, but stocks apparently accumulate modifiers so that they now appear nearly wild type. RK2.
other information: Not separated from sc in two crossovers between *ac* and sc or *in* 60 crossovers between sc and *pn.* Not covered by *Dp(l;2)sc^{i9} = Dp(l;2)lBl'2;lB4-7;25-26.* Locus must be slightly to the right of sc

***saw^2**

origin: Ultraviolet induced.
discoverer: Edmonds on, 51 f.
references: 1952, DIS 26: 61.
phenotype: More extreme than *saw.* Wing margins as in *saw,* but wings strongly warped up or down; thin texture especially in female. Viability reduced. Fly often becomes stuck in food owing to warped wings. Fertility good; classification easy. RK2.

sb:* see *ml

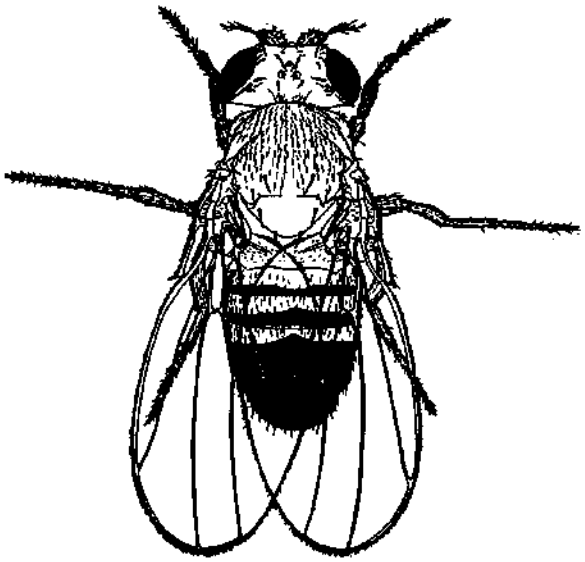
Sb: Stubble

location: 3-58.2.
origin; Spontaneous.
discoverer. Bridges, 23d21.
references: Dobzhansky, 1930, Z. Induktive Abatamnmngs- Vererbungslehre 54: 427—57 (fig.).
phenotype: Bristles of *Sb/+* less than one-half normal length, and somewhat thicker than wild type. HooK*zygous lethal. *Sh/sbd^2* more extreme than S&/+. *sbdP Sb* behaves as a recessive *sbd* allele but is homozygous lethal. Classifiable in single dose in triploids. Developmental studies by Lees and Waddington [l943, Proc. Roy. Soc. (London), Ser. B 131: 87-110 (f%.)] show that

trichogen is shifted to lie more or less on the level of the tormogen. RK1.

cytology: Salivary chromosomes normal (Morgan, Bridges, and Schultz, 1937, Carnegie Inst- Wash. Year Book 36: 301). Placed in 89B4-5, probably in 89B4 by Lewis (1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159—74). These probably correspond to 89B9-10 on Bridges's revised map.

other information: *Sb* is pseudoallelic to and lies 0.01 to 0.03 unit to the right of *sbd?*. Deficiency for the *Sb* locus produces no dominant phenotype (Lewis, 4951).



Sb: Stubble

Edith M. Wallace, unpublished.

Sb^{63b}

origin: Spontaneous.

discoverer: Merriam, 63b.

phenotype: Bristles somewhat shorter and thicker than *Sb*. Wings and legs normal. Homozygous lethal. *Sb^{63b}/Sb* viable and fertile; more extreme than either heterozygote. RK1.

other information: Allelisra inferred from failure to recover recombinants among 100 progeny of *Sb^{63b}/Sb*.

S6^{r}: see *sbd*

SbSpi: Stubble-Spike

origin: X ray induced.

discoverer: Moore, 31dl5.

references: 1935, DIS 3: 27.

phenotype: Bristles of *Sb$^{s}P^{1}$*/+ about two-thirds normal length. Wings and legs normal. Bristles of homozygote one-fourth normal length. Wings reduced, crumpled, or blistered. Legs often short and bowed. *S^P^Sb* viability about 30 percent wild type. Bristles and wings shorter than homozygous *SbSpl*. RK1.

Sb^{v}: Stubble-Variegated

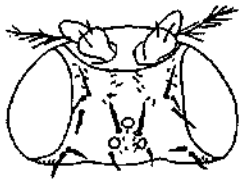
origin: X ray induced in *In(3R)Mo, Sb ar*.

discoverer: E. B. Lewis, 1948.

references: 1956, DIS 30: 76-77.

phenotype: *Sb^{v}*/+ has mixture of wild-type and *Sb* bristles. In *X/X/Y* female and *X/Y/Y* male, bristles nearly all *Sb*. *lnX/0* male, bristles usually all wild type. *Sb^{v}/Sb* and homozygous *Sb^{v}* are lethal. RK1A.

cytology: Associated with *T(2;3)Sb^{v} = T(2;3)41A-C;88;89B*. Superimposed on *In(3R)Mo = In(3R)93D; 98F2-6*.



sbd: stubbloid

From Dobzhonsky, 1930, Z. Indukttve Abstammungs-Vererbungslehre 54: 427-57.

sbd: stubbloid

location: 3-58.2.

discoverer: Sturtevant, 1926.

synonym: S6^{r}; *Stubble-recessive.*

references: Stern, 1929, Biol. Zentr. 49: 261—90. Dobzhansky, 1930, Z. Induktive Abstammungs-Vererbungslehre 54: 427-57 (fig.).

phenotype: Bristles short but usually slightly longer than in *Sb*/+. One or both wings often shortened and crumpled at base. Tibia and femur often shortened, thickened, and bowed. Viability somewhat low. RK2.

cytology: Placed in region 89B4-5 by Lewis (1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74). This probably corresponds to 89B9-10 on Bridges's revised map.

other information: Pseudoallelic to *Sb* and lies to the left of it (Lewis, 1951).

sbd^{2}

origin: Spontaneous.

discoverer: Harnly, 271.

synonym: Sö$^{1\text{ш}2}$.

phenotype: Most bristles about three-fourths normal length although some, for example, posterior postalars, are shorter. Less extreme than *sbd. sbd^/Sb* has shorter bristles than homozygous sөd^{2} or S6/+. *sbd^{2} Sb*/+ + has wild type bristles (Lewis, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159—74). RK1.

sbd^{105}

origin: X ray induced,

discoverer: E. B. Lewis.

references: 1948, DIS 22: 72-73.

cytology: Associated with *Dt(3R)abdl°S = Dt(3R)88 F.89B4-5*.

sbd^{106}

origin: X ray induced.

discoverer: E. B. Lewis.

cytology. Associated with *T(2;3)mbd$^{1(}$>6 = TC2;3)22B;89B*.

sbdh stubbloid-letho!

origin: X ray induced.

discoverer: E. B. Lewis.
references: 1949, DIS 23: 92.
pbenotype: *sbd*^{l}*/sbd* is *sbd; sbdl/Sb* is lethal. RK2A.
cytology: Associated with *T(2;3)Me = T(2;3)48C1-2;59D2-3;80-81 + In(3L)63C;72El-2 + In(3LR)69E;9lC + In(3R)89B;97D.*

sbr: small bristle
location: 1-33.4.
origin: Spontaneous.
discoverer: Curry.
phenotype: Bristles small; one or more missing, particularly the posts cute liars. RK2.

**sbs: stubs*
location: 1-0.9.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 90.
phenotype: Wing abnormalities vary from extreme reduction in size to partial incision of margin with L2 and L3 closer together. Eyes small and slightly rough. Male viable and fertile. Female sterile. RK2.

**sbt: shorter bristles*
location: 1-32.8 (no crossovers with *ras* among 669).
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer. Fahmy, 1954.
references: 1959, DIS 33: 90.
phenotype: Bristles slightly short and thin. Wings slightly divergent. Male late hatching. Viability and fertility greatly reduced. RK3.

**sby: small body*
location: 1-60.8.
origin: Gamma ray induced.
discoverer: Fahmy, 1958.
synonym: *sby-61.*
references: 1964, DIS 39: 58.
phenotype: Extremely small, lightly pigmented fly. Viability and fertility reduced. RK.3.
cytology: Placed in salivary region 18A4 to 18B8, on basis of its inclusion within deficiency resulting from recombining left end of *In(l)y*^{4} *ln(l)lA8'Bl;18A3-4* with right end of *In{l)sc*^{l}*> = In(l)lB2-3;18B8-9* (Norton and Valencia, 1965, DIS 40: 40),

sby-6t: see *sby*

sby-62: see *srb*

sc: scute
location: 1-0.0.
origin: Spontaneous.
discoverer: Bridges, 16a22.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235, 211 (fig.),
phenotype: Causes loss or marked reduction in number of scutellar, coxal, oceilar, first and second orbital, anterior notopleural, postvertical, tergital, and sternal bristles. Bristle patterns for •c through sc** tabulated by Dubinin (1933, J. Genet. 27: 446). Bristle sockets missing; bristle cell* absent 19 hr after pupation, when normally present [Lees and Waddington, 1942, DIS 16: 70-70a; 1943, Proc. Roy. Soc. (London), Ser. B 131: 87—HO]. Suppressed by *su(Hw)* and *su(Hw)*^{2}. RK1.
cytology: Placed in 1B3, on basis of its exclusion from *Df(l)260-2 = Df(l)lB2-3,* and its inclusion in the inverted section of *In(l)sc*^{8} *= In(l)lB2-3.-20B-D1* but not of *In(l)sc*^{4} *= In(l)lB3-4;19F-20C1* (Muller and Prokofyeva, 1935, Proc. Natl. Acad. Sci, U.S. 21: 16-26; Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191; Sutton, 1943, Genetics 28: 210-17).

S_C2
origin: X ray induced.
discoverer: Dubinin, 1928.
references: 1929, Biol. Zentr. 49: 328-39 (fig.). Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.).
phenotype: Almost all bristles and hairs missing from sternites and tergites. Most scutellars and some humerals absent. Most bristles on head and thorax present, but the bare abdomen provides easy classification. Abdomen tends to be swollen. Wings poorly expanded. Viability low. RK2.
other information: Reported to be a transposition of tip of *X* to *X* heterochromatin (Dubinin, 1929). The sc^{2} studied by Sturtevant was not a transposition and mapped as a point mutation at the left end of the X.

*sc3
origin: X ray induced (simultaneously with ac^{2}),
discoverer: Dubinin, 1928.
references: 1929, Biol. Zentr. 49: 328-39 (fig.)- Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.)-
phenotype: Most bristles affected, principally ventrals, orbitals, verticals, postverticals, ocellars, humerals, presuturals, notopleurals, supra-alars, postalars, sternopleurals, abdominals, and anterior dorsocentrals; scutellars and postdorsocentrals usually present. Viability of male low; female virtually lethal. RK2.
cytology: Salivary chromosomes appear normal (Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 290).

sc3-»
origin: Spontaneous derivative of *sc*^{3}.
discoverer: Sturtevant.
references: 1935, DIS 3: 15.
phenotype: Partial reversion from *sc*^{3}. RK2.

sc^{3B}: scute-3 of Bridges
discoverer: Bridges, 26d26.
phenotype: Like sc, but does not affect anterior notopleurals. RK1.

*sc**
origin: X ray induced in *y.*
discoverer: Agol, 1928.
references: 1929, Zh. Eksperira. Biol. 5: 86-101 (fig.).
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.).

Agol, 1931, Genetics 16: 254-66.
Muller and Raffel, 1940, Genetics 25: 541-83.
phenotype: Extreme scute. Bristles of head, except anterior verticals, absent. Only posterior notopleurals and alars remain on sides; abdominals, ventrals, coxals, and scutellars also missing. Slight variegation for Hw. RK1A.
cytology: Associated with *In(l)sc^4 =In(l)lB3-4;19F-2OC1.*

$_{SC}$S
origin: X ray induced in y.
discoverer: Gaissinovitsch, 1928.
references: 1930, Zh. Eksperim. Biol. 6: 15—24.
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.).
phenotype: Sternital and scutellar bristles reduced in number; others rarely affected. *sc^5/sc^6* is practically wild type. RK1.

sc«
origin: X ray induced.
discoverer: Serebrovsky, 29a21.
references: 1930, Arch. Entwicklungsmech. Organ. 122: 88-104.
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.)«
phenotype: Slight sc; removes coxals, ocellars, first and second orbitals, postverticals, and anterior notopleurals. Scutellars and sternitals not affected. RK1.
other information: No inversion.

sc^7
origin: X ray induced in *wa.*
discoverer: Dubinin, 1929.
references: 1930, Zh. Eksperim. Biol. 6: 300—24.
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65 (fig.).
Dubinin, 1933, J. Genet. 27: 443-64.
phenotype: Like sc, but anterior notopleurals not affected. sc^7 tends to suppress expression of *h* (Steinberg, 1942, DIS 16: 68). RK1A.
cytology: Associated with *In(l)sc^7 = ln(l)lB4-6;SD3-6.*
other information: *w°* separable from *sc^7* by exchange in triploid female.

sc
origin: X ray induced.
discoverer: Sidorov, 1929.
references: 1931, Zh. Eksperim. Biol. 7: 28—40.
Noujdin, 1935, Zool. Zh. (Moscow) 14: 317-52.
Sidorov, 1936, Biol. Zh. (Moscow) 5: 3-26.
phenotype: Slight sc; supra-alars, sternopleurals, or other bristles sometimes affected. Extra bristles may be present. Shows *Hw* effect and may be recognized in heterozygote, homozygote, or male by presence of one or more hairs on anterior mesopleural region. The *Hw* effect interacts strongly with *h* to produce extremely hairy wings (Steinberg, 1942, DIS 16: 68). *sc^s/0* male nearly lethal; survivors show variegation for *y* and ac; lethality suppressed by a *Y* chromosome, partially suppressed by parts of the *Y* (Hess, 1962, DIS 36: 74-75; 1963 Verhandl. Deut. Zool. Ges., Zool. Anz. Suppl. 26: 87-92). RK2A.
cytology: Associated with *In(l)sc8- -In(l)lB2-3;20B-Dl.*

sc«c.o. *X:* see *Df(l)scS*
scDENc.o. X: see *Df(l)scs*

sc*
origin: X ray induced.
discoverer: Levit, 1929.
references: 1930, Arch. Entwicklungsmech. Organ. 122: 770-83.
phenotype: Like sc, but scutellars always absent. Abdomen swollen and wings poorly expanded like s$_C$2. RK2A.
cytology: Associated with *In(l)sc^9- -ln(l)lB2-3;18B8-9.*

sc^{1} °: see *ac^3*

sc$^{10.1}$
origin: X ray induced in *In(l)ac^3.*
discoverer: Sturtevant, 1930.
references: 1935, DIS 3: 15.
1936, Genetics 21: 444-66.
phenotype: Like *sc^3* but more extreme. Viability low. RK2A.
cytology: Associated with *Dl(l)sc$^{10-1}$- -Df(l)lBl-2;1B2-14,* which is superimposed on *In(l)ac^3 = ln(l)lB2-3;lB13-Cl* and is therefore deficient for only band 1B2 (Schultz).

sc^{11}: see *ac^3*

*$_{sc}$?2
origin: X ray induced.
discoverer: Shapiro, 1929.
references: 1930, Zh. Eksperim. Biol. 6: 347-64.
phenotype: First and second orbitals reduced or absent; other head bristles, posterior scutellars, and coxals also affected. Also shows achaete effect. Viability of homozygous female low. RK2.

$_{5C}$13
origin: X-ray-induced derivative of *sc* (induced simultaneously with ac*).
discoverer: Dubinin, 1929.
references: 1930, Zh. Eksperim. Biol. 6: 300-24.
1932, J. Genet. 26: 37-58.
1933, J. Genet. 27: 443-64.
phenotype: Like sc, but scutellars invariably absent and ocellars, postverticals, and first and second orbitals less frequent. Anterior and posterior dorsocentrals also absent, as are thoracic hairs because of ac*. Viability low. RK2.

$_{SC}$15
origin: X ray induced,
discoverer: Muller.
synonym: *scutex.*
references: Patterson and Muller, 1930, Genetics 15: 495-577 (fig.).
Dubinin, 1933, J. Genet. 27: 443-64 (fig.),
phenotype: Originally a lie lie to *sc* and sernilethal in male. Subsequently allelic to *y, ac,* and sc and male lethal. Lethal form exaggerates other *ac* and ac alleies in heterozygote. RK2A.
cytology: Presumably associated with *Di(l)®c*^{s};* breakpoints unknown.

other information: Apparently, y^+ and ac^+ were inserted elsewhere in the genome as in sc^{19} or sc^, and became separated from the left end of *X*, and were lost.

sc^{19}

origin: X ray induced.
discoverer: League.
references: Muller, 1935, Genetica 17: 237-52.
phenotype: Scute liar bristles absent and sternitals reduced. RK1A.
cytology: Associated with *T(l;2)sc*^{9} = T(1;2)1B1-2;1B4'7;25-26.*

SC29

discoverer: Agol, 1930.
phenotype: Similar to sc^7. Viable and fertile. RK2A.
cytology: Associated with *In(l)sc*^{29} = *In(l)lB;13A2-5* (Raffel).
other information: Genetically, left break of *In(l)sc*^^{9} is to the right of *l(l)sc;* the right break is between *g* and / (Muller).

$_{sc}$49c

origin: Induced by P^{32} simultaneously with Hw^{49c}.
discoverer: E. B. Lewis, 1965.
other information: Overlooked at the time Hw*$^{?c}$ was described. Possibly of subsequent spontaneous origin.

sc^{52c}

origin: Spontaneous in *raa v;* arose simultaneously with*su(s)S2<:*,
discoverer: Green, 52c.
references: 1952, DIS 26: 63.
phenotype: Not described. RK1A (ranked by Green).
other information: Association with *In(l)sc*^{Sic} (breakpoints unknown) inferred, since sc^{52c} has been inseparable from *raa v.*

***sc^{90}**

origin: X-ray-induced derivative of sc^6.
discoverer Goldat.
references: 1936, Biol, Zh. (Moscow) 5: 803—12.
cytology: Associated with *In(l)ac90 =ln(l)lB4-7;1D2-E1.*

***sc^{115}**

origin: X-ray-induced derivative of sc*.
discoverer: Goldat.
references: 1936, Biol. Zh. (Moscow) 5: 803-12.
cytology: Associated with *T(l;2)ac*^{i15} » *T(1;2)1A6-B1;25F.*

$_{SC}$26C14

origin: X ray induced.
discoverer: Sutton, 39b.
references: 1943, Genetics 28: 210-17.
phenotype: Both sexes viable and fertile. RK2A.
cytology: Associated with *Io(l}sc260-14* = in(i)|B2-3;11D3S,

$_{SC}$26Q-JS

origin: X ray induced,
discoverer: Demerec, 381.
references: Sutton, 1943, Genetics 28: 210—17.
phenotype: Male sterile. Viability reduced. RK2A.
cytology: Associated with *T(l;3)sc*$^{26\&-15}$ = *T(1;3)1B4-5;71C-D.*

***$_{sc}$260.J6**

origin: X ray induced.
discoverer: Sutton, 1938.
references: 1943, Genetics 28: 210-17.
phenotype: $sc^{260\,i6}$/sc overlaps wild type. Lethal homozygous and hemizygous. RK2.
cytology: Salivary chromosomes normal.
other information: y not affected.

***$_{sc}$260-7 7**

origin: X ray induced.
discoverer: Sutton, 39d.
references: 1943, Genetics 28: 210—17.
phenotype: Male and homozygous female viable and fertile. RK2A.
cytology: Associated with *T(l;2)sc260-17 = T(1;2)1B2-3;31C.*

***$_{sc}$260.J8**

origin: X ray induced.
discoverer: Sutton, 39d.
references: 1943, Genetics 28: 210—17.
phenotype: Male sterile. RK2A.
cytology: Associated with *T(l;2;3)sc^60-18 - T(1;2)1A6".B1;41D-E + T(l;3)7A2-Bl;80C*

***$_{SC}$260-20**

origin: X ray induced.
discoverer: Sutton, 39e.
references: 1943, Genetics 28: 210—17.
phenotype: Male and homozygous female viable and fertile. RK2A.
cytology: Associated with *T(l;3)sc260-20 = T(l;3)lA8-Bl;61Al-2.*

$_{sc}$260.22

origin: X ray induced.
discoverer: Sutton, 39f.
references: 1943, Genetics 28: 210—17.
phenotype: Both sexes viable and fertile. RK2A.
cytology: Associated with *In(l)sc*^$^{60\,\prime\prime}$^^{2} *=ln(l)lB2-3;lE2-3.*

***$_{sc}$260.23**

origin: X ray induced.
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210—17.
phenotype: Both sexes viable. RK3A.
cytology: Associated with *T(l;?)sc^0-23 - T(1;?)1B2-3.*

$_{sc}$260-25

origin: X ray induced.
discoverer: Sutton, 39k.
references: 1940, Genetics 25: 628—35.
phenotype: Variegates for *y, ac* and probably *1(1)J1,* but not *svr,* more extreme than sc^. Homozygous lethal. RK2A.
cytology: Associated with *In(lLR)Bc*^°-^{2}*5 = In(lLR)lB2-3.*

***$_{sc}$26Q-26**

origin: X ray induced.
discoverer: Sutton, 391.
references: 1943, Genetics 28: 210—17.
phenotype: Viability reduced in male. Male fertile. RK2A.
cytology: Associated with *TXl;2)uc*$^{260-36}$ » *T(l;2)lB4-5;41F2~3;58B2-3 + ln(2LR)27D2-3;41A.*

*$_{sc}$260-2 7
origin: X ray induced.
discoverer: Sutton, 391.
references: 1943, Genetics 28: 210—17.
phenotype: Male viable but sterile. RK2A.
cytology: Associated with *T(l;2)sc^{260,27} = T(1;2)1A8-B1 ;15E;19F;33-34;57B-C.*

*$_{sc}$260-29
origin: X ray induced.
discoverer: Sutton, 40a.
references: 1943, Genetics 28: 210-17.
phenotype: Male viable but sterile. RK2A.
cytology: Associated with *T(l;2;3)sc$^{260-29}$ = T(1;2;3)1A6-B1;22A-B;34A-B;75C-E.*

*sc^: *scute of* Ago/
discoverer: Agol.
references: 1936, DIS 5: 7.
phenotype: Similar to sc. Viability low. RK2A.
other information: Associated with *In(l)sc^{A};* breakpoints unknown.

*sc^{B1}: *scute of Brande*
origin: X ray induced in *In(l)y* = In(l)lA8-Bl;18A3-4.*
discoverer: Brande, 37g.
phenotype: Similar to sc. Viability Good. RK2A.

sc^{D1}: scute of Dobzhansky
origin: X ray induced simultaneously with a *y.*
discoverer: Dobzhansky, 1930.
references: 1935, DIS 3: 16.
Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 290.
phenotype: Weak *sc.* RK2.
cytology: Salivary chromosomes apparently normal (Schultz).

$_{Sc}$O2
origin: Spontaneous in y.
discoverer: Dobzhansky, 1931.
references: 1935, DIS 3: 16.
phenotype: Slight sc. RK2.

sc^{Fah}: scute of Fahmy
origin: Induced by DL-p-NN-di(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 74.
phenotype: Bristles, principally orbitals, verticals, postverticals, and ocellars missing. Scutellars and postdorsocentrals left nearly intact. Male viable and fertile; female homozygous lethal. *sc^{Fah}/sc* has only occasional absence of postvertical or ocellar bristles. RK2A.
cytology: Associated with *D^l)sc^{Fah} =Df(l)lA8-Bl;lB2-3.*

sc^{H}: scute of Hackett
origin: Gamma ray induced.
discoverer Hackett, 46a.
references: Muller and Valencia, 1947, DIS 21: 70.
phenotype: Similar to sc but more extreme. RK2A.
cytology: Associated with *T(1;4)BC» « T(1;4)1B4-C3;101-102.*

$_{SC}$JJ: *scute of Jacobs-Muller*
origin: X ray induced simultaneously with *l(l)Jl.*
discoverer, Jacobs-Muller.
references: Muller, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 225.
Muller, Prokofyeva, and Raffel, 1935, Nature 135: 253-55.
cytology: Associated with *InfiyscJ^{1} =In(l)lA4-5;lB4-5.*

sc^{J4}
origin: X ray induced.
discoverer: Jacobs-Muller.
references: Muller, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 225.
1934, DIS 2: 60.
phenotype: Scute and achete effects. RK3A.
other information: Associated with *T(l;3)scJ^{4} = T(1;3)1B;3A3-C2;61A.*

sc^{K}: scute of Krivshenko
discoverer: Krivshenko.
references: Agol, 1936, DIS 5: 7.
phenotype: Similar to *sc,* but semilethal in male and lethal in homozygous female. RK2A.
cytology: Associated with *T(l;3)sc^{K};* breakpoints unknown.

$_{SC}$K3
origin: X ray induced.
discoverer: Krivshenko, 53j29.
references: 1959, DIS 33: 95-96.
cytology: Associated with *T(l;3)sc^{K}3 = T(1;3)1B2-3;61Al-2.*

$_{SC}$L3; *scute of Levy*
discoverer Levy, 1932.
phenotype: In addition to scute, it has a spoonlike wing caused by a mutation to the right of *sc.* Viable. RK2.

$_{5C}$L8
discoverer: Levy, 1932.
references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.
Muller and Raffel, 1938, Genetics 23: 160.
Raffel and Muller, 1940, Genetics 25: 541-83.
phenotype: Similar to *sc^{4}* but more extreme. Homozygous female sterile. RK2A.
cytology: Associated with *In(l)sc^{L8} =In(l)lB3~4;20B~C.*

*$_{JC}$PI; *scute of Panshin*
discoverer: Panshin, 1934.
phenotype: Like sc. RK2A.
cytology: Associated with *T(l;2;3)sc^{P1};* breakpoints unknown.

sc^{s1}: scute of Sinitskaya
discoverer: Sinitskaya, 34c.
references: Muller, 1935, DIS 3: 50.
Muller and Raffel, 1938, Genetics 23: 160.
Raffel and Muller, 1940, Genetics 25: 541-83.
Crew and Lamy, 1940, J. Genet. 39: 273—83.
phenotype: Rather extreme «c allele; slight *Hw* effect; hairs often removed from abdomen and wings. Homozygous female sterile and low in viability. Male fertile and fairly viable. RK2A.
cytolo-gy: Associated with *In(l)8c^{si} * ln{l)lB3-4;2®B-D1.* Wan found in combination with *In(l)S * In(l)6Al-3;lQFlQ-llAl.*

sc^{s2}
discoverer: Sinitskaya, 1934.
phenotype: Similar to *sc?*. RK1A.
cytology: Associated with *T(l;2)$sc^{s}2$ = T(1;2)1B4-7;6QC-E.*

sc^{So}: *scute of Sytko
discoverer: Sytko.
references: Agol, 1936, DIS 5: 7.
phenotype: Like *sc;* viability of homozygous female low. RK2.

$sc^{V'}$: *scute of Valencia*
origin: Gamma ray induced.
discoverer: J. I. Valencia, 46h23.
synonym: *sc^{vi}, Inp (Inp* signifies a pericentric inversion).
references: Muller and Valencia, 1947, DIS 21: 69-70.
phenotype: Extreme scute and achaete. Viability low. RK2A.
cytology: Associated with *In(lLR)sc^{Vl} = In(lLR)lA8-C3.*

scV2
origin: Gamma ray induced.
discoverer: J. I. Valencia, 46h23.
references: Muller and Valencia, 1947, DIS 21: 70.
phenotype: Both achaete and scute variably affected. Some tendency for extra or twin bristles. Abdominal bristles markedly fewer both dorsally and ventrally. Male and homozygous female viable and fertile. RK2A.
cytology: Associated with *In(l)sc^{V2} = In(l)lB2-3;20B-F.*

Sc: *Scotched eye*
location: 1-4.5 (about 4 or 5).
origin: X ray induced.
discoverer. Muller.
references: 1946, DIS 20: 67.
phenotype: Ommatidia disarranged near posterior margin of eye. Resembles *spa^{Cat}*. Good viability and fertility in heterozygous female. Male lethal. RK2.

Sd:* see *Scp

sc-Dp:* see *Dp(l;f)100

sc-Inh-3:* see *Sufsc)

sea: scabrous
location: 2-66.7.
origin: Spontaneous.
discoverer: Ives, 34j2.
references: 1935, DIS 4: 10.
phenotype: Eyes large and rough. Ocellar bristles 85 percent absent at 25°C and 10 percent absent at 18°. Postverticals occasionally missing. Bristle effect more extreme in male at 21° and in female at 28°. Most bristles subject to twinning. May be extra rows of acrostichal hairs. RK1.
cytology: Placed in region 49D1-3, on basis of its inclusion in *Df(2R)v&*~ Dt(2R)49C2-Dl;50A2-3* but not *inDfC2R)vg^{B} = Df(2R)49D3-4;50A2-3* (Morgan, Bridges, and Schultz, 1938, Carnegie Last. Wash. Year Book 37: 205).

scalloped:* see *sd

****Scar: Scarred***
location: 2- or 3- (rearrangement).
origin: X ray induced.
discoverer: Yu, 48h.
references: 1949, DIS 23: 65.
phenotype: Eyes elliptical with indented, glassy posterior margin. Wings spread at 45° from body from body axis. Enhanced at 28°C. Homozygous lethal. RK1A.
cytology: Associated with *T(2;3)Scar = T(2;3)27E;95A + In(3)91F;96A.*

scarlet:* see *st

scarp: see scrp

***Scarred:* see Scar**

****sch: slender chaetae***
location: 1-21.1.
origin: Induced by D-p-NN-di-(2-chlorethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 90.
phenotype: Bristles thin and slightly shortened. Eyes slightly smaller and brownish. Body small. RK2.

****Scn: Scutenick***
location: 4- [included in *Df(4)M].*
discoverer: Padoa, 1931.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
Padoa, 1938, Monit. Zool. Ital. 49: 279-84.
phenotype: Scutellum shortened, with nick at posterior edge; scutellar bristles missing. Ocelli reduced, with disturbed hairs and bristles. One or both eyes often small or absent. All characters overlap wild type. Eye effect is strongest at 19°C but other effects weaker. Scutellum effect best at 28° but eyes normal. Homozygous lethal. RK2.
cytology: Placed in salivary chromosome region 101E through 102B16, on basis of its inclusion in *Df(4)M = Df(4)101E-F;102B6-17.*

Sco: Scutoid
location: 2-51.0.
origin: X ray induced.
discoverer: Krivshenko, 56115.
references: 1959, DIS 33: 96.
1960, DIS 34: 55.
phenotype: Scutellar bristles usually absent; one or both postscutellar bristles sometimes present but are shorter and thinner than normal. Ocellar and humeral bristles often absent. Homozygous lethal. RK1.
cytology: Salivary chromosomes apparently normal. Placed in region between 34E5 and 35D1, on basis of its inclusion in *Df(2L)64j = Df(2L)34E5-F1;35C3-D1* (E. H. Grell).

Scoop: see Scp

***scooped:* see scp**

scooped thickvein:* see *set

***Scotched eye:* see Sc**

scp; *scooped*
location: 1-19.3.
discoverer Muller, 1926.

phenotype: Wings turn up slightly; classification fairly reliable. RK2.
cytology: Placed between 6A3-4 and 6F10-11 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

Scp:** ***Scoop
location: 3- (not located).
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Reddi.
synonym: Sc (preoccupied).
references: 1963, DIS 37: 53.
phenotype: Wing size reduced; proximal one-third of wing compressed laterally; distal two-thirds spoon-like. Three furrows run length of wing and surface is wrinkled. Abdomen cylindrical and untapered posteriorly. Pigmented abdominal bands darkened. Excellent viability and fertility. RK3.

scr:** ***scruH
location: 1-22.0.
origin: Spontaneous.
discoverer: Neel, 41b22.
references: 1942, DIS 16: 52.
1942, Genetics 27: 532.
phenotype: Hairs and bristles missing or doubled, and deranged. Eyes small and rough. Scute Hum more convex than wild type. Wing margins, especially posterior, often incised. Wings occasionally blistered. All characters variable; a few flies appear normal. RK3.
cytology: Salivary chromosomes appear normal.

scrp; ***scarp***
location: 2-74 (to the left of c; not an allele of *L).*
origin: Spontaneous.
discoverer: Hansen and Gardner, 1960.
references: 1962, DIS 36: 38.
1962, Genetics 47: 587-98 (fig.).
phenotype: Ventral one-third of eye flattened and separated from dorsal two-thirds by a furrow. Penetrance 80 percent at 30°C; at 25°, eyes are wild type. Temperature-effective period from forty-second to sixty-eighth hour of development. RK3.

scruff: **see scr**

****sct: scooped thickvein***
location: 1-16.0.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer: Fahmy, 1956.
references: 1960, DIS 34: 49.
phenotype: Wings short and scooped; inner margin frequently incised in several places; veins thickened. Eyes darker and slightly altered in shape. Abdominal tergites slightly ridged. Male sterile; viability about 40 percent normal. RK2.

scute: **see sc**

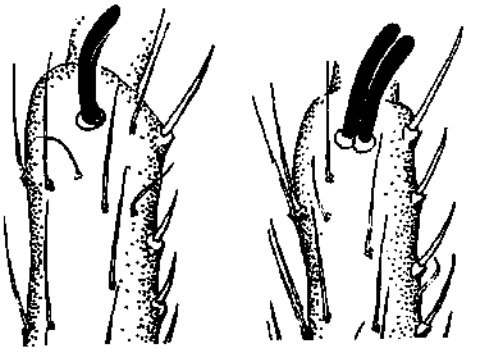
scute Inhibitor on chromosome 3: **see *Su(sc)***

Scutenick: **see Sen**

scutex: **see *sc[1 s]***

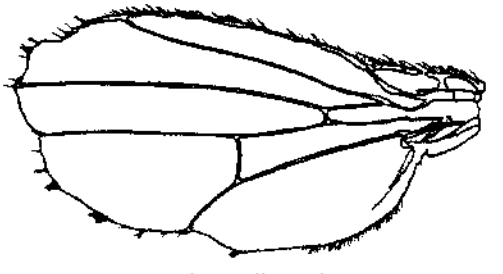
Scutoid: **see 5co**

Sex; ***Extra* sex *comb***
location: 3-47 <0.3 unit to the right of Pc and to the left of *p}.*
origin: Spontaneous.
discoverer: Hannah, 53b.
references: Hannah and Strömnaes, 1955, DIS 29: 121-23.
Hannah, 1958, Genetics 43: 878-905 (fig.).
phenotype: Sex combs may be present on all six legs of male. At least one extra sex comb present in 75—90 percent of males. Third pair of legs less" often affected than second. *Scx/Pc* more extreme than *Scx/+;* male usually has large sex comb on all six legs. Lethal homozygous and when heterozygous with $Antp^{49}$ and $Antp^{so}$. Expression of *Scx/+* enhanced in males that are also heterozygous for *bx, bxd,* and *Ubx.* Furthermore, with *bx* and *bxd,* the enhancement is greater if mutants are in coupling rather than repulsion, but compounds with *Ubx* show no phase difference (Hannah-Alava, 1964, Z. Vererbungslehre 95: 1-9). RK2.



Sex: *Extra sex comb*
Third legs of *Sex* moles
From Hannah, 1958, Genetics 43: 878-905.

sd: scalloped
location: 1-51.5.
origin: X ray induced.
discoverer: Grüneberg, 28j20.
references: 1929, Biol. Zentr. 49: 680-94.
1934, DIS 2: 9.
phenotype: Wing margins scalloped and veins thickened. Eyes slightly roughened. Does not overlap wild type. Waddington (1940, J. Genet. 41: 75-139) concluded that sd reduces size of prospective wing area during larval period and shifts plane along which wing area is folded out from imaginal bud. Scalloping visible in prepupal wing and scorable in unexpended wing. RK1.



sd: scalloped
Edith M. Wallace, unpublished.

cytology: Placed in salivary chromosome region 13B2-F17 on basis of its inclusion in *Dp(l;f)A12 = Dp(l;i)lB-C;13Bl-5* but not in the proximal part of the *X* derived from *T(1;4)A4 = T(1;4)13F6-14A1;1O2F* (inferred from Patterson, 1938, Am. Naturalist 72: 193—206, also frontispiece of Texas Univ. Publ. 4032).

sd: see *sprd*

sd

origin: X ray induced.
discoverer: Panshin, 33g7.
references: 1935, DIS 3: 28.
phenotype: More extreme than *sd.* Wings small and scalloped. Like *vg* at high temperatures. Crossing over inhibited. RK2A.
cytology: Associated with *In(l)sd²;* breakpoints unknown.

,«/35

origin: Spontaneous.
discoverer: Hollander, 1935.
references: 1937, DIS 8: 8.
phenotype: Like *sd.* RK2.
other information: Allelism inferred from phenotype.

sd56j

origin: X ray induced.
discoverer: Clark, 56j.
references: Andrew, 1959, DIS 33: 82.
phenotype: More extreme than sd. Expression enhanced by high temperature. Visible in prepupal wing buds. Interacts with *Bx* and *iri.* RK1.
cytology: No gross chromosomal abnormality.

sd58d

origin: Gamma ray induced.
discoverer: Ives, 58dl4.
references: 1961, DIS 35: 46.
phenotype: Wings reduced to vestiges, like *vg.* Halteres and bristles also like *vg. ad^{58d}/sd* has strap-shaped wing. RK2A.
cytology: Associated with *In(l)sd^{S8d}i* breakpoints unknown.

</«; *scalloped-sterile*

origin: X ray induced.
discoverer Muller.
references: 1946, DIS 20: 67-68.
phenotype; Wings divergent and slightly nicked. Male sterile. RK2.
other information: Allelism inferred from position and phenotype. No evidence of chromosome rearrangement.

sd*P: scalloptd-spatula

origin: X ray induced *inIn(l)Bc^{s}l^{L}BC*R+dl-49.*
discoverer: R. M. Valencia, 1959.
synonym: *sp.*
references: 1959, DIS 33: 99.
1965, DIS 40: 37.
phenotype: Wings cut at tips and along both margins. *md*P +/+ Bx^{r}* give slight nicking of wings. RK1A.
cytology: No gross rearrangement in addition to *In(l}tsc^{SiL}fiC^{8R}4<lt-49,* but possibly a local disturbance in pairing.

SD: Segregation Distorter

location: 2-55 (near the heterochromatic-euchromatic junction).
origin: Naturally occurring allele recovered near Madison, Wisconsin. The same or similar alleles found in populations in Baja California (Mange, 1961, Am. Naturalist 95: 87-96), Kentucky, and Illinois (Greenberg, 1962, DIS 36: 70).
discoverer: Hiraizumi.
references: Sandier, Hiraizumi, and Sandier, 1959, Genetics 44: 233—50.
phenotype: Female and homozygous male normal. The majority of functional sperm of heterozygous male, often 95 percent, carry the SD-bearing second chromosome. Meiosis and sperm development in *SD/+* male are without visible abnormality; it has been postulated that SD acts by directing its homolog into a normally nonfunctional half of the sperm (Peacock and Erikson, 1965, Genetics 51: 313-28). RK3.
cytology: Base of *2R* may be normal (Lewis, 1962, DES 36: 87). All naturally occurring *SD* chromosomes contain inversions in the right arm. The inversion present varies and is not required for *SD* activity.
other information: SD-bearing chromosomes in nature have *St-SD: Stabilizer of SD* located at the tip of *2R,* in the absence of which *SD* action is more variable (Sandier and Hiraizumi, 1960, Genetics 45: 1269—87). There are in addition a great variety of modifiers of SD activity in the genome (Sandier and Hiraizumi, 1959, Proc. Natl. Acad. Sci. U.S. 45: 1414-22; Sandier and Rosenfeld, 1962, Can. J. Genet. Cytol. 4: 453—57). The *SD* locus is complex and consists of at least a distorter element and an element that renders chromosome *2* immune to SD action (Sandier and Hiraizumi, 1960, Genetics 45: 1671-89).

sdx: spreadex

location: 1- (rearrangement).
origin: X ray induced.
discoverer: Muller.
synonym: spx (preoccupied).
references: 1965, DIS 40: 35.
phenotype: Wings spread widely apart and often directed somewhat downward, as in Dichaete. Abdomen of female tends to be narrow and shrunken. Fertility sufficient for maintaining homozygous stock. RK2A.
cytology: Associated with *In(l)sdx;* breakpoints unknown.

se; *sepia*

location: 3-26.0.
discoverer: E. M. Wallace, 13elO.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 86 (fig.).
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eye color brown at eclosion, darkening to sepia and becoming black with ag@. Pigmentation of ocelli normal. Chromatographically, *me* eyes characterized by having no red pigment and

an accumulation of the yellow pigment, sepiapterin (Hadorn and Mitchell, 1951, Proc. Natl. Acad. Sci. U.S. 37: 650—65); other pteridines present in greater-than-normal amounts. se/+ can be distinguished from +/+ in that it has more isoxanthopterin and other pale pteridines; the red drosopterins are at wild-type level, so that se appears completely recessive on ordinary visual examination (Ziegler-Günder and Hadorn, 1958, Z. Vererbungslehre 89: 235—45). Structure of the sepiapterin is 2-amino-4-oxo-6-lactyl-3,4,7,8-tetrahydropteridine (Forrest and Nawa, 1962, Nature 196: 372-73). Eye color autonomous in se eye disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). RK1.

se^{51j}

origin: Spontaneous.
discoverer Hungerford, 51j.
references: Redfield, 1952, DIS 26: 68.
phenotype: Like se. RK1.

***se^{51}**

origin: Spontaneous,
discoverer: Clark, 51k.
references: 1952, DIS 26: 60.
phenotype: Like se. RK1.

***se^{58k}**

origin: Spontaneous,
discoverer: Andrew, 58k.
references: 1959, DIS 33: 82.
phenotype: Like se. RK1.

se^{61c}

origin: Spontaneous.
discoverer: Clancy, 61c.
references: 1964, DIS 39: 65.
phenotype: Like se. RK1.

se-like 62: see *pni*

sed: see Hn^{r3}

Segregation Distorter: see ***SD***

****semi-f: semiforked***

location: 3- (not located).
origin: Spontaneous.
discoverer: Lancefiled, 18b.
references: 1918, Am. Naturalist 52: 462—64.
phenotype: Homozygotes that are also heterozygous for *f* have slightly forked bristles. RK3.

sep: separated

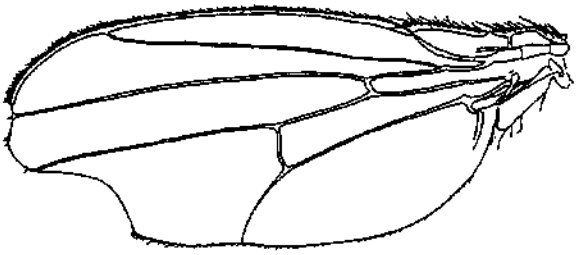
location: 3- (rearrangement).
discoverer; Muller.
phenotype: Most of posterior crossvein absent, one-third usually remaining attached to vein L5. RK2A.
cytology: Associated with *In(3LR)®ep* = *In(3LR)65E;85E* (Lewis, 1951, DIS 25: 108-9).

sepia: see ***se***

sepiaoid: see Hn^{T3}

Sen ***Serrate***

location: 3-92.5 (to the right of *Pf*).
origin: Spontaneous.
discoverer: Spencer, 3517.
references: Curry, 1939, DIS 12: 46.
phenotype: Wings notched at tip; deepest notch at second posterior cell. In tripioids, one dose of *Ser* overlaps wild type. Homozygous lethal. RK1.



Ser: Serrate
Edith M. Wallace, unpublished.

sexcombless: see **sx**

sf: safranin

location: 2-71.5.
origin: Spontaneous.
discoverer: Bridges 16a6.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235.
phenotype: Eye color soft dark brown. More easily classified in male and in aged fly. Larval Malpighian tubes pale yellow; classifiable (Brehme and Demerec, 1942, Growth 6: 351—56). RK2.

sf2

origin: Spontaneous.
discoverer: Spencer, 25k.
synonym: *bronze.*
references: 1934, DIS 1: 35.
1935, Am. Naturalist 69: 223-38.
1937, DIS 7: 21.
phenotype: Like sf but possibly less extreme; 47 percent normal red and 98 percent normal brown pigment (Nolte, 1955, Genetics 53: 1-10). Eye color autonomous in larval optic disks transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes bright yellow like wild type (Beadle, 1937, Genetics 22: 587-611). RK2.

****sP***

origin: Spontaneous.
discoverer: Ives, 39c.
references: Curry, 1939, DIS 12: 45.
phenotype: Like *sf.* RK2.

***sf^{32a}**

origin: From heat-treated larvae.
discoverer. Ives, 32e28.
synonym: *dark eye* (1934, DIS 1: 33).
references: Plough and Ives, 1935, Genetics 20: 42-69.
phenotype: Like *sf.* RK2.

****sf-3: safranin in chromosome 3***

location: 3- (not located).
discoverer: Bridges, 15al5.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 126.
phenotype: Eye color dull brown. RK3.

sfc;** ***stiff chaetae

location: 1-3.2.
origin: Induced by D-p-NN-di-(2-chloroethyl)aminO" phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.

references: 1958, DIS 32: 74.
phenotype: Bristles short and stiff; occasionally one missing. Fertility and viability good. RK2.
other information: One allele induced by CB. 1592.

***sg: shortened wing**
location: 3- (left arm).
origin: Spontaneous.
discoverer: Herskowitz, 47118.
references: 1949, DIS 23: 57.
phenotype: Wings abnormal at base; veins interrupted, missing, or thickened. Many flies have short, rounded wings that curve upward slightly. RK3.

***sge: shifted genitals**
location: 1-48.4.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 74.
phenotype: Male genitalia and anal plates rotated to various degrees (up to 90°). Wings slightly divergent and drooping, occasionally one outheld. Eyes slightly dark. Male sterile. Viability about 70 percent normal. RK2.

***sh: short winged**
location: 3-56.
origin: Spontaneous,
discoverer: Bridges, 23d3.
synonym: *short wing.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235.
1935, DIS 3: 16.
phenotype: Wings small; similar to *dy.* RK2.

***sh-5: short-5**
location: 3- (not located).
origin: Spontaneous.
discoverer: Spencer, 26j.
references: 1934, DIS 1: 35.
1935, Am. Naturalist 69: 223-38.
phenotype: Wing veins L5 and L3 short; do not reach wing margin. Expression variable; overlaps wild type. RK3.

***Sh: Shaker**
location: 1-57.7.
origin: X ray induced.
discoverer: Catsch.
references: 1944, Z. Induktive Abstammungs- Vererbungslehre 82: 64-66.
phenotype: Causes spasmodic tremor of legs and abdomen in moderately etherized male and homozygous female; very little effect in deeply anaesthetized fly. Heterozygous female shows reduced effect, with shaking confined to forelegs. Expression and viability excellent. RK1.

Sh2
origin; X ray induced.
discoverer: Novitski, 48k.
references: 1949, DIS 23: 61-62.
phenotype: Like *Sh* but male lethal. RK2.

Sh
origin: X ray induced.
discoverer: Novitski, 49b.
references: 1949, DIS 23: 61-62.
phenotype: Like *Sh.* RK1.

Sh4
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
synonym: *Shw: Shaker downheld.*
references: 1959, DIS 33: 90.
phenotype: Fly quivers when etherized. Wings frequently droop at sides. Thorax often dented, particularly near anterior border. Homozygote viable and fertile. RK1.
other information: One allele each induced by X rays and CB. 1592. Two alleles induced by CB. 1540.

***shaven:* see sv**

***shb: shortened bristles**
location: 1-39.0.
origin: Induced by S-2-chloroethylcysteine (CB. 1592).
discoverer: Fahmy, 1957.
references: 1959, DIS 33: 90.
phenotype: Bristles slightly short and thin. Wings broad, often convex or concave. Fly somewhat large. Male fertile; viability about 50 percent wild type. Female sterile. RK3.

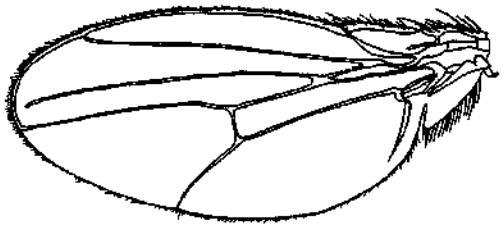
shd:* see *spl

***she: sherry**
location: 3-0.
origin: Spontaneous.
discoverer: Kaliss, 36a13.
references: 1937, DIS 8: 9.
phenotype: Eye color sherry. Sterile *inter se* but both sexes crossfertile. RK3.

***shf: shifted**
location: 1-17.9.
discoverer: Bridges, 13a.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 63.
phenotype: Vein L3 fails to reach wing margin and is shifted toward L4. Anterior crossvein usually lacking. Wings divergent. Postscutellar bristles small and erect. Body small. Viability 60 percent of wild type. Female often sterile. RK2.
cytology: Placed between 6A3 and 6F11 based on deficiency analysis using shf^2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

shf2
origin: X ray induced.
discoverer: Oliver, 29j29.
references: 1935, DIS 3: 28.
1935, DIS 4: 10.
phenotype: Veins closer together than in wild type. L3 and L4 tend to fuse near anterior crossvein; anterior crossvein shortened, knotted, or absent. Phenotypic effect visible in prepupal wing bud, the two longitudinal veins diverging at a smaller than normal angle [Waddington, 1940, J. Genet. 41: 75—139 (fig.)]. Eyes sometimes slightly rough. Scutellar bristles often absent. Scutellum short. Wings narrow and often warped downward. Fertility and viability good. RK2.

***shf³**
origin: Spontaneous.
discoverer: Curry, 37d26.
phenotype: Like *shf²* but more extreme. Viability about 70 percent wild type. Frequently infertile. RK2.



shfh shifted-3
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 173.

s/if^{ov}: ***shifted-oval***
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 55.
phenotype: Eyes rough and narrow. First basal wing cell absent because L3 and L4 veins close. Wings narrow and pointed. Viability and fertility low. RK2.
other information: On basis of phenotype and position, could be an allele of either ov or *shf* or both; not tested.

shifted genitals: see *sge*

shl: shorter legs
location: 1-36.3.
origin: Induced by 2-fluoroethyl methanesulfonate (CB. 1522).
discoverer: Fahmy, 1957.
references: 1959, DIS 33: 90.
phenotype: Small fly with short legs. Male viability and fertility low. RK3.

shm: short macros
location: 1-22.4.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer. Fahmy, 1953.
references: 1959, DIS 33: 90.
phenotype: Bristles short and stiff. Eclosion delayed. Male sterile and viability reduced. RK2.

sho: shovel
location: 2- (not located).
origin: Spontaneous in *In(2L)t.*
discoverer: GoodSmith, 49k.
references: Ives, 1952, DIS 26: 65.
phenotype: Wings short and rounded. Viability good. RK2A.

short bristle: see *stb*
short macros: see *shm*
short tarsi: see *sht*
short vein: see *shv*
short wing: see sw
short wing: see *sh*
short winged: see *sh*
short-5: see s/i-5
short-bristte: see *ml*
shortened wing: see *sg*
shortened bristles: see *shb*
shortened veins: see *svs*
shorter bristles: see *sbt*
shorter legs: see *shl*
shovel: see *sho*

shp: shrimp
location: 1-47.5.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 74.
phenotype: Small fly. Eclosion delayed. Male viability about 30 percent wild type. Both sexes fertile. RK3.

shr: shrunken
location: 2-2.3.
discoverer: Bridges.
phenotype: Body small and dark. Viability and fertility good. Overlaps wild type unless combined with *abb,* where mutual enhancement occurs. RK3.
cytology: Placed between 22A3 and 22B1, on basis of its inclusion in *Df(2L)S2 = Df(2L)21C6-Dl;22A6~Bl* but not in *Df(2L)S5 = Di(2L)21C2-3;22A3-4* (Lewis, 1945, Genetics 30: 137-66).

shrimp: see *shp*
shrunken: see *shr*
shrunken-3: see *wz*

sht: short tarsi
location: 1-20.9.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 90.
phenotype: Legs extremely short; reduction in length most pronounced in metatarsal and tarsal regions. Some tarsi fused; others absent. Bristles thin and short. Adult short lived. RK3.

shv: short vein
location: 2-3.8 (between *ast* and ho).
origin: Spontaneous.
discoverer: Pope, 1947.
references: Lewis, 1947, DIS 21: 69.
phenotype: Veins L2 and L4 do not reach wing margin. RK1.

shV: see *avs*
Shw: seeS/i*
*S/: *Ski*
location: 2-36.
discoverer Clausen, 1511.
references: Clausen and Collins, 1922, Genetics 7: 385-426.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 149 (fig.).
phenotype: Homozygous or heterozygous *Si* combined with homozygous *si-3* produces wings with turned up tips. Double homozygote has also a crimped costal vein. Other genotypes wild type. RK3.

si-3: ski-3
location: 3-46.5.

discoverer: Clausen, 1511.
references: Clausen and Collins, 1922, Genetics 7: 385-426.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 149.
phenotype: *si-3/si-3* fly has upturned wingtips when homozygous or heterozygous for *Si,* otherwise normal. RK3.

side wings: see s/w

****Sit: Skilike***
location: 2- (not located).
discoverer: Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 216.
phenotype: Wings turned up at tips. Semidominant. Poor viability. RK3.
other information: Not an allele of *Si.*

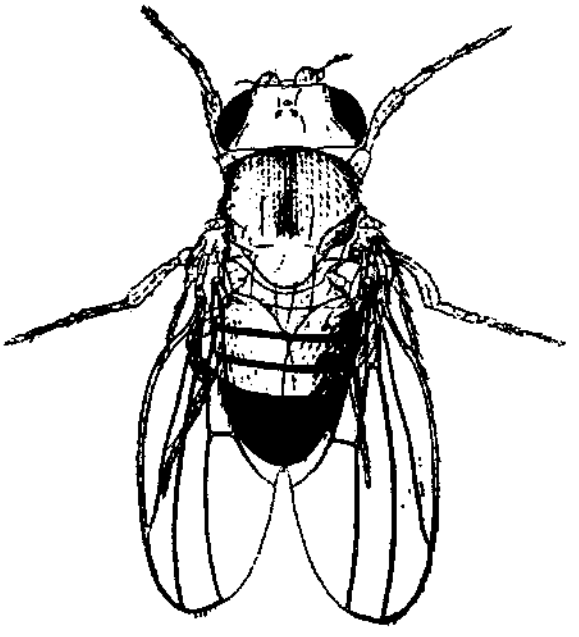
silver: see *svr*

silver tips: see *stp*

***sine* ocu/is:** see so

singed: see *sn*

****siw: side wings***
location: 1-58.5.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 74.
phenotype: Wings rotated on long axis so that inner margin is higher than costal margin. Male sterile; viability about 50 percent wild type. RK2.



Sk: Streak
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Pubi. No. 278: 216.

Sk: Streak
location: 2-16.0.
origin: Spontaneous,
discoverer: Bridges, 12k27.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 222 (fig.).
phenotype: Dark streak extends down middle of thorax from neck to tip of scutellum. Wings may diverge and droop. Overlaps wild type. Enhanced by *b* or e^s. Homozygous lethal. RK2.
cytology: Salivary chromosomes apparently normal (Bridges).

Ski: see *Si*

ski-3: see *si-3*

Skilike: see *Si I*

si: small wing
location: 1-53.5.
origin: Spontaneous.
discoverer: Bridges, 15121.
phenotype: Wings about 80 percent normal length, straight edged, and blunt tipped. Crossveins rather close. Eyes large and slightly rough. RK2.

Sl2
origin: X ray induced.
discoverer: Dobzhansky, 31b3.
references: Sivertzev-Dobzhansky and Dobzhansky, 1933, Genetics 18: 173-92.
phenotype: Similar to *si* but possibly more extreme. RK2.

****sl34***
origin: Pound among progeny of cold-treated male.
discoverer: Gottschewski, 1934.
phenotype: Wings like *si,* but eyes normal. RK2.

****SI: Splotched***
location: 1-56.9 (to the right of f).
origin: X ray induced.
discoverer: Muller, 26111.
references: 1935, DIS 3: 30.
phenotype: Wing hairs disarranged in small patches. Male infertile. Viability excellent. RK1.

sla: slimma
location: 1-48.6.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 74.
phenotype: Fly slim with very narrow abdomen. Body length normal. Eclosion delayed slightly. Wings curve slightly, *sla/sib,* and *sla/sld* wild type. Male fertile and viable. Female sterile; viability about 50 percent wild type. RK3.
other information: Two alleles each induced by CB. 3007 and CB. 3025.

****slb: slim body***
location: 1-45.3.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer. Fahmy, 1956.
references: 1958, DIS 32: 74.
phenotype: Body narrow but of normal length. *stb/ala* and *alb/aid* wild type. Viability and fertility good in both sexes. RK3.

sic: slim chaetae
location: 1-3.6.
origin: Induced by L-p~NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 90-91.

phenotype: Bristles thin and short. Inner wing margins occasionally incised. Both sexes viable and fertile. RK1.

sld: slender
location: 1-50.1.
origin: Induced by p-NN-di-(2-chloroethyl)amino-phenylethylamine (CB. 3034).
discoverer. Fahmy, 1957.
references: 1959, DIS 33: 91.
phenotype: Fly rather small and slim with narrow abdomen, *sld/sla* and *sld/slb* wild type. Male fertile but shows delayed eclosion and reduced viability. Female very inviable. RK3.
other information: One allele induced by CB. 3025.

**sldP^{fa}: slender-pointed abdomen*
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
synonym: *pta.*
references: 1959, DIS 33: 88.
phenotype: Fly small, with narrowed abdomen and slightly altered eye and wing shape. Male sterile; viability about 25 percent wild type. RK3.

slender chaetae: see sc/i
slight: see *sit*
slim: see *slm*
slim body: see *sib*
slim bristle: see *smb*
slim chaetae: see *sic*
slimma: see *sla*
slimmer abdomen: see *sin*

slm: slim
location: 1-33.7.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 75.
phenotype: Small fly with narrow abdomen. Viability and fertility good. RK3.
other information: One allele induced by CB. 1506.

**sln: slimmer abdomen*
location: 1-53.5.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 91.
phenotype: Rather small fly with narrow abdomen. Occasionally, wings slightly upheld and eyes small or misshapen. Male infertile; viability about 15 percent wild type. Female sterile. RK3.

slope wing: see s/w

sit: slight
location: 2-106.3.
origin: Spontaneous.
discoverer. Curry, 39b20.
references: 1939, DIS 12: 45.
phenotype: Fly small. Bristles short and thin. Enhances *px.* Viability and fertility good. RK3.

slV: see *avr*

**slw: slope wing*
location: 1-51.2.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 75.
phenotype: Wings usually slightly upheld or spread. Viability and fertility good. RK3.

sm: smooth
location: 2-91.5.
origin: Spontaneous.
discoverer: Bridges, 35cl4.
phenotype: Abdomen partially denuded of bristles and shrunken. Wings usually warped and semi-erect. Acrostichal hairs disarranged. Tendency for erect postcutellars. Male genitalia often disturbed. Anal protuberance of female bent down. Viability 30 percent wild type. Both sexes entirely sterile. RK2.

sm: see *smk*

sma: smaller
location: 1-29.9.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 75.
phenotype: Body small. Eye color frequently dark. Viability and fertility good. RK2.
other information: One allele each induced by CB. 1528, CB. 1540, CB. 2511, CB. 3007, CB. 3025, CB. 3026, CB. 3034. Two alleles induced by CB. 1414.

small: see *sml*
small body: see *sby*
small body 62: see *srb*
small bristle: see *sbr*
small eye: see *os^{s}*
small narrow: see *smn*
small pallid: see *smp*
small round', see *srd*
small thin: see *sth*
small thorax: see *smt*
small tvmoroid: see *stu*
small wing: see *si*
smaller: see sma
smaller body: see *srb*
smaller eye: see *sme*
smaller thinner: see *smh*
smaIhid: see *smd*

**smb: slim bristle*
location: 1-23.1.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer Fahmy, 1956.
references: 1959, DIS 33: 91.
phenotype: Bristles thin and rather short. Male viable and fertile; female sterile. RK2.
other information: One allele induced by CB. 1540.

smd: smallold
location: 1-61.1.
origin: Induced by DL-p-NN-di-(2-chloeoethyI)amino-phenylalanine (CB. 3007).
discoverer Fahmy, 1954.
references: 1958, DIS 32: 75.

phenotype: Rather small body. Eyes frequently dark. Viability and fertility good. RK2.
cytology: Placed in salivary chromosome region 18A4-18B8, on basis of its inclusion within the deficiency resulting from recombining left end of *In(l)y*^{4} *~In(l)lA8-Bl;18A3-4* with right end of *In(l)sc*^{9} *=In(l)lB2-3;18B8-9* (Norton and Valencia, 1965, DIS 40: 40).
other information: One allele each induced by CB. 1414, CB. 1540, CB. 1592, and CB. 3007. Two alleles each induced by CB. 1506 and CB. 1528. Seven alleles induced by CB. 3025 and 10 by X rays.

***sme: smaller* eye**
location: 1-68.9.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahmy, 1955.
references: 1959, DIS 33: 91.
phenotype: Small fly with small, round, and slightly dark eyes. Wings occasionally diverge. Male sterile; viability about 50 percent wild type. RK2.
other information: One allele induced by CB. 3051.

smh: smaller thinner
location: 1-1.5.
origin: Induced by methyl methanesulfonate (CB. 1540).
discoverer Fahmy, 1956.
references: 1959, DIS 33: 91.
phenotype: Rather small fly with thin bristles. Both sexes viable and fertile. RK2.

smk: smoky
location: 2-58.6.
origin: Ultraviolet induced.
discoverer: Edmondson and Meyer, 49d.
synonym: *sm* (preoccupied).
references: 1949, DIS 23: 61.
phenotype: Body color dark, especially along sides of thorax. Similar to e* but somewhat lighter. At 27°C, female sterile and male fertile; at 17°, both sexes fertile. Viability and classification good. RK2.

sml: small
location: 1-25.
origin: Induced by *P*^{33}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 56.
phenotype: Body small; wings short; eyes small, rough, and bulging. Thoracic hairs irregular. Eclosion delayed. 10 percent normal viability. RK3.

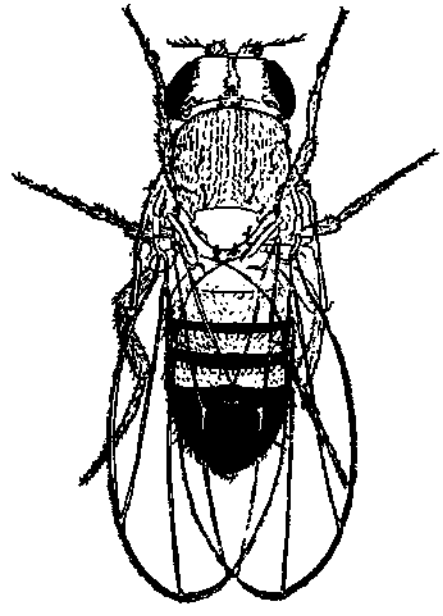
smn: small narrow
location: 1-45.7.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer Fahmy, 1955.
references: 1959, DIS 33: 91.
phenotype: Fly weak and inviable; usually dies within 48 hr of eelosion. Wings frequently upheld slightly. Abdomen narrow. RK3.

smoky,* see *smk

smooth:* see *sm

**smp: small pallid*
location: 1-25.6.
origin: X ray induced.
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 91.
phenotype: Fly quite small and lightly pigmented. Bristles slightly thin. Occasional eye misshapen. Male viable and fertile. Female sterile. RK2.

s/nf: *small thorax
location: 1-51.9.
origin*. Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 75.
phenotype: Thorax and head small. Wings correspondingly short but of normal width and frequently wavy. Both sexes fertile. Viability about 50 percent wild type. RK2.

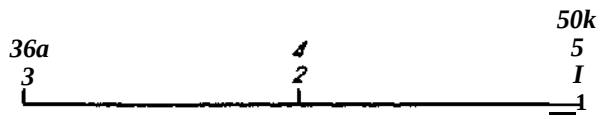


sn: singed
From Mohr, 1922, Z. Intuktive Abstammungs-Vererbungslehre 28: 1-22.

sn: singed
location: 1-21.0.
origin: Spontaneous.
discoverer: Mohr, 18j5.
references: 1922, Z. Induktive Abstammungs-Vererbungslehre 28: 1—22 (fig.).
Bender, I960, Genetics 45: 867-83 (fig.).
phenotype: Bristles twisted and shortened. Hairs wavy. Female sterile. Bender (1960) finds that, in ovaries of sterile sn female, vitellogenesis is retarded and eggs never develop beyond stage 13. Mohr (1922) reported that eggs laid are short and have flattened filaments, *sn* heterozygous with fertile alleles is fertile; *sn* heterozygous with sterile alleles of sn is sterile. RK1.
cytology: Demerec and Sutton place locus between 7C4-5 and 8C1-2 (Demerec, Kaufmann, Fano,

Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Hannah-Alava places it in 7D1-2.

other information: The singed locus is divided into three recombinationally different sites (Ives and Noyes, 1951, Anat. Record 111: 565; Hexter, 1955, Proc. Natl. Acad. Sci. U.S. 41: 921-25; 1957, Genetics 42: 376). *sn* occupies right site. Some of the double mutants synthesized by Hexter and studied by Bender (1960).



Map of the *sn* locus
Drawn from Hexter, 1957, Genetics 42: 376.

***sn*^{2}**

origin: Spontaneous.
discoverer: Bridges, 1912.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235.
Bender, 1960, Genetics 45: 867-83 (fig.),
phenotype: Bristles wavy, twisted at ends. A weak allele of *sn.* Hairs wild type. Female fertile. RK2.
other information: Occupies middle pseudoallelic site (Hexter, 1955, Proc. Natl. Acad. Sci. U.S. 41: 921-25).

sn*

origin: Spontaneous.
discoverer Mohr, 22fll.
references: 1923, Hereditas 4: 142-60 (fig.).
Bender, 1960, Genetics 45: 867-83 (fig.).
phenotype: Bristles and hairs curved and twisted as in *sn.* Female entirely fertile. RK1.
other information: Occupies left pseudoallelic site (Hexter, 1955, Proc. Natl. Acad. Sci. U.S. 41: 921-25).

sn4

origin: Spontaneous.
discoverer: Bridges, 30a26.
references: Bender, 1960, Genetics 45: 867—83 (fig-),
phenotype: Bristles kinked at ends as in *sn*^{2}. Hairs wild type. Female fertile. *sn*^{36a} *sn*^{4} homozygote has nearly normal bristles and is sterile. RK2.
other information: Occupies middle pseudoallelic site (Hexter, 1955, Proc. Natl. Acad. Sci. U.S. 41: 921-25).

snS

origin: Spontaneous.
discoverer: Bridges, 30b5.
references: Bender, 1960, Genetics 45: 867—83.
phenotype: Bristles and hairs kinked. Expression intermediate between an and *sn*^{4}. Female sterile. RKl.
other information: Occupies right pseudoallelic site (Hexter).

sn*^{ss}: *singed-5* of *Skinner

origin: Spontaneous.
discoverer: Skinner, 42cl8.
references: Ives, 1943, DIS 17: 50.
phenotype: Like *sn*^{s}. Female sterile. RKl.

$_{sn}$73o7

origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with *T(l;3)sn*^{13tl} = *T(1;3)6C;7C9-D1;79D2-E1.*

***$_{sn}$27-70**

origin: Induced by mustard gas.
discoverer. Sobels, 57j.
references: 1958, DIS 32: 85.

***$_{sn}$27-49**

origin: Induced by mustard gas.
discoverer: Sobels and Jansen, 57j.
references: Sobles, 1958, DIS 32: 85.

sn29-7

origin: X ray induced.
discoverer: Sobels and Schouten, 571.
references: Sobels, 1958, DIS 32: 85.

***sn**^{31f}*

origin: X ray induced.
discoverer: Patterson.
references: 1934, DIS 2: 59.
phenotype: Like *sn.* Female sterile. RKl.

sn*

discoverer. Duncan, 34e20.
references: 1935, DIS 4: 10.
phenotype: Bristles show slight sn effect. Hairs kinked. Female fertile. RKl.

$_{sn}$36o

origin: Spontaneous.
discoverer: Spencer, 36a21.
references: Bender, 1960, Genetics 45: 867—83 (fig-)-
phenotype: Bristles gnarled in a fairly extreme manner. Hairs wild type. *sn*^{36a} is only allele to cause pronounced reduction in replication of oocyte nurse cell DNA [King and Burnett, 1957, Growth 21: 263—80 (fig.)]. *sn*^{36a} also causes more extreme retardation of vitellogenesis than other female-sterile *sn* alleles (Bender, 1960). Female sterile. *sn*$^{3\wedge a}$ *sn*^{4} homozygote has nearly normal bristles and is sterile. RKl.
other information: Occupies left pseudoallelic site (Hexter).

sp37b

origin: Spontaneous,
discoverer Poulson, 37b.
references: 1938, DIS 10: 55.
1939, DIS 12: 49.
phenotype: Like *sn.* Female sterile. RKl.

***sn**^{39k}*

origin: Spontaneous.
discoverer: Buzzati-Traverso, 39fcl9.
references: 1940, DIS 13: 49.
phenotype: Like sn. Female sterile. RKl.

***$_{sn}$41l**

origin: Spontaneous.
discoverer: Oliver, 41i25.

references: 1942, DIS 16: 53.
phenotype: Like *sn.* Female sterile. RK1.

sn^{46a}
origin: X ray induced.
discoverer: Belgovsky.
references: 1946, DIS 20: 63.
phenotype: Weak sn; hairs unaffected. Female fertile. RK1.
other information: Crossing over unaffected.

*$_{5n}$*48h*
origin: X ray induced.
discoverer Lindsley, 48hll.
references: 1949, DIS 23: 60.
phenotype: Like *sn*^{4}. Female fertile. RK1.

*$_{sn}$*49h*
origin: Induced by P^{32}.
discoverer: R. C. King, 49h.
references: Poulson and King, 1949, DIS 23: 63.
phenotype: Like sn. Female sterile. RK1.

$_{sn}$*S0k*
discoverer: Ives.
references: Ives andNoyes, 1951, Anat. Record 111: 565.
Bender, 1960, Genetics 45: 867-83.
phenotype: Kinky hairs and gnarled bristles. Female sterile. RK1.
other information: Occupies right pseudoallelic site.

sn^{55a}
origin: Spontaneous.
discoverer Hillman, 55a.
references: 1957, DIS 31: 82.
phenotype: Bristles and hairs affected, but not so extreme as *sn*^{3}. Female fertile. RK1.

**sn*^{57c}
origin: Spontaneous.
discoverer: Kadel.
references: 1957, DIS 31: 83.
phenotype: Like *sn.* Female sterile. RK1.

**sn*^{61k}
origin: Gamma ray induced,
discoverer: Mickey, 61k.
references: 1963, DIS 38: 31.
phenotype: Like sn, RK2.

**sn*^{61k2}
origin: Gamma ray induced.
discoverer: Mickey, 61k.
references: 1963, DIS 38: 31.
phenotype: Like *sn*^{3}. RK1.

sn^{63a}
origin: Found among progeny of male treated with radio frequency.
discoverer: Mickey, 63a.
references: 1963, DIS 38: 29.
phenotype: Like sn. RK1.

$_{sn}$*63h*
origin: Found among progeny of male treated with radio frequency.
discoverer: Mickey, 63b 19.
reference*: 1963, DIS 38: 29.

sn^{e}
origin: Spontaneous.
discoverer Muller.
references: Bender, 1960, Genetics 45: 867—83.

sn'9BbS
origin: X ray induced in *In(l)sc*^{s}* ^{L}*sc*^{SR}*+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
cytology: Associated with *T(l;3)sn*^{I9Bbs} = *T(l;3)3Cl-2;7C9-10;72A-B.*

**sn*^{K}: *singed of Krivshenko*
discoverer Krivshenko.
references: Agol, 1936, DIS 5: 7.
phenotype: Like sn. Female sterile. RK1.

sn^{X2}: *singed from X irradiation*
origin: X ray induced.
discoverer Muller.
references: Bender, 1960, Genetics 45: 867—83.

snb: sunburst
location: 3-34 or 47 [6.5 units from *D* (3-40.4)].
discoverer: Dobzhansky.
phenotype: Eye color soft maroon with seven flecks. Overlaps wild type. Classification best in fly at least one day old. Larval Malpighian tubes somewhat lighter than normal (Brehme and Demerec, 1942, Growth 6: 351-56). RK3.

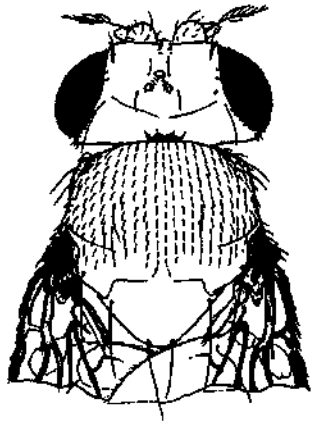
so: *sine oculis*
locotion: 2-57.1.
origin: Spontaneous.
discoverer: Milani, 1939.
references: 1941, DIS 14: 52.
Buzzati-Traverso, 1946, DIS 20: 63.
Milani, 1946, Boll. Soc. Ital. Biol. Sper. 23: 111—13.
1951, DIS 25: 79.
1951, Rend. 1st. Lombardo Sci. Lettere, Ser. 3, 84: 143-54.
phenotype: Ocelli always absent. Eyes usually reduced to small groups of ommatidia. More extreme at elevated temperatures; lethal at 30°C. *so* eye disks transplanted into wild-type host develop autonomously as do wild-type disks in so host (Castiglioni, 1950, DIS 24: 79). RK2.

SO*
origin: Spontaneous derivative of so.
discoverer. Milani, 1939.
references: 1946, Boll. Soc. Ital. Biol. Sper. 22: 1025-28.
1949, Sci. Genet. 3: 106-112.
phenotype: Less extreme than *so.* Ocelli absent. Eyes usually normal, but sometimes reduced or deformed. Homozygous expression not affected by temperature. At 20°-23°C, *so*^{2}/so eyes like *&o*^{2}/®*o*^{2}. At 27° *so*^{2}*/BO* may resemble *so/so;* eyes range from normal to greatly reduced or deformed. RK2.

**scum* somors
location: 1-40.8.
origin: Induced by DL-p-KN-di-(2-chloa-oethyl>rnino-phenylalaniae (CB. 3007).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 75.

phenotype: Pigmentation of body and eyes dark and dull. Wings occasionally divergent or blistered. Good viability and fertility. RK2.
other information: One allele induced by CB. 1414.

sp: speck
location: 2-107.0.
origin: Spontaneous.
discoverer: Morgan, 10c.
synonym: *ol-2: olive-2.*
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 128 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 211 (fig.), 236.
phenotype: Axils of wings have black specks. Body color dark. In pupa, region of anal papilla is dark (Waddington). RK1.
cytology: Placed in 60B13-60C5, on basis of its inclusion in the $2R^{P}X^{D}$ element of *T(l;2)Bld = T(1;2)1C3-4;6OB12-13* and *Df(2R)Px = Df(2R)60B8-10;60Dl-2* but not in *Df(2R)Px* =Df(2R)60C5~6;60D9-10* [Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol 2: 745-55].



sp: speck
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 129.

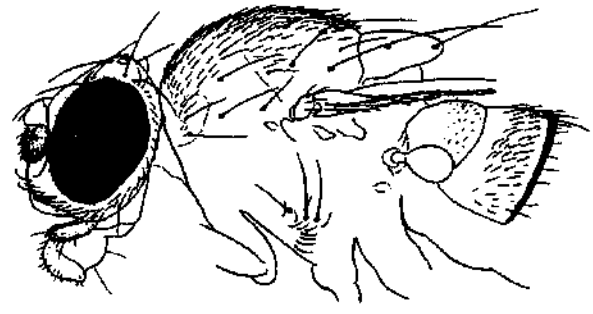
sp: see ***sdsp***

$_{P}$2
discoverer: Bridges, 25f.
phenotype: Darker speck and body color than *sp.* Tyrosinase formed in adults (Horowitz). RK1.

$pS6 7**. ***speck of Shuman
origin: Spontaneous.
discoverer Shuman, 61c.
references: Meyer, 1963, DIS 37: 51.
phenotype: Similar to *sp.* RK1.

****sp^{u}: speck from ultraviolet***
origin: Ultraviolet induced.
discoverer: Meyer, 52d.
references: 1955, DIS 29: 74.
phenotype: Weak allele. $sp^{u}/@p$ not difficult to classify, but sp^{a}/sp^{2} overlaps wild type. RK2.

Sp: Sternopleural
location: 2-22.0.
origin: Spontaneous.
discoverer: M. (Mann) Lesley.
synonym: *Br: Bristled.*
references: 1923, Genetics 8: 27—36.
phenotype: Sternopleural bristles increased in number. At 19°C wild type; at 25° overlaps wild type; at 28—30°no overlap. Apparently does not affect sternopleural bristles on metathoracic segment converted by *bx* to a tnesothoracic segment (Waddington, 1939, Growth Suppl. 1 pp. 37—44). Homozygous lethal. RK2.
cytology: Salivary chromosomes apparently normal (Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).
cytology: Placed in salivary chromosome region 27C1 to 28C1 (E. H. Grell).



Sp: Sternopleural
Edith M. Wallace, unpublished.

sp~w: see $W^{S}P$

spa: sparkling
location: 4- [probably most distal visible locus on chromosome *4* (Abrahamson, Herskowitz, and Muller, 1956, Genetics 41: 410-19)].
origin: Spontaneous.
discoverer L. V. Morgan, 34k6.
references: 1941, DIS 14: 52.
1947, Genetics 32: 200-19.
phenotype: Byes rough in varying degrees and somewhat bulging. Affected by genetic modifiers. More extreme at 17°-19°C than at 22°-25°. Heterochromatin and sex affect expression so that *X/0 > X/X > X/Y > X/X/Y;* also enhanced by *M(2)S2*0. spa* haplo-4's have an exaggerated phenotype. RK2.
cytology: Placed in 102D-F, on basis of the absence of spa^{+} from the $2L^{D}4^{P}$ element of *T(2;4)b = T(2;4)25E;102C15-Dl* (E. B. Lewis). Observations on its further location conflict. Fahmy restricts its location to 102D, on basis of its inclusion in *D%4)M^{63}* •= D%4)101E;102D13-El,* whereas Hochman places it between 102E2 and 102F10, on basis of its inclusion in *Df(4)U « Di(4)102E2-10;W2F2-10.*

spaCat: sparkling-Cataract
origin: X ray induced,
discoverer. BeLgovsky, 1936.
syrtonym: *Cat.*

references: 1937, DIS 8: 7.
Morgan, 1941, DIS 14: 52,
phenotype: Posterior third or half of eye of heterozygote rough; facets irregular and fused. Homozygous lethal. Stocks vary in expression, presumably because of genetic modifiers. *X/X* and *X/0* flies that are spa^{Cat}/spa show the bulging eyes and roughening of *spa* and the posterior fused facets of spa^{Cat}; *X/X/Y* and *X/Y* flies have only the spa^{Cat} phenotype. $spa^{Cat}/spaP^{o1}$ has fusion of facets over entire surface of eye and roughness in posterior region of eye. $spa^{Cat}/4\text{-}sim$ is wild type. RK2.

spa*(lxh sparkling-enhancer of lozenge
origin: Spontaneous.
discoverer: H. A. Bender, 65b23.
phenotype: Homozygote wild type in absence of *lz;* eyes strongly roughened in presence of heterozygous *Iz3, lz^G,* or *lz-D.* Slight eye roughening when both $spa^{e}(^{lx})$ and a *lz* allele are heterozygous. $spa^{e}(^{lz})/spaP^{ot}$ and $spa^{e}(^{tx})/spaP^{6S}$ have very rough eyes but normal tarsal claws and spermathecae. RK3.

spaP&'; sparkling-poliert type
origin: Spontaneous.
discoverer: Sturtevant, 1961.
phenotype: Eyes small, rough, and glazed. More extreme than $spaP^{ot}$ or $spaP^{65}$. Nonpigmented tarsal claws. RK1.

spaP^65
origin: Spontaneous.
discoverer: H. A. Bender, 65J11.
phenotype: Eyes somewhat reduced in size, rough, and partially glazed. More extreme than *spaP°l* but less so than *apaP^6**. Tarsal claws unpigmented and possibly reduced; reminiscent of certain lozenge mutants. Pulvilli and accessory female reproductive structures appear normal. Heterozygote with $spaP^{ol}$ and $spaP^{61}$ has affected tarsal claws as well as rough eyes. Heterozygote with *spa* has slightly roughened eyes at 25°C but markedly roughened eyes at 18°; female somewhat more extreme than male. Viability and fertility good. RK1.

spaP°': sparkling-poliert
origin: Spontaneous.
discoverer: Hadorn, 51a.
synonym: *pol.*
references: Rickenbacher, 1953, DIS 27: 59.
1954, Z. Induktive Abstammungs- Vererbungslehre 86: 61-68 (fig.).
phenotype; Eyes rather small; surface smooth and glassy. During second day of pupal life, retinula cells withdraw from other cells of eye disk. $spaP^{ol}/spa^{Cet}$ has extreme phenotype; $spaP^{ol}/apa$ slightly more extreme than *spa* {Sturtevant, 1961, DIS 35: 47). Homozygote has excellent viability and fertility. RK1.

spade: see spd

sparkling:* see *spa

spastic:* see *sps

spd: spade
location: 2-21.9 [to the left of *Sp* (E\ H. Grell)].
origin: Spontaneous,
discoverer: Bridges, 30dl5.
phenotype: Wings short and broad; pointed at tip, and warped at base. Effect on wing shape arises from excessive contraction of epithelium from inflated stage onward (Waddington, 1940, J. Genet. 41: 75—139). Overlaps wild type in existing stock. RK3.
cytology: Placed in salivary chromosome region 27C1 to 28C1 (E. H. Grell).

spd^fv: spade-flag
origin: Spontaneous.
discoverer: Doane, 60fl4.
synonym: fg.
references: 1960, DIS 34: 49.
1961, DIS 35: 45-46.
phenotype: Wings about two-thirds the length and three-fourths the width of wild type; held tentlike over abdomen. Alulae absent or vestigial; proximal posterior wing margins often irregular with tendency to fold under about vein L4. Venation usually normal with occasional blistering. $spd^{f}6/spd$ has phenotype varying from slight shortening of wings to a shape midway between the two homozygotes. Excellent viability and fertility. RK1.

spe: see ***lz^s***

specific dilutor:* see *dil

speck:* see *sp

spectacled: see lz^{s}

spermatheca:* see *spt

spineless:* see *s$

spiny legs:* see *sple

spl: split
location: 1-3.0.
origin: X ray induced.
discoverer Dubinin.
synonym: *shd; fa^3* (1934, DIS 1: 10).
references: Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65.
Agol, 1931, Genetics 16: 262.
phenotype: Eyes rough and small. Many bristles doubled; sometimes missing. Bristle effect caused by an extra division of initial bristle-forming cell [Lees and Waddington, 1943; Proc. Roy. Soc. (London), Ser. B 131: 87-110 (fig.)]. Few bristles (but not their sockets) regularly removed from posterior border of tergites in *spl/+* heterozygotes (Welshons). *spl* in heterozygotes with other recessive members of the iV pseudoallelic series is virtually normal, but it is *spl* when heterozygous with *N.* RK1.
cytology: Placed in band 3C7, on basis of interaction with *N.* Salivary chromosomes normal (Welshons).
other information: A member of the pseudoallelic series at the Notch locus; located between N^{Nic} and $N^{36}\text{*-}^{1}$ *03* (Welshons and Von Halle, 1962, Genetics 47: 743-59).

spl2
origin: Spontaneous.
discoverer: Gottschewski, 1935.
phenotype: Like *sp!,* but eyes smaller. RK1.

splay wing: **see sp/w**

sple: spiny legs
location: 2-54 (5.5 units to the right of *b).*
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 503-4, 521.
phenotype: Hairs on legs irregular, giving a spiny appearance. RK3.

split: **see *spl***

split thorax: **see *spx***

Splotched: **see *SI***

sp/w; ***splay wing***
location: 1-58.6.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 75.
phenotype: Wings shortened and usually slightly divergent. Eyes small and occasionally rough and deformed. Body size reduced slightly. Emergence delayed. Male sterile; viability about 10 percent wild type. RK3.
other information: One allele induced by CB. 1246.

****spot: spot***
location: 3- (not located).
discoverer Hersh, 34hl5.
references: 1935, DIS 4: 14.
phenotype: Dark spot appears below eye on posterior margin of head. Expression variable. RK3.

spotted white: see $w^{s}P$

spotty: see ***stt***

spotty-tergum: see stt^{2}

spr: spread wings
location: 3- [right arm associated with *In(3R)P\.*
origin: Spontaneous.
discoverer: Bridges, 36cl6.
phenotype: Wings held out at wide angle. Both sexes sterile. RK3A.

****Spr: Spread***
location: 3- (rearrangement).
origin: X ray induced.
discoverer: Oliver, 32k21.
references: 1935, DIS 4: 15.
phenotype: Wings held outstretched perpendicular to body axis; drooping in older fly. Homozygous lethal. Heterozygote viability somewhat low. Female fertile; male quite infertile. RK2A.
cytology: Associated with *In(3L)Spr,* breakpoints unknown.

****sprd: spread***
location: 3-65.
origin: Spontaneous in *In(3R)C.*
discoverer Dexter, 13k.
synonym: *sd* (preoccupied),
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 105.
phenotype: Wings spread at right angles to body. RK2A.
other information: Probably separable from *In(3R)C = ln(3R)92Dl-El; 100F2-3.*

Spread: see Spr

spread wings: **see spr**

spreadex: **see *sdx***

sps: spastic
location: 2-63.6.
origin: Ultraviolet induced,
discoverer: Edmondson and Meyer, 49d.
references: 1951, DIS 25: 73.
phenotype: Pupal and postpupal lethal. Fly that emerges from pupal case unable to walk or fly. Spastic contraction and jerking of leg and wing muscles. Fly becomes overturned and stuck; survives less than 24 hr; sterile. Muscles so relaxed in etherized fly that mutant indistinguishable from normal fly. RK3.

spt: spermatheca
location: 2-63.3.
origin: Spontaneous.
discoverer: Hadorn, 43e.
references: Hadorn and Graber, 1944, Rev. Suisse Zool. 51: 418-23.
Graber, 1949, Z. Induktive Abstammungs-Vererbungslehre 83: 106-35 (fig.).
phenotype: At 28°C female has two spennathecae, but ducts partly fused; at 25° only one enlarged spermatheca on one duct; at 18° a duct with three branches, each bearing a spermatheca. Temperature-sensitive period in third larval instar. Female fertility not greatly affected. RK3.

spt: see $stt^{\wedge}$

**spw: spur wing*
location: 3- (right arm).
origin: Spontaneous,
discoverer Wallbrunn.
references: 1942, DIS 16: 54.
phenotype: Wings vary from normal to large fan-shaped structures with extra veins; often a spur-shaped lobe from costal margin. Penetrance better in female and in old cultures. RK3.

spx: split thorax
location: 1-22.6.
origin: X ray induced.
discoverer Fahmy, 1956.
references: 1959, DIS 33: 91-92.
phenotype: In extreme manifestation, thorax split into two segments by longitudinal furrow; abdominal tergites also split along mid-dorsal line. Eyes deformed. In least abnormal fly, always a hairless stripe along the dorsal midline of thorax. Wings often slightly divergent. Occasionally one or both palpi abnormal in position or structure. Viability and fertility rather low in male, very low in female. RK3.
other information: One allele each induced by CB. 2511 and CB. 3007. Two alleles induced by CB. 1528.

spx: **see *sdx***

****sq: square***
location: 2-8.4.
discoverer: Bridges, 17hl7.
phenotype: Wings truncated with squarish or oblique tip. Overlaps wild type. Viability erratic. RK3.

***Sq: Squat**

location: 2-38.

origin: Spontaneous.

discoverer: Bridges, 15k29.

references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 283-84 (fig.).

phenotype: Wings short, broad, blunt, arched, and less transparent than normal. Thorax and head short and broad. Legs short and weak. Overlaps wild type. Homozygous lethal. RK3.

***sr: stripe**

location: 3-62.0.

discoverer: Bridges, 22b6.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 244.

phenotype: Trident pattern on thorax replaced by broad dark median stripe; color intensified by e/+ and e/e. Midthorax flattened; some hairs turn toward midline; colorless bubbles in midthorax. Wings tend to droop or be raised. RK1.

cytology: Placed between 90D2 and 90F7, on basis of its inclusion in both *Dt(3R)srlO0.394* = ***Df(3R)90C2-7;90F3-7*** **and** ***Df(3R)sr300.101*** = *Df(3R)90D2-4;9lA6-8* (Ward and Alexander, 1957, Genetics 42: 42-54).

***sr3.2**

origin: X ray induced.

discoverer Alexander.

references: 1960, Genetics 45: 1019-22.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *In(3R)sr3-2* = ***In(3R)90Dl-B1;93B-E.***

***$_{sr}$4.2**

origin: X ray induced.

discoverer Alexander.

references: 1960, Genetics 45: 1019-22.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *T(2;3)sr*-2* = ***T(2;3)30C;90C-96.***

***$_{sr}$J00.23**

origin: X ray induced.

discoverer Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

cytology: Associated with *Tfi^{r};3)sr^{i}00.33* = ***T(Y;3)90E2-3.***

*$_{Sr}$100.372

origin: X ray induced.

discoverer Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *7X2;3)8r^0.312* $_{m}$ ***7X2,3)40-41;9OD2-E1.***

***$_{sr}$100.394**

origin: X ray induced.

discoverer: Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *DS[3R)mt$^{1(>0}$-394* $_{m}$ ***Di[3R)9OC2-7;9OF3-7.***

***$_{sr}$300.24**

origin: X ray induced.

discoverer: Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *Df(3R)sr300.24* = ***Df(3R)90C2-4;91A2-5.***

***$_{sr}$300.101**

origin: X ray induced.

discoverer: Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *Df(3R)sr300.101* = ***Df(3R)90D2-4;91A6-8.***

***$_{sr}$300.240**

origin: X ray induced.

discoverer: Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.

phenotype: Homozygous lethal. RK2A.

cytology: Associated with *Tp(3)sr3 00.240* = ***Tp(3)75C;89E;92A.***

***srb: smaller body**

location: 1-62.0.

origin: Induced by S-mustard (CB. 1735).

discoverer: Fahmy, 1960.

synonym: ***sby-62: small body 62.***

references: 1964, DIS 39: 58.

phenotype: Body size slightly reduced. Bristles finer. Both sexes viable. Female fertility low. RK3.

cytology: Not included in deficiency for 18A4-18B8 formed by combining left end of *In(l)y^{4}* = *ln(l)lA8-Bl;18A3-4* **with right end of** ***In(l)sc^{9}*** **=** ***In(l)lB2-3;18B8-9,*** although *sby* (1-60.8) is (Norton).

***srd: small round**

location: 1-0.6.

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).

discoverer: Fahmy, 1955.

references: 1959, DIS 33: 92.

phenotype: Fly small with slightly dark, rounder, small eyes. One or both postvertical bristles frequently missing. Both sexes viable and fertile. RK3.

ss; *spineless*

location: 3-58.5.

discoverer Bridges, 14a3.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 109 (fig.).

Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 211 (fig.), 236.

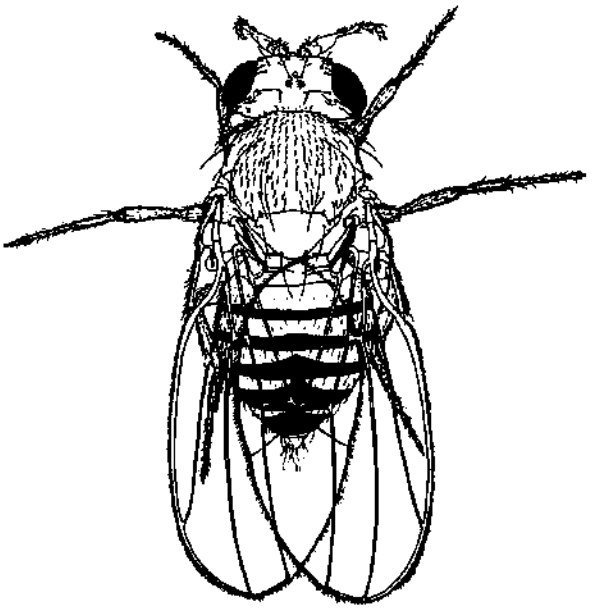
phenotype: Bristles only a little larger than hairs; dorsocentrals least reduced. Postscutellars erect. No effect on legs or aristae. Growth of bristles slows during development [Lees and Waddington, 1943, Proc. Roy. Soc. (London), Ser. B 131: 87-lioj. RK1.

cytology: Locus placed in 89C1-2 (Lewis, 1963, Am. Zoologist 3: 33-56).

other information: A compound locus (Hexter).

*$_{ss}$37b

origin: Spontaneous.
discoverer Poulson, 37b.
references: Poulson and King, 1948, DIS 22: 55.
phenotype: Similar to ss but with some differences. Vertical bristles, particularly posterior verticals, smaller than in ss; some scutellars shorter and have square tips; occasionally some scutellars missing. Viability good. RK1.



55°; *spinel ess-aristapedia*

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 179.

ss°: spineless-aristapedia

origin: Spontaneous.
discoverer Balkaschina, 1926.
references: 1929, Arch. Entwicklungsmech. Organ. 115: 448-63 (fig.).
phenotype: Antennae and aristae tarsuslike; size approaches normal tarsus; two claws at tip. Third joints of antennae like parts of a tarsal row but with broad, flat, platelike lobes below. Bristles like those of a medium to slight Minute. Frequent extra dorsocentral bristles. Development of tarsi in place of aristae enhanced by low temperature (Villee, 1943, Genetics 28: 94). Antennal disks from ss^a larvae give rise to leglike structures when transplanted into wild-type hosts; when disks are pretreated with colchicine the developing structures more aristalike (Vogt, 1947, Experientia 3: 156—59). Disks from wild-type larvae also develop autonomously when transplanted into $\&\&^a$ hosts (Braun, 1940, Genetics 25: 143-49). Similar results observed in mosaics resulting from X-ray-induced somatic exchange (Roberts, 1964, Genetics 49: 593—98). •«*/«* has normal aristae but bristles like *ss"* or slightly smaller. Regions of aristae converted into tarsi not affected by mutants affecting aristae, e.g., *th* and *al,* but are affected by those operating on tarsi, e.g., *fj, d, app,* and *ey* (Waddington, 1939, Growth, Suppl. 1, pp. 37-44; Braun, 1940). RK1.
other information: To the left of ss^a40a (Hexter).

$_{ss}$*a40a*

origin: Spontaneous.
discoverer: Buzzati-Traverso, 40a2.
references: 1940, DIS 13: 49.
phenotype: Antennae and aristae tarsuslike. Legs always show four tarsal joints fused and swollen. In male, sex combs enlarged and sometimes present on the second pair of legs. Bristles practically wild type. RK1.
other information: To the right of ss^a (Hexter).

*

origin: Spontaneous,
discoverer. Neel, 4H30.
references: 1942, Genetics 27: 530.
phenotype: Like ss*. RK2.

*$_{ss}$a44a

origin: Spontaneous derivative of ss^a*0^a.
discoverer: Buzzati-Traverso, 44al7.
references: 1949, DIS 23: 57.
phenotype: Antennae and aristae tarsuslike but without claws. Male legs normal. Less extreme than ss^a*^{Oa}. Bristles practically normal. RK1.

origin: Spontaneous.
discoverer: Meyer, 52g.
references: 1952, DIS 26: 67.
phenotype: Extreme allele. Bristles and hairs reduced so much that male sometimes lacks sex combs. Aristae leglike, with claws. Homozygote weak; male sterile; female only slightly fertile. RK2.

*$_{ss}$*a53**

origin: Spontaneous.
discoverer: Pitemick, 1953.
phenotype: Aristae tarsuslike with fused, distorted joints and terminal claws. Bristles reduced to vestiges, and hairs short. Wings spread and drooping. Tarsal joints of legs fused, swollen, and distorted. Viability low; fly sterile. ss^{aS3e}/ss^a like ss^a. $_{sa}$*a53e/$_{ss}$iao53 i_{ias}* fleshy proximal segments of aristae. RK2.

*SS<»63c

origin: Spontaneous.
discoverer: Merriam and Pitemick, 63c.
phenotype: Aristae tarsuslike, with terminal claws. Tarsal joints of legs sometimes swollen or fused. Bristles shorter than in ss^a. $ss^{a£3c}/ss^a$ like ss*. RK1.

$_{ss}$aB: spineless-aristapedia of Bridges

origin: Spontaneous.
discoverer. Bridges, 38all.
phenotype: Bristles of female like a slight Minute, especially postscutellars. At 25°C, aristae inconspicuously thickened at base; plumed or threadlike for rest of extent. At 14°, ss^{aB} enhanced and resembles sm^m (Villee, 1943, Genetics 28: 94). Legs frequently have lumps at second joint of tarsi;

more pronounced in male and result in doubling of sex combs, which are strung along first and second fused joints. Eyes a little flattened. Except at low temperatures, all characters slight and may overlap wild type. ss^{aB}/ss has slight Minute phenotype but wild-type legs and aristae. $_{ss}aBf_{ss}aSp$ like $ss^{aS}P$, with large tarsal aristae. RK2.

***ss^{aF}:** *spineless-aristapedia of* von *Finck*

origin: Spontaneous derivative of ss^{a}.
discoverer, von Finck, 1937.
references: 1942, Biol. Zentr. 62: 379—400.
Vogt, 1946, Bioi. Zentr. 65: 238-54.
phenotype: Bristles normal at all temperatures. Arista leglike at 18°C, leglike at base at 25°, normal at 29°. Temperature-sensitive period during third larval instar. Dominant to more extreme alleles and recessive to less extreme. RK1.

***$_{ss}$a5p;** *spineless-aristapedia of Spencer*

origin: Spontaneous.
discoverer: Spencer, 36dl5.
synonym: *arp-1.*
references: 1937, DIS 7: 5.
phenotype: Aristae transformed into nearly normal tarsi with claws. Third joint of antenna cylindrical rather than platelike; hence, antenna is longer and more leglike than in ss^{a}. Thorax humpy; legs weakened and misshapen. Bristles practically wild type. Viability and fertility good. $ss^{aS}P/ss^{a}$ has good arista1 legs. RK2.

ss-A; see *Antp^{R}*

***ss^{AT}:** see *Antp^{LC}*

***$_{ss}$/so51;** *spineless-isoallele*

origin: Spontaneous.
discoverer. Pitemick, 1953.
phenotype: Homozygote is wild type. ss^{iaoS3}/ss^{a}, $_{ss}iao53/_{se}tt63c_{t\ an(}j\ _{8S}lao53/_{ss}a53t>$ *faye* thickened proximal segments of aristae, like ss^{aB}. RK3.

ss^{v}; *spineless-variegated*

origin: X ray induced,
discoverer E, B. Lewis.
phenotype: Variegates for spineless character but completely mutant for aristapedia. Male sterile. RK2A.
cytology: Associated with *T(l;3)ss^{v}* *= *T(l;3)20;89B;100F.*

***st:** scarlet*

location: 3-44.0.
origin: Spontaneous.
discoverer. Richards, 16kl8.
references; 1918, Biol. Bull. 35: 199-206.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 172 (fig.).
phenotype: Eyes bright vermilion, darkening with age. Ocelli colorless, even in old fly; a reliable trait for classifying *st me.* Eyes of *bw, st* white. Eye color autonomous in larval optic disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes pale yellow (Beadle, 1937, Geoetics 22: 587—611). RK1.
cytology: Placed between 73A2 and 73B1, on basis of its inclusion in *Df(3L)st* 00.62* = *Df(3L)73A2-3.-73A10-B1* (Ward and Alexander, 1957, Genetics 42: 42-54).

***st^{54i}**

origin: Ultraviolet induced.
discoverer: Meyer, 54i.
references: 1954, DIS 28: 77.
phenotype: Like *st.* RK1.

***$_{s}$fT00.62**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Df(3L)st^{loo-6}2* = *Dt(3L)73A2-3;73A10-B1.*

***$_{5}$fl00.126**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like *st.* RK2A.
cytology: Associated with *T(Y;3)st$^{100-126}$* = *T(Y;3)73A2-3.*

***$_{s}$f7OO.I77**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Df(3L)st$^{100-171}$* = *Df(3L)72E4-5;74C2-3.*

***$_{s}$f100.200**

origin: X ray induced.
discoverer Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Df(3L.)stl0O.2OO* = *Df(3L)72E4-5;73A10-B1.*

***$_{s}$f700.359**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Like *st.* Homozygous lethal. RK2A.
cytology: Associated with *TC2;3)st'°0.359* = *T(2;3)21C3-5;73A2-3;98F2-4.*

***st*P:** *scarlet-spotted*

origin: Spontaneous.
discoverer: Bridges, 36bl9.
phenotype: Eyes scarlet with facets and groups of facets that appear wild type. Darkening spreads in old fly. Not a variegated position effect. $st^{B}P/st$ like *&t*P.* Larval Malpighian tubules pale yellow and classifiable (Brehme and Demerec, 1942, Growth 6: 351-56). RK2.
cytology: Salivary chromosomes appear normal.

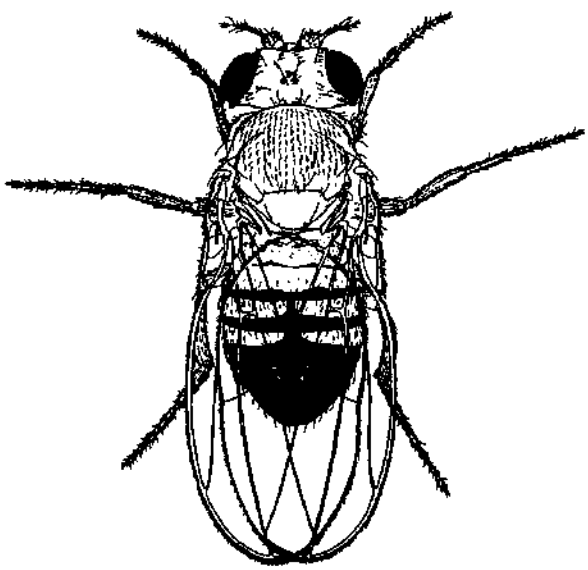
***St:** Stumpy*

location: 1-55.5.
origin: X ray induced.

discoverer: Muller, 2612.
references: 1935, DIS 3: 30.
phenotype: Wings and abdomen short. Bristles Minute. Eyes rough. Male lethal. RK2.

St-SD: Stabilizer of Segregation Distorter

location: 2- (close to and probably distal to *bw).*
origin: Naturally occurring allele.
discoverer: Sandier and Hiraizumi.
references: 1960, Genetics 45: 1269—87.
phenotype: Decreases variability of transmission ratio of SD-bearing second chromosome among *SD/+* males. RK3.
other information: Present on SD-bearing chromosomes recovered from natural populations.



sta: stubarista

From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 180.

sta: stubarista

location: 1-0.3.
origin: X ray induced.
discoverer: Oliver, 32122.
references: 1935, DIS 4: 15.
phenotype: Third joints of antennae short, blunt, free of hairs, and yellowish. Aristae bases thickened, axes sometimes short, and branches irregular. All bristles and hairs extremely short and sparse. Eyes rotated on head slightly so that the long axis is vertical. RK2A.
cytology: Placed in region between 1D3 and 2B, on basis of its association with *T(l;3)sta = T(1;3)1D3-E1;2A;89B21-C4.*

sta[1]:* see *crm*

Stabilizer of Segregation Distorter: see *St-SD*

Star: see 5

staroid: see *std*

**stb: short bristle*

location: 1-14.6.
origin: Induced by L-p-NN-di-(2-chtoToethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahray, 1955.
references: 1958, DIS 32: 75.
phenotype: Short, thin bristles. Viability and fertility good. RK2.

std: staroid

location: 2-56.5.
origin: Spontaneous.
discoverer: E. M. Wallace, 31c26.
phenotype: Eyes small, oval, and very rough. Bristles short. Wings slender, dusky, and warped; marginal veins irregular; gap in L4; L5 short. Body dwarfed. Thorax has dark streak. Male sterile. Female semisterile. Viability variable. At 19°C, eye character remains but other abnormalities disappear. RK2.

Sternopleural: see *Sp*

**sth: small thin*

location: 1-3.7.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 92.
phenotype: Fly small, with short thin bristles. Eyes frequently deformed and rough. Wing shape and position slightly atypical. Male ecloses late but is viable and fertile. Female sterile. RK3.

stiff chaetae: see *sfc*

**sto: stocky*

location: 1-29.8.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 75.
phenotype: Fly short and stocky. Wings short but normal in width. Eyes large and pear shaped. Bristles slightly shorter than normal. Male sterile; viability about 50 percent normal. RK2.
other information: One allele induced by CB. 1528.

**sfo'P[w]: stocky-tapered wings*

origin: Induced by DL~p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
synonym: *tpw.*
references: 1958, DIS 32: 76-77.
phenotype: Wings slightly shortened and broadened, with tip pointed at L3 rather than being smoothly rounded. Eyes small and oval. Slightly dusky thorax. Both sexes viable; female rather infertile. RK2.

**stp: silver tips*

location: 1-46.1.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 92.
phenotype: Fly slightly smaller than normal. Bristles thin, weak, and most are unplgmented; hairs unaffected. Male sterile; viability low. RK3.

**Stp-l: Strapped in chromosome 1*

location: 1-50.6 (not allelic with sd).
origin: Spontaneous.
discoverer: Hannah.
references: 1950, Genetics 35: 669.

phenotype: Expression limited to male. About 15 percent *of Stp-1; Stp-2/+* males show some scalloping of wing margins. Most *Stp-1; Stp-2/Stp-2* males have some degree of scalloping; varying from a small nick to vestigal-like wings. Modified by both genetic and environmental factors. Without *Stp-2, Stp-1* has no effect. RK3.

Stp-2: Strapped in chromosome 2

location: 2- (right arm between c and *sp).*
origin: Spontaneous.
discoverer: Hannah,
references: 1950, Genetics 35: 669.
phenotype: 15 percent of *Stp-1; Stp-2/+* and most *Stp-1; Stp-2/Stp-2* males show incising of wing margin. *Stp-2/Stp-2/+* and *Stp-2/Stp-2/Stp-2* intersexes show scalloping in the presence or absence of *Stp-1.* RK3.

Sfr: Stretched wings

location: 2-67.
discoverer: Tanaka, 34al2.
references: 1937, DIS 8: 11.
phenotype: Wings divergent. Homozygous lethal. RK2.

straight abdomen: see ***sab***
Strapped: see ***Stp***
straw: see ***stw***
strawberry: see ***swb***
Streak: see ***Sk***
streaked stern i: see ***sts***
streakex: see ***stx***
Stretched wings: see ***Str***
stripe: see ***sr***

sts: streaked sterni

location: 1-60.3.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 92.
phenotype: Small fly with light body color. Brown areas on abdominal stemites often form two longitudinal lines. Eclosion delayed. Viability and fertility low. RK3.

sff: *spotty

location: 1-34.3.
origin: Induced by p-NN-di-(2-chloroethyl)aniino-phenylethylamine (CB. 3034).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 92.
phenotype: Fly small. Wings slightly deformed. Small dark spots on anterior abdominal segments. In extreme cases, tergites broken and abnormally rejoined and hairs deranged. Eyes rather small. Male sterile; viability about 50 percent wild type. RK2.

stt2

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
synonym: *apt: spotty-tergum.*
references: 1959, DIS 33: 91.
phenotype: Fly small; wings wrinkled or pleated. Darkly pigmented spots dispersed over abdomen, particularly on fourth tergite. Tergites occasionally ridged or broken. Bristles long and straggly. Male sterile; viability about 30 percent normal. RK2.
other information: Allelism inferred from similarity in phenotype and genetic location at 34.1.

stu: small tumoroid

location: 1-20.4.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 92.
phenotype: Fly small; frequently has small melanotic pseudoturnors. Viability 5 percent wild type. Male fertile. RK3.

stubarista; see ***sta***
stubarista-P^{3}^: see *crm*
Stubble: see ***Sb***
Stubble~recessiv&: see *sbd*
stubbloid: see ***sbd***
Stubby: see ***Sy***
Stubby-30: see ***Bl30***
Sttibby-31119: see ***Bl311***
stubs: see ***sbs***
Stumpy: see ***St***

stw: straw

location: 2-55.1 [0.03 unit to the right of *rl* (Tano, 1966, Japan. J. Genet. 41: 299-308); between *rl* and *ap^{btt}* (Sturtevant, 1949, DIS 23: 98)].
discoverer: Bridges, 17fll.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 237.
phenotype: Hair color yellowish, especially on legs. Bristles pale at tips. Heterozygous deficiency for *stw* produces paling of body color. RK2.
cytology: Placed in 41B or C, on basis of pale body color of heterozygotes for the deficiency from 41B3 through 42A2 formed by combining left end of *In(2R)Cy = ln(2R)42A2-3;58A4-Bl* with right end of *In(2R)bw^{VDel} =In(2R)41B2-Cl;59E2-4* and inclusion of *stw* in several cytologically invisible deficiencies at base of *2R,* e.g., *Df(2R)M-S2* (Schultz).

stw*

discoverer Bridges, 21 g.
synonym: *swy,*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 239.
phenotype: Hairs pale yellow; bristles brownish with yellow tips. Wings pale yellow and somewhat thin and warped. Slightly more extreme than sfw. Larval mouth parts straw colored at basal prongs and classifiable with difficulty in third-instar larvae (Bretone, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2.

stw^{3}

origin: X ray induced,
discoverer. Serebrovsky, 1930.
phenotype: Hairs, bristles, wings, and wing veins straw yellow. Body yellowish with pronounced dark trident. Tyrosinase formed in adult (Horowitz). Wings thin and buckled. Hairs on wing cells incompletely chitinized (Waddkifton, 1941,

Proc. Zool. Soc, Ser. A 111: 173-80). Puparium noticeably lighter than wild type. Larval mouth parts straw colored at basal prongs; classifiable in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2.

other information: Waddington found that irradiation of *stw$* homozygote 2 days before eclosion produces reverse mutations that appear as single wild-type wing hairs (1940, Nature 146: 335).

***stw*^{4}**

discoverer: Mather, 37k30.

phenotype: Body pale yellow. Legs almost colorless. Wings colorless, thin, and fragile. Black areas of abdomen still black, but heavily sprinkled with pale spots. Larval mouth parts normal (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2.

***stw*^{5}**

origin: Ultraviolet induced.

discoverer Meyer, 51d.

references: Meyer and Edmondson, 1951, DIS 25: 73.

phenotype: Semilethal or associated with a closely linked semilethal. RK2.

***stw*^{6}**

origin: Ultraviolet induced.

discoverer: Meyer, 51e.

references: Meyer and Edmondson, 1951, DIS 25: 73.

phenotype: Like *stw.* Viability low. RK2.

***stw*^{7}**

origin: Ultraviolet induced.

discoverer: Meyer, 53f.

references: 1953, DIS 27: 58.

phenotype: Bristles yellowish. Wing color pale, but often overlaps wild type. Eclosion delayed. Poor viability. RK2.

stw*^{D}: *straw-Dominant

origin: Spontaneous,

discoverer: Kiil, 38k28.

references: Mossige, 1939, DIS 12: 47.

phenotype: Body and bristles of homozygote light yellow; wings thin, buckled, and curled. In heterozygote, wings less abnormal; body and bristles wild type. *stwD/stw*^{3} like *stw^.* *stw^/M(2)S2* has exaggerated *stw* phenotype. RK1.

stx: streakex

location: 1- (rearrangement).

origin: X ray induced.

discoverer: Muller, 26k30.

references: 1935, DIS 3: 30.

phenotype: Dark streak down dorsal midline of thorax. Semilethal. RK3A.

cytology: Associated with *ln(l)stx;* in the left end but breakpoints unknown.

su-: see ***su( )***

Su-: see ***Su( )***

su^-pr: see ***In(3R)su(pr)***

su(b): suppressor of black

location: 1-0.1.

origin: Spontaneous.

discoverer: Plough, 23j28.

references: 1927, Proc. Intern. Congr. Genet., 5th. Vol. 2: 1193-1200.

phenotype: Suppresses *b* so that body color is only slightly darker than wild type. No dominant effect. Egg hatch in homozygous crosses about 30 percent, apparently owing to effect on male. RK2.

cytology: Locus placed between 1B4 and 1C4 on basis of not being carried on the $2R^DX^P$ element of *T(l;2)Bld = T(1;2)1C3-4;6OB12-13* and being present on *Df(l)260-l =Dt(l)lB4-6.*

other information: Gives frequent reversion to normal allele.

su(B): suppressor of Bar

location: 2-94.

origin: Spontaneous.

discoverer: Steinberg, 361.

synonym: *m(B): modifier of Bar.*

references: 1937, DIS 7: 20.
1937, DIS 8: 11.
1939, DIS 12: 49.
1940, Collecting Net 15: 173.
1941, Genetics 26: 325-46, 440-51.

phenotype: When homozygous, increases number of eye facets from about 75 to 220 in *B* male and to 140 in *B/B* female. Affects all *B* effects but not *ey*^{2} or wild type. RK2.

su(B)2: suppressor of Bar in chromosome 2

location: 2-46 or -60 (7 units from *Tft).*

origin: Spontaneous.

discoverer Gans.

phenotype: *su(B)2/su(B)2* causes B/+ female to appear wild type. RK2.

su(B)4: suppressor of Bar in chromosome 4

location: 4- (not located).

origin: Spontaneous.

discoverer: Brehme, 39k.

synonym: *tn(B)4: modifier of Bar in chromosome 4.*

references: 1942, DIS 16: 47.

phenotype: Facet number in eyes of *B* male increased, approaching that of *B/+* female. Effect increases with age of culture. *B/B* and *B/+* female not affected. RK3.

Sufbw^^{1}): Suppressor of brown-Variegated

location: 2-105.2.

origin: Spontaneous.

discoverer: Kadel, 59bl7.

synonym: *Su-Pm: Suppressor of Plum.*

references: 1959, DIS 33: 95.

phenotype: *Su(bw*^{vi}*)/bw*^{vi} has wild-type eye color with peppering of dark spots instead of the more or less uniform brown of *bw*^{vl}*/+«* Effect on various-*bw*^{v} chromosomes varies from none fen- some to complete suppression for others. Homozygous viable. RK2.

cytology: No gross aberration (Lindsley).

other information: *Su(bw*^{vi}*)* may be a tandem duplication. Homozygous *Su(bw*^{Vl}*)* female produces 0.3 percent reversions associated with crossing over in a manner analogous to reversions of 6.

su(Cbx): suppressor of Contrabithorax

location: 1-30.

origin: Spontaneous-

discoverer: E. B. Lewis.
reference*: 1955, Am. Naturalist 89: 73-89.
phenotype: Almost completely suppresses *Cbx;* wings made virtually normal, and segmental transformations strongly reduced. RK2.

Su(Cy): Suppressor of Curly
location: *2-* (not located).
origin: Spontaneous in *In(2LR)bw^{vl}.*
discoverer: Thompson, 61e.
references: 1963, DIS 38: 28.
phenotype: *Su(Cy)/Cy* has wild-type wings. RK3.
other information: Separable from *In(2LR)bw^{vl},*

**su(dx): suppressor* of *deltex*
location: 1-5.
discoverer: Bridges, 35c26.
synonym: *su^-dx: suppressor in X chromosome of deltex.*
phenotype: Reduces phenotype of and imparts male fertility to dx^{8}'. RK2.

Su(dx): Suppressor of *deltex*
location: 2- (not located).
origin: Spontaneous.
discoverer: Bridges, 31a3.
references: Morgan, Bridges, and Schultz, 1931, Carnegie Inst. Wash. Year Book 30: 410.
phenotype: *Su(dx)/+* reduces *dxst* to a slight but recognizable, fully fertile phenotype. *Su(dx)/Su(dx)* converts *dxst* to nearly wild type. RK3.

Su(dx)2
origin: Spontaneous.
discoverer: Bridges, 31fl.
references: Morgan, Bridges, and Schultz, 1931, Carnegie Inst. Wash. Year Book 30: 410.
phenotype: Less effective than *Su(dx)* as a suppressor of *dx.* RK3.
other information: Found in *dx* stock, as was *Su(dx),* along with ed. *Su(dx)^{2}* may simply be *ed Su(dx),* or it may be of independent origin. Allelism inferred from phenotype alone.

Su(er): Suppressor of *erupt*
location: 2- (near en).
origin: Present in many stocks.
discoverer Glass, 1941.
references: 1944, Genetics 29: 436-46.
1957, Science 126: 683-89.
phenotype: Only effect is suppression of er. Semidominant. Exposure to 1000 r of X rays from shortly after fertilization [8 min, according to Glass (1957) but not until 10 hr, according to Hildreth] to middle of second larval instar inhibits *Su(®r),* and er is then manifested in about 98 percent of flies. Tryptophan fed to larvae has a similar effect. Some related compounds have a lesser effect; kynurenine and indole acetic acid have little or no effect. RK3.

su(f): suppressor of *forked*
location: 1-65.9 (to the right of *mml* and left of *bb).*
origin: X ray induced.
discoverer. Vhittiaghill, 37g4.
synonym: *au^-f.*
references: 1937, DIS 8: 11, 13.
1938, Genetics 23: 305.
1942, DIS 16: 70.
phenotype: *f su(f)* has nearly wild-type bristles; in about half the flies, some bristles slightly shortened or twisted at tips. Autonomous in gynandromorph. f alleles may be divided into suppressible and insuppressible. Among the suppressible are f, *f^{4},* and *f^{s};* among the insuppressible are f^{3} and *f3N* (Green, 1955, Proc. Natl. Acad. Sci. U.S. 41: 375—79). *su(f)* also interacts with *w^{a}* to make the eye of *w^{a} su(f)* nearly white (Green, 1959, Heredity 13: 303-15). *su(f)/Df(l^nal* has Minute-like bristles; eyes rough and ocelli reduced or absent, as are ocellar and other head bristles; acrostichal rows irregular. Excessive melanization, especially on head; some crippling of legs. Is a fertile female (E. H. Grell). *su(f)/In(l)sc*^{L}sc8^{R}* and *su(f)/0* are normal (Von Halle). RK2.
cytology: Salivary chromosomes appear normal. Located near heterochromatic-euchromatic junction as judged by the fact that *su(f)$^{+}$* is carried by certain free *X* duplications, e.g., *Dp(l;f)3, Dp(l;f)12, Dp(l;f)52, Dp(l;f)167* (Lindsley and Sandier, 1958, Genetics 43: 547—63) and by *B^{S}Y* (Zimmering, 1959, DIS 33: 175-76).

**Su(f): Suppressor* of *forked*
location: 2-74.
origin: X ray induced.
discoverer. Dobzhansky, 1931.
synonym: *Su®-f: Suppressor of forked of Dobzhansky**
phenotype: Heterozygous *Su(f)* reduces expression of *fz* bristles blunt and wavy. Female fertility low. Homozygous lethal. RK3(A).
other information: Crossing over probably reduced.

Su(H): Suppressor of Hairless
location: 2-50.5.
origin: Spontaneous.
discoverer. Plunkett, 24i.
references: Nash, 1965, Genet. Res. 6: 175—89.
phenotype: *Su(H)/+* is wild type, with L5 occasionally shortened. *Su(H)/+; H/+* has nearly normal bristles but shortened L4 and L5. Does not suppress lethality *oiH/H. H^{2},* a stronger allele, not suppressed so much as *H.* Homozygous lethal. RK3.
cytology: Placed in region between 34E5 and 35D1 on the basis of its lethality in combination with *Df(2L)64j ➥ Df(2L)34E5-Fl;35C3-Dl* (E. H. Grell).

**su(Hw): suppressor of Hairy wing*
location: 3-54.8.
origin: Spontaneous.
discoverer. Bridges, 23e4.
references: 1932, Proc. Intern. Congr. Genet., 6th. Vol. 2: 12-14.
phenotype: *Hw* male and *Hw/+* female made wild type; *Hw/Hw* female has only a trace of Hw phenotype. Also suppresses «c and *ct^{6}* completely and to a lesser extent /and *B.* Body rather squat. Wings slightly spread and warped. Female sterile; male fertile. Viability good. RK2.

other information: L. V. Morgan, Bridges, and T. H. Morgan discovered suppressors that were probably allelic (if not the same allele) to *Su(Hw).* These mutations all lost.

su(Hw)2

origin: Spontaneous in bx^3 chromosome.
discoverer: E. B. Lewis, 1948.
references: 1949, DIS 23: 59-60.
phenotype: Resembles description of *su(Hw).* Almost completely suppresses *Hw;* sc^1, sc^{Di}, and $_{SC}$Z)2 b$_{ut\ no}$t $_{SC}$2(sc"^{3}"^, sc^5, sc^6, *sc?,* sc^a, sc^{10}, sc^{Si}, or,sc^{S2}; *dm;* ct^6 but not ct^n; *lz* but not lz^3, lz^{34k}, lz^{36}, *tz37h*$_f$ *l*$_z$*48t*$_i$ $_{lz}$*6*$_t$ $_{OT}$ *i*$_z$*a.*, $_{Bx}$*2* $_{but\ no}$t *Bx, Bx*^{3}, *BxJ, Bx*^{r}, or *Bx^9k*$_;$ *t*$_{)X}$*3*$_>$ bx^{34}°, $_{an}$d *bxd* but not *bx, Cbx, pbx,* or *Ubx; ci* but not ci^{s7}&, ci^D, or ci^w. Partially suppresses *B* and f and the yellow wing color of y^2. Does not suppress *y,* y^{2S}, y^{34c}*i* y^{v2}, ac, ac^3, *svr, svrP*^{oi}, $su(s)^2$, $su(s)^s$, *tw, br, kz, pn,* pn^2, $su(w^B)$, *w,* w^a, $w<*^2$, $w*^3$, w^{bt}, w^{bf2}, $w^{B\ WX}$, *yyCO*, w^{e2}, $w^{e\,c3}$, *yyl*, w^h, w^{eat}, w^t, *fa, spl, cho, cho*^{2}, *ec, peb, rb, bo, ex, cv, vs, cm, sn,* sn^2, sn^3, sn^4, sn^{34e}, sn^{36}*, oc,* gg^2, *t,* t^2, t^3, t^4, *amx, ras,* ras^2, ras^3, *v,* v^{36f}, v^{ot}, *m, dy, tw, wy,* wy^2, *&> ty> pl, yb, un,* if^3, cs^{53}, f^{36a}, *sy,. car, to,* net, a/, ex, *S, shv, ho, E(S), Cy, ft, dp,* dp^{ov}^, *pi, Sp, b, el, rd", pu, hk, pr, Bl, Alu, It, tl,* stw^s, *ap,* ap^{blt}, *pk, ltd,* dil^2, *en, en, sea, vg, eg, L* (three alleles), *gp, c, fj, sm, a, px, bw,* bw^{2b}, bw^D, *pd, mr, or, sp,* bs^2, *R, Ly,. D, cp, in, pP, ry? sbd*^{2}, *Sb, Sb/sbd*^{2}, *ss*, ss^a*/ss,* Dr^L, *H, Pr, ca, gvl,* sv^{35a}, sv^®, sv^n, ey, ey^2, ey^4, ey^{36e}, ey^D, *M(2)173, M(2)38b,* $M(2)l^2$, *M(2)p, M(2)S1,* $M(2)S2^3$, $M(2)H^{S5}$, $M(2)m^{S6}$, *M(2)S7,* $M(2)S2^9$, *and*$M(2)m^{S13}$. Does not suppress variegation of w^+, $7V^+$, or bw^+. Ovaries rudimentary; female sterile. RK2.

***su(lz3*): suppressor* of /ozenge-34**

location: 3- (not located).
origin: Spontaneous.
discoverer: H. A. Bender.
references: Bender and Green, 1960, Genetics 45: 1563-66.
phenotype: lz^{34}; $su(lz^{34})$ eyes are larger, less rough, and more normal in color than lz^{34} alone. Female distinctly more fertile with $su(lz^{34})$ but still lacks parovaria and spermathecae. RK2.

su(pd): suppressor of purpleoid

location: 3- (not located).
origin: Spontaneous.
discoverer Bridges, 22h.
phenotype: Normal by itself. Changes *pd* eye color to wild type. RK2.

Su(Pm): see *su(bwvi)*

su(pr): suppressor of purple

location: 3-95.5 [measured for $su(pr)^B$].
origin: Spontaneous.
discoverer Stern, 27c2.
synonym: au^s*-pr.*
references: 1929, Z. Induktive Abstammungs-Vererbungslehre 52: 373—89.
Schultz and Bridges, 1932, Am. Naturalist 66: 323-34.
Stern, 1934, DIS 1: 35.
phenotype: Completely suppresses *pr,* but fly is dilapidated and poorly viable. Both sexes sterile. Enhances *Hw.* RK3(A).
cytology: Association with *In(3R)su(pr)* (breakpoints unknown) inferred from crossover reduction in *3R.*

su(pr)&: suppressor of purple of Bridges

discoverer: Bridges, 29al3.
references: 1932, Z. Induktive Abstammungs-Vererbungslehre 60: 207—18.
Schultz and Bridges, 1932, Am. Naturalist 66: 323-34.
phenotype: Eye color of *pr; su(pr)*^{B} is wild type. Eyes large and bulging. Wing venation irregular; body color pale; low viability; late hatching, and short lived. Male entirely sterile; female partially sterile. $su(pr)^B$*/su(pr)* suppresses *pr,* viability and fertility high. RK3.

***su(s): suppressor of sable**

location: 1-0.
discoverer: Bridges, 1915.
synonym: Originally called sable duplication.
references: 1919, Anat. Record, 15: 357-58.
Schultz and Bridges, 1932, Am. Naturalist 66: 323-34.
phenotype: With *su(s), s* is nearly wild type. *su(s)/+* with *s/s* is as dark as *s/s* or nearly so. Also suppresses v (probably only one allele tested). No record of testing with *pr* or sp. RK2.

su(s)2

discoverer: Bridges, 1915.
references: 1919, Anat. Record 15: 357—58.
Bonnier, 1926, Hereditas 7: 229-32.
Schultz and Bridges, 1932, Am. Naturalist 66: 323-34.
phenotype: Suppresses s, v, sp, and pr. Shows allele specificity at *v* locus; suppresses *v* and v^2 but not v^{361}, v**«, v^{51a}, *v^lb*$_{r\ or\ v}$*51c* (Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5). Allele specificity at *s, sp,* and *pr* not tested. Restores wild-type eye color, reduces nonprotein tryptophan accumulation (Shapard, 1960, Genetics 45: 359—76) and partially restores tryptophan pyrrolase activity (Baglioni, 1960, Heredity 15: 87—96; Kaufmann, 1962, Genetics 47: 807-17) in suppressible v mutants. Heterozygous $su(s)^2$ has slightly suppressive action on v (Shapard, 1960; Baglioni, I960). RK2.

su(s)3

origin: X ray induced.
discoverer: Schultz, 33a2.
phenotype: Suppresses *s, v,* and *sp; pr* not tested. RK2.

Su(s)S0!

origin: X ray induced.
discoverer: Green.
synonym: $mt^{SQ!6}$*-v: mippresmar-5016 of vermilion.*
references: 1951, DIS 25: 70.
phenotype: Suppreses *v,* not tested for suppression of «, sp, or *pr.* RK.2.

su(s)511

origin: Spontaneous,
discoverer: Green.

synonym: $su^{sl}S^{6}$-*v*.
references: 1952, DIS 26: 63.
phenotype: Like $su(s)^{2}$ in suppression of v. Not tested for suppression of s, *sp*, or *pr*. RK2.

**Su(s)S2c*
origin: Spontaneous; simultaneously with $\$c\$^{2c}$.
discoverer: Green,
synonym: su^{S3c}-*v*.
references: 1952, DIS 26: 63.
phenotype: Suppresses v. Not tested for suppression of other loci. RK2(A).
other information: May be inversion since crossing over between $su(a)^{S2c}$ and v virtually eliminated.

su(s)^{s}: suppressor of sable of Stern
origin: Spontaneous,
discoverer: Stern, 33jl9.
synonym: *su^^-v pr*.
references: 1936, DIS 5: 8.
1937, DIS 7: 20, 21.
phenotype: Suppresses *v* and *pr*. RK2.
other information: No record of test with s or sp, but said to be allelic to *su(s)*.

Su(S): Suppressor of Star
location: 2-3; based on cytological location between *shr* (2-2.3) and *ho* (2-4.0).
origin: Synthetic.
discoverer: Curry, 37b.
references: Morgan, Bridges, and Schultz, 1937, Carnegie lust. Wash. Year Book 36: 301.
Lewis, 1945, Genetics 30: 154.
phenotype: *Su(S)/S* and *Su(S)/+* wild type. RK2A.
cytology: Associated with the deficiency for 22D1 to 22E1 or the deficiency for 33F to 34A9, or both, derived by combining the left end of *In(2L)Cy = ln(2L)22Dl-2;33F5-34Al* and the right end of *Ia(2L)t = In(2L)22D3~El;34A8-9*. According to Lewis (1945), the region between 22D1 and 22E1 is more likely responsible.

****Su(sc): Suppressor of scute***
location: 3-59.
discoverer Payne,
synonym: *sc-Inh-3: acute Inhibitor cm chromosome 3; Bxt-mct-3*.
references: 1921, Genetics 5: 501—42.
Bridges and Morgan, 1923, Carnegie Inst. Wash. PubL No. 327: 158.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 225, 235.
phenotype: Tends to restore bristles removed by sc in *Su(®c)/+* heterozygotes. RK3.

****Su(ss): Suppressor of spineless***
location: 3-61 (between *toe* and *sr)*,
origin: Spontaneous,
discoverer: Bridges, 22gl5.
references: Morgan, Bridges, and Sttsrtevant, 1925, EMblioc. Geoet. 2; 236.
phenotype: *SU(M)/+* converts *»m/»a* to wild type •accept for reduced and erect posterior scutellars. Bonocygtms lethal. RK2.

Sw(ssP
origin: Spontaneous,
discoverer: E. B. Lewis, 1947.
references: 1950, DIS 24: 59.
phenotype: Homozygous or heterozygous $Su(ss)^{2}$ causes ss to have long bristles that are only slightly thin, like a mild Minute; however, the posterior scutellars remain greatly reduced as in unsuppressed ss. RK2.

Su(ss)3
origin: Spontaneous.
discoverer: Hexter, 1950.
references: 1953, DIS 27: 55-56.
phenotype: ss $Su(ss)^{3}$ homozygote wild type for all bristles; ss $Su(ss)^{3}/ss$ + intermediate between ss and wild type, ss $Su(ss)^{3}/ss$ *bx* $Su(ss)^{2}$ is wild type. RK2.

su(t): suppressor of tan
location: 3-26.
origin: Spontaneous.
discoverer Bridges, 22k2.
phenotype: Converts *t* to wild type. RK3.

***su(tu-bw): suppressor of tumor with* brown**
location: 3- (not located but probably in *3L)*.
origin: Naturally occurring allele.
discoverer Glass, 1941.
references: Glass and Plaine, 1952, Proc. Natl. Acad. Sci. U.S. 38: 697-705.
Glass, 1954, DIS 28: 74.
Burnet and Sang, 1964, Genetics 49: 223-35, 599-610.
phenotype: Reduces incidence of melanotic masses in *tu-bw* homozygote from 85—100 percent in *su(tu-bw)/+* to 5—10 percent in *su(tu-bw)* homozygote. Suboptimal ratios of pentose nucleotides, cholesterol deficiency, or excess L-tryptophan in the larval diet, as well as X irradiation of embryos, increase incidence of melanotic masses in *tu-bw; su(tu-bw)* homozygote. Glass and colleagues attribute this to an effect on *su(tu-bw)*, whereas Burnet and Sang believe the reaction controlled by *tu-bw* is affected. Does not suppress *tu-48* (Burnett, 1966, DIS 41: 161). RK3.

Su(var): Suppressor of variegation
location: 3-41.3.
origin: Spontaneous.
discoverer Spofford, 61c.
synonym: *Su-V*,
references: 1962, Genetics 47: 986—87.
1965, DIS 40: 36.
phenotype: Reduces variegated mutant effect (sometimes completely) of *w, rst, is,* sp/, *nd,* and *dm* in $Dp(l;3)N^{364}{\sim}^{S}*'$ Also reduces *w* variegation of $In(l)w^{m4}$, *mt* variegation of $ln(l)rst^{3}$, and *sc* variegation of $In(l)ac^{8}$. Enhances sc variegation of *ht(l}Mc4* and *y* variegation of $ln(l)y^{3P}$. Semidominant; heterozygote less suppressed than homozygote. Shows maternal effect; *Stt(var)/+* offspring of *Sut(var)/Su(var)* more normal than *Su(var)/+* offspring of *Su(var)/+* mothers. Homozygote fertility slightly reduced. Viability excellent. RK2.

su(ve): suppressor of veinlet
location: 3- -0.1 (0.1 unit to the left of *m)*.
origin: Spontaneous.
discoverer Curry, 37a.

phenotype: At 19°C, suppression of ve is complete except tip of L2 occasionally missing. At 25° suppression only partial, with some overlap into range of unsuppressed ve. At 19°, *su(ve)/+* partially suppresses ve. RK2.

cytology: Not included in *Dt(3L)D = Df(3L)61E2-Fl;62A4-6* from *T(Y;2;3)D;* therefore, probably located in 61A-E.

su(w^a): suppressor of white-apricot

location: 1-0.1 (placed at 0.05 by Green).

origin: X ray induced.

discoverer: Schultz, 1941.

phenotype: Darkens eye color of *w°* to brownish. Does not affect *w^a*, *w*3$_t$* vv^a, or any other w allele tested (Green, 1959, Heredity 13: 303-15). RK2(A).

cytology: Placed in region ID or E, on basis of its inclusion in *Dp(l;f)112 = Dp(l;f)lE4-Fl; 19-20* but not *in Dp(l;f)3 = Dp(l;f)lD; 19-20* (Gersh). May have small duplication in region 1D-E (Schultz).

**su(w")2*

origin: X ray induced.

discoverer: Schultz, 1944.

phenotype: Like *su(w^a).* RK2(A).

cytology: May have small inverted section in region 1D-E (Schultz).

su(w")^G: suppressor of white-apricot of Green

origin: Spontaneous in *In(l)sc^8, y^{31d} w*.*

discoverer: Green.

references: 1954, DIS 28: 74.

phenotype: Like *su(w^a).* RK2A.

**Su(y^{3P}): Suppressor of yellow-3 of Patterson*

location: 3-90.

origin: X ray induced.

discoverer: Parker, 48h.

synonym: *su-y^{31e}*.

references: 1950, DIS 24: 62.

phenotype: *Su(y^{3P})/+* suppresses *y^{3P}* to about normal color, except that wings remain yellowish. *y^{3P}; Su(y^{3P})/Su(y^{3P})* is darker than wild type but wings remain yellow. May be suppression of variegation since extra *Y* chromosomes also suppress *y^{3P}*. No effect on *y, y^2, y^{2S}, y^{3d}, y^4, y^{35a}, or y^{td}*. Homozygote has low viability and fertility; occasionally, wings held out from body. RK2.

sunburst: see *snb*

**sup: superwith*

location: 3- (not located).

discoverer. Morgan, 10k.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 35.

phenotype: Trident pattern on thorax dark. RK.3.

Super-Bar: see 5^3í

superwith: see *sup*

suppressor: see *su( )*

Suppressor: see Suf *)*

**sv: shaven*

location: 4-3.0 [in dipla-4 txiploids (Sturtevant, 1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7)].

origin: Spontaneous.

discoverer. Brldges, 20kl4.

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235 (fig.).

Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.

phenotype: Bristles reduced, somewhat variably. Trichogen irregularly displaced and usually partly converted to socket (Lees and Waddington, 1942, DIS 16: 70). *sv/sv/sv* triplo-4 nearly normal, sv haplo-4 extreme shaven (Schultz, 1935, Am. Naturalist 69: 30—54). Expression depends on temperature: excellent at 19°C, overlaps wild type at 25°, and entirely wild type at 30°. RK2.

cytology: Placed in region between 1O2E2 and 102F10, on basis of its inclusion in *Dt(4)ll = Df(4)102E2-10; 102F2-10.*

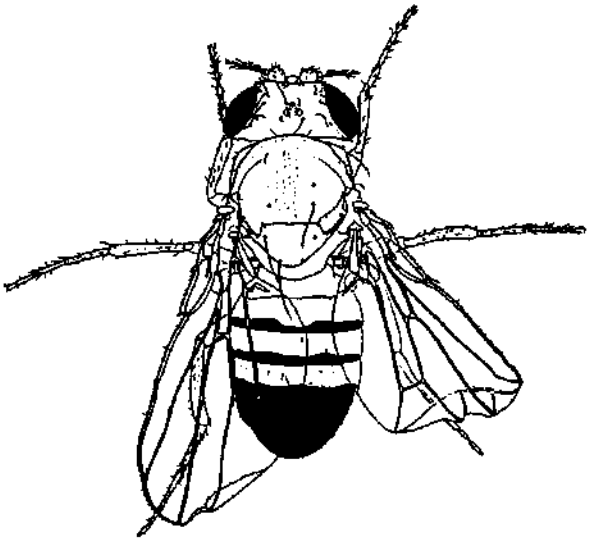
SV:* see sv"

sv^{35a}

discoverer: Ives, 35al8.

references: 1935, DIS 4: 11.

phenotype: Resembles *sv^n* more than sv. Bristles frequently reduced to stumps. RK2.



sv^{cl} *shaven-depilate*

Edith M. Wallace, unpublished.

sW*: *shaven-depiIate*

origin: Spontaneous.

discoverer. E. M. Wallace, 37a24.

phenotype: More extreme than sv". Thorax denuded over large areas. Both sexes sterile. RK2.

s v : *shaven-naked*

discoverer. Mohr, 31j!3.

synonym: sv^2.

references: 1933, Hereditas 17: 317-22 (fig.).

phenotype: Extremely short bristles. Viability excellent. Trichogen irregularly displaced, becoming more or less converted into tormogen [Lees and Waddington, 1943, Proc. Roy. Soc. (London), Ser. B, 131: 87-110 (fig.)]. In triplo-4 sWsv*Vsv", the phenotype is *more* normal than in diplo-4. RK1.

other information: Selective advantage for triplo-4 in stocks of *tsv*>* results in accumulation.

svr: silver
location: 1-0.0.
discoverer: Bridges, 23g23.
synonym: *slv.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 235.
Morgan, 1940, DIS 13: 51.
phenotype: Color of legs, wings, veins, and integument pale and silvery. Bristles and trident pattern on thorax dark. Tyrosinase formed in adult (Horowitz). Wings of all males and some females pointed. Viability fair. Larval mouth parts normal in color. RK2.
cytology: Locus placed at 1B5-6 (Demerec, Kaufman, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

svrP°h silver-pointed
origin: Spontaneous.
discoverer: Goldschmidt, 1934.
synonym: *poi.*
references: 1944, DIS 18: 42.
1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
phenotype: Body color pale. Wings pointed and occasionally soft or spread. Suppressed by *y.* Suppresses *sp* and partially suppresses s. RK2(A).
cytology: Salivary chromosomes show abnormality at 1E3-4 (Goldschmidt and Hannah, 1944, Proc. Natl. Acad. Sci. U.S. 30: 299-301).

svrP° '-*»': silver-pointed blistered
origin: Spontaneous.
discoverer: Goldschmidt, 1934.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
phenotype: Barely distinguishable from $svrP^{ot}$; best recognized in $svrP^{oi}$~^{b}t; a^{ba}, which has long, pointed wings with blistered area. RK2.

svrpo'-C<»: silver-pointed from Canton stock
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 197-222.
phenotype: Almost like $svrP^{oi}$. RK2.
cytology: Salivary chromosomes appear normal (Hannah).

svrpot'di*h: silver-pointed dishevelled
origin: Spontaneous.
discoverer: Goldschmidt.
reference*: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
phenotype: Body color pale with reduction of dark bands at posterior edge of abdominal tergites. Hairs on tergites few and irregular. In extreme cases, all hairs irregular. Enhanced by a^{bm}. Suppresses *p. RK3(A).
cytology: Abnormality of 1E3-4 (Goldschmidt and Hannah, 1944, Proc. Natl. Acad. Sci. U.S. 30: 299-301).

SVTJ»O/-JI; silver-pointed heat
origin: Recovered among F2 of heat-treated larvae.
discoverer. Goldschmidt.
references: 1945, Uaiv. Calif. (Berkeley) Publ. Zool. 4t: 291-550.
phenotype: Like $svrP^{oi}$ but somewhat more extreme. RK2.

svrP°^{olm}H: silver-pointed lanceolate
origin: Spontaneous derivative of $svrP^{oi}$.
discoverer Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 197-222.
phenotype: Wings resemble //; some are truncated. Semidominant in female; expression poor in male. RK2.
cytology: Salivary chromosomes appear normal (Hannah).

svrP°i'^{M}: silver-pointed soft
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
phenotype: Nearly wild type except when combined with a^{ba}; then, wings narrowed and pointed at tip. Heterozygous a^{bB} also gives narrow wings. RK3(A).
cytology: Salivary chromosomes appear to have a two- to four-band inversion of 1E1-4 (Goldschmidt and Hannah, 1944, Proc. Natl. Acad. Sci. U.S. 30: 299-301).

svrP°'-*': silver-pointed singed
origin: Spontaneous derivative of $svrP^{oi}$.
discoverer Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
phenotype: Indistinguishable from $svrP^{oi}$. RK2.

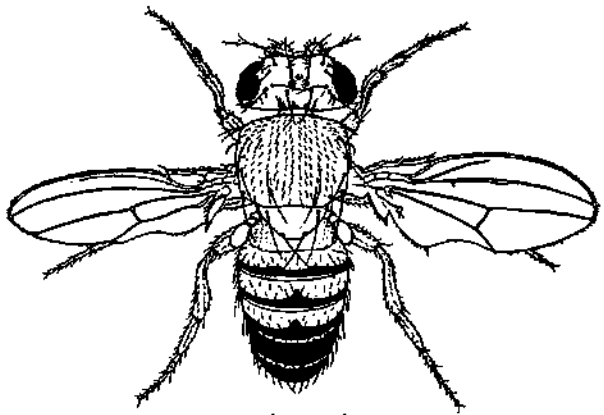
$vrP°'''*«J; silver-pointed square
origin: Spontaneous,
discoverer. Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 291-550.
other information: Presumably arose in $svrP^{ol\text{-}bl}$ but not clearly different.

svr^{Pot}: silver-Pointed Dominant
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 197-222.
phenotype: Resembles *svr,* does not suppress *sp.* Homozygote viable. Wings slightly truncated. RK2.
cytology: Salivary chromosomes appear normal (Hannah).

svr^{p}°l'*: silver-Pointed semidominant
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1947, J. Exptl. Zool. 104: 197-222.
phenotype: Pointed wings with good expression. RK2.
cytology: Salivary chromosomes appear normal (Hannah).

svs: shortened veins
location: 1-24.6.
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
synonym: &*hv* (preoccupied),
references: 1959, DIS 33: 90.
phenotype: Wings highly abnormal, varying from small stubs to almost full size with inner margin

cut away. Vein L4 often shortened and posterior crossvein absent. Eyes small and deformed. Male fertile; viability about 50 percent wild type. Female sterile. RK2.



sw: *short wing*

From Eker, 1935, J. Genet. 30: 357-68.

sw: short wing

location: 1-64.0.

discoverer: Eker, 32al2.

references: 1935, J. Genet. 30: 357—68 (fig.). 1939, J. Genet. 38: 201-27.

phenotype: Above 23°C, most flies have spread and incised wings with irregular veins; eyes reduced and roughened. Male expression more extreme than female. Above 27.5°, viability low; above 31°, sw is lethal. At 17°, most flies are wild type; at 14°, all are wild type. RK2 at 28°C.

swY:* see *stw^2

swo: *swollen antenna

location: 1-1.3.

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).

discoverer: Fahmy, 1956.

references: 1959, DIS 33: 92.

phenotype: Antennae swollen and deformed. Aristae abnormal. Eyes slightly rough, pear-shaped, and browner than normal. Body dark. Wings often upheld and frequently incised on the inner margins. Small extra sex combs on second tarsal segments of forelegs of most males. Male emerges late, is rather inviable, but is fertile. Female sterile. RK2.

other information: One allele induced by CB. 1528.

swarthy:* see *swy

swb: strawberry

location: 1-2.2.

origin: Induced by L-p-NN-di-(2-chloroethyl)amino~ phenylalanine (CB. 3025).

discoverer: Fahmy, 1958.

references: 1960, DIS 34: 49.

phenotype: Eyes large and rough, with glazed surface; color bright fed but patchy. Inner wing margins often incised. Male viable and fertile; female fertility reduced. RK2.

swollen antenna:* see *swa

swy: swarthy

location: 1-42.5.

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).

discoverer: Fahmy, 1956.

references: 1959, DIS 33: 92.

phenotype: Body color slightly dark; darkened scutellum particularly noticeable. Eyes brownish (best detected immediately after eclosion) and occasionally misshapen, *swy/s* is wild type. Viability about 50 percent wild type. Both sexes fertile. RK2.

sx: *sexcombless*

location: 1- (rearrangement).

origin: X ray induced.

discoverer: Muller, 261.

references: Mukherjee, 1965, Genetics 51: 285—304 (fig.)-

phenotype: Number of teeth in primary sex comb reduced from the normal 10 to 1. Bristles intermediate between normal bristles and sex-comb teeth also appear in sex-comb area. Bristle pattern of *sx* male basitarsus feminized in other respects. *sx/+* reduces the mean number of sex-comb teeth in *tra/tra* female from 11.37 to 3.7. Sex-comb development autonomous in mosaic from either chromosome loss or somatic crossing over in *tra/tra* female (Mukerjee and Stem, 1965, Z. Vererbungslehre 96: 36—48). Reduces number of teeth in secondary sex comb of en/en male and in primary sex comb of ey^D/+ male. Male sterile owing to imperfect development of internal duct system; testes often remain unattached to ducts, and are therefore ellipsoidal, but contain fully developed sperm (Stern, 1941, J. Exptl. Zool. 87: 113—58). External genitalia also greatly modified. Size, shape, and arrangement of teeth on clasper varies; occasionally more than one penial apparatus (Mukherjee). RK2A.

cytology: Associated with *In(l)sx = In(l)llD4-6;llE2-6;14B8-9;lSE2-4* (Mukherjee, 1963, DIS 38: 62).

sy:* see *os^s

Sy: Stubby

location: 1- or 2- (rearrangement).

discoverer: Ives, 34j31.

phenotype: Bristles short and thick, especially humerals and notopleurals. Male sterile. RK2.

cytology: Associated with *T(l;2)Sy;* breakpoints unknown, but break in *X* is genetically at the right end.

Sy3o: see ***Bl^{30}***

Sy3Hi9: **see *Bl^{311}***

syn: syndrome

location: 3-14.7.

origin: Gamma ray induced.

discoverer: Wallbrunn, 61i21.

references: 1964, DIS 39: 58.

phenotype: Eyes of male translucent brown, of female slightly darker than normal. Wings of male held at right angle to body, of female held out at about 45°. Viability low. Both sexes sterile. RK2.

t:ton

location: 1-27.5.

discoverer: Bridges, 14gl6.

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 237.
phenotype: Body color more tan than wild type. Easiest to identify by light tan antennae; male easier than female. Not positively phototropic. (McEwen, 1918, J. Exptl. Zool. 25: 49-106). Tyrosinase formed in adult (Horowitz). Larval mouth parts lighter than normal at basal prongs; classifiable with difficulty in larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2 in male.
cytology: Locus placed in region 8C3 through 8C17 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191), on basis of its inclusion in *Df(l)t2S2-l = Df(l)8C2-3;8C14-D1.*

f2
discoverer: Bridges, 19d5.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 237.
phenotype: Body color not so pale as *t,* but antennae color same. Light sensitive. Larval mouth parts lighter than normal at basal prongs; classifiable with difficulty in larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2 in male.

f*
discoverer: Bridges, 31ell.
phenotype: Lighter than *t;* tan spot on abdomen. Basal prongs of larval mouth parts lighter than normal; classifiable with difficulty in dissected larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2 in male.

*i**
discoverer: Bridges, 33c14.
phenotype: Weak f. RK3.

f282-1
origin: X ray induced.
discoverer. Demerec, 34c.
phenotype: Lethal in male; ceil lethal. RK2A.
cytology: Associated with *Dtfiyt^{26}^^{1} =D%1)8C2-3;8C14-D1* (Sutton).

***T*:** see *dp°lv2*

for: *tapered*
location: 2-56.6.
origin: Ultraviolet induced.
discoverer: Edmondson and Meyer, 49c.
references: 1949, DIS 23: 61.
phenotype: Wings narrow and pointed; somewhat longer than normal. Veins close together. Viability good. Female fertility low; male sterile. RK2.

t&: see ter

Tac: see *Ṕm^^{ac}*

tarn mo: see fmo

tan: see *t*

tapered: see fa

tar: tarry
location: 1-27.3 (0.4 unit from *lz,* probably to the left),
origin: Found among progeny of deuteron-irradiated male.
discoverer: Hildretfa, 51i.
synonym: te (preoccupied).
references: 1953, DIS 27: 56.
phenotype: Expression ranges from small black spots on distal end of femora or proximal end of tibiae to cases in which the tibiae, femora, and bases of coxae are encapsulated in a dark, brownish black, glossy covering. Legs weak. Some overlap wild type. Viability reduced. RK2.
other information: Possibly an allele of me (1-29.0).

Tarnished: see *bw^{v}3*

tarry: see *tar*

tarsi irregular: see *ti*

taw: tawny
location: 1-41.1.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 75-76.
phenotype: Head and thorax slightly dark; abdomen pale. Wings usually scooped or tips curved. Female tergites often narrow, serrated, or broken. Viability and fertility good. RK3.

taxi: see *tx*

tb: tiny bristle
location: 1-35.8.
discoverer. Bridges, 16a4.
references: 1919, J. Gen. Physiol. 1: 645—56.
phenotype: All bristles short and fine; wings somewhat short. Female fertility low. RK2.

tb: see *tbr*

tb-53: see *me*

tbd: tiny bristleoid
location: 1-25.
origin: Spontaneous.
discoverer: Curry, 37g23.
phenotype: Bristles short and thin, like a medium Minute. Fly somewhat smaller than wild type. Good viability and fertility. RK2.
cytology: Locus between 7C5 and 8C1 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Further restricted to 7E1 through 8C2, on the basis of its genetic location to the right of *oc* which is excluded from *Df(l)sn =Dt(l)7B2-3;7D22-El* (Hinton and Welshons, 1955, DIS 29: 125-26).

tbr: tracheae broken
location: 3- (not located),
origin: Spontaneous,
discoverer: Slatis.
synonym: *tb* (preoccupied),
references: 1959, Genetics 44: 536.
phenotype: Main tracheal trunks of larva have interruptions. Penetrance 17 percent at 16°C, 5 percent at 25°. Does not seem to affect viability. RK3.

tc: tiny chaetae
location: 1-51.6.
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 76.
phenotype: Bristles extremely short and fine. Eclosion delayed. Viability and fertility good. RKl.
other information: One allele induced by CB. 3007.

tdd: tiddler
location: 1-0.0 (0/871 crossovers with sc).
origin: Induced by ethyl methanesulfonate (CB. 1528).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 76.
phenotype: Body small. Viability and fertility good. RK3.

te: tenerchaetae
location: 1-5.6.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 76.
phenotype: Bristles short and fine. Eyes dark and glistening. Wings frequently small, deformed in various ways. Eclosion delayed. Male viability, but not fertility, good. Female infertile. RK3.

Tegula: see *Tg*

telegraph: see *tg*

telescope: see *ts*

ten: tenuis chaetae
location: 1-43.9.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 76.
phenotype: Bristles short and thin. Body small. Expression more extreme in female. Eclosion slightly delayed. Viability, fertility good. RK3.

tenerchaetae: see *te*

tent: see *tnt*

tenuis chaetae: see fen

ter: terraced
location: 2-36.
origin: Spontaneous.
discoverer: Bridges, 29cl2.
phenotype: Eyes have horizontal seam; often a tuft of bristles at anterior end of seam; lower half of eyes depressed and small. Variable, overlaps wild type about 20 percent. Occasionally reverts to wild type. RK3.

tet: tetraltera
location: 3-48.5.
origin: Spontaneous.
discoverer: Goldschmidt, 341.
references: 1940, Material Basis of Evolution, Yale University Press, p. 325 (fig.).
Villee, 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 125—84.
Goldschmidt, Hannah, and Piternick, 1951, Univ. Calif. (Berkeley) Publ. Zool. 55: 67-294.
phenotype: Wings reduced, with tendency to be halterelike. Mesonotum, scutellum, and bristles may be altered or absent; mesothorax becomes metathoraxlike. According to Lewis, however, dorsal posterior half of mesothorax (including wing) converted in varying degrees to structure resembling mirror image of anterior half of mesothorax. Requires as^{8} for expression (Lewis). Expression variable; overlaps wild type. Penetrance temperature sensitive: 0—1 percent at 29^C» 35 percent at 15°. Partially suppressed by *Cy* and completely so by *Gla.* Enhanced by *D, ey, ey^{D}, Me,* and Y^{L}. RK3.

tet-b: tetraltera-b
location: Multifactorial.
origin: Spontaneous.
discoverer: Goldschmidt, 1950.
synonym: tet^{Bd}.
references: 1952, J. Exptl. Zool. 119: 405-60 (fig.). 1953, J. Exptl. Zool. 123: 79-114.
phenotype: Wings reduced; not so halterelike as *tet;* more frequently leglike, with three joints. RK3.

tetrapter: see *ttr*

tf: trefoil
location: 2-55 (between 50 and 60).
discoverer: Morgan, 13k.
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 244 (fig.).
phenotype: Scutellum darkened. Base of trident pattern and back of head have extra areas of dark pigmentation. Classification uncertain. RK3.

tft: tufts
location: 2-102 (between *px* and *bw).*
origin: Gamma ray induced.
discoverer. R. M. Valencia, 1959.
references: 1959, DIS 33: 99-100.
phenotype: Sternopleural bristles form a dense tuft. Fully penetrant at 20°C, poorly so at 25°. RK2.

Tft: Tuft
location: 2-53.2.
origin: X ray induced.
discoverer Ritterhoff, 52f25.
references: 1952, DIS 26: 68-69.
phenotype: In heterozygote, number of scuteilar, postalar, and dorsocentral bristles increased; scutellars increased about fivefold, other bristles to a lesser extent. Scutellum shortened; furrow between it and the mesonotum absent. Bristles present dorsal to the halteres, at junction of thorax and abdomen. Small to moderate amounts of fluid tend to remain between the epithelial layers of the wing. Viability and fertility excellent. In homozygote, number of bristles increased, like heterozygote, but shorter. Scutellum quite small. Viability and fertility low. RK1.

tg: telegraph
location: 2-0.
discoverer: Bridges, 16c27.
references: Stern and Bridges, 1926, Genetics 11: 507 (fig.), 508-10.
phenotype: Vein L2 has one or more gaps or thin sections. Postscutellar bristles erect or misdirected. Overlaps wild type. RK3.

Tg; *Tegula*
location: 2- [o.O to 4.0; associated with *Jn(2L)Tg*\.
origin: X ray induced.
discoverer E. B. Lewis, 1962.
references: Mora, 1963, DIS 38: 32.
phenotype: Wings extended at 90° from body axis, often drooping. The tegula (small plate at base of wing) uniformly duplicated and adjoining anterior supra-alar bristle usually twinned as well. Horaozygcus lethal. RK2A.

cytology: Associated with *In(2L)Tg = In(2L)21C;22F* (Lewis and Mora).

th: thread

locotion: 3-43.2.
origin: Spontaneous.
discoverer: Bridges, 22J31.
phenotype: Aristae threadlike, without side branches. RK1.
cytology: Placed in region between 72A2 and 72E5, on basis of its inclusion in *Df(3L)th*^{1}*<>0.105--Df(3L)72A2-Bl;73A4-5* but not in *Df(3L)sti 00.171 = Dt(3L)72E4-S;74C2-3. In(3L)thiO0.293 = ln(3L)72A2-Bl;76A4-Bl;79A4-Bl* implicates 72A2-B1 (Ward and Alexander, 1957, Genetics 42: 42-54).

***f/,I00.705**

origin: X ray induced.
discoverer: Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Dt(3L)thl00.1QS = Df(3L)72A2-Bl;73A4-5.*

***$_{tn}$'100.293**

origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *In(3L)thl<>0.293 = In(3L)72A2-Bl;76A4-Bl;79A4-Bl.*

***tha: thin arched**

location: 1-27.8.
origin: Induced by S-2-chloroethylcysteine (CB. 1592).
discoverer: Fahmy, 1957.
references: 1959, DIS 33: 93.
phenotype: Fly small, with short thin bristles. Wings arched over abdomen or drooping at sides. Viability and fertility low. RK3.

***thb: thin bristle**

location: 1-48.0.
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1951.
references: 1958, DIS 32: 76.
phenotype: Bristles thin; short in female. Occasionally, vibrissae abnormal and eyes rough. Vein L5 sometimes faint or missing beyond posterior crossvein. Viability and fertility good in male but reduced in female. RK2.

thick: see ***tk***
thick legs: see ***thl***
thick vein: see ***thv***
thick veins: see ***tkv***
thickoid: see ***tkd***
thickset: see ***tht***
thin arched: see ***tha***
thin bristle: see ***thb***
thin macros: see *thm*

***thh thick legs**

location: 1-60.7.
origin: Induced by D-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1959, DIS 33: 93.
phenotype: Legs short and swollen, particularly posterior pair; swelling most pronounced in tibial and tarsal regions. Wings small and broad; divergent or slightly upheld. Body color slightly dusky and eye color a bit brownish. Male fertile; viability about 20 percent wild type. RK3.
other information: One allele each induced by. CB. 1506 and CB. 1528.

***thH: thick legs-darker**

origin: Induced by L-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
synonym: *dkl: darker legs.*
references: 1959, DIS 33: 85.
phenotype: Extra pigment in body and legs. Legs slightly shortened, especially in female. Wings small and divergent. Eye shape altered. Viability good in both sexes; female fertility reduced. RK3.

***thm: thin macros**

location: 1-48.9.
origin: Induced by 2-chloroethyl methansulfonate (CB. 1506).
references: 1958, DIS 32: 76.
phenotype: Bristles slightly shorter and thinner than normal. Viability and fertility good. RK3.

thorny: see ***tny***
thread: see ***th***
thread bristle: see ***trb***

***tht: thickset**

location: 1-42.1.
origin: Induced by DL-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3007).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 93.
phenotype: Fly reduced in size, more in length than breadth, giving a stocky appearance. Eye shape slightly altered; a few deranged facets. Viability about 10 percent wild type. Male fertile. RK3.

thv: thick vein

location: 1-49.7.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer: Fahmy, 1956.
references: 1958, DIS 32: 76.
phenotype: Veins thick, especially at junction of LI and L2. Wings short and broad; marginal hairs irregular. Eyes small and dark. Body color rather pale. Eclosion delayed. Male viable and fertile. Female fertility subnormal. RK2.

***tbv<*: thick vein-delta**

origin: Induced by L-p-NN-di(2~chloroethyl)aminophenylalanine (CB. 3025).
discoverer: Fahmy, 1955.
synonym: *dtv: delta vein.*
references: 1958, DIS 32: 69-70.
phenotype: Wings slightly short and broad and with extra venation, especially around L2, which usually ends in a delta. Anal plates and genital arch

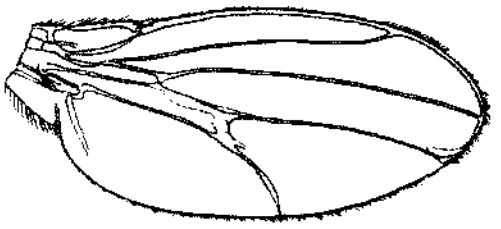
deformed; genital region protruding. Male fertile but viability about 50 percent normal. RK3.

ti: tarsi irregular
location: 2-55.9.
origin: Spontaneous.
discoverer: Ives, 38k5.
references: 1942, DIS 16: 48.
phenotype: Third and fourth tarsal segments more or less fused and swollen. Eyes slightly rough. Viability subnormal. RK2.

tiddler: **see *tdd***
tilt: **see *tt***
tiny: **see *ty***
tiny bristle: **see *tb***
tiny bristleoid: **see *tbd***
tiny chaetae: **see *tc***
tiny wing: **see *tyw***
tinylike: **see *tyl***

tk: thick
location: 2-55.3.
discoverer: Guthrie, 24k.
references: 1925, Am. Naturalist 59: 479—80.
phenotype: Legs and especially tarsi thick. Wings somewhat short and broad, with slight px-like effect. According to Waddington [l942, Proc. Zool. Soc. London Ser. A, 111: 181-88 (fig.)], these effects result from inadequate contraction of the legs and whole pupa after inflation period. RK2.
cytology: Placed in region between 42A2 and 42B1, on basis of its inclusion in inverted segment of *In(2R)Cy = In(2R)42A2-3;58A4-Bl* as well as in *Dt(2R)M-S2^{v}6^{11} = Df(2R)40F-41Al;42A19-Bl* (Morgan, Schultz, Bridges and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77).

tkd: thickoid
location: 2-40 (30 to 50).
discoverer: Bridges, 33d25.
phenotype: Fly large and thickset, with thick legs. Wings blunt at tip. Eyes large and slightly rough. Male genitalia sometimes rotated. Fertile but viability about 50 percent wild type. RK3.



tkv: thick veins
Edith M. Wallace, unpublished.

tkv: thick veins
location: 2-16.
origin: Spontaneous.
discoverer: Nichols-Skoog, 33b25.
phenotype: Veins thickened and branched in region of crossveins, near end of L2, and elsewhere. Sometimes a blister near posterior crossvein in female; L4 sometimes shortened, especially in female. Female more extreme than male. Easier to identify at 19°C. RK2.

tkv2
origin: Spontaneous,
discoverer: Bridges, 34e30.
phenotype: Veins thickened and with deltas. More-extreme expression in female and at 19°C. RK2.

/mc: tonomacrochaetae
location: 1-17.5.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 76.
phenotype: Bristles thin. Abdomen underpigmented, especially in female. Eclosion slightly delayed. Viability and fertility good. RK2.

tmo: tammo
location: Not located.
origin: X ray induced.
discoverer: Ohnishi, 491.
references: 1950, DIS 24: 62.
phenotype: Bristles one-ha If normal length. RK.2.

tms: tumorous
location: 1-58.7.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 93.
phenotype: Many small, diffuse tumors. Fly slightly small. Both sexes viable and fertile. RK3.

tnt: tent
location: 1-18.0.
origin: X ray induced.
discoverer. Fahmy, 1956.
references: 1959, DIS 33: 93.
phenotype: Wings droop to variable extent. Bristles thin. Fly small. Male sterile. RK2.

iny: thorny
location: 1-33.5.
origin: Induced by DL-p-NN-di-(2-chloroethyl)ainino-phenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1959, DIS 33: 93.
phenotype: Fly grossly deformed; extremely inviable. Eyes small, very rough, and dull red. Thoracic bristles very short. Wings abnormal, spread, incompletely expanded' Male sterile. RK2.

toni: **see *ix^{2}***
tomboy: **see *ix^{2}***
ton: tonochaetae
location: 1-60.1.
origin: Induced by l:4-dimethatiesulfonoxybut-2-yne (CB. 2058).
discoverer: Fahmy, 1951.
references: 1958, DIS 32: 76.
phenotype: Bristles short and thin. Eyes large with deranged facets. Wings short, with incised inner

margins and abnormal venation. Variable expression of eye and wing effects. Eclosion slightly delayed. Male infertile; viability about 50 percent wild type. Female sterile. RK2.

other information: One allele induced by CB. 1506.

tonomacrochaetae: **see *tmc***

tpw: **see *sto$^{t}P^{w}$***

****tr-26\: triangle-261***

location: 3- (not located).

origin: Spontaneous.

discoverer: Spencer.

references: 1934, DIS 1: 35.
1935, Am. Naturalist 69: 222-38.

phenotype: Small extra crossvein between marginal vein and L2, near their juncture. Variable; overlaps wild type. RK3.

tra: transformer

location: 3-45 (between *st* and *cp).*

origin: Spontaneous.

discoverer: Sturtevant, 44d.

references: 1945, Genetics 30: 297-99.
Seidel, 1963, Z. Vererbungslehre 94: 215-41 (fig.).

phenotype: Transforms female into sterile male, with fully developed sex combs, male-colored abdomen, normal male abdominal tergites and plates, external and internal male genitalia. Testes rudimentary, without sperm, and with ovarian-nurse-cell-like cells [Brown and King, 1961, Genetics 46: 143—56 (fig.)]. Mates readily with female. Testes reduced in size, but of normal shape and color. Transformed female slightly larger than normal male; development rate about that of female. *X/X/Y; tra/tra* also sterile. *X/Y; tra/tra* normal male, *tra/tra/tra* triploid and intersex like diploid but with larger wing cells. Superfemale intersexual. Normal testis anlage transplanted into *tra* female becomes attached to duct apparatus and produces progeny. RK2.

tra^{0}: transformer-Dominant

origin: Spontaneous.

discoverer: Gowen, 1940.

synonym: *Hr: Hermaphrodite.*

references: 1942, Anat. Record 84: 458.
Gowen and Fung, 1957, Heredity 11: 397-402.
Fung and Gowen, 1957, J. Exptl. Zool. 134: 515-32 (fig.).

phenotype: *X/X; tra^{D}/^{J}r* intersexual. Body size as large as female. Abnormal external genitalia male-like. Sex combs with six to eight teeth present. Internal genitalia extremely variable. Spermathacae and ventral receptacle often present, as are sperm pump and paragonia. Gonads most often underdeveloped ovaries. Triploid, *tra^{D}/+/+*, resembles *3N* female; genitalia female but sex combs have four to six teeth; sterile. *X/X; tra^{D}/tra* has malelike appearance; internal and external genitalia male, and sex combs have eight to nine teeth. RK3.

tracheae broken: **see *tbr***

transformer: **see *tra***

translucent: **see *tri***

trb: thread bristle

location: 1-36.3.

origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).

discoverer: Fahmy, 1955.

references: 1959, DIS 33: 93.

phenotype: Bristles short and very thin. Hairs small and sparse. Wings more rounded at tips, margins often incised; veins slightly thickened. Trident pattern slightly darker than wild type. Male viable and fertile; female sterile. RK2.

other information: One allele induced by CB. 3026.

****tre: triangle eye***

location: 1-20.2.

origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).

discoverer: Fahmy, 1956.

references: 1959, DIS 33: 93.

phenotype: Eyes triangular with apex pointing forward. Fly large. Wings broad, blunt tipped, and slightly divergent. Male viable and fertile; female sterile. RK3.

trefoil: **see *tf***

tri: trident

location: 2-55.

origin: Spontaneous.

synonym: Probably *trj32k. $_{M}$33d27. and ^33^18* are the same.

discoverer: Plough, 32k.

references: Plough and Ives, 1934, DIS 1: 34.
1935, Genetics 20: 42-69.

phenotype: Dark trident or streak on thorax. Scutellura and stemopleural plates also dark. Thorax often contains bubbles. Variable; overlaps wild type, but also semidominant. RK3.

triangle eye: **see *tre***

triangle-261: **see *tr-261***

trident: **see *tri***

trimmed: **see *fr****

****trl: translucent***

location: 2-45 or -65 (10 units from B/).

origin: Spontaneous.

discoverer: Bridges, 20bl7.

references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 238.

phenotype: Eye color translucent ruby, like p. RK2.

tnxi: see *fr^{2}*

Truncate-51h: see *dpolM*

**ts: telescope*

location: 2-68.

discoverer: Bridges, 15127.

references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 291 (fig.).

phenotype: Abdominal segments somewhat drawn out. Wings drooping and divergent. Overlaps wild type. RK3.

ft: tilt

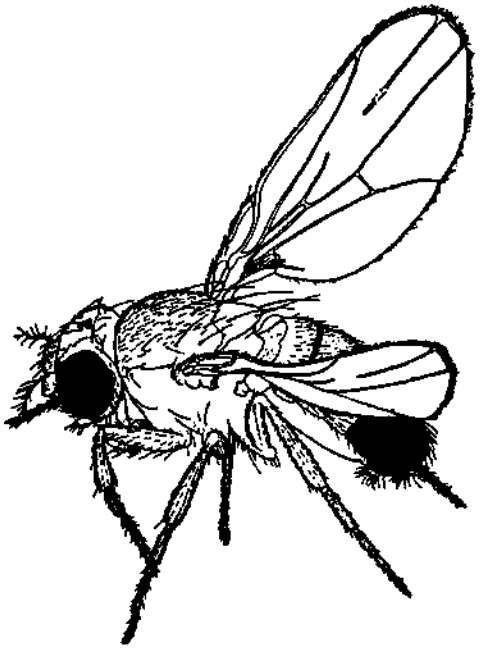
location: 3-40.0.

discoverer: Bridges, 15h29.

references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 134 (fig.).
Mossige, 1938, Hereditas 24: 115.

phenotype: Wings spread, elevated, and warped in a compound curve. Vein L3 shows gap. Eye color

may be slightly dilute. Developmentally, L3 originally complete but central section disappears during contraction period (Waddington, 1940, J. Genet. 41: 75-139). RK2.



tt: tilt

From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 135.

**ttr: tefrapter*

location: 3-51.3.
discoverer: Tshetverikov, 25b.
references: Astaurov, 1929, Arch. Entwicklungsmech. Organ. 115: 424-47.
1930, Z. Induktive Abstammungs- Vererbungslehre 55: 183-262.
Timoféeff-Ressovsky, 1934, Z. Induktive Abstammungs- Vererbungslehre 67: 248 (fig.).
Villee, 1942, Univ. Calif. (Berkeley) Publ. Zool. 49: 180-81.
phenotype: Like ðx. Halteres tend to become wing-like. Most flies wild type but may have, in place of a haltere, an organ one-half the size of a normal wing with veins, bristles, and sense organs. RK3.

Tu: Turned-up wing

location: 1-59.
origin: X ray induced.
discoverer: Muller, 46119.
references: Muller and Valencia, 1947, DIS 21: 70.
phenotype: Wings curled; somewhat wrinkled in longitudinal direction. Heterozygous viability good; homozygote also viable. RK1.

tu: tumor

General term used to denote genes that lead to formation of melanotic masses of tissue, usually in late larval stages. Masses apparently result from cell aggregation rather than proliferation since cells in division are not observed within them; Barigozzi refers to them as pseudotumors. They are under multigenic control, but where adequate analysis exists there usually seems to be one primary locus and numerous secondary loci responsible for the phenotype. In many instances, different names have been applied to different derivatives of the same tumor line, which have the same mary gene but different markers and therefore different constellations of modifiers. The present treatment represents an attempt to define, insofar as possible, the primary loci.

tu-1: see *tuh-1*

***tu-la**

location: 2- (not located).
origin: Spontaneous.
discoverer: Payne.
references: Wilson, 1924, Genetics 9: 343—62 (fig.).
phenotype: In combination with *tu-lb,* produces melanotic masses in posterior third of third-instar larva; 20 percent of larvae and 14 percent of adults affected. Produces some effect when *tu-lb* heterozygous. Eighty-one percent of larvae with tumor and 57 percent of those without die before eclosion. *tu-la/+; tu-lb/+* has infrequent melanotic masses. RK3.

***tu-lb**

location: 3- (not located).
origin: Spontaneous.
discoverer: Payne.
references: Wilson, 1924, Genetics 9: 343-62 (fig.).
phenotype: In combination with *tu-la,* produces melanotic masses in posterior third of third-instar larva; produces some effect when *tu-la* heterozygous. RK3.

***tu-2**

location: 2- (not located).
origin: Spontaneous.
discoverer. Payne.
references: Wilson, 1924, Genetics 9: 343-62 (fig.).
phenotype: Melanotic masses in larval hemocoele; 20—100 percent of larvae affected. Forty-one percent mortality of affected larvae. RK3.
other information: Modifiers on third chromosome.

tu-3: see *tuh-3*

tu-36a

location: *2-* (not located).
origin: Spontaneous.
discoverer: Bridges, 36al6.
references; Russell, 1940, J. Exptl. Zool. 84: 363—79 (fig.).
1942, Genetics 27: 612-18.
Oftedal, 1953, Z. Induktive Abstammungs- Vererbungslehre 85: 408—22.
phenotype: Melanotic masses appear in late larval instars. RK3.

tu-36e

location: Not located,
origin: Spontaneous.
discoverer: Skoog, 36el5.

tv-48

location: 2-29.5.
origin: Spontaneous.

discoverer: Ghelovitch, 1948.
references: 1950, Compt. Rend. 230: 1002-4.
phenotype: Melanotic masses become visible to unaided eye in third instar; located in abdomen; vary in size. RK3.
other information: Modifiers on the *X* and possibly the fourth chromosome.

tu-48[49h]
origin: Spontaneous.
discoverer: Brncic.
synonym: *iu[49h]*.
references: 1950, DIS 24: 57.
other information: Modifier on third chromosome. Allelism to *tu-48* inferred from interaction in heterozygote (Burdette, 1959, Texas Univ. Publ. 5914: 57-68).

tu-48**
references: Barigozzi and di Pasquale, 1956, Rend. 1st. Lombardo Sci. Lettere, Ser. B 90: 484-509.
Barigozzi, 1962, Atti Assoc. Genet. Ital. 7: 9-76.
other information: Allelism to *tu-48* inferred from its location about 20 units to the left of 6.

tu-48j
location: 3-46.
origin: Spontaneous.
discoverer: Herskowitz.
synonym: *tu[48]L*
references: 1949, DIS 23: 57.
Herskowitz and Burdette, 1951, J. Exptl. Zool. 117: 499-521.
phenotype: Melanotic growths appear in larva, more often posteriorly than anteriorly, and in adult abdomen. Penetrance around 50 percent; about two masses per fly. RK3.

tv-49k
location: 2- (not located).
origin: Spontaneous.
discoverer: Oftedal.
references: 1951, DIS 25: 122-23.
1953, Z. Induktive Abstammungs- Vererbungslehre 85: 408-22 (fig.).
phenotype: Black aggregations of blood cells becoming macroscopically visible 96 hr after hatching. Result from cell aggregation rather than proliferation. RK3.
other information: Modifiers on *X* and second chromosome. Not an allele of *tu-bw*,

tv-53
location: 1-41.
origin: Beta ray induced.
discoverer. Darrow, 53120.
references: King, 1955, DIS 29: 73.
phenotype: Small, melanotic masses in 15—20 percent of adults. Wings occasionally blistered or nicked; veins knotted or abbreviated. Egg hatching delayed and reduced to about 65 percent normal. Viability 30-50 percent normal. RK3.
other information: Not an allele of ivy.

tu-54e
location: Not located.
origin: Spontaneous.
discoverer Haddox, 54e23.
references: Burdette, 1954, DIS 28: 73.
phenotype: Small melanotic masses under tergites 1 and 2. Tumor incidence 0.44 percent. RK3.

****tu-59h***
location: 2- (not located).
origin: Spontaneous.
discoverer: Oshima.
references: 1959, DIS 33: 99.
phenotype: Small melanotic masses in third-instar larval abdomen; persist into adult stage. RK3.

tu-hw: tumor with brown
location: 2-80.5 (E. H. Grell).
origin: Spontaneous.
discoverer: Morgan, 1922.
synonym: *ifit^-: melanotic tumor-A,*
references: 1938, DIS 9: 108.
Hartung, 1950, J. Heredity 41: 269-72.
Oftedal, 1953, Z. Induktive Abstammungs- Vererbungslehre 85: 408-22.
phenotype: Numerous melanotic masses in posterior part of hemocoele; increase in size and number through third instar; remain as benign bodies in adult abdomen. Characterized by precocious transformation of plasmatocytes into lamellocytes (which usually occurs at time of pupation); subsequent encapsulation of tissue by lamellocytes produces melanotic masses (Rizki, 1957, J. Morphol. 100: 459-72). RK3.

tu-bw[501]
origin: Spontaneous.
discoverer. Mittler, 1950.
synonym: *tu^^K*
references: 1951, DIS 25: 74.
phenotype: Darkly pigmented spots beneath ventral abdominal surface. RK3.
other information: Allelism inferred from location between 75 and 90 on chromosome 2.

tv-bwSSg
origin: Spontaneous.
discoverer: Jacobs.
references: Jacobs, Bowman, and Walliser, 1958, DIS 32: 130.
phenotype: Melanotic masses appear in larva 55 hr after batching; persist in adults, commonly in abdomen, occasionally in thorax, and rarely in head. Nearly 100 percent penetrant. RK3.
other information: Allelism by Erk and Sang (1966, DIS 41: 95).

tu-bw[B3]
references: Barrigozzi and di Pasquale, 1956, Rend. 1st. Lombardo Sci. Lettere, Ser. B 90: 484-509.
Barigozzi, 1962, Atti Assoc. Genet. Ital. 7: 9-76.
other information: Tentatively considered to be an allele of *tu-bw* from crossover data, which place it about 18 units to the right of v^.
other information: Allelism by Erk and Sang (1966, DIS 41: 95).

tu-bw*
origin: Spontaneous,
synonym: ••'•' *tu.*
references: Friedman, Harnly, and Goldsmith, 1951, Cancer Res. 11: 904-11.

Kaplan, 1955, Trans. N.Y. Acad. Sci. 17: 289-93.
phenotype: Dark masses in posterior regions of larva and in abdomen and thorax of imago. RK3.

tu-g
location: 2- (not located).
synonym: *tu&.*
references: Burdette, 1951, DIS 25: 101—2.
Oftedal, 1953, Z. Induktive Abstatnmungs-Vererbungslehre 85: 408—22.
Burdette, 1959, Texas Univ. Publ. 5914: 57-68.
phenotype: Penetrance 47 percent. Second- and third-instar larvae have melanized large blood cells and spindle-shaped cells in hemocoele. RK3.

***tu-h^{63}:* see ey'"**

tu-K: tumor from Oregon-K
location: 2- (not located).
origin: Spontaneous.
discoverer: Sang and Burnet.
references: 1963, Genetics 48: 235—53 (fig.).
1964, Genetics 49: 223-35.
phenotype: Small black nodules become evident toward end of third instar, either free in abdominal hemocoele or associated with the fat body. Penetrance low but increased by suboptimal balances of pentose nucleotides, cholesterol deficiency, or an excess of L-tryptophan in the larval diet as well as by X irradiation of embryo. RK3.
other information: Not allelic to *tu-hw.*

****tu-R: tumor of Rosenberg***
location: 1- (not located).
origin: X ray induced.
discoverer Rosenberg, 57c.
references: Hinton, 1957, DIS 31: 83.
phenotype: Bristles shortened. Tumor not described, but penetrance 40 percent. Developmental time lengthened. Viability of male and homozgous female about 50 percent normal. RK3.

****tu-W: tumor from We//e$/ey***
location: 2- (not located).
origin: Spontaneous.
discoverer. Gowen.
references: Wilson, King, and Lowry, 1955, Growth 19: 215-44 (fig.).
phenotype: Melanotic masses become visible 97—102 hr after hatching. Located on surface of or imbedded in fat body. Located in abdominal segment 10 and less frequently in 9 and 11. Characterized by precocious transformation of plasmatocytes into lamellocytes (which usually occurs at time of pupation); subsequent encapsulation of tissue by lamellocytes produces melanotic masses (Rixki, 1957, J. Morphol. 100: 459-72). Viability and fecundity low. RK3.
other information: Modifiers on the *X* and third chromosomes. Not allelic to *tu-bw* or *tu-48^{49h}*-

tuf: tufted
location: 2-55.5 (between *pk* and *ltd).*
origin: Spontaneous.
discoverer: Sturtevant, 1948.
references: 1948, DIS 22: 56.
phenotype: Small tuft of hairs between eyes and antennae; basal twinning of anterior halves of wings. Overlaps wild type. *tuf/T(2;3)dp* has extreme form of phenotype. RK2.
cytology: Included in *In(2R)Cy = In(2R)42A2-3;58A4-B1* (Sturtevant, 1949, DIS 23: 98).

Tuft:* see *Tft
tufted:* see *tuf
tufts:* see *tft

tuh-1: tumorous head in chromosome 7
location: 1-64.5.
origin: Spontaneous.
discoverer: Griff en.
synonym: *tu-1.*
references: Gardner, 1949, DIS 23: 57.
Gardner and Woolf, 1949, Genetics 34: 573—85 (fig).
Newby, 1949, J. Morphol. 85: 177-95 (fig.).
Newby and Thelander, 1950, DIS 24: 89-90.
phenotype: In presence of *tuh-3,* produces asymmetrical growths of variable size in head region; mostly external but sometimes internal. Penetrance responds to selection. Produces maternal effect in that reciprocal crosses between tumorous-head flies and wild type produce different results. Asymmetry of eye and antenna 1 disks evident in 32 hr larva; contains cells with large chromatic inclusions not seen in wild type. Viability about 70 percent normal. RK3.
other information: Modifiers on chromosome 2.

tuh-3: tumorous head in chromosome 3
location: 3-58.5.
origin: Spontaneous.
discoverer: Griff en.
synonym: *tu-3.*
references: Gardner, 1949, DIS 23: 57.
Gardner and Woolf, 1949, Genetics 34: 573—85 (fig-)-
Newby, 1949, J. Morphol. 85: 177-95 (fig.).
Newby and Thelander, 1950, DIS 24: 89-90.
phenotype: In presence of *tuh-1,* produces tumorous-head phenotype described under *tuh-1.* Semidominant. Suspected by Woolf (1966, Genetics 53: 295-302) of contributing in certain crosses, to inhibition of attachment of testes to duct system during development, causing formation of small, unattached, uniform gonads. RK3.

Tuh Turneduplike
location: 1-50 (between *g* and *f).*
origin: Spontaneous,
discoverer: Muller.
references: 1965, DIS 40: 35.
phenotype: Like *Tu.* Wing tips of heterozygote turned up slightly but definitely not twisted. Male and homozygous female more extreme, with wrinkled wings sometimes held somewhat apart; viable and fertile. RK2.

***tumor:* see to-**
tutnorhe&d-63:seeey*™
tumorous:* see *tms
tumorous head:* see *tuh
Turned-up wing:* see *Tu
Turneduplike:* see *Tul

fw: ***twisted***
location: 1-0.4.
origin: X ray induced.
discoverer: Demerec, 28cl4.
phenotype: Abdomen twisted clockwise about 30°, as viewed from behind, and not overlapping wild type. Body tends to be dwarfed. Viability about 60 percent wild type. Male usually fertile. RK2.
cytology: Locus between 1CS and 2C10 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

fw2
origin: Spontaneous.
discoverer: Mohr, 32bl.
phenotype: More extreme than fw. Body regularly dwarfed. Abdomen twisted 30—60° clockwise, as viewed from behind; male genitalia often twisted counterclockwise. Viability about 50 percent wild type. Male usually fertile, *tw^/tw* like *tw**. RK2.

twg:** ***twisted genitals
location: 1-48.1.
origin: Induced by 2-chloroethyl methanesulfonate (CB. 1506).
discoverer Fahmy, 1956.
references: 1959, DIS 33: 93-94.
phenotype: External genitalia abnormally positioned on extreme tip of abdomen. Tergites often notched at mid-dorsal line. Eyes large, abnormally shaped, and slightly rough. Wings vary from almost normal to small, deformed structures with very abnormal venation. Bristles frequently waved or bent. Male viability and fertility subnormal. RK2.

twirl*: see *twl

twirled tips: **see *twt***

twisted: **see fw**

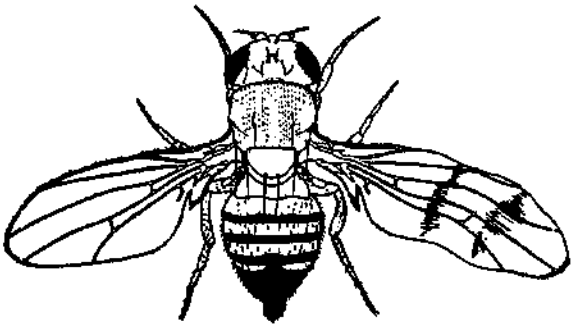
twisted genitals; **see *twg***

twl: twirl
location: 2-63.5.
origin: Ultraviolet induced.
discoverer. Meyer, 54d.
references: 1955, DIS 29: 74-75.
phenotype: Wings strongly curled. Good viability; easy to classify. RK2.
other information: Possibly an allele of *upw* (2-62).

Two-b:** ***Two bristles
location: 3-58.3.
origin: Spontaneous,
discoverer: Bridges, 16b22.
references: Bridges and Morgan, 1923, Carnegie lost. Wash. Publ. No. 327: 155.
phenotype: Two postvertical bristles always and two anterior dorsocentrals usually absent. Heterozygote viability excellent. Homozygous lethal. RK1.

twt:** ***twirled tips
location: 1-37.1.
origin: Induced by l:4-dimethanesulfonoxybut-2-yne (CB. 2058).
discoverer: Fahmy, 1951.
references: 1959, DIS 33: 94.
pfoeuotype;: Wings completely or partially unexpended; tips frequently twisted. Male inviable, dies shortly after eclosion and does not breed. RK3.

tx: taxi
location: 3-91.
origin: Spontaneous.
discoverer: Collins, 24j30.
references: 1928, Am. Naturalist 62: 127-36 (fig.).
phenotype: Wings held out at about 75° from body axis, often arched or wavy, somewhat narrow and dusky. RK2.



tx: taxi
From Collins, 1928, Am. Naturalist 62: 127-36.

tx52j
origin: Spontaneous.
discoverer: Tsukamoto, 52j.
references: 1956, DIS 30: 79.
phenotype: Like *tx*. Good viability; easily classified. RK2.

ty: tiny
location: 1-44.5.
discoverer: Bridges, 25kl.
phenotype: Bristles small. Body small. Eclosion delayed. Viability excellent. Female sterile. Yolk formation in oocytes inhibited [King and Burnett, 1957, Growth 21: 263-80 (fig.)]. Follicular cells form abnormal derivatives of endoplasmic reticulum and migrate abnormally or form excess of normal endoplasmic reticulum derivative [King and Vanoucek, 1960, Growth 24: 333-38; Falk and King, 1964, Growth 28: 291-324 (fig.)], *ty* ovaries in ry^+ host develop autonomously (King and Bodenstein, 1965, Z. Naturforsch. 20B: 292-97). RK2.

tyb-2: tiny bristle-2
location: 1-19.5.
origin: Spontaneous.
discoverer: Neel, 4119.
references: 1942, DIS 16: 52.
phenotype: Bristles small and thin. Viability and fertility good. RK1.

tyl: tinyIike
location: 1-36.
origin: X ray induced in *In(l)dl-49*.
discoverer: Oliver, 28k4.
references: 1935, DIS 3: 28.
1942, DIS 16: 53.
phenotype: Bristles short, fine, and stubblelike. Eclosion delayed. Both sexes viable and fertile. RK2A.
other information: Not separated from *In{l)dl-49*.

tyr-h tyros inase-1

location: 2-52.4 (4.2 units to the right of *b).*
origin: Spontaneous.
discoverer: H. W. and H. S. Lewis, 1960.
synonym: *a[1]: alpha-1.*
references: 1960, DIS 34: 51.
1961, Proc. Natl. Acad. Sci. U.S. 47: 78-86.
1963, Ann. N.Y. Acad. Sci. 100: 827-39.
phenotype: Homozygote has much less tyrosinase activity than most strains. Tyrosinase in *tyr-1/try-1* is heat labile relative to wild type and has a different substrate profile. Probably *tyr-1* specifies primary structure of the enzyme. Modifying genes that alter amount of tyrosinase activity in other strains have no effect on homozygous ryr-i. RK3.

Tyr-2: Tyrosinase-2

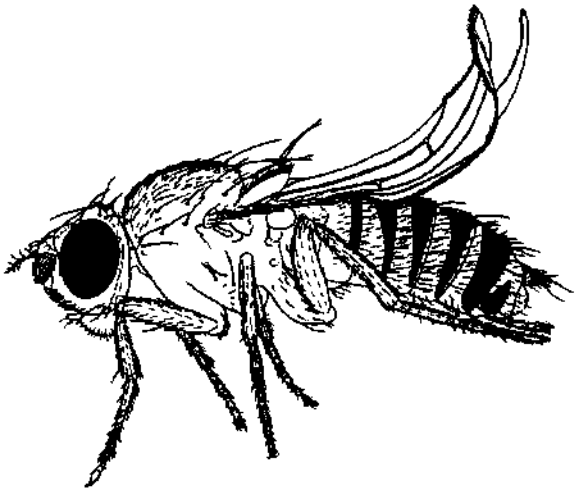
location: 2-57.
origin: Naturally occurring allele found in *In(2L)Cy + In(2R)Cy.*
discoverer: H. W. and H. S. Lewis.
references: 1963, Ann. N.Y. Acad. Sci. 100: 827—39.
phenotype: In combination with some modifying genes, reduces tyrosinase activity about 50 percent. Dominant. RK3A.

Tyr-3: Tyrasinase-3

location: 3- (on the right arm).
discoverer: H. W. and H. S. Lewis.
references: 1963, Ann. N.Y. Acad. Sci. 100: 827-39.
phenotype: In combination with some modifying genes, reduces tyrosinase activity about 35 percent. RK3.

****tyw: tiny wing***

location: 3-0.
discoverer: Bridges, 18c9.
phenotype: Wings small. Postscutellars divergent, curving upward and forward. Extra bristles on head and thorax. Viability 60 percent wild type. RK3.



U: Upturned
Edith M. Wallace, unpublished.

U: Upturned

location: 2-70 (based on $U^{H2°}$, whose allelism is uncertain).
origin: X ray induced.
discoverer: Ball, 32a27.
references: 1935, DIS 3: 17.
phenotype: Wings upturned like those of *Cy* but dark and waxy. Postscutellars crossed as in cu. Body color darker than normal. Eyes mottled with light flecks. Homozygous lethal. RK2A.
cytology: Associated with *In(2LR)U;* breakpoints unknown.

**UH20*

discoverer: Tanaka, 35a6.
references: 1937, DIS 8: 11.
phenotype: Wings curled like those of *Cy.* Homozygous viable. RK2.

Ubx: Ultrabithorax

location: 3-58.8.
origin: Spontaneous.
discoverer: Hollander, 1934.
synonym: *bx®: bithorax-Dominant; bxdP: bithoraxoid-Dominant; Bxl: Bithoraxlike.*
references: 1937, DIS 8: 9, 77.
Lewis, 1949, Heredity 3: 130.
1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74 (fig.).
1954, Am. Naturalist 88: 225-39.
1955, Am. Naturalist 89: 73-89.
1963, Am. Zoologist 3: 33-56.
phenotype: Halteres of heterozygote about twice normal volume, characteristically with one or more hairs on anterior surface of swollen apical segment, or capitellum, of the haltere. No overlap with wild type and little variability; accurate scoring takes practice. Homozygous larva has, in addition to normally present mesothoracic pair of spiracles, both a metathoracic and a first abdominal spiracle pair. Flies homozygous for *Ubx* but carrying *Dp(3;3)bxd^00 = Dp(3;3y66C;89B5-6;89E2-3,* which carries a normal allele of *bx* but none of *bxd,* have extreme *bxd* phenotype. *Ubx/bx[34e]* has oval, flat halteres; phenotype more extreme if the third chromosomes are heterozygous for a chromosome aberration with a breakpoint between the centromere and the *bx* locus; E. B. Lewis (1954) termed this the transvection effect. *bx3** Ubx/+ +* indistinguishable from *Ubx/+. Ubx/bxd* has large, fleshy halteres like *bxd/bxd;* larva lacks first abdominal ventral row of setae. The *cis* types, *Ubx bxd/+ +* and *Ubx phx/+ +,* also indistinguishable from *Ubx/+. Ubx/pbx* has large halteres and causes transformation of posterior metathorax toward posterior mesothorax. Homozygous lethal. Enhances expression of Pc and *Sex* (Hannah-Alava, 1964, Z. Vererbungslehre 95: 1—9). RK2.
cytology: Placed close to, if not in, doublet 89E1-2 (E. B. Lewis). Salivary chromosomes normal.
other information: Middle member of bx pseudoallelic series including, from left to right, *bx, Cbx, Ubx, bxd,* and *pbx* (see map under bx).

***Ubx*[67b]**
origin: X ray induced in *In(3LR)TM6.*
discoverer: Bacher, 67b.
phenotype: Weak Ubx effect. RK3A.
cytology: Not associated with further rearrangement.

Ubx'oi
origin: X ray induced.
discoverer: E. B. Lewis, 1947.
synonym: *Bxl*[101].
phenotype: Like *Ubx* but much more extreme in interactions with other *bx* pseudoalleles. RK1A.
cytology: Associated with *In(3LR)Ubx*[101] = *In(3LR)80;89D9-El.*

***Ubx*[130]**
origin: X ray induced.
discoverer: E. B. Lewis, 511.
references: 1952, DIS 26: 66.
1952, Proc. Natl. Acad. Sci. U.S. 38: 953-61.
phenotype: Like *Ubx* but much more extreme in interactions with other *bx* pseudoalleles. RK1A.
cytology: Associated with *In(3LR)Ubx^0 = In(3LR)61A-C;74;89D-E;93B;96A.*

Ubx*
origin: X ray induced.
discoverer: Schalet, 1959.
references: 1960, DIS 34: 53, 55.
phenotype: Halteres like *Ubx.* Most flies have variable rough eyes and lack one or both postvertical bristles; a few have a slight upward curvature of wings, RK1A.
cytology: Associated with *In(3LR)Ubx*[A] (cytological breakpoints unknown), with one break between *h* and s*t* and another left of e.

uex: unextended
location: 2-55.
origin: Spontaneous.
discoverer: Maeda, 5813.
synonym: *unexpended.*
references: 1962, DIS 36: 39.
phenotype: Wings incompletely expanded as in newly emerged fly; about one-half normal length and frequently inflated. Tibiae and tarsi of third legs irregularly shortened and gnarled. Posterior scuteliars convergent. Male viability low. RK2.

Uf: Unfolded
location: 2- (to the left of 6).
origin: X ray induced.
dJ»cov«rer. Beigovsky, 36c29.
phenotype: Wings spread in homozygote and heterogerte. Viability and ferdlity good. RK3.

Wfra-tef.' see *BB*

Ultrabithorax:* see *Ubx

un: uneven
location: 1-54.4.
origin: Spontaneous.
discoverer: llobr, 25a 14.
references: 1927, Ifyt Mag. Natarv. 65: 266,
phenotype: Eyes somewhat smaller than normal; surface roa^i. RK1.

***un*[3]**
origin: X ray induced,
discover**: Deaeree, 28f30.
synonym: *ro-63.*
phenotype: Like un, but wing margins frayed. RK1.

origin: X ray induced.
discoverer: Dubinin, 1928.
phenotype: Less extreme and more viable than *un* or un[3]. RK2.

un*[K]: *uneven of Krivshenko
origin: Spontaneous.
discoverer: Krivshenko, 56b9.
references: 1956, DIS 30: 75.
phenotype: Eyes slightly small, bulging, and rough. Scutellum long and narrow; scutellar bristles thin, misdirected, and often deformed. Viability and fertility good. RK1.
cytology: Salivary chromosomes appear normal.

***un*[P]: *uneven from P^*[2]**
origin: Induced by P[32].
discoverer Bateman.
references: 1951, DIS 25: 78.
phenotype: Like *un.* RK2.
other information: Allelism inferred from phenotype and genetic location.

unc: uncoordinated
location: 1-65.9 (reduced from Fahmy's value of 68.9 to fit on map).
origin: Induced by L-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3025).
discoverer. Fahmy, 1954.
references: I960, DIS 34: 49.
phenotype: Fly unable to walk because of lack of coordination in moving legs. Wings held up and frequently curled at tips. Dies shortly after eclosion. RK3.

undersized:* see *us
uneven:* see *un
Uneven wing:* see *Bgz
unexpended:* see *uex
unexpanded:* see *unp
unexpanded irregular:* see *unr
***unextended:* see uex**
unfolded:* see *uf

unp: unexpanded
location: 1-63.1.
origins Induced by DL-p-NN-di-(2~chloroethyl)aminophenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references; 19S9, DIS 33: 94.
phenotype: Wings always unexpanded; frequently droop-. Two symmetrical grooves occur on the pronotam iuMaediately anterior to wing base. Postsciitellar bristles often crossed. Eclosion delayed. Male fertile; viability about 10 percent normal. Female extremely inviable. RK3.
oftei- Information: On© allele each induced by CB. 1356 and X rays.

um: unexpanded irregular
location: 1-52.3.
origin: Induced by 2-chloroethyl niethanesulfonate (CB. 1506).
d-iscov&rer: Fahmy, 1956.
reference*: 19S9, DES 33: 94.

phenotype: Wings usually unexpanded to some degree; if expanded, they are short, broad, and slightly drooping or divergent. Fertility reduced in both sexes. RK3.

up: upheld

location: 1-41.0.
origin: Induced by DL-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3007).
discoverer: Fahmy, 1954.
references: 1958, DIS 32: 77.
phenotype: Wings held upright. Viability and fertility good. RK1.
other information: Two alleles induced by CB. 1528.

**ups: upright scutellars*

location: 1-40.8.
origin: Spontaneous.
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 77.
phenotype: Posterior scutellar bristles held vertically. Fly small. Eyes dull, small, and abnormally shaped. Wings short and folded. Male sterile; viability about 20 percent normal. RK2.

Upturned: see *U*

**upw: upward*

location: 2-62.
discoverer: Bridges, 33k21.
phenotype: Wings turned up at tips. More extreme at higher temperatures. Veins sometimes have lumps. RK3.

vq: see *£*"<?*

**us: undersized*

location: 1-52.5.
origin: X ray induced.
discoverer: Fahmy, 1956.
references: 1959, DIS 33: 94.
phenotype: Body small. Viable and fertile. RK3.
other information: One allele each induced by CB. 1506 and CB. 1528; two by X rays.

UW: see Bg^2

v: vermilion

location: 1-33.0.
origin: Spontaneous.
discoverer Morgan, 10k.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 27 (fig.).
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eye color bright scarlet owing to absence of brown ommochrome. Ocelli colorless. The combination v; *bw* has white eyes. Eye color wild type in genetically v eyes of gynandromorph mosaic for wild type and v tissue (Sturtevant, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 304—7). v eye disks develop wild-type pigmentation when transplanted into wild-type larva (Beadle and Ephrussi, 1936, Proc. Natl. Acad. Sci. U.S. 22: 536—40). The v^+ hormone of Beadle and Ephrussi was identified as kynurenine (Butenandt, Weidel, and Becker, 1940, Naturwissenschaften 28: 63-64). Activity of the indueible enzyme (Rizki and Ri*ki, 1963, J. Ceil Biol. 17: 87-92) tryptophane pyrrolase, absent (Baglioni, 1959, Nature 184: 1084-85; 1960, Heredity 15: 87-96). Nonprotein tryptophan accumulated (Green, 1959, Genetics 34: 564—72). Suppressed by alleles at the *su(s)* locus (Schultz and Bridges, 1932, Am. Naturalist 66: 323—32). Tryptophan pyrrolase of *su(s) v* differs kinetically from that of wild type (Marzluf). Some brown pigment formed under conditions of partial starvation (Tatum and Beadle, 1939, Biol. Bull. 77: 415—22). Larval Malpighian tubules pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
cytology: Locus in or near 10A1-2 (Green, 1954, Proc. Natl. Acad. Sci. U.S. 40: 92-99).
other information: Pseudoallelism at the v locus demonstrated by recombination between v and v^{36t} in which *v* is to the left of v^{36i} (Green, 1954).

*V**

origin: Spontaneous.
discoverer: Plunkett, 24g.
phenotype: Eye color as bright as v at hatching, but darkens rapidly. Suppressed by alleles of *su(s)* (Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5). Larval Malpighian tubes pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK2.

v36f

origin: Spontaneous.
discoverer: Williams, 36f.
phenotype: Eye color may be slightly more yellow than v. Not suppressed by alleles of *su(s)* (Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5). Fly from starved larva does not form brown eye pigment (Green, 1954, Proc. Natl. Acad. Sci. U.S. 40: 92-99). Malpighian tubes of larva pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: Located to the right of v (Green, 1954).

y48a

origin: X ray induced.
discoverer: Fox, 48a7.
references: 1948, DIS 22: 53.
1949, Genetics 34: 647—64.
Green, 1952, Proc. Natl. Acad. Sci. U.S. 38; 300-5.
Barish and Fox, 1956, Genetics 41: 45-57.
phenotype: Not suppressed by alleles of *su(s)*. Eyes of fly from partially starved larva contain no brown pigment. Fly lacks an antigen produced by wild type; same antigen removed by *rb***. v^4** fly has a new antigen not shared by rfr**^{a} or* wild type. RK1.
cytology: Salivary chromosomes normal.
other information: v^{*Sa} pseudoallelic to r^{3}*' and occupies a position to the left of it. *v48** not recombinationally separable from v (Barish and Fox, 19S45).

*$_v$5Io

origin: X ray induced.
references: Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5.
phenotype: Insuppressible v allele. RK1.

**$_y$51b*

origin: Spontaneous.

references: Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5.
phenotype: Insuppressible vallele. RK1.

v5Jc
origin: X ray induced.
references: Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 300-5.
phenotype: Insuppressible v allele. RK1.

**v Slg*
origin: Ultraviolet induced.
discoverer: Edmondson, 51g.
references: Meyer and Edmondson, 1951, DIS 25: 74.
phenotype: Like v. RK1.

**v 267-4*
origin: X ray induced.
discoverer: Hoover, 35i.
phenotype: Semilethal. RK2A.
cytology: Associated with *'T(l;2)v™7-4 = T(l;2)llA7-8;36* (Sutton).

v° *f: vermilion of OHermann*
origin: X ray induced in *In(l)dl-49.*
discoverer: Offermann.
references: 1935, DIS 3: 28.
phenotype: Like v. RK1A.
other information: For practical purposes, inseparable from *ln(l)dl-49* and a useful marker for that inversion.

**Va: Venae abnormeis*
location: 2- (not located).
discoverer: Timofeeff-Ressovsky.
references: 1927, Arch. Entwicklungsmech. Organ. 109: 70-109 (fig.).
Roelofs, 1937, Genetica 19: 518-36.
phenotype: Veins irregularly branched or interrupted. Heterozygote overlaps wild type in 50 percent of flies. RK3.

***vac:** *vacuolated*
location: 1-58.5.
origin: Induced by D-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3026).
discoverer: Fahmy, 1955.
references: 1958, DIS 32: 77.
phenotype: Wings blistered; character varies from small vacuole to involvement of entire wing. At least one wing affected in 95 percent of flies. Viability and fertility good. RK2.

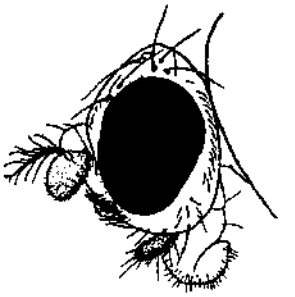
***voo;** *varied outspread*
location: 1- (rearrangement).
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1959, DIS 33: 94.
phenotype: Wings outspread. Eye color mottled brown (possibly variegation for *car).* Male sterile and short lived. RK3A.
cytology: Associated with *ln(l)v@o = In(l)18C5-6;19B7S.*

Var34k22: see *bw34k*

varied outspread: see *vac*

varnished: see vr

vb: vibrissae
location: 1-49.3.
discoverer: Bridges, 25122.
phenotype: Vibrissae form tufts of bristles beneath eyes. Overlaps wild type. RK2.

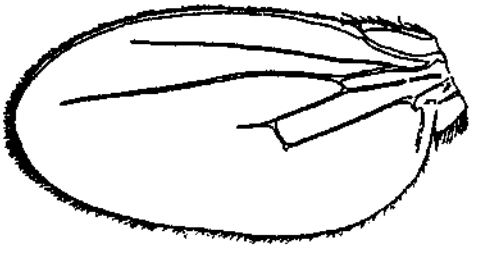


vb: vibrissae
From Bridges and Brehme, 1944, Carnegie Inst. Wash. Publ. No. 552: 212.

vb2
origin: X ray induced.
discoverer: Muller, 261.
other information: Associated with aberration.

***Vc:** *Vortice*
location: Autosomal.
origin: Spontaneous.
discoverer: Smith, 37c20.
references: Novitski, 1937, DIS 8: 10.
phenotype: Enhances *dp/dp* to give phenotype like *hy.* Homozygous lethal. RK3.

ve: *veinlet*
location: 3-0.2.
origin: Spontaneous.
discoverer Duncan, 34a.
references: 1935, Am. Naturalist 69: 94-96 (fig.).
phenotype: Wing veins L3, L4, and L5 do not reach wing margins. Does not overlap wild type. Suppressed by px (Waddington) and *su(ve).* *ve/ve/+* intersexes are veinlet whereas *ve/ve/+* triploids are normal, according to Pipkin. Developmentally, veins appear complete in prepupa but distal tips obliterated during contraction period [Waddington, 1939, Proc. Natl. Acad. Sci. U.S. 25: 305; 1940, J. Genet. 41: 75-139 (fig.)]. RK1.
cytology: Placed between 61E2 and 62A6, on basis of its inclusion in *Dt(3L)D = Df(3L)61E2-Fl;62A4-6* from *T(Y;2;3)D.*



ve: veinlet
From Duncan, 1935, Am. Naturalist 69: 94-96.

*ve**
origin: Spontaneous.

discoverer: Bertschmann, 54a.
references: 1955, DIS 29: 69-70.
phenotype: Wing veins L2, L3, L4, and L5 do not reach wing margins, ve/ve^2 male more extreme than female and tends to resemble ve^2; female resembles ve. RK1.

Veln: see Vn

***Vein off:* see Vno**

***vein let:* see ve**

veins longitudinally shortened:* see *vli

****Vel: Velvet***

location: 1- or 3- (rearrangement).
discoverer: Patterson, 1933.
phenotype: Hairs on eyes conspicuous. RK3A.
cytology: Associated with *T(l;3)Vel;* breakpoints unknown.

****ven: venation***

location: 3- [right arm associated with *In(3R)P).*
origin: Spontaneous.
discoverer: Bridges, 33gl8.
references: 1937, DIS 7: 17.
Bridges and Bridges, 1938, Genetics 23: 111—14.
phenotype: Veins irregularly thickened and branched, especially L3 and crossveins. Eyes bulging and bright. Bristles gnarled. Body small. Often sterile. RK3A.

Venae abnormeis:* see *Va

***venation:* see ven**

***venula:* see vn/**

***vermilion:* see v**

verticals:* see *vt

****ves: vestigium***

location: 1-1.4.
origin: Induced by L-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahmy, 1953.
references: 1958, DIS 32: 77.
phenotype: Wings abnormal; vary from small and curved to almost normal with cut-away inner margins. Eyes slightly rough and abnormally shaped. Male infertile; viability about 50 percent normal. RK2.
other information: One allele induced by CB. 3025.

***vesiculated:* see vs**

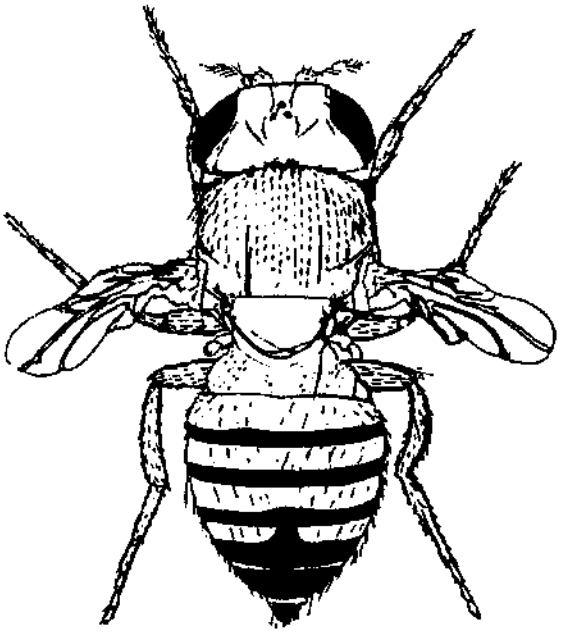
vestar:* see *vst

***vestigial:* see vg**

vestigium:* see *ves

vg: vestigial

location: 2-67.0.
origin: Spontaneous.
discoverer: Morgan, 101.
references: Bridges and Morgan, 1919, Carnegie Last. Wash. Publ. No. 278: 150 (fig.)-Mohr, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212.
phenotype: Wings reduced to vestiges; usually held at right angles to body. Wing veins still visible. Halteres also reduced. Postscutellar bristles erect. Viability somewhat reduced. Final size of larva smaller than wild type; pupation is slightly later. Wing disks of late larva markedly smaller than wild type (Auexbach, 1936, Trans. Roy. Soc. Edinburgh 58: 787-815). Haltere disks also small [Chen, 1929, J. Morphol. 47: 135-99 (fig.)]. Goldschmidt [l935, Biol. Zentr. 55: 535-54; 1937, Univ. Calif. (Berkeley), Publ. Zool. 41: 277-82] claimed that wings are more or less fully formed and subsequently eroded by degeneration during pupation. Waddington [l939, Proc. Natl. Acad. Sci. U.S. 25: 299-307; 1940, J. Genet. 41: 75-139 (fig.)] found no evidence of erosion and concluded that effect of the gene is during larval period and involves reduction in size of prospective wing area and shift in position of line along which wing area is folded out from imaginal disk. Temperatures of 29°C or greater appreciably increase wing size (Harnly, 1936, Genetics 21: 84-103; Stanley, 1935, J. Exptl. Zool. 69: 459-95). *vg/+* with certain Minutes shows scalloping of wings [.Green and Oliver, 1940, Genetics 25: 584-92 (fig.)J. vg/vg/+ has scalloped wings more often than *vg/+* (Green, 1946, Genetics 31: 1-20). RK1.
cytology: Placed between 49D3 and 49E6, on basis of its inclusion in both $Dt(2R)vg^B$ =*Df(2R)49D3-4;50A2-3* and $Df(2R)vg^D$ = *Df(2R)49Cl-2;49E2-6* (Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—9).



vg; *vestigial*
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ, No. 278: 148.

****vg^2***

origin: Spontaneous in *In(2R)Cy.*
discoverer: L. Ward, 1920.
references: 1923, Genetics 8: 276-300.
phenotype: Wings and halteres absent or reduced to tiny knobs. Viability low. Female sterile and male usually so. RK3A.

***vgl?**

origin: X ray induced simultaneously with *M(2)S2[illegible]*.

discoverer: Ruch, 1931.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.
phenotype: Slightly more extreme than *vg*. Fully fertile. vg^{il}/+*has* occasional nick in wing. $M(2)S2^{V}6^{11}$ vg^{11}/+ + *haa* small eyes, arclike wings, and in 65 percent of flies, wing nicks. RK2.
other information: Originally considered associated with *Dt(2Rya-S2^{v}AH,* but Bridges and Curry showed the two phenotypes to be separable by recombination.

vg^{31c}: see vg^{No1}

Vf£*^^t* S66 V&^®^

****yg33k***

origin: Spontaneous.
discoverer: Ives, 33k30.
references: Plough and Ives, 1934, DIS 1: 33. 1935, Genetics 20: 42-69.
phenotype: Like $vg^{\wedge 01}$, but reported to have greater dominance and greater variability in heterozygote. RK2.

$_{Y}$g37g

origin: Spontaneous.
discoverer: Poulson, 37g.
references: 1938, DIS 10: 55. 1939, DIS 12: 49.
phenotype: Weak allele. Homozygote has slight nick at ends and occasionally at sides of wings. Penetrance better in male than female. RK2.

$_{yg}$40b

origin: Spontaneous.
discoverer: Ives, 40b.
references: 1941, DIS 14: 39.
phenotype: Homozygote like *vg*. Considerable dominance in heterozygote. RK2.

$_{v}$g40c

origin: Spontaneous,
discoverer: Buzzati-Traverso, 40c20.
references: 1940, DIS 13: 49.
phenotype: Like *vg*. RK1.

$_{vg}$48a

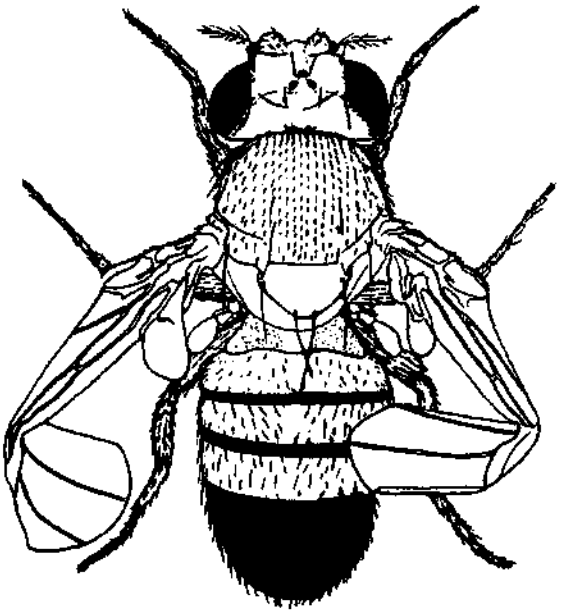
origin: Spontaneous derivative of *vg*.
discoverer: R. C. King, 48a1.
references: Poulson and King, 1948, DIS 22: 55.
phenotype: Wings of 15 percent of homozygotes have slight nick between L3 and L4. vg^{48a}/*vg* wings scalloped at tips and usually along sides in female, only at tips in male. Halteres and postscutellars normal in all cases. RK3.

$_{Y}$gSlh2S

origin: Spontaneous.
discoverer: Ives, 51h25.
references: 1952, DIS 26: 65.
phenotype: Similar to *vg* but wings slightly larger. RK1.

vg°:** ***vestigial-antlered

origin: Spontaneous (probably a derivative of *vg).*
discoverer: Morgan, 12j.
references: Morgan and Bridges, 1919, Carnegie fast. Wash. Publ. No. 278: 211 (fig.).
phenotype: Wings nearly full length but heavily scalloped and narrowed by excisions. Halteres and postscutellars normal. vg^{a}/*vg* intermediate between the two homozygotes. Wings straplike and smaller in female than in male. RK2.



vg°: vestigial-antlered
From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 212.

vg^{s}; ***vestigial-Beaded***

origin: Spontaneous.
discoverer: Bridges, 28dll.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 305-6.
phenotype: Heterozygote has terminal nicks and lateral incisions in a few male and still fewer female wings. Homozygous lethal; ceases development at about tenth hour. Mitosis abnormal; chromosomes seem sticky and form what appear to be anaphase bridges [Bull, 1956, J. Exptl. Zool. 132: 467-508 (fig.)]. RK2A.
cytology: Associated with *Dt(2R)vg^{B} = Df(2R)49D3-4;50A2-3.*

vg^{c}: ***vestigial-Carved***

origin: X ray induced.
discoverer: Demerec, 28c3.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 305-6.
phenotype: Heterozygote has terminal nicks or lateral incisions in about one-third the flies. Homozygous lethal. Most embryos show only partial involution and retraction of larval head; mouthparts distorted (Bull, 1952, Genetics 37: 569-70). RK2A.
cytology: Associated with *Df(2R)vg^{c} = Df(2R)49B2-3;49E7-F1.*

vg^{c}";** ***vestigial-Clipp&d

origin: Spontaneous.
discoverer: Robertson and Reeve, 1947.

references: Beatty, 1949, Proc. Roy. Soc. Edinburgh, B 63: 249-70.
phenotype: Female sterile. Oogenesis seems normal, but no eggs laid. RK2.

***vg^D:* vestigial-Depilate**
origin: Spontaneous.
discoverer: Bridges, 31a22.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 305—6.
phenotype: Heterozygote has hairs sparse over thorax except above wings. Hairs and bristles absent from legs except from tarsi. Postscutellars small and erect. Humeral bristles and patches reduced. Wings have nicks in about one-third the flies; wings smaller at higher temperatures [Harnly, 1940, Genetics 25: 521—33 (fig.)]. Homozygous lethal. In embryo, there is failure of head involution and retraction; components of mouth parts dissociate and develop on surface of everted larval pharynx (Bull, 1952, Genetics 37: 569-70). RK2A.
cytology: Associated with *Df(2R)vg^D = Df(2R)49Cl-2;49E2-6.*

**vgdn:* vestigial-double notch
origin: Spontaneous derivative of vg.
discoverer: Nolte, 1942.
references: 1944, DIS 18: 44.
phenotype: Wings have one notch between veins L3 and L4 and a second between L4 and L5, but near L4 and sometimes including the tip of L4. Halteres and scuteliars wild type. *vg^dtl/vg* has straplike wings, often with bent ends and held at right angles to body. RK1.

****ygh; vestigial-hemithorax***
origin: Spontaneous derivative of *vg.*
discoverer: Ludwig, 1936.
synonym: *vg*10*".*
references: 1936, Verhandl. Deut. Zool. Ges. 38, Zool. Anz. Suppl. 9: 21—73 (fig.).
1937, DIS 7: 18.
Schultz, 1938, Arch. Entwicklungsmeeh. Organ. 138: 69-102 (fig.).
phenotype: Half of dorsal thorax missing in about 20 percent of flies. Wings resemble v^"" in 10—20 percent, the majority resemble *vg.* Developmentally, hemithorax is caused by degeneration of a dorsal mesothoracic imaginal disk. RK2.

****vghR:* vestigial-hemithorax of Reck**
origin: Spontaneous derivative of vg.
discoverer: Reck, 1937.
references: 1937, DIS 8: 10.
phenotype: Like vg*. RK2.

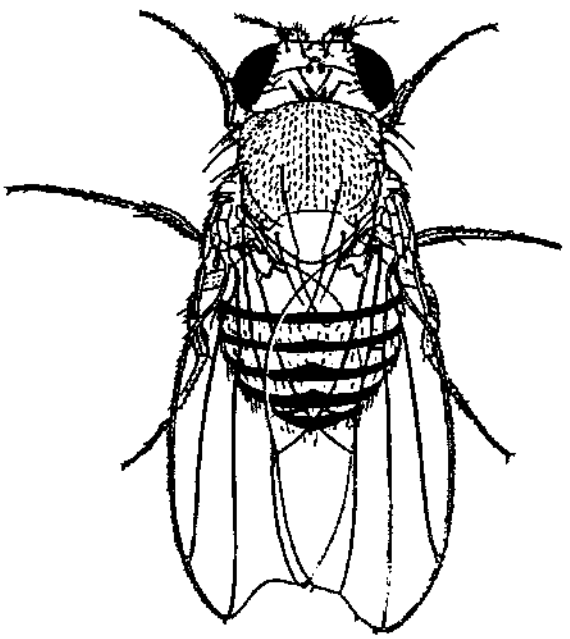
****vg':* vestigial-Incised**
origin: Spontaneous.
discoverer. Bridges, 36d20.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 305—6.
phenotype: Heterozygote shows nicked and incised wings in one-third the flies. Homozygous lethal. RK2A.
cytology: Associated with *D^R^g^1 » D% 2R)49C2-Dl;50A2-3.*

vg": vestigial-nick
origin: Spontaneous.
discoverer: Bridges, 15h7.
references: Morgan and Bridges, 1919, Carnegie Inst. Wash. Publ. No. 278: 273 (fig.).
phenotype: Homozygous *vg^n* is wild type; *vgn/vg* shows nicked wing tips or laterally incised wings. Penetrance 82 percent in female and 45 percent in male. RK3.

vgnG; vestigial-nick of Green
origin: Spontaneous derivative of vg.
discoverer: Green, 40j26.
references: 1941, DIS 14: 39.
1946, Genetics 31: 1-20.
phenotype: Homozygote usually wild type; wings occasionally nicked; *vg^nO/vg* has notched wings; *vg^nG/Df(2R)vg^D* has scalloped wings. vg"^G enhanced by certain Minutes so than an appreciable proportion of homozygotes have notched or scalloped wings. RK3.

vgn h vestigial-nicked
origin: Spontaneous derivative of *vg.*
discoverer: Mohr, 1926.
references: 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212 (fig.).
phenotype: Homozygote wild type. vg"'/vg shows wing nicks in 27 percent of flies. Enhanced in homozygote, especially female, by Minutes (Green, 1946, Genetics 31: 1-20). RK3.

vgn12
origin: Spontaneous.
discoverer: Mohler, 55b9.
references: 1959, DIS 33: 98.
phenotype: Homozygote wild type, v^^/vghas terminal wing nicks in 20—30 percent of flies. v£^ni5/vg^n*^r and *vg^ni2/vg^nw,J* has larger nicks and scalloping. RK3.



ygno; *vestigial-notched*
From Mohr, 1932, Proc. Intern. *Congr.* Genet., 6th. Vol.]: 190-212.

vgno*: *vestigial-notched

origin: Spontaneous derivative of *vg*.
discoverer: Mohr, 1926.
references: 1932, Proc. Intern, Congr. Genet., 6th. Vol. 1: 190-212 (fig.).
phenotype: Wings notched in 45 percent of homozygotes. vg"⁰/+is wild type. vg^{n0}/vg has ragged wings with terminal notches and lateral excisions in all flies. RK2.

ygHo1*: *vestigial-Notch

origin: Recovered among progeny of heat-treated parents.
discoverer: Swigert, 31c.
synonym: $vg^{31\,c}$.
references: Plough and Ives, 1934, OIS 1: 32. 1935, Genetics 20: 42-69 (fig.).
phenotype: Wings of most heterozygotes have terminal nicks; variations influenced by temperature. Homozygote has only bent vestiges of wings. Postscutellars erect; trident pattern dark. Body often dwarfed. Viability about 50 percent wild type. Homozygous female sterile. RK2.

$_{vg}$No2

origin: Spontaneous.
discoverer: Plough, 31j.
synonym: $vg^{31}t$.
references: Plough and Ives, 1934, DIS 1: 32. 1935, Genetics 20: 42-69 (fig.).
phenotype: Like *vgNol*. Heterozygote enhanced by Minutes (Green, 1946, Genetics 31: 1-20). RK2.
other information: Bridges suggested that all *vg* semidominants reported by Plough and Ives were really $vg^{\wedge 01}$ carried in the South Amherst stock in a suppressed condition or linked with a lethal.

$vg^{n}P$: *vestigial-nipped

origin: Spontaneous.
discoverer: E. M. Wallace, 38a5.
phenotype: Wings have terminal and sometimes lateral incisions- Overlaps wild type at 25°C but not at 19°. Scalloping visible in prepupal wing bud [Waddington, 1940, J. Genet. 41: 75-139 (fig.)]. RK2.

ygnw; *vestigial-no wing*

origin: Spontaneous.
discoverer Morgan, 1924.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 59 (fig.), 232.
phenotype; Wings of homozygote smaller than in *vg;* often only small, bent hooks or knobs. Balancers also knobs. Scutellar bristles erect. Fly often dwarf and viability low. Female usually sterile. Heterozygote occasionally has wing nicks; second vein often shortened (in 73 percent). vg^{nw}/vg similar to vg/vgj; vg^{nw}/vg^{no} has strongly incised narrow wings; vg^{nw}/vg^{ni} has scalloped wings with shortened L2 (Mohr, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212). Larval wing buds reduced in size (Chen, 1929, J. Morphol. 47: 135-99). RK2.

ygnwl*: *vestigial-no wing lethal

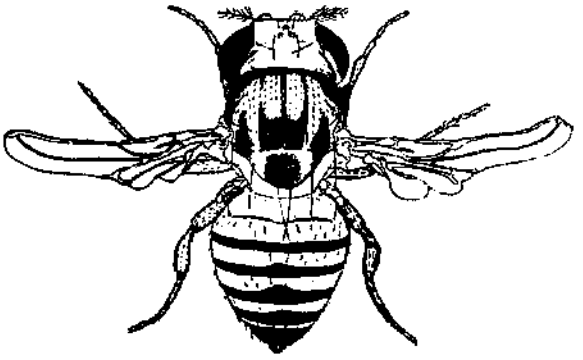
origin; Spontaneous.
discoverer: Mahler, 55b9.
references: 1959, DIS 33: 98.
phenotype: Homozygous lethal. Heterozygote has terminal wing nicks in up to 50 percent of flies. vg^{nwt}/vg^{nw} like homozygous vg^{nw}; sterile. RK2.

vgP: *vestigial-pennant

origin: Spontaneous derivative of *vg*.
discoverer: Kerr, 3Oal5.
references: Harnly, 1935, DIS 4: 14. 1936, J. Exptl. Zool. 74: 41-59 (fig.).
phenotype: Homozygote usually wild type but occasionally has wing nicks. Postscutellars and halteres wild type. *vgP/vg* has narrow straplike wings, larger in male than female. Size and form vary with temperature. RK3 *(vgP/vg* RK2).

vgP^{K}: *vestigial-pennant of Kutschera

origin: Spontaneous derivative of *vg*.
discoverer: Kutschera, 1955.
references: Mainx, 1956, DIS 30: 77. 1957, Z. Induktive Abstammungs- Vererbungslehre 88: 286-88 (fig.).
phenotype: Homozygote wild type at 17°C, 25°, and 28°; vgP^{K}/vg normal at 30°, has straplike wings at 25°, and wings smaller at 17°. RK3.



vg*: *vestigial-strap*

From Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 200.

vg^{s}: *vestigial-strap

origin: Spontaneous derivative of *vg*.
discoverer: Morgan, 12d.
references: Morgan and Bridges, 1919, Carnegie Inst. Wash. Publ. No. 278: 200 (fig.),
phenotype: Wings of homozygote narrow and straplike but nearly full length; often held at right angles to body. Halteres reduced in size. Postscutellars normal. RK2.

***vg*^{2}**

origin: Spontaneous.
discoverer: Williams, 56c.
references: 1956, DIS 30: 80.
phenotype: Wings incised and about one-fourth to one-half normal width; length varies. RK2.

vg^{s}: *vestigial-Snipped

origin: X ray induced,
discoverer: Mullet, 1929.
references: 1930, J. Genet. 22: 299-334 (fig.). Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.

phenotype: Heterozygote has wing nick in most males but only a few females. Homozygous lethal. RK3A.
cytology: Associated with *Df(2R)vg^{s} = Df(2R)49B12-C1;49F1S-SOA1.*

vgU: yestigial-Ultra
origin: Gamma ray induced.
discoverer: Ives, J5131.
references: 1956, DIS 30: 72-73.
phenotype: Heterozygote has greatly reduced wings; halteres like *vg;* some variability. Homozygous lethal. *vg^{u}/vg* wings reduced to a single segment and halteres virtually absent. About 5 percent of *vg^{u}/vg^{D}* eclose; wing varies from bristled knob to two or three small segments; scutellum bare and half normal size; halteres extremely rudimentary. RK1A.
cytology: Associated with *In(2R)vg^{u} = In(2R)49Cl-2;50Cl-2.*

Vi: seeM(l)Bld

Viability:* see *M(l)Bld

vibrissae:* see *vb

****vli: veins longitudinally shortened***
location: 3- (not located).
origin: Spontaneous.
discoverer: Buchman, 1936.
references: 1937, DIS 8: 8.
phenotype: Veins L2, *LA,* and L5 tend to be shortened. Overlaps wild type. Semidominant. RK3.

Vn; *Vein
location: 3-19.6.
origin: Spontaneous.
discoverer Mohr, 28j21.
references: 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212.
1938, Avhandl. Norske Videnskaps-Akad. Oslo, I. Mat.-Natur. Kl. 4: 1-7.
Mohr and Mossige, 1942, Avhandl. Norske Videnskaps-Akad. Oslo, I. Mat.-Natur. Kl. 7: 1-51.
phenotype: Vein L4 not complete. Wings slightly spread. Fly smaller than normal. Homozygous lethal. RK2A.
cytology: Associated with *Di(3L)Vn = Df(3L)64C12-D1;65D2-El.*

****vnl: venula***
location: 2- (not located).
origin: Spontaneous.
discoverer: Plaine, 50h.
references: 1951, DIS 25: 77.
phenotype: Extra veins between L3 and L4 largely between anterior and posterior crossveins, some also arise from L4 distal to posterior crossvein. Penetrance in male 1.3 percent; in female 43 percent. With Sô, penetrance is 63 percent in female; expressivity also increased. RK3.

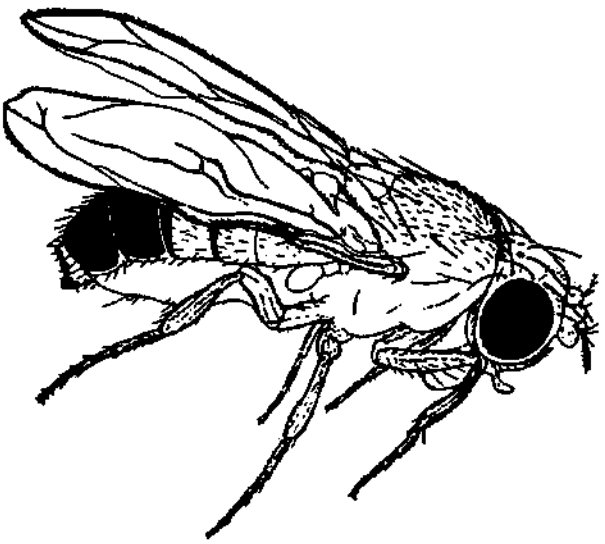
Vno: *Vein off*
location: 3- (rearrangement).
origin: X ray induced.
discoverer. E. H. Grell, 56c.
references: 1959, DIS 33: 94.
phenotype: Second longitudinal wing vein always has a sizeable gap. L4 often broken, L5 sometimes also affected. Homozygous lethal. RK1A.
cytology: Associated with *Tp(3)Vno = Tp(3)89E;93F;97A* (Nicoletti and Lewis, 1960, DIS 34: 53).

vo-3:* see *e(dp^{v})

vortex in chromosome 3:* see *e(dpv)

***Vortice:* see Vc**

vr; *varnished
location: 3-44.
discoverer: Mohr, 20j22.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 237.
phenotype: Eyes small with fused facets. Female sterile. RK2.



vs: *vesiculated*
From Evong, 1925, Z. Induktive Abstammungs-Vererbungslehre 39: 165-83.

vs; *vesiculated*
location: 1-16.3.
origin: Spontaneous.
discoverer: Mohr, 24c23.
references: 1927, Hereditas 9: 173.
Evang, 1925, Z. Induktive Abstammungs-Vererbungslehre 39: 165—83 (fig.).
phenotype: Wings warped, wrinkled, blistered, rough textured, discolored, and divergent. May overlap wild type. May be result of breakage of fibers that normally hold wing surfaces together during unfolding (Waddington, 1939, Proc. Natl. Acad. Sci. U.S. 25: 307). RK2.
cytology: Salivary chromosome location between 5D3 and 6A2 (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191).

***$_{vs}$29c**
origin: X ray induced.
discoverer: Oliver, 29c9.
references: 1937, DIB 7: 19.

phenotype: Like *vs* but probably more extreme. At 25°C, no overlap of wild type; at 30°, 5 percent of males and 12 percent of females overlap wild type (Green, 1939, DIS 11: 45). RK2.

***vs52a**

origin: Induced by P32.
discoverer: R. C. King, 52a.
references: 1952, DIS 26: 65.
phenotype: Wings wrinkled and blistered. Viability 40 percent wild type. RK2,

vs61j

origin: Found among progeny of male treated with radio frequency,
discoverer: Mickey, 61j.
synonym: *bw^{61}h bubble wing 61j; bu-w^{61j}.*
references: 1963, DIS 38: 28.
1964, DIS 39: 58.
phenotype: Not described.

***vs64j**

origin: X ray induced.
discoverer: Mayo, 1964.
references: 1966, DIS 41: 58.
phenotype: One or both wings crumpled and partially expanded; occasionally blistered but not otherwise affected. Penetrance about 77 percent. No difference between sexes. RK2.

vst: *vestar

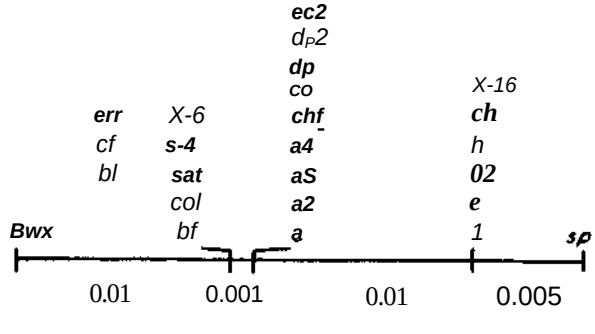
location: 2-4.3.
discoverer: Glass, 41115.
references: 1944, DIS 18: 40.
phenotype: Wings small and straplike; variable. Eyes small, very rough, and somewhat glazed. Female sterile. Viability low. RK3.

vf: *verticals*

location: 1-2.3.
origin: Synthetic.
discoverer: Gersh.
references: 1965, Genetics 51: 477—80.
phenotype: Anterior vertical, anterior dorsocentral, and anterior scutellar bristles often missing, verticals being most likely to be affected. RK2.
cytology: Placed in 3C5-6, on basis of the v* phenotype of the following genotypes: *Df(l)rat^{a} = Df(l)3C3-4;3C6-7;* the heterozygote between *Df(l)t8t^{2}* and the synthetic deficiency for 3C5 and 6 produced by combining the *X^{D}4^{P}* element of *T(l;4)w*5*-l* = T(lj4)3C4-5;101* and the *4^{D}X^{P}* element of *T(l;4Jf1^{2}64-l2 = T(l;4)3C6-7;101F;* and the synthetic deficiency for 3C5 and 6 produced by combining the *X*>4^{P}* element of *T(l;4)w25«-1** with a recombinant between *In(lLR)l-vl39 = ht(lLR)3C6-7* and the right end of a normal *X* chromosome.
other information: Not known as a point mutation.

w: *white*

location: 1-1.5.
origin: Spontaneous.
discoverer: Morgan, lOe.
references: 1910, Science 32: 120-22.
Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 25 (fig.).
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eyes pure white. Ocelli, adult testes sheaths, and larval Malpighian tubules colorless. Wild-type alleles not completely dominant to wy *w/+* has less red pigment than +/+ (Muller, 1935, J. Genet. 30: 407—14; Ziegler-Günder and Hadorn, 1958, Z. Vererbungslehre 89: 235-45; Green, 1959, Proc. Natl. Acad. Sci. U.S. 45: 549-53). *w* adult has very little, if any, pteridine (Hadorn and Mitchell, 1951, Proc. Natl. Acad. Sci. U.S. 37: 650—65). Isoxanthopterin present in considerable quantity during pupation but is eliminated during first 3 days of adult life (Hadorn, 1954, Experientia 10: 483—84). The meconium contains more pteridine than wild type (Hadorn and Kürsteiner, 1955, Arch. Julius Klaus-Stift. Vererbungsforsch. Sozialanthropol. Rassenhyg. 30: 494—98). Optomotor response absent (Kalmus, 1943, J. Genet. 45: 206—13) but fly phototactic. Eye color development autonomous in larval optic disk transplanted into wild-type host (Beadle and Ephrussi, 1936, Genetics 21: 230). *w* is a dominant suppressor of *z* (Gans, 1953, Bull. Biol. France Belg., Suppl. 38: 1—90). *w* decreases ratio of diameter to thickness in spermathecae (Dobzhansky, 1924, Z. Induktive Abstammungs- Vererbungslehre 34: 245—48; Dobzhansky and Holz, 1943, Genetics 28: 295-303). RK1.
cytology: Placed in band 3C2 by Schultz and confirmed by Lefevre and Wilkins, on basis of the *w* nonlethal phenotype of recombinant carrying left end of *In(l)w™4 = In(l)3Cl-2;20A* and right end of the 4-centric element of *T(l;4)w™J = T(1;4)3C2-3;20;102C* (1966, Genetics 53: 175). Placed in 3C2-3 by Demerec and Sutton (Demerec, Kaufmann, Fano, Sutton, and Sansome, 1942, Carnegie Inst. Wash. Year Book 41: 191). Panshin also places it at 3C2-3 (1941, Dokl. Acad. Nauk SSSR 30: 57-60). Location by Prokofyeva-Belgovskaya is at 3C3 (1941, DIS 15: 34-35).



Map of the w locus
Redrawn from Judd, 1964, Genetics 49: 253-65.

other information: First mutant found in *Drosophila.* Member of a pseudoallelic series containing five subloci that have been resolved by recombination as shown in map (Lewis, 1952, Proc. Natl. Acad. Sci. U.S. 38: 953—61; MacKendrick and Pontecorvo,

1952, Experientia 8: 390-91; Green, 1959, Heredity 13: 303-15; Judd, 1959, Genetics 44: 34-42). Mutants occupying the right two sites act as dominant suppressors of *z;* those occupying the left three do not (Green, 1959). *w* (e.g., w^1) located to the right of w^a; presumably occupies the same site as w^{c}^.

wJ1E4

origin: X ray induced.
discoverer Gans.
references: 1953, Bull. Biol. France Belg., Suppl. *36:* 1-90.
phenotype: Eyes white. Suppresses *z.* RK1.
cytology: Salivary chromosomes apparently normal.

w11G3: see *z11G3*

**wUG2*

origin: X ray induced.
discoverer: Gans.
phenotype: Eyes variegated. RK2A.
cytology: Associated with *T(l;2)w^3G2 – T(1;2)3C3-5;56F,*

w^{30}: see *w^{e2}*

w3 2k; see *wbf2*

w33e31: see *wdil*

w^{33}:* see *w^{sat}*

w40aHl

origin: X ray induced in *Dp(l;l)sc^{Vi}.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
phenotype: Male lethal, *w* affected. RK1A.
cytology: Associated with but presumably independent of *ln(l)w40aHl = ln(l)lAl-C3;4C4-7;17B7-8;18E2-3.*

**w48h*

origin: Induced by mustard gas; derivative of w^{m4}.
discoverer. Lindsley, 48hl3.
references: 1949, DIS 23: 60.
phenotype: Like *w.* RK1A.
cytology: No rearrangement other than *ln(l)$w^{m}4$ = In(l)3Cl-2;20A.*

**w48hS: white-48h of Schultz*

origin: X ray induced in inbred Oregon-R.
discoverer: Schultz, 48h.
synonym: *w*^{8}*** (preoccupied).
phenotype: Like *w.* RK1.

**^5 To

origin: Spontaneous in highly inbred y Oregon-R strain.
discoverer Redfield, 51a.
references: 1952, DIS 26: 68.
phenotype: Like *w.* RK1.

w60

origin: Spontaneous derivative of *w* in* Jn(7>cSi£$_{S}$c*<R+S, *BC^{S1} @c^{s} w» B.*
discoverer: Hollander, 1960.
references: 1960, DIS 34: 50.
phenotype: Like w. RK1A.

**w62d

origin: Spontaneous derivative of *w** in *ln(l)^cSiL$_{MC}$8R+s, ac$* «c« W* B.*
discoverer Mickey, 62d.
references: 1963, DIS 38: 29.
phenotype: Like *w.* RK1A.

*w63b

origin: X ray induced.
synonym: *w^{ma}: white-marbled.*
references: Lefevre and Wilkins, 1966, Genetics 53: 175-87.
phenotype: *w^{63b}/w* has brownish eye color like *w^{a}P/w. w6^{3b}/Di(l)w258-45* has a similar but lighter eye color than *w^{a}P/Df(l)w258-45$_{\epsilon}$* jjale lethal because *w^{63b}* is inseparable from *Df(l)N^{63b}.* RK2A.
cytology: Associated with *Df(l)N63b =Df(l)3C2-3;3E2-3.*

**w64

origin: Spontaneous in *FM6.*
discoverer Witten, 1964.
phenotype: Like *w.* RK1A.

w64g3

origin: Spontaneous.
discoverer: Kidd, 1964.
references: 1966, DIS 41: 60.
phenotype: Eye color dark carnation similar to *g.* RK1.

**w258-3*

origin: X ray induced.
discoverer Demerec, 33h.
phenotype: Homozygous lethal. RK2A.
cytology: Associated with *Dt(l)w2S8-3 =Dt(l)3B2-3:3C1-2.*

w258-8: see *wcol*

w258-11

origin: X ray induced.
discoverer. Demerec, 33j.
phenotype: Lethal and cell lethal. Embryologically, the male is abnormal after 12 hr at 23°C; gut incompletely developed and mesoderm abnormal (Poulson, 1940, Collecting Net 15: 172). RK2A.
cytology: Associated with *Df(l)w2S8-ll =Df(l)3A2-3-.3C3-5* (Siizynska, 1938, Genetics 23: 291-99).

w258-12

origin: X ray induced,
discoverer. Demerec, 33j.
phenotype: Like *w.* RK1.
cytology: Salivary chromosomes normal.

**w258-14*

origin: X ray induced.
discoverer Demerec, 33k.
phenotype: Lethal and cell lethal. Hemizygous male embryo abnormal after 12 hr at 23°C; gut incompletely developed and mesoderm abnormal (Poolson, 1940, Collecting Net 15: 172). RK2A.
cytology: Associated with *Df(l)w258-14 ^Dl(l)3A3-4;3Cl-2* CSlizynska, 1938, Genetics 23: 291-99).

w2S8-42

origin: X ray induced.
discoverer: Demerec, 38i.
cytology: Associated with *Df(l)w2S8-42 *-Dt(l)3A6" 8;3C3-S.*

**w258-43*

origin; X ray induced.
discoverer: Demerec, 38k.

phenotype: Male lethal. RK2A.
cytology: Associated with $T(l;4)w^{25S\sim43}$ = *T(J;4)3C3-5;102F4-5.*

$_w$258-45
origin: X ray induced.
discoverer. Demerec, 381.
phenotype: Development resembles w^{2S8}-**l* (Poulson). RK2A.
cytology: Associated with *Df(l)w258-45 =Df(l)3B4-Cl;3Cl-2* (Sutton) =£>*f(l)3Cl-2;3C3-4* (Schultz). Most recent analysis shows it to be *Df(l)3B4-Cl;3C2-3* (Lefevre and Wilkins, 1966, Genetics 53: 175-87).

**$_w$258-47*
origin: X ray induced,
discoverer Demerec, 39a.
phenotype: Like *w.* RK1.
cytology: Salivary chromosomes appear normal.

$_w$2S8-48
origin: X ray induced.
discoverer Demerec, 39c.
cytology: Associated with *Dt(l)w258-48 =Df(l)3A9-B1:3C1-2.*

**$_w$2S8-49*
origin: X ray induced.
discoverer Demerec, 39c.
phenotype: Like *w.* RK1.
cytology. Salivary chromosomes normal (Sutton).

**$_w$2S8-S0*
origin: X ray induced.
discoverer Demerec, 39c.
phenotype: Like *w.* RK1.
cytology: Salivary chromosomes normal.

**$_W$258-51*
origin: X ray induced.
discoverer Demerec, 39k.
phenotype: Like *w.* RK1.

*$_w$258-52
origin: X ray induced.
discoverer Demerec, 40a.
phenotype: Eyes white; texture rough. Not lethal. RK2A.
cytology: Associated with *In(J)w2S8S2 =i_n(l)3C7-9;8B1UF1* (Sutton).

w^{+A}: *American wild-type* o//e/e of *white*
discoverer Timofe'eff-Ressovsky.
references: 1932, Biol. Zentr. 52: 468-76.
Muller, 1935, J. Genet. 30: 407-14.
phenotype: Lower degree of dominance in *w/w/+* triploids than in w^{*R}. Eyes pinkish at eclosion, darken to maroon, but never become a normal red. RK3.
other information: Mutates more readily to w when irradiated than w^{+R} (Timofe'eff-Ressovsky, 1932).

w^{+}C; Confon-S *wild-type aliele of white*
origin: In Canton-S wild type,
discoverer: Green,
references: 1959, Proc. Natl. Acad. Sci. U.S. 45: 549-53.
1959. Nature 184: 294.
phenotype: Eyes of $w/w/w^{+c}$ triploids are reddish, not maroon as in $w/w/w^{+o}$ (see description of $w^{+\circ}$). RK3.

$_w$+0; *Oregon-R wild-type aliele of white*
origin: In Oregon-R wild type.
discoverer Green.
references: 1959, Proc. Natl. Acad. Sci. U.S. 45: 549-53.
1959, Nature 184: 294.
phenotype: Eyes of $w/w/w^{+o}$ triploids maroon; contain less red pigment than $w/w/w^{+c}$. Amount of pigment in diploid w^{+o}/w less than w^{+c}/w but difference is not readily detected visually. Homozygotes of w^{+c}/w^{+c} and w^{+o}/w^{+o} contain same amount of red eye pigment. RK3.
other information: The difference in dominance between w^{+0} and w^{+c} is located to the right of the w^a sublocus. Crossing over is greater in the *y-w^{ch}* and *w^{ch}-spl* regions in the presence of w^{+o} than w'"'Cj this difference is also located in the region to the right of the w^a sublocus. *w*O* and w'"'C seem to have the same X-ray mutability (Green, 1960, Genet. Res. 1: 452-61).

w^{+R}; *Russian wild-type aliele of white*
discoverer: Timofeeff-Ressovsky.
references: 1932, Biol. Zentr. 52: 468—76.
Muller, 1935, J. Genet. 30: 407-14.
phenotype: Like w^{+A} except by special tests. $w/w/w^{+R}$ triploids have pinkish eyes at hatching, which soon darken to normal red. Has greater degree of dominance than w^{+A} (Muller, 1935). RK3.
other information: Mutates less frequently to w when irradiated than w^{+A} (Timofe'eff-Ressovsky, 1932).

w^T: see *Df(l)w'Ji*

W: see *Df(l)w*J2*

m'N: see *Df(l)w'J3*

w": white-apricot
origin: Spontaneous.
discoverer. Hues Us, 1923.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 218.
synonym: *apr.*
phenotype: Eyes of male yellowish with orange tone; female eyes yellower, somewhat lighter than male. Larval Malpighian tubules colorless (Brehme and Demerec, 1942, Growth 6: 351—56). w^a*; bw* slightly lighter than w^a. w^a*; st* light pinkish yellow (Mainx, 1938, Z. Induktive Abstammungs-Vererbungslehre 75: 256—76), as is w^a *v. z w** lighter than either mutant alone, only slightly darker than w^{bf}; therefore, *w°* does not suppress z (Green, 1959, Heredity 13: 303-15). *w* rb* and *w* g* have nearly white eyes; *w* w^{ch}*, w^{b}* w^a, and *w* su(f)* all have white eyes. *su(w^a) w°* and *suCw*)^0* w^a have browner eyes than *w*.* w^{Bwx} *w** is like w^a (Judd). *w*/+* has lighter eyes than +/+ in v homozygote (Braver, 1953, DIS 27: 86). Darkened by P. The amount of pigment formed as a function of gene dose can be determined by use of duplications carrying *w** and deficiencies: *w** female < w^0 male = $w^{\wedge}/w^3$ female < *w**/w** male ^ w^a/w^a*fw** female (Muller, 1932, Proc. Intern.

Congr. Genet., 6th. Vol. 1: 234). Eye color development autonomous in w^a optic disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). RK1.

other information: Occupies middle site in the *w* pseudoallelic series; i.e., to the right of w^{bt} and to the left of w^{ch}. Gives rise to partial revertants, as w^T (Muller), w^{aM} (Mossige), and w^{aS7i} (Green). The white region of chromosomes carrying w^a pairs and crosses over regularly with nonhomologous regions of the homologous chromosome; specific regions of nonhomologous involvement characterize different homologous chromosomes (Green, 1959, Genetics 44: 1243-56; Judd, 1961, Genetics 46: 1687-97). The products of nonhomologous exchange are deficiencies; e.g., *Df(l)*w^{rG}, *Df(l)*w^r*Jl, Df(l)*w^T*J2,* and *Df(l)wiJ3,* and duplications; e.g., *Dp(l;l)*w^{rG} and *Dp(l;l)*w^r*J2.*

$_w$a2

origin: Spontaneous.
discoverer: Bridges, 1929.
references: 1938, DIS 9: 114.
phenotype: Eye color orange, slightly darker than w^B. Eyes of male darker than female. Phenotype of w^{a2} *rb* and w^{a2} *g* like *rb* or *g* alone; not affected by *su(w*)* and does not suppress *z* (Green, 1959, Heredity 13: 303—15). Larval Malpighian tubes colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: Occupies middle site of *w* pseudoallelic series.

origin: Spontaneous.
discoverer Curry, 34g2.
references: 1938, DIS 9: 114.
phenotype: Eyes brownish orange; slightly darker than either w* or w^{a2}; very little sex difference. Eye color of w^{*3} *rb* and w^{a3} *g* like *rb* or *g;* not suppressed by *su(w*)* and does not suppress z (Green, 1959, Heredity 13: 303-15). Larval Malpighian tubules colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: To the left of w^{ch}. Green (1959) was unable to recover recombinants between w^{a3} and either *w**, w^{*2}, or w^{*4} and concluded that they occupy the same site of the w pseudoallelic series.

$w^{a3>}$; see w^{*1}

origin: Spontaneous.
discoverer Nichols-Skoog, 35cl2.
phenotype: Eyes of male yellowish orange, of female lighter and more yellow, of both sexes paler than *w** and with less sex difference. Eyes of w^{*4} *rb* and w^{m4} *g* nearly white. Not suppressed by *&u(w*)* and does not suppress *x* (Green, 1959, Heredity 13: 303-15). Larval Malpighian tubules colorless (Brehme and Deuaerec, 1942, Growth 6: 351-56). RK1.
other information: To the left of w^{ch}. Green (1959) was woable to recover recooabitMtnts between w^{m4} and either *w*>,* w*»2, or w®$* and conelode-d that they occupy *the* I A M site of the *w* p*eiado*Uellc series.

$_w$a5Sk

origin: X ray induced.
discoverer: Clark.
synonym: *apr^Sk,*
references: 1956, DIS 30: 71.
phenotype: Apparently like w^a. RK1.

$_w$q57l

origin: Spontaneous derivative of w^a.
discoverer: Green, 57H.1.
synonym: $w^{aR57}i$.
references: Rasmuson, Green, and Ewertson, I960, Hereditas 46: 635-50.
Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.
phenotype: Eye color between w^a and wild type. Change from *w** is greater for brown than for red pigment. *su(*w^a*)* decreases the amount of both red and brown pigment. Enhanced by *su(f);* not a suppressor of z. RK2.
other information: Green (1959, Heredity 13: 303—15) was unable to recover recombinants with w^{a2} or w^{a4}.

$_w$o58/

origin: Spontaneous derivative of w^a.
discoverer: Green, 58112.
references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.
Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.
phenotype: Eye color between w^a and wild type. Brown pigment at normal level; red pigment intermediate. *suCvi^)* decreases brown and slightly increases red pigment formation. Enhanced by *su(f);* not a suppressor of z. RK2.

$_w$a59W

origin: X-ray-induced derivative of w^9.
discoverer. Green, 59kl.
references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.
Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.
phenotype: Eye color intermediate between w^a and wild type. Increase in brown pigment greater than red pigment over level of w°. Suppressed by *mtfw*);* enhanced by suff); not a suppressor of *z.* RK2.

$_w$o59k9

origin: X-ray-induced derivative of w^a.
discoverer: Green, 59k9.
references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.
Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.
phenotype: Eye color intermediate between *W* and normal. More brown pigment than *w*;* red pigment virtually unchanged. Suppressed by stifw^J; enhanced by stiff); not a suppressor of *z.* RK1.

$_w$aS9k13

origin: Spontaneous derivative of w*.
discoverer: Green, 59kl3.
references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.

Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.

phenotype: Eye color intermediate between w^a and normal. With respect to the level in w^a, brown pigment increased more than red. Red but not brown pigment formation increased by *su(w^a);* enhanced by *su(f);* not a suppressor of z. RK2.

**Yfa60a5*

origin: Spontaneous derivative of w^B.

discoverer: Sherwood, 60a5.

references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.

Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.

phenotype: Eye color intermediate between w^a and normal. More brown but not red pigment than w^a. Enhanced by *su(w^a);* not a suppressor of z. RK1.

$w^{aE'}$: see w^e

$_w$oM: white-apricot of Mossige

origin: Spontaneous derivative of w^a.

discoverer: Mossige.

synonym: ***w^a^^.***

references: Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-50.

Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.

phenotype: Eye color intermediate between w^a; considerably more brown pigment than in w^a; red pigment virtually unchanged. Suppressed by *suCw^8);* enhanced by *su(f);* not a suppressor of z. RK1.

other information: Green (1959, Heredity 13: 303—15) was unable to recover recombinants with w^{a2} and w^{*4}.

$_w$aR57j: see ***w^{a57i}***

$_w$aRM: see ***w^{aM}***

w^{bf}: white-buff

origin: Spontaneous.

discoverer: Safir, 15g28.

references: 1916, Genetics 1: 584-90.

phenotype: Eyes light buff, lighter than *w°* male. $w^{6'}$ male eyes somewhat lighter than female. Lighter at 19°C than at 25°. w^{bl}; *at* has white eyes (Mainx). *w^f rb* and w^{bl} *g* eyes are lighter than $w^{b/}$, *rb,* or *g* (Green, 1959, Heredity 13: 303-15). Larval Malpighian tubes colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

other information: Occupies a recombinational site between w^{Bwx} and w* in white pseudoallelic series (Judd, 1959, Genetics 44: 34-42; Green, 1959). Spontaneous reversions reported by Redfield (1952, DIS 26: 68).

$_w$bf2

origin: X ray induced.

discoverer: Oliver, 32kl6.

synonym: w^{32}*.

references: 1935, DIS 3: 28.

1935, DIS 4: 12.

phenotype: Eye color light buff, but slightly darker than w^{bl} or $w^{bl}$$. No sexual dimorphism; not a suppressor of * (Green, 1959, Heredity 13: 303-15). Larval Malpighian tubules yellow (Brehme and Dewerec, 1942, Growth 6: 351-56). RK1.

$_w$bf3

origin: Spontaneous.

discoverer Curry, 36k9.

phenotype: Eye color buff, but slightly darker than w^{bf}. Larval Malpighian tubes pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

w^{bl}: white-blood

origin: Spontaneous.

discoverer Hyde, 14glO.

references: 1916, Genetics 1: 535-80 (fig.).

phenotype: Eyes yellowish ruby at hatching," darkening to sepialike with age; female lighter than male. Not a suppressor of z (Green, 1959, Heredity 13: 303—15). Sensitive to temperature; at 19°C eye color as dark as *pn,* at 30° as light as w^{bt} or w^{l}; sensitivity greatest 40—48 hr after pupation (Ephrussi and Herold, 1945, Genetics 30: 62-70). Testes sheaths colorless. Larval Malpighian tubules pale yellow at 25°C (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

other information: Located to the left of *w* (MacKendrick and Pontecorvo, 1952, Experientia 8: 390-91) and w° (Judd, 1958, Proc. Intern. Congr. Genet., 10th Vol. 2: 137; Green, 1959). Judd (1958) was unable to recover recombinants between w^b* and either w^{Bwx} or w^a.

$_w$Bwx; white-Brownex

origin: Spontaneous.

discoverer: Mossige, 52a.

references: 1953, DIS 27: 59.

Judd, 1959, Genetics 44: 34-42.

phenotype: Eye color like *bw;* no sexual dimorphism. w^{Bwx}/+ duller and darker than wild type, from which it is readily distinguishable. Heterozygotes between w^{Bwx} and other *w* alleles or deficiencies, e.g., *Dt(l)N^s,* are indistinguishable from $_wBwx/_wBwx_m$ jj$_o$t $_a$ suppressor of z (Judd, 1959). The double mutant w^{Bwx} w^{co1} lighter than either single mutant, but w^{Bwx} w^a and w^{Bwx} w^{bt} indistinguishable from w^a and w^{bf}, respectively. Testes sheaths colorless. Larval Malpighian tubes pale yellow. RK1.

other information: Occupies leftmost site in *w* pseudoallelic series, to the left of w^{bt} (Judd, 1957, Genetics 42: 379-80); 1959). Reduces recombination in the *y-spl* interval.

w^{ef}: white-coffee

origin: X ray induced.

discoverer: Nicoletti, 1960.

references: I960, DIS 34: 52-53.

phenotype: Eyes deep ruby at hatching, resemble w^{aat}, but darken greatly with age and resemble *se* in older fly. Female heterozygous for w^{c}? and *w, w*,* w^{c}°, w^{cf}>, w^{bl}, w^{co1}, or w^{aat} like *wct/wcl,* w^{ci}/+ wild type. Larval Malpighian tubules bright yellow. RK1.

cytology: Salivary chromosomes appear normal.

other information: Occupies a site in *w* pseudoallelic series very close to the left of *w** (Welshons and Nicoletti, 1963, DIS 38: 80).

w^{ch}: white-cherry

origin: Spontaneous.

discoverer: Safir, 12j.
references: 1913, Biol. Bull. 25: 45-51.
Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 51 (fig.).
phenotype: Eyes translucent pink, only slightly yellowish; male distinctly lighter than female. Ocelli pale; larval Malpighian tubes and adult testes sheaths colorless. Enhanced by *P* and *e(w^e)*. Eyes light in double mutant with *rb* or *g*, white with w^a. Acts as dominant suppressor of z (Green, 1959, Heredity 13: 303-15). RK1.
other information: Occupies a site to the right of w^a (Green, 1959) and to the left of $W^S P$ (Lewis, 1956, Genetics 41: 651).

*w*ch2*
references: Green, 1959, Heredity 13: 303—15.
phenotype: Differs from w^{ch} in that eye color of homozygous female is not darker than male; it is insensitive to *e(w°)*, and is not a suppressor of *z*. RK1.
other information: Located to the left of w^{ch}.

*w*ch41 i
origin: Spontaneous.
discoverer: Ives, 41j9.
references: 1942, DIS 16: 48.
phenotype: Resembles w^{ch}. RK1.

w^{co}: *white-coral*
origin: Spontaneous.
discoverer: Lancefield, 1917.
references: 1918, Am. Naturalist 52: 264—69.
phenotype: Eyes of male deep ruby at eclosion, darkening to garnetlike with age. Eyes of female somewhat lighter. Not a suppressor of z. Enhanced by *e(w^e)*. Lightens *rb* and *g* (Green, 1959, Heredity 13: 303—15). w^{co}; *st* is yellow (Mainx, 1938, Z. Induktive Abstammungs- Vererbungslehre 75: 256—76). Larval Malpighian tubules pale yellow (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: Originally shown to be to the left of w by MacKendrick and Pontecorvo (1952, Experientia 8: 390-91). Green (1959) was unable to recover recombinants between w^{co} and either iv* or w^{*2} and inferred that it occupies middle site of *w* pseudoallelic series.

yyco6I
origin: Spontaneous derivative of *w*.
discoverer Hollander, 1961.
references: 1962, DIS 36: 78.
phenotype: Like w^{ao}. RK2.

wco/; *white-colored*
origin: X ray induced.
discoverer: Demerec, 33j6.
synonym: w^{2SS}~^{g}.
phenotype: Eye color varies in young male from brick-red to dull brownish like pn; female slightly lighter. Lightens *rb* or *g;* not a suppressor of *z* (Green, 1959, Heredity 13: 303-15). RK1.
other information: To the left of $w^{*>2}$ (Green, 1959).

w^c"; w/»ffe-carro*
origin: Spontaneous.
discoverer: Jodd, 1962.
references: 1964, DIS 39: 59.
phenotype: Eyes reddish brown, lighter than w^{ct}, w^l, or w^{sat}, more orange than w^{a}^, and more red than w^{Bwx}, No sexual dimorphism. Not a suppressor of *z*. RK1.
other information: Located to the left of w^a.

w*d!l: *white-dilute
origin: Spontaneous.
discoverer Ives, 33e31.
synonym: *w33e31,*
references: Plough and Ives, 1934, DIS 1: 31.
phenotype: Eye color like weak *pr,* dilute red. Overlaps wild type; not readily classified. Darkest known w allele. Eye color of *w/w^{dil}* between pn and *g*. RK2.

w^dP: white-deep purple
origin: Induced by chloroethyl methanesulfonate (CB. 1506).
discoverer Auerbach, 1957.
references: 1957, DIS 31: 107-9.
Green, 1958, DIS 32: 88.
1959, Heredity 13: 303-15.
phenotype: Eye color deep purple. No sexual dimorphism. No interaction with *e(w^e)*. Does not suppress *z* (Green, 1959). RK1.
other information: Located to the left of w^{ch} (Green, 1959).

***w*dp2**
origin: Induced by chloroethyl methanesulfonate (CB. 1506).
discoverer Auerbach, 1957.
references: 1957, DIS 31: 107-9.
Green, 1958, DIS 32: 88.
1959, Heredity 13: 303-15.
phenotype: Like w^dP. RK1.
other information: Located to left of w^{ctl},

w*: *white-eosin*
origin: Spontaneous derivative of *w*.
discoverer Morgan, 1lh.
synonym: w^{aE}: *white-apricot of Edinburgh;* stock labeled w^a from Edinburgh behaved like w°; probably result of mislabeling (see MacKendrick, 1953, DIS 27: 100).
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 28.
Sturtevant and Beadle, 1939, An Introduction to Genetics, Saunders, p. 64 (fig.).
phenotype: Eyes of female yellowish pink, male and *w*/w* female lighter. Using duplications and deficiencies for w^e, Muller (1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 233—35) showed that the eye pigmentation of w^e female = *w** male < w^e/w'' male = w^e/w^e female < *w*/vr*fw** female. Enhanced by *P, cru, wttg,* and *e(w^0)*. Dominant suppressor of x; lightens *rb* and *g* (Green, 1959, Heredity 13: 303—15). Eye color develops autonomously in w® eye disks transplanted into wild-type hosts (Beadle and Ephrussi, 1936, Genetics 21: 230). Larval Malpighian tubes and adult testes sheaths colorless. RK1.
other information: Located to the right of *w*° (Green, 1959).

***W*[2]**

origin: Spontaneous derivative of *w.*
discoverer: Hefner, 1925.
synonym: *w[30].*
phenotype: Similar to w[e] but distinctly darker in both sexes. Less sex difference than in *w[e].* Lightens *rb* and g; enhanced by *e(w[e])j.* Dominant suppressor of z (Green, 1959, Heredity 13: 303—15). Larval Malpighian tubules colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: Located to the right of *w[a]* (Green, 1959).

origin: Spontaneous (extracted from a *w[e] rb* stock).
discoverer: Nolte, 1953.
references: 1954, DIS 28: 77.
phenotype: Eye color of female slightly darker than that of *w[e]* female. Eyes of male pinker than those of the *w[e]* male. Amount of red pigment 3 times and brown pigment 1.5 times that of *w[e].* RK1.

w«[c]: *white-ecru

origin: Spontaneous.
discoverer: Muller, 1918.
references: 1920, J. Exptl. Zool. 31: 443-73.
phenotype: Eyes very pale buff; between *w[1]* and *w.* RK1.

***w•c2**

references: Green, 1959, Heredity 13: 303-15.
phenotype: Like *w[ec].* Eye color same in male and female. Lightens *rb* and *g.* RK1.
other information: Located to left of *w[ch].*

wec3

origin: X ray induced.
discoverer: Muller.
references: 1946, DIS 20: 68.
phenotype: Eyes almost white. RK1.

wFM6; nhife i[n] First Multiple

origin: Spontaneous in *FM6* balancer.
discoverer: Kidd, 1964.
references: 1966, DIS 41: 60.
phenotype: Typical white eyes. Useful as another marker in *FM6.* RK1A.

****w[G]: white of Goldschmidt***

origin; X ray induced in *In(l)y[G] = In(l)lA;lC3-4.*
discoverer Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 522.
phenotype: Like *w.* RK1A

w[h]: white-honey

origin: Spontaneous derivative of *w.*
discoverer: Dunn, 34j27.
synonym: *w[a3].*
references: 1935, Hereditas 21: 113-18.
phenotype: Eye color between *w[bi]* and *w**[4];* slightly darker in male than in female. Enhanced by *e(w[0]).* Dominant suppressor of *z* (Green, 1959, Heredity 13: 303—15). Larval Malpighian tubules colorless. RK1.
other information: Located to the right of *w[a]* (Green, 1959).

w': *white-ivory*

origin: Spontaneous.
discoverer: Sturtevant, 1918.
references: Muller, 1920, J. Exptl. Zool. 31: 443-73.
phenotype: Eyes very light buff or yellowish, lighter in male than in female. Does not suppress z (Green, 1959, Heredity 13: 303-15).' Larval Malpighian tubules colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.
other information: Located to left of *w* (MacKendrick, 1953, DIS 27: 100). Reverts to wild type at high frequency of 5 X 10^{-5} in female; much more rarely in male; frequency increased by X irradiation. Also somatic reversions in patches of eye tissue; increased by X irradiation of young larvae (Lewis, 1959, Genetics 44: 522). Bowman and Green (1964, Genetics 50: 237) find a spontaneous reversion rate of 0.25 X 10^{-5} in females heterozygous for a deletion and in males; reversions not associated with crossing over.

w[is]: white-isoxanthopterinless

origin: Spontaneous.
discoverer: Rasmuson.
references: 1962, Hereditas 48: 587-611.
phenotype: Eye color normal. Male has greatly reduced amount of isoxanthopterin in abdomen. Eye color of *z* w'[s] male intermediate between z and wild type and appears variegated. *w[ch]* only partially suppresses z when heterozygous for *w[ls].* RK3.
other information: Located to the right of *w[a]* and probably to the left of *w[ch].* w[a] *w[ctl]/w[ia]* female yields recombinants between *w[a]* and *w[ch]* with different but characteristic intermediate production of isoxanthopterin. Postulated to be an intralocus duplication, based on its interaction with z. Probably the same type of change as *w[rd]P, w[zl],* and *w[zm].*

[w]ml; *white-mottled

origin: X ray induced.
discoverer: Muller, 1927.
references: 1930, J. Genet. 22: 299-334 (fig.).
phenotype: Eye color variegated. Variegates for *N.* Male lethal. Lines with dark eye color [an effect of an extra *Y* chromosome (Gowen and Gay, 1933, Proc. Natl. Acad. Sci. U.S. 19: 122-26)] produce sterile males *[T(1;3)W^Y/Y\.* RK2A.
cytology: Associated with *T(l;3)w[ml];* breakpoints unknown.
other information: First case of variegated position effect recorded; originally termed eversporting displacement.

**[w]m2*

origin: X ray induced.
discoverer Patterson, 1929.
references: Muller, 1930, J. Genet. 22: 299-334.
phenotype: Eyes mottled. Male sterile. RK2A.
other information: Associated with *T(l;3)w[m2];* breakpoints unknown.

origin: X ray induced.
discoverer: Muller, 1929.
references: 1930, J. Genet. 22: 299-334.

phenotype: Eyes mottled. RK3A.
other information: Fragment of an *X* chromosome. The region of the chromosome from the right of *fa* locus to the proximal heterochromatin is deleted. Survives only in combination with normal *X's;* mottled effect present when normal *X's* carry w.

$_{w}m4$
origin: X ray induced.
discoverer Muller, 1929.
references: 1930, J. Genet. 22: 299-334.
phenotype: Eyes mottled. Male and homozygous female viable and fertile. RK2A.
cytology: Associated with *In(l)w^{m4} =In(l)3Cl-2;20A* (Sutton).

W"^{5}
origin: X ray induced.
discoverer. Muller, 1929.
references: 1930, J. Genet. 22: 299-334.
Bolen, 1931, Am. Naturalist 65: 417-22.
phenotype: Eyes reddish with white facets. Both sexes viable and fertile. RK2A.
cytology: Associated with *T(l;4)xv°*5 = T(1;4)3C3-4;101Fl-2.*

$*_{w}$ml1
origin: X ray induced.
discoverer Panshin.
references: Panshin and Khvostova, 1938, Biol. Zh. (Moscow) 7: 359-80.
Panshin, 1938, Nature 142: 837.
1941, DIS 15: 33-34.
cytology: Associated with *T(l;4)w°*ll = T(1;4)3C3-4;101A-D.*

yfm49a
origin: X ray induced.
discoverer Lefevre, 49a7.
synonym: *w^{mS}P: white-mottled Spotted.*
references: 1949, DIS 23: 59.
1951, DIS 25: 71.
Ratty, 1954, Genetics 39: 513-28.
phenotype: Eyes contain one or a few large red sectors on white background. Extra *Y* chromosome converts eyes to nearly wild type. RK2A.
cytology: Associated with *T(l;3)w^{m4}^a = T(l;3)3At0-Bl;3E2-3;80.*

yym57*b*
origin: X ray induced,
discoverer W. K. Baker, 51bl9.
phenotype: Mottled for wand *rst.* RK2A.
cytology: Associated with *ln(l)w^Slb = l_{n}(l)3Cl-2;20.*

wm51c
origin: X ray induced in *In(l)w^{m}*.*
discoverer Lefevre, 51c20.
references: 1951, DIS 25: 71.
1951, DIS 26: 66.
Ratty, 1954, Genetics 39: 513-28.
phenotype: Eyes of *w^Slc/$_{w}$* variegated. Male lethal. RK2A.
cytology: Associated with *T(l;4)w^{mSlc} « T(1;4)3C1-2;3C4-7;20A;10l.*

$*_{w}$m52bl2
origin: X ray induced in *In(l)rat^{3}.*
discoverer: Ratty, 52bl2.
references: Lefevre, 1953, DIS 27: 57.
cytology: Associated with *T(l;2)w^{mS}^bl2 — T(l;2)1E5-F1;3C3-4;20B;40-41.*

$*_{w}$mS2bl3
origin: X ray induced in *In(l)rst^{3}.*
discoverer: Ratty, 52bl3.
references: Lefevre, 1953, DIS 27: 57.
cytology: Associated with *T(l;4)w^{m52b13} = T(l;4)2A2-3;3C3-4;101* superimposed on *In(l)rst^{3} = In(l)3C3-4;20B.*

y/m53a
origin: X ray induced.
discoverer: P. Farnsworth, 53a4.
references: Lefevre, 1953, DIS 27: 57.
cytology: Associated with *T(l;2)w^{m53a} = T(1;2)3B2-C1;3C9-D1;4O-41.*

*wm53e
origin: Neutron induced.
discoverer: Mickey, 53ell.
references: 1963, DIS 38: 29.
cytology: Associated with *T(l;2)w^{m53t}> = T(1;2)3C3-4;20A2-3;58F8-59Al.*

*y/rn531
origin: X ray induced in *In(l)EN.*
discoverer M. A Bender, 53j.
references: 1955, DIS 29: 69.
phenotype: Eyes of hemi- and homozygote mottled with small dark brown patches. RK2A.
cytology. Associated with *In(l)W"S3j =i_{n}(i)3C3-5;1A-2O* superimposed on *In(l)EN = In(l)lA;20;20B-C.*

y/m541
origin: Neutron induced.
discoverer Mickey, 5413.
references: 1963, DIS 38: 29.
phenotype: Like *w^{m}<.* RK2A.
cytology: Associated with *InCiyw*^{1}*^{4}* = In(l)3C3-5;20D.*

*$_{w}$m55b
origin: X ray induced in *R(l)2.*
discoverer: M. A Bender, 55b.
references: 1955, DIS 29: 69.
phenotype: Eyes mottled with large patches of pink or white. RK2A.
cytology: Associated with *ln(l)w^SSb z*I_{n}(l)3C3-5;1A-2O* superimposed on *R(l)2,* which has opened out as *In(l)lA3-4;19F-20Al.*

Yftn258-J8
origin: X ray induced.
discoverer Demerec, 33k.
references: Demerec and Slizynska, 1937, Genetics 22: 641-49.
phenotype: Eyes cream colored and mottled. Both sexes viable and fertile. RK2A.
cytology: Associated with *T(l;4)w**2^{5}8-^{IS} = T(l;4)3C4-5;101.*

$_{w}$m258~21
origin: X ray induced.
discoverer. Demerec, 1934.
references: Judd, 1955, Genetics 40: 739-744.
synonym: *w^{VD3}.*

phenotype: Eyes and larval Malpighian tubes (Schultz) mottled. Heterozygous female shows Notch phenotype. Nearly lethal. Variegation sensitive to temperature; more extreme at lower temperatures than at 25°C. Variegation caused by proximity of the *w* locus to heterochromatin; nonvariegating w alleles separable from rearrangement by recombination (Judd). RK2A.

cytology: Associated with $T(l;4)w^{m2}$ *58-21* = ***T(1;4)3E5-6;1O1F.***

$*_w$m2S8-31

origin: X ray induced.

discoverer Demerec, 371.

phenotype: Eyes cream colored and mottled for *w*. Male viable. RK2A.

cytology: Associated with $T(l;4)w^{m2S8}$-31 = ***T(l;4)3C3-5;102F4-17.***

$*_w$m258-32

origin: X ray induced.

discoverer: Demerec, 371.

phenotype: Eyes cream colored and mottled. Male viable. RK2A.

cytology: Associated with $T(l;3)w^{m2}$*S8-32* = ***T(1;3)3C3-5;81.***

$*_w$m258-34

orig'in: X ray induced.

discoverer Demerec, 38b.

phenotype: Eyes cream colored and mottled. Male viable. RK2A.

cytology: Associated with *T(l;2)W»258-34* = ***T(1;2)3C3-S;41A.***

$*_w$m258-36

origin: X ray induced.

discoverer: Demerec, 38b.

references: Sutton, 1940, Genetics 25: 534—40.

phenotype: Eyes cream colored and mottled. Male viable. RK2A.

cytology: Associated with $T(l;2)w^{m2S8}$-36 = ***T(l;2)3C6-7;4C2-3;41A-B;41F5-6.***

$*_w$m258-37

origin: X ray induced.

discoverer: Demerec, 33j.

phenotype: Eyes mottled. Male viable. RK2A.

cytology: Associated with *T(l;2)wta2S8-37* = ***T(l;2)3C3-4;40-4lA.***

$*_w$m258-39

origin: X ray induced.

discoverer: Demerec, 38e.

phenotype: Eyes cream colored and mottled. Male viable. RK2A.

cytology: Associated with $T(l;2)w^{™}$*258-39* $_m$ = ***T(l;2)3C3-5;40E-F.***

$*_w$m2S8~40

origin: X ray induced.

discoverer: Demerec, 38e.

phenotype: Eyes cream colored and mottled; texture rough. RK2A.

cytology. Associated with $T(l;2)w^{t''}$*2 58-40* = ***7T1;2)3C3'5;41.***

$*_w$m2S8-44

origin: X ray induced.

discoverer: Demerec, 38k.

phenotype: Eyes mottled. Male viable. RK2A.

cytology: Associated with $T(l;2;3)w^{m2}$*58-44* = ***T(1;2;3)3C3-4;4D2-E1;56E1-F1;8OD.***

$*_w$m2S8-53

origin: X ray induced.

discoverer: Demerec, 391.

references: Sutton, 1940, Genetics 25: 628-35.

phenotype: Eyes mottled. Male viable. RK2A.

cytology: Associated with $T(l;4)w^{™2}$*58-53* = *T(1;4)3C1-2;1O1E-F;* 101F through 102F lost.

$*_w$m258-S4

origin: X ray induced.

discoverer: Sutton, 40e.

phenotype: Eyes cream colored and mottled. Male lethal. RK2A.

cytology: Associated with $T(l;3)w^{m258}$*-54* = ***T(l;3)3B2-Cl;19F2-20Al;20E;63C7-8.***

Y^m264-58

origin: X ray induced simultaneously with $N^{264,58}$.

discoverer: Demerec, 38d.

references: 1940, Genetics 25: 618-27.

phenotype: Eye color variegated. Exists in three types of lines: $w^{m264,S8}$ from a lines shows extreme variegation and produces more pigment when paternally inherited than when maternally inherited; from / lines produces more fully pigmented eyes and the converse parental effect; from *g* lines produces more pigment than f and no parental effect. In a lines, variegation partially suppressed by extra heterochromatin in genome (Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54) and in mother's genome (Spofford, 1959, Proc. Natl. Acad. Sci. U.S. 45: 1003-7). Homozygous viable in female but apparently not in male. Variegation less (phenotype more wild type) in homozygous female than in heterozygous female. Heterozygous offspring of homozygous female less variegated than heterozygous offspring of heterozygous female (Spofford, 1958, Proc. Intern. Congr. Genet., 10th. Vol. 2: 270; Hessler, 1961, Genetics 46: 463-84). When $w^{\wedge 2}$*64-58* inherited from mother, more variegation than when inherited from father (Hessler, 1961; Spofford, 1961, Genetics 46: 1151-67; Baker, 1963, Am. Zoologist 3: 57-69). RK2A.

cytology: Associated with $T(1;3)N^{264}$*~S8* = ***T(l;3)3B2-3;3D6-7;80D-F* as well as its derivative *Dp(l;3yN^{264}-^{58} = Dp(l;3)3B2-3;3D6-7;80D-F.*** **The** duplication has been used in most of the variegation studies.

$_w$m609e

origin: X ray induced.

discoverer: Patterson.

references: Griffen and Stone, 1938, Genetics 23: 149.

phenotype: Eyes variegated. RK1A.

cytology: Associated with $T(l;3)w^{m}$*609e* ≃ ***T(l;3)3C2-3;100C3-4,***

$_w$m4000

origin: X ray induced.

discoverer: Buzzati-Traverso, 4117.

references: 1943, Rend. 1st. Lombardo Sci. Lettere, Pt. I: Class. Sci., Mat. e Nat. 77: 61-64.
phenotype: Eyes cream colored, darker in male than female. Viable and fertile in male and homozygous female. Variegated for *w, rst, fa,* and *Co.* RK2A.
cytology: A rearrangement with a break in white region.

w^{ma}: see w^{63}^

w^{mA}: *white-mottled from Austin
origin: X ray induced.
discoverer: Stone.
references: Griffen and Stone, 1939, Genetics 24: 73.
1940, Texas Univ. Publ. 4032: 201-7 (fig.)-
phenotype: Eyes variegated. Male viable and fertile. RK1A.
cytology: Associated with *T(l;4)w^{mA} = T(1;4)3C2-3;101A2-3.*

$_w$mCi: *white-mottled of Cicak
origin: X ray induced in $Y^SX^tY^L$.
discoverer Cicak.
references: Oster, 1957, DIS 31: 150.
phenotype: Eyes variegated with red and white facets. Introduction of additional *Y* chromosome does not seem to alter expression. RK2A.
other information: Recombination reduced.

$_w$mDJ; *white-mottled of Dubinin
origin: X ray induced,
discoverer. Dubinin.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: **293-302.**
cytology: Associated with *T(l;2)w^{mD1} = T(l;2)3B;19-20;21 F.*

w^{mD3}
discoverer: Dubinin.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: 293-302.
cytology: Associated with *T(l;4)$w^{'''D3}$ = T(l;4)3C;101.*

$_w$mDGl: *white-mottled of Dubinin and Goldat
discoverer: Dubinin and Goldat.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: 293-302.
cytology: Associated with rearrangement in which 3B is inserted into chromocenter.

***$_w$mD V4: *white-mottled of Dubinin and* Vofofov**
discoverer: Dubinin and Volotov.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: 293-302.
phenotype: Eyes mottled; male lethal; heterozygous female 2V. RK2A.
cytology: Associated with *T(l;4)w^{tnDV4} = T(1;4)3C3-7;3D;IQIA-D.*

w^{mJ}: *white-mottled of Jonsson
origin: X ray induced,
discoverer: Jonsson, 61128.
references: Lefevre, 1963, DIS 37: 49-50.
Lefevre and Wilkins, 1966, Genetics 53: 175-87.
phenotype: Eyes mottled red and white. RK2A.
cytology: Associated with *T(l;4)w«*J » T(t;4)3G2-3;20;imC.*

$_w$mM c; *white-mottled of McLean
origin: X ray induced.
discoverer: McLean.
references: Muller, 1946, DIS 20: 68.
phenotype: Eye color light mottled. Variegated for *rst* RK2A.
cytology: Associated with *In(l)w^mMc = l_n(l)3Cl-2;20A-C.*

$_w$mMed: *white-mottled of Medvedev
discoverer. Medvedev, 1934.
phenotype: Mottling on w^a background. RK2A.
cytology: Associated with *T(l;4)w^{mMed}; break-*points unknown.

$w^{''10}$; *white-mottled orange*
origin: Spontaneous.
discoverer. Hanly.
references: 1963, DIS 38: 30.
Wright and Hanly, 1966, Science 152: 533-35.
phenotype: Eyes light mottled orange at eclosion, darkening with age. Red pigments (drosopterins) reduced to about 10 percent normal; other pteridines about normal. w^{mo}; *bw* is pale yellow, indicating most ommochromes removed. Xanthine dehydrogenase about normal. Some males accumulate large quantities of drosopterins in abdominal fat body. These pigments appear about the second day of adult life and disappear on the fourth, fifth, or sixth. Low temperature increases proportion of males with this trait. Female not affected. $w^{mc>}$/w has dark homogeneous brown eye color; w^{mo}/w^a and w^{mo}/w^{Bwx} are similar but somewhat lighter. Viability good. RK1.
other information: Crossover tests give no indication of chromosome aberration, w^{010} probably belongs to the w^aP subgroup of the *w* pseudoalielie series.

w^{mSp}: see w^{m49a}

w^M: *white of MacKendrick
origin: Spontaneous derivative of *w** (MacKendrick believed it to be w^e, but she obtained it from Edinburgh, where subsequent results make it seem likely w* and *w** became interchanged).
discoverer: MacKendrick, 1955.
references: 1958, DIS 32: 82,
Rasmuson, Green, and Ewertson, 1960, Hereditas 46: 635-40.
Rasmuson and Rasmuson, 1961, Hereditas 47: 619-30.
phenotype: Male and homozygous female alike and practically indistinguishable from wild type. Heteroarygote with *w* or deficiency for *w* has slightly darker eyes than $w*''^3$. Brown pigment at normal level; red pigment intermediate between w^{fl} and normal. Enhanced by ®ufw*j and suff); not a suppressor of *z.* Viability and fertility good. RK2.

$_w$MS9: *white of Muller
origin: Spontaneous.
discoverer: Muller, 59d.
references: Mischaikow, 1959, DIS 33: 9«.
phenofype: Eyes cream colored, darkening slightly with age. RK1.

WP: white-pearl

origin: Spontaneous.
discoverer: Steinberg, 37bl7.
references: 1937, DIS 8: 11.
phenotype: Eyes extremely pale, lighter than *w**. Larval Malpighian tubules colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

w: white-reddish

origin: Spontaneous partial reversion from w^a in *In(1)sc^{S1}L$_{sc}$^{1}R+S$_t$ sc^{sl}* sc^{8} *w^{a} B.*
discoverer: Muller, 1944.
references: 1944, DIS 18: 57.
phenotype: Eye color nearly normal in homozygote; dark maroon in w^r/w^a heterozygote. RK2A.

w^{rdf}: white-recombinant deficiency

origin: Spontaneous product of asymmetrical exchange within the *w* locus; marker distribution such that w^{rdt} is also w°.
discoverer Judd, 1961.
references: 1961, Proc. Natl. Acad. Sci. U.S. 47: 545-50.
1964, Genetics 49: 253-65.
1964, DIS 39: 59.
phenotype: Eyes white. Suppresses *z*. w^{rdt}/w^sP like *w*P* homozygous. RK1.
other information: Deficiency for the site occupied by w^{cil} in the *w* pseudoallelic series. Reciprocal asymmetric exchange product is $w^{rd}P$. Recombination in w region reduced. Judd was unable to recover recombinants between w^{Tdi} and *w*, w°, or w^{Bw}*.

$w^{rd}P$: white-recombinant duplication

origin: Spontaneous product of asymmetrical exchange within the *w* locus; marker distribution such that w^P is also w^{bf}.
discoverer Judd, 1961.
references: 1961, Proc. Natl. Acad. Sci. U.S. 47: 545-50.
1964, Genetics 49: 253-65.
1964, DIS 39: 59.
phenotype: Eye color lighter than w^{bl}. Enhancer of *z*; z^+ $w^{rd}P/z$ w^+ has reddish brown mottled eyes. $_z$ w^a w""/z^+ w^{bt} $w^{rd}P$ female has white eyes. RK1.
other information: Duplication for site occupied by w^{ch} in the *w* pseudoallelic series. Reciprocal asymmetric exchange product is w^{rdf}. Increases exchange in *y-spt* interval and within the *w* locus. Probably same type of change as *w**, *w*l*, and *w*">*.

$_w$r,dup. see ***Dpd;l)wrJ2***

w*': white-spontaneous

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Does not suppress *z*. Not affected by *su(w*)*. RK1.
other information: Located to the left of w^c*.

$_w$s2

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Does not suppress *z*. RK1.
other information: Located to the left of w^{ch}.

$_w$, 3

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Does not suppress *z*. RK1.
other information: Located to the left of w^{ch}.

$_w$s4

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Does not suppress z. Not affected by *su(w^B)*. RK1.
other information: Located to the left of w^a.

$_w$s5

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Does not suppress *z*. RK1.
other information: Located to the left of w^{ch}.

$_w$s9

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Does not suppress z. RK1.
other information: Located to the left of $w^{c/l}$.

$_w$s10

origin: Spontaneous.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Not a suppressor of z. Not affected by *sa(w*)*. RK1.
other information: Located to left of w^{ch}.

w^{*at}: white-satsuma

origin: Spontaneous.
discoverer: Bridges, 33126.
synonym: w^{33t}.
references: 1935, DIS 3: 18.
phenotype: Eye color deep ruby; resembles *pr* and *ma*. No sexual dimorphism. Lightens *rb* and *g*. Not modified by *P* or *e(w°)* or by temperature. Does not suppress z (Green, 1959, Heredity 13: 303-15). Larval Malpighian tubules nearly wild type (Brehme and Demerec, 1942, Growth 6: 351—56). RK1.
other information: Occupies a site to the left of *W>* in the *w* pseudoallelic series (Green, 1959).

W*P: white-spotted

discoverer: Showell, 1944.
synonym: *ap-w: spotted* wfiite.
references: Lewis, 1956, Genetics 41: 651.
phenotype: Eyes have fine-grained mottling; facets range from yellowish to brown. Male darker than female (Green, 1959, Heredity 13: 303-15). •*w"P/w*, $w^sP/w^{cJ)}$, and W^BP/W** have homogeneous brown eye color. w^aP heterozygous with a deficiency for all or part of the *w* locus produces phenotype like W^BP/W^SP (Green, 1959, Z. Vererbungslehre 90: 375-84). Suppressor of z (Green, 1959). The double mutant w*» W^SP is white and w^{ctt} w^BP has pale yellow eyes. RK1.
other information: Occupies rightmost site in the *w* pseudoallelic series, to the right of w^{ch} (Lewis, 1956).

$W*P^2$

origin: Spontaneous.
discoverer: Mohler, 56c22.
references: 1956, DIS 30: 78-79.

phenotype: Eyes mottled like w^aP, W^SP^2/W and $_wsp2/_we$ have uniform brownish eyes. w^sP^2/w slightly darker and more red than w^sP/w. RK1.

$_wsp3$

origin: X ray induced,
discoverer: Green, 59a29.
references: 1959, DIS 33: 94.
phenotype: Like W^SP. RK1.

w': *white-tinged*

origin: Spontaneous.
discoverer: Hyde, 14k2.
references: 1916, Genetics 1: 535-80 (fig.).
phenotype: Eye color light pinkish. Larval Malpighian tubes colorless (Brehme and Demerec, 1942, Growth 6: 351-56). RK1.

w^{vC}: white-variegated of Catcheside

origin: X ray induced in *R(l)2.*
discoverer: Catcheside.
phenotype: Eyes mottled; heterozygous female tends to show *N.* Viability of male varies among lines from nearly zero to fair. RK2A.
cytology: Associated with *In(l)w^C =l_n(l)3Cl-2;19-20* superimposed on *R(l)2.*

$_w$vco: *white-variegated cobbled*

discoverer: Clausen,
phenotype: Eyes mostly white, with red mottling. RK2A.
cytology: Associated with *T(1;3)W™° = T(1;3)2B17-C1;3C4-5;77D3-5;81.*

$_w$vD I: white-variegated of Demerec

origin: X ray induced.
discoverer: Demerec, 33jl9.
phenotype: Eyes variegated white and red. Male fertile. RK2A.
cytology: Associated with *Dp(l;4)w^{vD1} = Dp(l;4)3Cl-4;lQlA-D.*

$_w$vD2

origin: X ray induced.
discoverer: Demerec, 33k27.
phenotype: Fine-grained variegation of cream with dark spots. Female occasionally shows *rst* variegation. RK2A.
cytology: Associated with *T(l;2;4)w^{vD2} = T(l;2;4)3C4-5;18F;38;101A-C.*

$_w$vD4

origin: X ray induced.
discoverer. Demerec, 33k2.
phenotype: Eyes of heterozygous female mottled. *X/Y* male mottled but rarely survives. *X/Y/Y* more viable, but sterile. RK2A.
cytology: Associated with *T(l;2)w^vD4 _ T(1;2)3D6-El;40F.*

wVD3; see $w^{™258,21}$

$*_wX1$: white from X irradiation

origin: X ray induced.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Not a suppressor of z. RK1.
other information: Located to left of w^{ch}.

$*_wX2$

origin: X ray induced.
references: Green, 1959, Heredity 13: 303-15.
phenotype: Eyes white. Not a suppressor of *z.* RK1.
other information: Located to left of w^{ch}.

$*_wX3$

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Not a suppressor of z. RK1.
other information: Located to left of w^{ch}.

*$_W$X4

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Not a suppressor of *z.* RK1.
other information: Located to left of w^{ch}.

$*_wXS$

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Not a suppressor of z. RK1.
other information: Located to left of w^{ctl}.

$*_wX6$

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Not a suppressor of z. Not affected by *su(W).* RK1.
other information: Located to left of w^a.

$*_wX8$

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. Not a suppressor of *z.* RK1.
other information: Located to left of w^{ch}.

*$_W$X7 6

origin: X ray induced.
references: Green, 1959, Heredity 13: 303—15.
phenotype: Eyes white. A dominant suppressor of z. Not affected by *su(w*).* RK1.
other information: Located to the right of *W.*

$w^{r'}$.' *white-zeste light*

origin: Spontaneous derivative of w^{zm}.
discoverer. Becker, 1958.
synonym: z^l.
references: 1959, DIS 33: 82.
1960, Genetics 45: 519-34 (fig.).
Judd, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 3-4.
1964, DIS 39: 60.
phenotype: Eyes of z w^{zl} female uniform lemon yellow at 25°-30°C; same at 14° but with large red spots, z w^{zl} male raised at high temperature like female raised at low temperature. At low temperature, they have large red spots on lemon background with salt-and-pepper mottling. *X/0* and *X/Y* males identical. + w^{*1} is wild type, z w*V+ + is vaguely mottled. RK1.
other information: Postulated to be a duplication of part of white locus. The white locus change is located to the right of *w**. w^{xt} is unstable and mutates to w^{*m} and a white Qudd, 1963; 1964> Probably same type of change as w^{ia} and $w^{r<i}P$.

w^{*m}: white-xeste mottled

origin: Spontaneous product of asymmetrical exchange within the *w* locus.
discoverer: Green, 54k5.
synonym: z^m.

references: Becker, 1959, DIS 33: 82.
I960, Genetics 45: 519-34 (fig.).
Judd, 1963, Proc. Intern. Congr. Genet., 11th. Vol. 1: 3-4.
1964, DIS 39: 60.
phenotype: Eyes of *z* w^{zm} female raised at 25°—30°C are lemon yellow; at 14°—17°, slightly orange with large red spots. Eyes of male raised at 25°—30° have lemon-yellow background and fine-grained red spots; at 14°—17° eye color of male almost normal. *X/0* and *X/Y* males identical. Eye color of z^+ w^{zm} homozygote and hemizygote is wild type. Eyes slightly mottled in + w^{zm}/z w^{zm}. RK1.
cytology: Salivary chromosomes normal.
other information: w^{zm} postulated to be a duplication of part of the white locus that arose from an asymmetrical exchange. The change in the white locus lies to the right of w^a. w^{zm} is unstable and mutates to w^{zt} and to white. These forms are in turn unstable and revert to w^{ztn} (Judd, 1963; 1964). Probably the same type of change as w^{is} and $w^{rd}P$,

W: Wrinkled
location: 3-46.0.
origin: Recovered among progeny of female exposed to stratosphere.
discoverer. Jolios, 1936.
references: 1936, Natl. Geograph. Soc. Tech. Papers, Stratosphere Ser. No. 2: 153-57.
Jollos and Waletzky, 1937, DIS 8: 9.
phenotype: Homozygote viable. Wings remain small and unexpended. Black spots on head beside proboscis or ocelli. Heterozygous female like homozygote but less extreme. Male much less extreme; wings often expanded but wrinkled, blistered, and surface finely pebbled and grayish; no overlap with wild type. Suppressed by *D* in male and nearly so in female. From prepupal stage through adult, wing bases abnormally narrow, possibly preventing flow of body fluid in sufficient quantity to expand wings [Waddington, 1940, J. Genet. 41: 75-139 (fig.)]. RK1 as dominant.

W13:* see *T(1;4)A1

^{k}wa: warty
location: 1-64.4 (based on location of *wa^2; wa* said to be near car).
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 56.
phenotype: Eyes rough, with scattered enlarged facets. Occasional notched wing tip. Penetrance low. Viability variable. Male infertile in proportion to degree of expression. Heterozygous female often infertile. RK3.

wa^2
origin: Induced by L«p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3025).
discoverer. Fahmy, 1953.
references; 1958, DIS 32: 77.
phenotype: Eyes irregularly roughened and of varying size ami shape; ommatidia deranged. Wing tips rarely notched. RK3.
other information: Allelism inferred from phenotype and genetic location. One allele each induced by CB. 1540, CB. 3025, and X rays.

waisted:* see *ws
***warped:* see wp**
***warty:* see wa**
Washed eye:* see *We
water wings:* see *wtw
wavoid:* see *wd
wavy: see wy
waxy: see wx

****wd: wavoid***
location: 2-40.
origin: Spontaneous,
discoverer: Kellen-Piternick, 1941.
references: Kellen, 1945, Genetics 30: 12.
phenotype: Wings waved. Variable penetrance and expressivity, especially in male. Partially suppressed by *y* in both sexes. RK2.

****wdn: wings down***
location: 3-100.
discoverer: Morgan.
references: 1929, Carnegie Inst. Wash. Publ. No. 399: 187.
phenotype: Wings extended and drooping or even directed ventrally, broad with close crossveins. Overlaps wild type. Low viability. RK3.

*we: wee
location: 1-3.
origin: X ray induced.
discoverer: Muller, 2615.
references: 1935, DIS 3: 30.
phenotype: Fly dwarfed. Eyes rough; bristles fine; and wings spread. Fertility very low. RK2.

****We: Washed eye***
location: 3-43.0.
origin: Spontaneous.
discoverer: Andres, 42e7.
references: 1943, DIS 17: 48.
phenotype: Dominant modifier of *w* that produces partial reversion. Produces spot of dilute red pigment varying in size from dot to nearly whole eye. Homozygous lethal. Classification, fertility, and viability of heterozygote excellent. RK2.

weoJt: see *wk*
wee: see we
welt:* see *wt
***weltIike:* see wt/**

****wgv: wing variance***
location: 1-33.0 (no recombinants with v among 90S).
discoverer: Fahmy.
references: 1959, DIS 33: 94.
phenotype: Wing position variable; wings drooping, outspread, or upheld. Male sterile. RK2.

wh: whiskers
location: Autosomal.
origin: Neutron induced,
discoverer: Mickey, 54a7.
references: 1963, DIS 38: 29.
phenotype: Many extra vibrissae, which are longer than normal. RK3.

whd: withered
location: 2-61.
origin: Spontaneous.
discoverer: Bridges, 38a6.
phenotype: Wings warped and waved or reduced to shrunken black pupal pads. RK2.

****whg: whiting***
location: Autosomal.
discoverer: Bridges, J3k21.
references: 1916, Genetics 1: 148.
1919, J. Exptl. Zool. 28: 337-84 (fig.).
phenotype: Specific modifier of w^e. w^e; *whg* has pure white eyes. RK3.

****whh: white head***
location: 3- (not located).
discoverer: Morgan, 13h.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 99.
phenotype: Ocelli surrounded by silvery patch. RK3.

whirly: **see w/**

whiskers: **see *wh***

white: **see w**

white-marbled: **see w^{63b}**

whiting: **see *whg***

wi: witty eye
location: 2-54.9 (not allelic to *rh).*
origin: Spontaneous.
discoverer: Whitten, 61 g.
references: 1963, DIS 38: 31.
phenotype: Eyes rough on lower half owing to irregular facets. Extra vibrissae in variable number and distribution. Removal of closely linked modifiers gives rise to dominant form. Penetrance and expression variable and highly sensitive to background genotype. RK3.

wider wing: **see *ww***

wing variance: **see *wgv***

wings down: **see *wdn***

****with: with trident***
location: 3- (near p).
discoverer: Morgan, 10a.
references: Morgan and Bridges, 1919, J. Gen. Physiol. 1: 639-43.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 31 (fig.).
phenotype: Dark trident pattern on mesonotum. Variable, with some overlap of wild type. RK3.

withered: **see *whd***

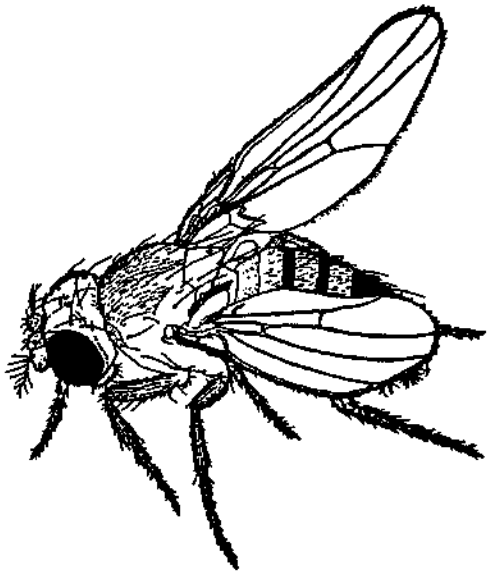
witty eye: **see *wi***

wizened: **see wz**

wk: weak
location: 3-42.
origin: Spontaneous,
discoverer Bridges, 33122.
phenotype: Bristles small, somewhat Minute, but variable. Abdomen disproportionately small. Wings somewhat warped. Viability variable. RK3.

****wl: whirly***
location: 2- (not located).
origin: Spontaneous,
discoverer: Kill, 43k4.
references: 1946, DIS 20: 66.
phenotype: Acrostichal hairs in irregular rows; incomplete whorls on thorax. RK3.

wo: *white ocelli*
location: 3-76.2.
discoverer: Bridges, 12f21.
references: 1920, Biol. Bull. 38: 231-36.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 66.
phenotype: Ocelli colorless. Eye color wild type. Modifies w^e to a lighter and less yellow tone. RK2.



wp: warped
From Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 216.

wp: *warped
location: 3-47.5.
discoverer. Bridges, 19kl5.
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 215 (fig.).
phenotype: Wings small and narrow, dusky, divergent, and warped. RK2.

wr: **see fw^{wr}**

****¥tr: Vfrinkle***
location: 2-76.
origin: Spontaneous,
discoverer. Goldschmidt, 1933.
synonym: *Wrinkled* (preoccupied),
phenotype: Wings wrinkled and blistered. Homoarygote viable and only slightly more extreme than heterozygote. Development retarded. RK1.

Wrinkled: **see W**

Wrinkled: **see Fr**

ws; waisted
location: 1-1.0.
origin: Induced by L^>-NN-di-(2-chloroethyl)®minopheaylalanine (CB. 3025).
discoverer: Fahray, 1955.
references: 1958, DIS 32: 77.

phenotype: Anterior part of abdomen constricted, giving appearance of long, narrow waist. Wings held abnormally and surface wavy. Most flies die shortly after eclosion, but occasional male is viable and fertile. RK3.

other information: One allele induced by CB. 1506.

wt: welt

location: 2-82.

discoverer: Bridges, 32119.

phenotype: Eyes small and narrow, with horizontal seam or welt. Many bristles, especially postverticals, doubled or even quadrupled in number. Abdomen chunky. Occasional nicks in wing. Expression overlaps wild type at 19°C, but is excellent at 25° or higher. RK1.

**wtl: weltlike*

location: 3-59.5.

discoverer: Bridges, 33c7.

phenotype: Eyes seamed and small. Aristae reduced. Wings rather broad. Female sterile. Expression better at 19°C. RK3.

**wtw:* wofer *wings*

location: 1-38.9.

origin: Induced by DL-p-NN-di-(2-chlorethyl)aminophenylalanine (CB. 3007).

discoverer: Fahmy, 1954.

references: 1958, DIS 32: 77-78.

phenotype: Wings short and broad, frequently with incomplete crossveins, and often thickened owing to separation of ventral and dorsal surfaces by fluid. Eyes small and slightly rough. Male genitalia twisted; pigmentation of last abdominal segment in female patchy. Penetrance and viability low. Female infertile. RK3.

*wfw^{cn}: wafer *wings-cleft end*

origin: Induced by DL-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3007).

discoverer Fahmy, 1953.

synonym: *cli.*

references: 1958, DIS 32: 68.

phenotype: Last male abdominal segment grooved in dorsal midline and with abnormal genitalia. Eyes small; wings short, broad, and slightly divergent. Female fertility low; viability good. Classification difficult. RK3.

other information: One allele induced by CB. 3007.

ww: *wider wing*

location: 1-32.9.

origin: Induced by L-p-NN-di-(2-chloroethyl)aminophenylalanine (CB. 3025).

discoverer: Fahmy, 1953.

references: 1958, DIS 32: 78.

phenotype: Wings slightly shorter and broader than normal, frequently upheld, and occasionally truncated. Male viability and fertility good but female viability and fertility reduced. RK3.

other information: One allele induced by CB. 3026.

**wx: waxy*

location: 2-69.7.

origin: Spontaneous.

discoverer: Ives, 4Ikl5.

references: 1942, DIS 16: 49.

phenotype: Wings heavy textured, more opaque, and smaller than normal. Male completely sterile; female fertile. RK2.

wx^{wxt}: waxy-waxtex

origin: Spontaneous.

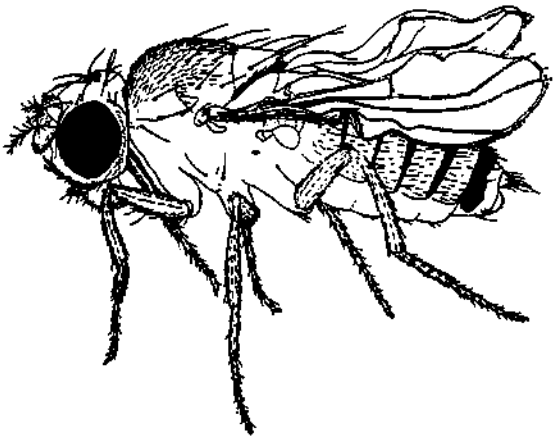
discoverer: R. F. Grell, 56k20.

synonym: *wxt,*

references: 1957, DIS 31: 81.

phenotype: Wings slightly spread and curved down distally, texture heavy and waxy, tips pointed. First posterior wing cell narrow, second posterior cell broad and flared. Fertile in both sexes. RK2.

other information: Allelism inferred from similarity in phenotype and genetic location (2-69).



wy: wavy

From Nachtsheim, 1928, Z. Induktive Abstammungs-Vererbungslehre 48: 245-58.

wy: *wavy*

location: 1-41.9.

origin: Spontaneous.

discoverer: Nachtsheim, 26g7.

references: 1928, Z. Induktive Abstammungs-Vererbungslehre 48: 245—58.

phenotype: Wings transversely waved, usually turned up at tip. Abdomen long and narrow. Marginal vein kinked even when other characters overlap wild type. RK2.

cytology: Tentatively placed in 11D-E, on basis of the breakpoint of *T(l;2;3)wy^74-a - T(1;2)8F-9A;20A-B;26B-D+T(1;3)11D-E;65C-D.*

wy^2

discoverer Ruch.

synonym: ex-6.

references: Parker, 1935, DIS 4: 62.

phenotype: More extreme than *wy;* more upward curl to wings. RK2.

*wy^®°

origin; Spontaneous.

discoverer. Haskell, 40a.

references: 1941, DIS 14: 39.

phenotype: More extreme than *wy;* more upward curl towing. wy-'Oa/ivyis intermediate. RK2.

**wy274-2*

origin: X ray induced.

discoverer: Demerec, 34a.
phenotype: Male lethal. RK2A.
cytology: Associated with *T(l;2;3)wy$^{274-2}$ = T(l;2)8F-9A;20A-B;26B-D + T(1;3)11D-E;65C-D.*

wz: wizened
location: 3-47.8.
discoverer Bridges, 1921.
synonym: *shrunken-3.*
references: Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 241.
phenotype: Small fly; not filled out. Body color dark dull; bristles small. Late hatching. Infertile. RK3.

X-:* see *1()S

Xei:* see *ap^{Xa}

y: yellow
location: 1-0.0.
origin: Spontaneous.
discoverer: E. M. Wallace, lla.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 27.
phenotype: Body color yellow; hairs and bristles brown with yellow tips. Wing veins and hairs yellow. Tyrosinase formed in adults (Horowitz). For the most part, *y* is autonomous in mosaics; i.e., a fly may show both yellow and nonyellow tissue; however, over limited distances there is some nonautonomy [Hannah, 1953, J. Exptl. Zool. 123: 523—60 (fig.)]. Larval setae and mouth parts yellow to brown, hence distinguishable from the dark brown of wild type (Brehme, 1937, Proc. Soc. Exptl. Biol. Med. 37: 578-80; 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.
cytology: Placed in region 1A5-8 on basis of its being carried by the *X^{D}3^{P}* element of *T(l;3)sc260-20 = T(l;3)lA8-Bl;61Al-2* and by *Dp(l;f)sc$^{260-27}$ - Df(l;f)lA8-Bl;19F,* but not being lost from *Df(l)260-5 =Df(l)lA4-5* (Sutton, 1943, Genetics 28: 210-17).

ylS: yelloW'l Of Schultz
origin: X ray induced.
discoverer: Schultz, 34kl5.
phenotype: Like *y.* Larval mouth parts like *y* (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

Y^{2}
origin; Spontaneous.
discoverer; Bridges, 25J26.
phenotype: Cuticle yellow. Hairs and bristles black. Wings and veins gray. *y^{2}fy* is like *y^{2}. y2/y35a$_{f}$ y2/yc4$_{)\ an(}$j y2fybl $_{are\ w}$*iid type. Viability excellent. Larval mouth parts slightly lighter than wild type at basal prongs, but not enough to enable reliable classification (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

y2S: yellow-2 from Swedish
origin: Spontaneous.
discoverer: Bridges.
phenofype: Body color darker tan than *y^{3},* but bristles not so dark. Viability excellent. Larval mouth parts golden brown; mouth hooks and mentum dark. Classifiable in living larva (Breiune, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

***y3**
origin: Spontaneous.
discoverer: Morgan, 26a.
phenotype: Cuticle tannish. Bristles vary from dark brown to black, hairs from yellow to black. Larval mouth parts golden at basal prongs; lateral process and mouth hooks light. Classification possible in dissected but not in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

y3d: yellow-3 dark
origin: Spontaneous.
discoverer: Sturtevant, 1933.
phenotype: Wings gray like *y^{2}* but bristles yellow. Larval mouth parts golden brown; mouth hooks light (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

y3Ai; *yellow-3 of Muller*
origin: Spontaneous in *Y^{L}'SC^{S1}.*
discoverer: Muller.
references: Muller and Valencia, 1947, DIS 21: 70.
phenotype: Like *y^{3}.* RK1A.

y3P. yellow-3 of Patterson
origin: X ray induced.
discoverer: Patterson, 31e25.
synonym: y-'-'*,
references: 1934, DIS 1: 31.
Stone, 1935, DIS 4: 62-63.
Muller and Prokofyeva, 1935, Proc. Natl. Acad. Sci. U.S. 21: 16-26.
phenotype: Body tannish with black bristles. Variegated with patches of yellow bristles and hairs, these patches being ac, slight *Hw* variegation. Larval mouth parts light at basal prongs. Classification possible in dissected larva, more difficult in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.
cytology: Associated with *In(l)y3P - I$_{n}$(l)lA;20.*

Y^{4}
origin: X ray induced.
discoverer Serebrovsky.
references: Dubinin and Friesen, 1932, Biol. Zentr, 52: 147-62.
phenotype: Like y. RK1A.
cytology. Associated with *In(l)y^{4} *>In(l)lA8-Bl;l8A3-4.*

***yS**
discoverer: Patterson.
phenotype: Male lethal. RK2A.
cytology: Associated with *In(l)y^{5} »In(l)lA-B;14D.*

***y6**
origin: X ray induced in *sc^{i2}.*
phenotype: Body yellow; bristles brown with yellow tips. Larval mouth parts like *y* (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1.

***y31h**
origin: X ray induced in *In(l)sc^{s}.*
discoverer; Patterson, 31b.
phertotype: Like *y.* Shows some ac variegation. Viability good. Larval mouth parts light enough for classification in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27; 254-61). RK1A.

***y31c**

origin: X ray induced in *In(l)sc*[8].
discoverer: Patterson, 31c.
phenotype: Bristles dark as in y^2 with some yellow variegation. Larval mouth parts light at basal prongs. Classification difficult (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1A.

***y3ld**

origin: X ray induced in *In(l)sc*[8].
discoverer: Patterson, 3Id.
references: 1935, DIS 4: 12.
Stone, 1935, DIS 4: 62-63.
phenotype: Similar to y^2, but *y31d/y35a* i_s *Ufa y31d* whereas y^2*fy35a* $j_{S\ w}$iid type. Larval mouth parts light at basal prongs, but classification difficult (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1A.

y3le**: see ***y3P

y34c

origin: Spontaneous.
discoverer: Curry, 34cl3.
phenotype: Body color tan, very near wild type. Tan antennae allow slow but reliable classification. Excellent viability. Larval mouth parts wild type (Brehme). RK2.

***y35t**

origin: X ray induced in *In(l)A99b = In(l)lD3-E1;19D-E.*
discoverer: Stone, 35a.
references: 1935, DIS 4: 62-63.
phenotype: Similar to y. *y35a/y* {s like *y*, *y35a/y2* is wild type; *y35a/y31d* j_s \]^$_e$ *y31d* ($_{or}$ y2), La_{rva}i mouth parts golden. Classifiable in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK1A.

***y39t**

origin: Spontaneous.
discoverer Mather, 39el5.
references: 1941, DIS 14: 39.
phenotype: Body yellow; bristles brown. Not so light as y. RK1.

***y40a**

origin: Spontaneous,
discoverer: Buzzati-Traverso, 40a31.
references: 1940, DIS 13: 49.
phenotype: Like y^2. RK1.

***ySO»**

origin: Spontaneous.
discoverer Thoday.
references: 1954, DB 28: 78.

***ySlg**

origin: Spontaneous in inbred Oregon-R.
discoverer. Redfield, 51g.
references: 1952, DIS 26: 68.
phenotype: Body yellow; hairs dark; bristles like y^2. RK1.

***y5J**

origin: X ray induced in *In(l}Mc*[stI]*'Sc*[8R]*+dl~49.*
discoverer Luning, 53el2.
references: 1953, DIS 27: 58.
phenotype: Homoxyecms lethal. RK2A.
other information: Not tested of *1(1}J1* <w «c.

yS3l

origin: X ray induced in y^+Y.
discoverer: Lüning, 53i.
synonym: *yS3iY,*
references: 1953, DIS 27: 58.
phenotype: *y/y*[53i]*Y* a fertile y male. RK1A.

yS4j

origin: Spontaneous.
discoverer: Mohler, 55j24.
references: 1956, DIS 30: 79.
phenotype: Body and antennae yellow; bristles brownish (slightly darker than y). Wings nearly wild type. Wings of *y*[54]*i/y* intermediate, but overlaps *y54j/y54).* **RK1.**

yS9b

origin: X-ray-induced derivative of y^2. Arose as a mosaic in which half the descendants of the irradiated y^2 gene were *y^*[9b] and half were y^+.
discoverer: Green.
references: 1961, Genetics 46: 1385-88.
phenotype: Like y. *yS9b/y2* $i_{S\ w}$Ud type, but *y^9b* does not complement with y^2 *sc* or other black-bristled alleles of *y.* RK1.

yS9e

origin: Spontaneous.
discoverer: Clancy, 59c.
references: 1960, DIS 34: 48.
phenotype: Like y, RK1.

y62a

origin: Spontaneous.
discoverer: Ehrlich, 62a.
references: McCloskey, 1963, DIS 37: 50.
phenotype: Bristles and hairs brown. Body yellow. Tip of male abdomen black. *y62a* dominant to y-type alleles and recessive to y^-type alleles. RK1.

***y62b**

origin: Found among progeny of male treated with radio frequency.
discoverer: Mickey, 62b21.
references: 1963, DIS 38: 29.

y62k

origin: Spontaneous in *In(l)sc*[SiL]*sc*[8R]*+S,* ***acSl &c& w*[a] *B.***
discoverer: Mickey, 62k8.
references: 1963, DIS 38: 29.

y62kl9

origin: Spontaneous in *In(l)sc*[sl]*+dl-49.*
discoverer: Pratt, 62kl9.
phenotype: Like *y.* RK1A.

***y94-J**

origin: Spontaneous.
discoverer Moree, 46f6.
references: 1946, DIS 20: 66.
1947, DB 21: 69.
phenotype: Like y. RK1.

y260-4

origin: X ray induced.
discoverer: Detnerec, 1938.
references: Sutton, 1943, Genetics 28: 210-17.
phenotype: Like y^2. RK1.
cytology: Salivary chromosomes normal.

**y260-ll*
origin: X ray induced.
discoverer: Sutton, 39a.
references: 1943, Genetics 28: 210-17.
phenotype: Like y. Male viable but sterile. RK2A.
cytology: Associated with *T(l;3)y*^{26}*-tl* = *T(l;3)lB2-3;85Fl-5.*

**y260-12*
origin: X ray induced,
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210—17.
phenotype: Like *y.* RK1.
cytology: Salivary chromosomes normal.

**y260-13*
origin: X ray induced.
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210—17.
phenotype: Body color wild type; bristles y. Male fertility reduced. RK2A.
cytology: Associated with *T(l;2)y*^{260}*-13* = *T(1;2)1A4-5;36D.*

**y260-21*
origin: X ray induced.
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210-17.
phenotype: Male lethal. *y260-21/y* nk$_e$ *y.* RK2A.
cytology: Associated with *T(l;3)y*^{2}*^0-21* = *T(l;3)6C;70E-F + In(l)lA6-7;SD8-Bl.*

**y260-24*
origin: X ray induced.
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210—17.
phenotype: Like *y.* RK1.
cytology: Salivary chromosomes normal.

**y260-28*
origin: X ray induced simultaneously with ac$^{2*0''2*}$.
discoverer Sutton, 39126.
references: 1943, Genetics 28: 210-17.
phenotype: Like *y.* Male viability reduced. RK2.
cytology: Salivary chromosomes appear normal.

**y260-30*
origin: X ray induced,
discoverer: Bishop, 1940.
references: Sutton, 1943, Genetics 28: 210—17.
phenotype: Like *y.* RK1.
cytology: Salivary chromosomes normal.
other information: *ac, sc,* and svr not affected.

**y260-31*
origin: X ray induced simultaneously with *T(l;2)260-31.*
discoverer Fano, 1941.
references: Sutton, 1943, Genetics 28: 210—17.
phenotype: Homozygous and hemizygous lethal. *y260-3I/y* is like *y.* RK2.
cytology: Salivary chromosomes normal at tip of *X. T(l;2)260-31 = T(1;2)9A;24;29* induced simultaneously.

***ybl**: yellow-bristle*
origin: Spontaneous,
discoverer Sandier.
references: Sandier, Hart, and Nicoletti, 1960, DIS 34: 103-4.
phenotype: Bristles yellow; body color wild type. *ybl/y* like y$^{fa'}$; *ybl/y2* $_{w}$iid type. RK1A.
cytology: Associated with *Dp(l;l)y*^{bl} = *Dp(l;l)lB2-3;4F8-9;5D4-5.*
other information: *y*^{bi} changes to y^{+} and y. These events are more complicated than gene mutations; they involve duplication, chromosome rearrangement, and mutation of neighboring genes such as sc and ac.

***yc4**: yellow-complementing*
origin: Spontaneous in *In(l)sc*^{sl}*+S.*
discoverer Muller.
synonym: *y*^{a} (Muller, Ifi46; preoccupied); *y*^{Si} (Green, 1961; error).
references: 1946, DIS 20: 68.
Frye, 1960, DIS 34: 49.
Green, 1961, Genetics 46: 1385-88.
phenotype: Like y except bristles slightly darker. *yc4/ySl* i^e *y*^{c4}. *y*^{c4}*/y*^{2} wild type; however, *yc4/y2* $_{sc}$ like *y2.* Does not complement with other black-bristled alleles of y. RK1A.

****y^{G}: yellow of Goldschmidt***
origin: Spontaneous.
discoverer: Goldschmidt.
synonym: *yP*^{x} ^{b}*h yellow-plexus blistered.*
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 307, 398-401.
phenotype: Like *y*^{2}. RK1A.
cytology: Associated with *In(l)y*^{G} = *In(l)lA;lC3-4.*

****yH51**: yellow from Hakozaki*
origin: Spontaneous.
discoverer: Tanaka, 37e30.
references: 1937, DIS 8: 11.
phenotype: Body, wings and legs yellow; bristles and hairs black. Like y^{2}. RK1.

****y^{w}: yellow of Heuhaus***
origin: X ray induced.
discoverer: Neuhaus.
references: 1936, DIS 5: 26.
phenotype: Bristles yellow; body color wild type. *yN/y* is like *y*^{N}; *y*^{N}*/y*^{2} is wild type. RK1.

****y°: yellow-orange***
origin: Spontaneous.
discoverer: Kill, 43kl8.
references: 1946, DIS 20: 66.
phenotype: Body yellow; bristles, hairs dark. RK1.

***yPS9**: yellow of Perkovic*
origin: Spontaneous in *y*$^{+}$*Y.*
discoverer. Perkovic, 59h.
references: Meyer, 1959, DIS 33: 97.
phenotype: Body and wings of *y/y*^{P59}*Y* yellow; bristles dark. RK1A.

***ypx bt**: see y°*

****y*: yellow-spot***
origin: Spontaneous.
discoverer. Cattell, 12d.
references: Morgan and Bridges, 1916, Carnegie Inst. Wash. Publ. No. 237: 33 (fig.).
phenotype: Large yellow spots on dorsal midline near tip of abdomen, on scutellum, and in narrow stripe along thorax. Spots on scutellum and thorax not obvious except in presence of b. RK2.

***y*^{9}: see *y*^{c4}**

yS1*: *yellow of Singh

origin: Spontaneous in *In(l)sc*^{8}.
discoverer. Singh, 1940.
references: 1940, DIS 13: 75.
phenotype: Like y. RK1A.

****yS6l*: *yellow ofShuman***

origin: Spontaneous.
discoverer Shuman, 61 f.
references: Meyer, 1963, DIS 37: 51.
phenotype: Like y. RK1.

***y*^{s}*: see *y*^{c4}**

yi<*:yellow-tanoid

origin: Spontaneous.
discoverer. Spencer, 361.
references: Bridges, 1937, DIS 7: 16.
phenotype: Body color rich tan; antennae light yellow; bristles black. Larval mouth parts golden brown. Classifiable in living larva (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2.

****y*^{v1}: *yellow-variegated***

origin: X ray induced.
discoverer: Schultz, 33all.
phenotype: Variegated for y. RK2A.
cytology: Associated with *T(l;2)y*^{vl} = *T(1;2)1A;39.*

yv2

origin: Spontaneous.
discoverer: Schultz, 35kl.
phenotype: Body color mostly wild type; head bristles mostly black; thoracic bristles often yellow. *X/0* male not more yellow than *X/Y* male. Larval mouth parts show basal prongs slightly lighter than wild type, the rest dark; not useful for classification (Brehme, 1941, Proc. Natl. Acad. Sci. U.S. 27: 254-61). RK2.

****yvS6***

origin: X ray induced in *y*Y.*
discoverer: C. Hinton and Schmidt.
references: 1956, DIS 30: 121.
phenotype: Variegates for *y.* Suppressed by extra *Y* chromosomes. RK2A.
cytology: Not known to involve a rearrangement.

Ybb. see *bbY*

***yellow:* see y**

Ylt:* see *Pin?*

z: zeste

location: 1.0 (to the right of *pn* and *kz).*
origin: Spontaneous.
discoverer. Gans, 46b.
references: 1948, DIS 22: 69-70.
Gans-David, 1949, Bull. Biol. France Belg. 83: 136-57.
1953, Bull. Biol. France Belg., Suppl. 38: 1—90.
phenotype: Male wild type. Eyes of female lemon yellow at 25°C, variegated light yellow and brownish red at 19°. Ocelli have normal pigmentation (Welshons). Female heterozygous for a white allele belonging to one of the two right-hand pseudoallelic subloci (e.g., *w,* w^h, *w*^{e}, *w*P)* is wild type. Male containing a w^{+} duplication is zeste; male with an intralocus duplication for one of the right subloci (e.g., w*^{d}P) has mottled eyes. Thus two doses of the right portion of the white locus seem to be required for expression of zeste. Interactions between duplications for z and *w* more complicated. Eye color develops autonomously in mosaics and from eye disks transplanted into wild-type hosts. Eye color not affected by addition or subtraction of F chromosomes. RK2.
cytology: Located in salivary chromosome band 3A3, on basis of its inclusion in *Df(l)w*^{2S8}*-U* = *Df(l)3A2-3;3C3-5* but not in *Df(l)w2S8-14* = *Dt(l)3A3-4;3Cl-2.*

z^{11G3}

origin: X-ray-induced derivative of z.
discoverer: Gans.
synonym: *wl*G3.*
references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90.
phenotype: Eye color wild type. RK3.
cytology: Salivary chromosomes normal.
other information: Maps at z rather than *w* (Judd); therefore a reversal of *z* rather than a suppressor of z at the w locus.

z°

origin: X ray induced.
discoverer: Gans.
phenotype: Eye color of both sexes wild type, but *z*^{B}/*z* female has yellow eyes like *z/z.* May be considered a subliminal allele. RK3.
cytology: Salivary chromosomes normal.

***z*^{l}: see *w*^{zl}**

***z*^{m}: see *w*^{zm}**

****Z: Zerknitterf***

location: 1-5.5.
discoverer: Grüneberg, 3Oh.
references: 1931, Biol. Zentr. 51: 219-25.
1934, DIS 2: 8.
phenotype: Wings crumpled or incompletely unfolded, but majority overlap wild type. Viability 10 percent wild type. RK3.

***zeste:* see z**

Zw*: Zwischenferment-A

location: 1-63 (T. Wright).
origin: Naturally occurring allele.
discoverer: Young.
references: Young, Porter, and Childs, 1964, Science 143: 140-41.
Young, 1966, J. Heredity 57: 58-60.
phenotype: Produces glucose 6-phosphate dehydrogenase that migrates faster in starch gel than that produced by *Zw*^{B}. *Zw*/Zw*^{B} female produces a slow- and a fast-migrating enzyme but no hybrid of intermediate mobility. Enzyme level same in male and female. RK3.

Zw*^{8}; *Zwisckenfer merit-B

origin: Naturally occurring allele.
discoverer. Young.
references: Young, Porter, and Childs, 1964, Science 143: 140-41.
Young, 1966, J. Heredity 57: 58-60.
phenotype: Produces a slow-migrating glucose 6-phosphate dehydrogenase. Enzyme level same in male and female. RK3.

Deficiencies

Duplications

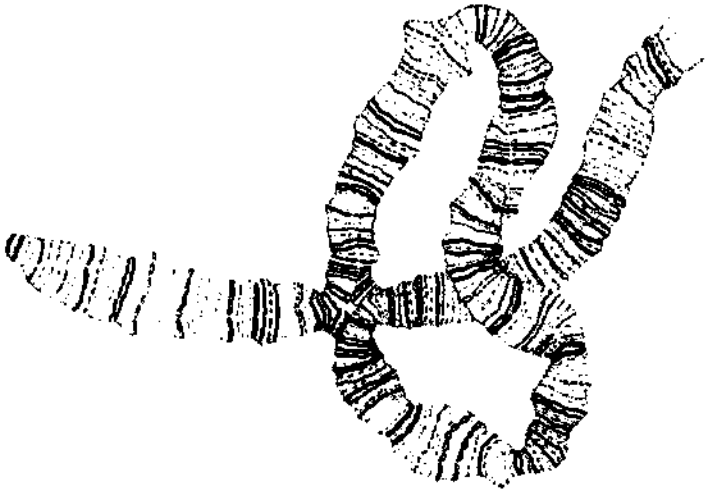
Inversions

Rings

Translocations

Transpositions

CHROMOSOME ABERRATIONS



ln(3R) Antp '/+

Le Calves, 1948. Bull. Biot. Franc© B#lg. 82: 97-113.

IDENTIFYING SYMBOLS. The standard chromosome sequence or rearrangement is the one on which the standard genetic map and the standard salivary gland chromosome map are based. Chromosome breakage and reunion can give rise to new chromosome sequences; i.e., chromosome aberrations. As the number of interacting breaks increases the number and complexity of possible chromosome aberrations become immense. Rather than a descriptive name and symbol for every type, chromosome aberrations are classified in terms of the elementary rearrangement deficiencies, duplications, inversions, rings, translocations, and transpositions; these are abbreviated *Df, Dp, In, R, T,* and *Tp,* respectively. The abbreviation is followed parenthetically by the necessary chromosomal information and then by a specific designation, which may be the symbol of a mutant arising simultaneously with the aberration or simply an experiment number. Information on salivary chromosome breakpoints is avoided to permit revising the description without altering the symbol. Except insofar as they are used to designate the associated mutant allele, superscripts are not used in aberration designations. As with mutant symbols, aberration symbols are always italicized and never contain Greek letters, subscripts, or spaces.

Translocations. Translocations are rearrangements in which nonhomologous chromosomes interact irrespective of the number of breaks involved or of sequential changes or losses or gains of chromosome material within the participating chromosomes. No distinction is made in the symbol between simple reciprocal and more-complex translocations, nor are the involved arms indicated in the parenthetical chromosomal information. Participating chromosomes are separated by semicolons and listed in the following order: *1 (X), Y, 2, 3,* and *4* [e.g., *T{1;Y;3)127, T(l;2;4)w*^{vD2}, and 7Ti;O£^{5}]. The first distinguishing information in the translocation symbol is within the parentheses. This chromosomal information is aligned on the left margin, the different classes being ordered numerically according to this information (with the provision that *Y* falls between 1 and 2); within classes translocations are arranged alphabetically according to specific designation. Individual elements of a translocation are denoted by the superscripts *D, P,* and *M. P* (proximal) refers to the source of the centromere of the element, *D* (distal) to the source of a terminus of different origin from the centromere, and *M* (medial) to the source of any material intercalated between *D* and P [e.g., $X^{D}2^{P}$ from *T{l;2)Bld,* $X^{D}3^{M}2^{P}$ of *T(l;2;3)Dinl*

Rings. Rejoining of breaks in opposite arms of the same chromosome may give rise to a ring-shaped chromosome. In ring designations the symbol is followed in parentheses by the chromosome involved and then by a specific designation; e.g., *R(l)l.* Ring-shaped *Y* chromosomes are described as *Y* derivatives in the section on special chromosomes. Replacement of the older X^{c} harmonizes the terminology for rings with that of aberrations instead of mutants.

Inversions. Intrachromosomal aberrations that are not rings and that have at least one section whose map order (either cytological or genetic) is inverted with respect to adjacent regions are designated inversions irrespective of whether segments are interchanged or lost. Inversions may involve one arm (paracentric) or both arms (pericentric) of a chromosome; they are symbolized by the abbreviation followed parenthetically by the chromosome arm or arms involved and then by a specific designation; e.g., *In{2L)Cy, ln(2LR)bw*^{vl}. *In(lLR)* designates pericentric AT-chromosome inversions rather than *Inp(l),* which was formerly used, and *1L* is implied in *In(l).* Sometimes one break of a simple autosomal inversion is in the pericentric heterochromatin and is not positioned with respect to the centromere, so that whether the inversion is paracentric or pericentric is indeterminable. In such cases, the parenthetical information consists of chromosome number with no arm designation. Recombination between similar inversions may produce viable recombinant inversions with the left end of one and the right end of the other. Superscripts *L* and *R* are used to identify the sources of the two ends; for example, *In(2R)Cy*^{L}*bw*^{VDelR}.

A segment inserted into a new location is in inverted order if its numerical order in salivary gland chromosome terminology is inverted with respect to the adjacent segments; it is in dyscentric order if its polarity with respect to the centromere is altered. When a segment from a right arm is inserted into a right arm or left into left, the inverted order is dyscentric; but in left-to-right and right-to-left insertions, the two terms are discordant, the inverted order being eucentric instead of dyscentric. This distinction has not heretofore been made, the omission resulting in ambiguous descriptions of some aberrations.

Transpositions. Intrachromosomal aberrations in which two noninserted segments are interchanged are called transpositions; those in which the order of the interchanged pieces is undetermined are also considered transpositions until demonstrated otherwise. In transposition

symbols the chromosome arm, or arms, involved is not indicated; e.g., *Tp(3)bxd*^{100}.

Deficiencies. Absence of a chromosome segment that produces a hypoploid genotype (either hypodiploid or hypotriploid) is referred to as a deficiency. (There is some question about whether a dipioid genotype with one and a fraction *X* chromosomes should be considered a hyperploid male or a hypoploid female and similarly whether a triploid genotype with two and a fraction *X's* should be considered a hyperploid triploid intersex or a hypoploid triploid female. This question is usually resolvable by the sexual phenotype of the fly.) The symbol for deficiency is followed in parentheses by the chromosome number and arm and then by a specific designation [e.g., *DK2L)G;* in D/(1)/V^{s}, *1L* is implied and in *Df(4)M, 4R* is implied]. Deficiencies may be formed by the deletion of material, either interstitial or terminal, from a chromosome arm; they may also be synthesized in a number of ways from preexisting aberrations. Terminal duplication-deficiency products resulting from aneuploid segregations from translocation heterozygotes are not ordinarily listed as either deficiencies or duplications but are discussed with the translocation entry. Other types of derived deficiencies and duplications are listed in the appropriate sections, often with simply a reference to the aberration from which they were derived.

Duplications. A genome that carries a chromosome segment in addition to the normal dipioid complement carries a duplication for the segment. The symbol for duplication follows the same plan as for other chromosome aberrations except that the parenthetical chromosomal information contains the chromosome of origin of the duplicated segment listed first followed, after a semicolon, by the recipient chromosome; e.g., *Dp(3;l)O5, Dp(l;l)y*^{bl}. When the duplicated segment is carried as a free centric element, the letter / (free) follows the semicolon within the parentheses; e.g., *Dp(l;Ol0l'* A small chromosome segment duplicated *in situ* may be referred to as a repeat, even though it is still symbolized as a duplication; e.g., *Dp{l;l)B** When the duplicated regions are in the same order, the term tandem repeat is sufficient to specify accurately the new chromosome if the limits of the duplicated segment are known. When these regions are inverted with respect to each other, two reversed repeats are possible, making it necessary to specify which end of the segment is at the axis of symmetry of the repeat; i.e., ABCCBD or ACBBCD. Failure to make such a distinction has given rise to ambiguous descriptions. Recombination within tandem repeats can lead to formation of triplications and in successive steps to tandem repeats of order higher than three. Such high-order repeats are also symbolized *Dp*.

The elementary categories of chromosome aberrations are not mutually exclusive, and some aberrations combine several of them. In such cases the symbol used is the one that stands highest in the following ranking: *T> R> In> Tp> Dp> Df.* This is especially so when the components are inseparable. A complicated rearrangement may be separable genetically into its simpler component aberrations, which are usually sufficiently designated with the distinguishing symbol of the original aberration. When, however, the original is named after a phenotype associated with one of the component aberrations, designation of the other component with the symbol of the mutant is inappropriate. A rearrangement superimposed upon another rearrangement may be given a name, which more often than not refers to the entire complex since the newly induced aberration is likely to be inseparable from the original; e.g., *ln(2LR)SMl* is a large pericentric inversion superimposed upon *In(2L)Cy + In(2R)Cy.* Component rearrangements of synthetic combinations of aberrations are occasionally referred to individually, connected with a plus sign; for example, *In(l)sc*^{8} + ***In(l)dl-49* or *In(2L)Cy + ln{2R)Cy.*** **Collecting** terms in much the same way as algebraic factoring to further abbreviate the symbol is legitimate; e.g., /n(l)sc*+ *dl-49* and *In(2L+2R)Cy.* Formerly, chromosomes with more than one inversion were symbolized *Ins(*); we use instead /n( ) for both singly and multiply inverted chromosomes since the presence of more than one inversion is indicated by the specific designation; e.g., *In(l)sc*^{slL}*sc*^{8R}*+S.* In describing a chromosome, inclusion of several types of information is often desirable; e.g., sequence and gene content. Such categories are separated by a comma followed by a space; e.g., *ln(l)dl—49*} *y w B,* which designates an *X* chromosome carrying the delta-49 inversion, the recessive markers yellow and white, and the dominant marker Bar. Marker genes are listed in the order of the standard genetic map irrespective of their order on the chromosome in question. Three categories of information may be necessary to describe some special chromosomes; e.g., ***Y*^{S}*X-Y*^{L}*, ln{l)EN+dl-49, y B,*** where, besides gene content and sequence, it is informative to designate an abnormal combination of complete chromosome elements.

DESCRIPTIVE SYMBOLS. In addition to identifying symbols just discussed, aberrations are given alternative descriptive symbols indicating points of breakage on the salivary chromosome map; breakpoints are listed in numerical order according to the limits within which they must lie. Each major chromosome arm is divided into 20 numbered divisions on the salivary gland chromosome map. The entire map is then numbered sequentially from 1 to 102 with 1—20*, 21^40-41-60, 61-80-81-100, and 101-102 representing *X* •, *2L-2R*, *3L-3R*, and 4, respectively, the centerpoints representing centromere positions. Each numbered division is divided into six subdivisions designated by the letters A through F, each of which begins with a heavily staining band; within the lettered subdivisions, the bands are numbered individually. Thus the complete designation of a particular band consists of its numbered division, its lettered subdivision, and its number; e.g., 3C2. Positions of breakpoints are designated according to the bands between which or the region or regions within which they are known to lie; for example, if a break lies between bands 3C2 and 3C7 its position is designated 3C2-7; for the sake of brevity, the redundant information 3C is omitted from the second half of the notation. Less accurately determined breakpoints may be given less specific designations; e.g., 3C or 3. An example of the total designation, both identifying and descriptive, is as follows: *1K2;3)P-T(2;3)58E3-F2;60D14-E2;96B5-Cl,* items of chromosomal information being separated by semicolons without spaces. Breakpoints are listed in order, *Y* chromosome breakpoints designated Y^S or Y^L or simply *Y* being inserted between 20 and 21. Apparent terminal deficiencies carry a single breakpoint designation. Descriptions of incompletely analyzed rearrangements incorporate the known information.

Descriptive symbols are used simply as a shorthand method for providing information about the aberration; they supplement rather than substitute for the identifying symbols. We have attempted to give breakpoints according to the revised salivary gland chromosome maps published by C. B. and P. N. Bridges rather than according to C. B. Bridges's original maps, in which individual bands were not numbered. No special notation is used to designate doublet bands; the member of the doublet closer to the breakpoint alone is listed. Insofar as practical, we avoid using breakpoint information in the identifying symbol on the proposition that subsequent revision of cytological descriptions not require alteration in the name of an aberration.

Breaks rejoin cyclically to produce chromosome aberrations (e.g., A with B and B with A) and multiple breaks may rejoin in more than a single cycle. Thus four breaks may interact to form one four-break rearrangement or two two-break rearrangements. A complex rearrangement consisting of two or more simple cyclic rearrangements is indicated in the descriptive symbol; e.g.,

T(2;3)OR72=T(2;3)19E;29F+In(2LR)24F;54B

or

T(1;2)C314=T(l;2)5D;40-41
+T(1;2)9D;51D+T(l;2)20;56F.

The order in which the component rearrangements are listed in complex descriptive symbols follows the hierarchy according to which the identifying symbol is determined. For a rearrangement superimposed upon a preexisting rearrangement, a similarly compound designation is used except that the plus symbol is replaced by the word on. If one of the new associations of the preexisting rearrangement is broken by the superimposed aberration, then the descriptive symbol is written as though the entire aberration occurred at one time rather than stepwise. An example is: $T(l;4)w^{m52b13}$, which was superimposed upon $In(l)tst^3$, is designated

T(l;4)2A2-3;3C3-4;20B;101

since 20B, which was originally adjacent to 3C3, has become associated with 2A2 and 3C3 with 101. A cyclic rearrangement was produced involving both the preexisting breakpoints and the subsequently occurring ones; i.e., the symbol cannot be written as the old and the new cyclic rearrangements.

NEW ORDERS. In an aberration having only two breakpoints, the new order follows unambiguously from the descriptive symbol. In heterochromatic rearrangements, however, an ambiguity in the position of the breakpoint with respect to the centromere may lead to ambiguities in order. Thus, for example, *T(l;2)8F;40-41* has chromosome *2* broken into two pieces, one extending from 21 to 40 and the other from 41 to 60. Since it is not known which piece is centric, it is not possible to state to which portion of chromosome *2* the acentric portion of the *X* extending from 1 to 8F is attached. With three or more breakpoints more than one new order is possible; specifying the breakpoints is therefore not sufficient to describe the aberration. We have adopted the following conventions for specifying sequences of aberrations. The sequence of each chromosome involved in an aberration is specified from one end to the other according to salivary gland chromosome terminology. Points

of breakage and reunion are indicated by vertical bars, and segments between these points are designated by the most extreme band known to be included at each end, separated by an em dash. Thus the order of

T(2;3)P=T(2j3)58E3-F2;60D12-E2;96B5-Cl

is represented as follows:

21 - 58E3|60E2 - 60F ;

61 - 96B5|60D14 - 58F2|96C1 - 100 .

Were the order of the inserted segment 60D14 — 58F2 not known, the segment would have been included within parentheses; i.e.,

61 - 95B5|(58F2 - 6OD14)|96C1 - 100 ;

hierarchies of ambiguities are represented by parentheses within parentheses. Salivary terminology is not italicized except when part of an aberration symbol, either identifying or descriptive. Use of information on order depends only on remembering that chromosome *1* extends from 1 through 20 with the centromere in 20F, chromosome 2 from 21 through 60 with the centromere between 40 and 41, chromosome *3* from 61 through 100 with the centromere between 80 and 81, and chromosome *4* from 101 through 102 with the centromere in 101D. The first breakpoint in *T(2;3)P* is listed as 58E3-F2; the first segment indicated in the sequential formula goes through band 58E3, and the inserted segment begins with 58F2. Nothing is implied about the position of the intervening bands 58E4 to 58F1; unless they are specifically described as missing, they are assumed to exist in association with one or the other or both fragments produced by the break. Information on new order is written as follows: each chromosomal element starts at the free end with the lower value and the elements are listed in numerical order, *Y* falling between 20 and 21.

When desirable, the centromere position is designated with a centerpoint; in special cases where centromeres and breakpoints coincide, as is frequently true with ring-X chromosomes, the centerpoint replaces the vertical line.

Rings are differentiated from rod-shaped chromosomes by vertical bars at the beginning and end of the element; the circle is broken for linear designation at the breakpoint with the lowest numerical value; e.g., |1A4 - 20-20F - 2OA1| for *R(l)2*. In multiple-break rearrangements in which there is a break in autosomal heterochromatin whose position with respect to the centromere is ambiguous, the new order may be written in two ways depending on the position assumed for the heterochromatic break. In such cases, we have usually assumed (for the sake of supplying the remainder of the new order) that the heterochromatic break is in region 40 for breaks in chromosome *2* and 80 for breaks in chromosome *3*.

FORMAT. The chromosome aberrations are now listed in alphamerical order according to symbol, which is in bold face. Names, where necessary, are listed (also in bold face) with cross-references to symbols; synonymic names and symbols appear in body type with cross-references to current symbols. Each aberration description is written in the following format:

symbol: name

cytology: The descriptive symbol as discussed above.

new order: As discussed in the preceding paragraphs.

origin: The inducing agent is listed; aberrations recovered from untreated parents are listed as spontaneous or naturally occurring, depending on whether recovered as a single occurrence or repeatedly.

discoverer: Name, date.

synonym: Alternative symbols or names, or both.

references: Sources of descriptions of the aberrations listed in this section, although bibliographic information may appear under other categories as well.

genetics: Effects of the aberration on the expression of genes near the breakpoints and phenotypic effects not yet attributable to known genes are described. Segregational and recombinational behavior may also be described. Descriptions of aneuploid derivatives are also included in this category.

other information: In rare instances, information not fitting into other categories is included here.

DEFICIENCIES

Del(l): see *Dp(l;f)*
Del(Xc2): see *Dp(l;f)R*

Df-3L«: see *Df(3L)K*
Df(l)0-sc,LVM: see *D((1)260-1*

****Df(\)7ak:* Def/c/encyfJ) *7a from Austin***
cytology: *Df(l)3C3-5;3C7-9;* inferred from Mackensen's fig. 15F (1935).
origin: X ray induced,
references: Mackensen, 1935, J. Heredity 26: 163-74 (fig.)-
genetics: Deficient for *fa* and *spl* but not *w* or ec; female *N.* Male lethal.

****Df(l)UzA***
origin: X ray induced.
discoverer: Mackensen.
references: 1935, J. Heredity 26: 163-74 (fig.).
genetics: Deficient for / but not *fw* or r. Male lethal.

****D«J)24a***
origin: X ray induced.
discoverer: Mackensen.
references: 1935, J. Heredity 26: 163-74 (fig.),
genetics: Deficient for *w* but not *pn* or *fa.* Male lethal.

****D«l)60b***
origin: X ray induced.
discoverer: Mackensen.
references: 1935, J. Heredity 26: 163-74 (fig.).
genetics: Deficient for f but not *fw* or r. Male lethal.

D«l)62dl8
cytology: *Df(l)3B2-Cl;C3-5* (JMd).
origin: X ray induced.
discoverer: Judd, 62dl8.
genetics: Deficient for *I(l)zw6, I(l)zw7,* and *I(l)zw9* but not *I(l)zw3.* Lethal in male and in combination with all alleles of *I(l)zw6* except $I(l)zw6^{lia}$. Forms a viable heterozygote with $In(l)w^{m4L}$ $rst3^{R}$ *=In(l)3Cl-2;20AL3C3-4;20B*^{R} (deficient for 3C2-3), which is *w rst* in phenotype. This combination should be homozygous deficient for 3C3 and lethal [see *l(l)3C3\;* the discrepancy is unexplained.

Df(l)62gl8
origin: X ray induced.
discoverer Judd, 62gl8.
genetics: Deficient for *z* and *l(l)zwl* but not *I(l)zw8.* Male lethal.

DKl)64c4
cytology: *Df(l)3A4-6;3C3-5* (Judd).
origin: X ray induced.
discoverer. Judd, 64c4.
genetics: Deficient for all known lethal loci between z and *w.* Also deficient for *w* but not for *z.* Male lethal.

DKl)64fl
origin: X ray induced.
discoverer. Abrahams on, 64fl.
genetics: Deficient for *J(ljzw3* and *I(l)zw6* but not *I(l)xw2* or *I{l)zw7.* Male lethal (Judd).

D«l)64j4
cytology: *Df(l)3A6-8;3Bl-2* (Judd) + *Df(l)3B4-C2;3Cl-4* (i.e., $w^{258\text{-}45}$).
origin: Spontaneous in w^^*"*^-bearing *X* chromosome.
discoverer: Judd, 64j4.
genetics: Deficient for *I(l)zw2* and *I(l)zw3* but not *I(l)zw4* or *I(l)zw6.* Male lethal.

****D«J)172***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *pn, w, fa,* and ec. Male lethal.

****Df(1)231c***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for v. Male lethal.

****D((1)235***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *pn, w, fa,* and ec. Male lethal.

****Dtfl)244***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for m. Male lethal.

****D«l)247a***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193-206.
genetics: Deficient for *m.* Male lethal.

****Df(l)247g***
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *w.* Male lethal.

Df(l)26Q-l
cytology: *Df(l)lB4-6;* apparently a terminal deficiency (Demerec and Hoover).
origin: Spontaneous,
discoverer. L. V. Morgan, 1932.
synonym: *Df(l)0-8C,LVM.*
references: Demerec and Hoover, 1936, J. Heredity 27: 206-12 (fig.).
Sutton, 1943, Genetics 28: 213.
genetics: Deficient for *y, ac,* and *sc* but not svr. Male lethal but not cell lethal (Ephmssi, 1934, Proc. Natl. Acad. Sci. U.S. 20: 420-22; Walen, 1961, Genetics 46: 93-103).

****Df(l)260>2***
cytology: *Df(l)lB2-3;* apparently a terminal deficiency (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 33k.
references: Demerec and Hoover, 1936, J. Heredity 27: 206-12 (fig.).
Sutton, 1943, Genetics 28: 211.

genetics: Deficient for *y* and *ac* but not sc. Hemizygous lethal but not cell lethal. Embryo develops to fully formed larva but fails to hatch (Kaliss, 1939, Genetics 24: 244-70).

***D«l)260.5**
cytology: *Df(l)lA4-5;* apparently a terminal deficiency (Demerec and Hoover).
discoverer: Hoover, 1935.
references: Demerec and Hoover, 1936, J. Heredity 27: 206-12 (fig.).
Sutton, 1943, Genetics 28: 214.
genetics: No phenotypic effect. Fertility and viability normal.

***Df(l)260-10**
cytology: *Df(l)lA2-3;* apparently a terminal deficiency (Sutton).
origin: X ray induced.
discoverer: Sutton, 39a.
references: 1940, Genetics 25: 628—35.
genetics: Mutant for *y* and *ac* but not *sc.* Viable.

***Df(l)260-19**
cytology: *Df(l)lA2-3;* apparently a terminal deficiency (Sutton).
origin: Spontaneous,
discoverer: Sutton, 1939.
references: 1940, Genetics 25: 628-35.
1943, Genetics 28: 214.
genetics: No phenotypic effects. Both sexes viable and fertile.

***D«1)262**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *fa;* female TV. Male lethal.

***DfCl)267**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *fa;* female *N.* Male lethal.

***D«1)268**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for car. Male lethal.

***D«1)271**
origin: X ray induced,
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for *fa;* female TV. Male lethal. Reduces crossing over.

***Df(l)274**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
genetics: Deficient for /. Male lethal.

***DK1)3O3**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193-206.
genetics: Deficient foe *fa;* female *N.* Male lethal.

***Df(l)308**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193-206.
genetics: Deficient for *fa* and ec. Male lethal.

***Df(l)314**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193—206.
Mackensen, 1935, J. Heredity 26: 163-74 (fig.).
genetics: Deficient for *w, fa,* and ec but not *pn* or *bi.* Male lethal.

***Df(l)354**
origin: X ray induced.
discoverer: Patterson.
references: 1932, Am. Naturalist 66: 193-206.
genetics: Deficient for *pi.* Male lethal.

***Df(l)Al: Deficiency^) from Austin**
cytology: *Df(l)9B;20.*
origin: Aneuploid segregant from *T(1;4)A1/+.*

***Df(1)A12**
cytology: *Df(l)7A;7B.*
origin: Aneuploid segregant from *T(l;2;4)A12/+.*

***Df(l)A124**
cytology: *Df(l)10A;13Al-2.*
origin: Aneuploid segregant from *T(1;2)A124/+.*

***Df(1)ac: Deficiency(T) achaete**
origin: X ray induced simultaneously with a detachment of an attached *X.*
discoverer: Muller.
references: 1954, DIS 28: 146-47.
genetics: Deficient for *ac* and probably *y.* Male viable.

***Df(1)B26^20. Deficiency(l) Bar**
cytology: *Df(l)15F9-16Al;16A6-Bl* superimposed on *Dp(l;l)15F9-16Al;16A7-Bl.*
new order. 1 - 15F9|16Bl - 20.-
origin: X ray induced in *B* chromosome.
discoverer: Demerec, 34a.
references: Sutton, 1943, Genetics 28: 97—107 (fig-)-
genetics: Reversion of *B.* Deficient for f but not *as.* Male lethal.

***Df(l)bb: Deficiency^) bobbed**
cytology: *Df(l)20C;20D.*
origin: Associated with $l^{\wedge}iybtfl^{1}$.

***Df(T)bb^{G}: Deficiency(l) bobbed of Gershenson**
cytology. *Df(l)19F-20Cl;20B-Dl.*
origin: Associated with $ln(l)sc^{4L}sc^{8R}$.

***Df(l)bbl-3°: Dcficiency(l) bobbed-lethal**
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Deficient for *bb,* Segregates irregularly from *y*Y* in male. *X/0* male lethal.

***Df(1)bbl-74**
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Deficient for *bb.* Segregates irregularly from *y*Y* in male. *X/0* male lethal.

Df(1)bb$^{1-158}$
origin: X ray induced,
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Deficient for 6b. Segregates irregularly from y^+Y in male. *X/0* male lethal.

Df(1)bb$^{1-452}$
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Deficient for *bb.* Segregates irregularly from y^+Y in male. *X/0* male lethal.

***D«l)bb'-*56**
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649-70.
genetics: Deficient for *bb.* Segregates irregularly from y^+Y in male. *X/0* male lethal.

Df(1)bb$^{1-481}$
cytology: Also carries *In(l)481 = In(l)12E-F;14B.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649—70.
genetics: Deficient for 6ft. Segregates irregularly from y^+Y in male. *X/0* male lethal.

Df(l)bis: Deficiency(1) bistre
cytology: *Df(l)7B5-6;7B7'8.*
origin: Induced by DL-p-NN-di(2-chloroethy)amino-phenylalanine (CB. 3007).
discoverer. Fahmy, 1954.
references: 1958, DIS 32: 67.
genetics: Deficient for *bis.* Male viable but sterile.

Df(l)C-PL: Deficiency(l) C of Peterson and Laughnan
cytology: *Dt(l)15F;16E.*
origin: Spontaneous; allegedly an asymmetrical exchange.
discoverer Peterson and Laughnan.
references: 1963, Proc. Natl. Acad. Sci. U.S. 50: 126-33.
genetics: Deficient for *f* and *B* but not *as.* Male lethal.

Df(1)Cl^{L}bb$^{D\,fR}$
cytology: *Df(l)4A5~Bl;4D2-3 + Df(l)17A6-Bl;20C-D.*
origin: Associated with *Infill^1* btplR.

D{(l)CILy4R
cytology: *Dt(l)17A6-Bl;18A3-4.*
origin: Associated with *In(l)Cl^{L}y4R.*

*DKl)cm**<>H4: Deficiency(l) carmine*
cytology: *D%1)6E.*
origin: X ray induced in *R(l)2.*
discoverer Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Deficient for cm.

Dtfl)cmD5: Deficiency(l) carmine of De Frank
cytology: *D%l)6E5-6;6F2-3.*
origln: X ray induced.
discoverer: De Frank.
genetics: Deficient for cm. Male lethal.

Df(l)cmH2: Deficiency(l) carmine of Hannah
cytology: *Di(l)6D8-El;6E6-Fl* (Hannah).
origin: X ray induced.
discoverer: Hannah.
genetics: Deficient for *cm.* Male lethal.

Df(J)cmH4
cytology: *Df(l)6D8-El;6E6-Fl* (Hannah).
origin: X ray induced.
discoverer: Hannah.
genetics: Deficient for *cm.* Male lethal.

Df(l)ct2o2: Deficiency^) cut
cytology: *Dt(l)7B3-6;7B6-7.*
origin: X ray induced.
discoverer. Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm, sn,* or *oc.* Male lethal.

Df(1)ct^{2o3}
cytology: *Df(l)7B2-3;7Cl-2.*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm, sn,* or *oc.* Male lethal.

Df(1)ct^{4b1}
cytology: *Dt(l)7B2-4;7C2-4.*
origin: X ray induced.
discoverer Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for cr but not *cm, sn,* or oc. Male lethal.

Df(1)ct^{7a2}
cytology: *Df(l)7A5-Bl;7C4-9.*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm, scp, an,* or oc. Male lethal.

Df(1)ct^{7c2}
cytology: *Df(l)6Fll-7Al;7B8-Cl.*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for cf but not *cm, scp,* or *&n.* Male lethal.

Df(1)ct^{10a1}
cytology. *Dt(l)7B3-4;7B6-7* (questionable).
origin: X ray induced.
discoverer De Frank, 1947.
references: Hannah, 1949, Proc. Intern. Congr. Genet, 8th. pp. 588—89.
genetics: Deficient for *ct* but not cm, *scp,* or sn. Male lethal.

Df(1)ct^{10b1}
cytology: *D%1)6D8-E1;7B7-C1.*
origin: X ray induced,
discoverer Hannah, 1947.

references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm* or *sn*. 6E and F may be transposed rather than lost; otherwise, it should be deficient for *cm*. Male lethal.

Df(1)ct^{12c2}
cytology: *Df(l)7B2-3;7B6-7* (possibly).
origin: X ray induced.
discoverer Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for cr but not *cm, sn,* or oc. Male lethal.

Df(1)ct^{14b1}
cytology: *Df(l)7B2-3;7C3-4.*
origin: X ray induced.
discoverer Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588—89.
genetics: Deficient for *ct* but not *cm, sn,* or oc. Male lethal.

Df(1)ct^{14c1}
cytology. *Df(l)7B3-4;7B6"9.*
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm, sn,* or *oc.* Male lethal.

Df(1)ct^{15b1}
cytology: *Di(l)7B2-4;7B6-7.*
origin: X ray induced.
discoverer Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Deficient for *ct* but not *cm, sn,* or *oc.* Male lethal.

Df(1)ct$^{268-13}$
cytology: *Df(l)2E3-Fl;2F2-3 + D£(l)7B2-3;7B4-5 + Dt(l)19A4-5;19A6-Bl.*
origin: Associated with *In(l)ct^{268}-*3.*

D ct$^{268-18}$
cytology: *D£(l)7B2-3;7B4-5.*
origin: Associated with *Jn(l)ct368-lS$_m$*

L ct$^{268-20}$
cytology: *Di(l)6Fll-7Al;7B5-6.*
origin: Associated with *In(l)ct^{26s}-2°.*

D41k$^{268-30}$
cytology. *D%l)7B2-3;7C3-4.*
origin: X my induced.
discoverer: Hoover, 38d.
genetics: Deficient for *ct* but not *acp* or *m.* Male lethal.

Df(1)ct$^{268-37}$
cytology. *DI(1)5D2-3;7B2*3.*
origin: AneaploAd segregmst from *7Yl;3)et l68~37/+.*

D
cytology: *®%1)7A5~6;7M-Cl* (Button),
•rifift; X ray induced.
discoverer: D*fMi*c, 40*.
genetic*; D»flci*ctt for *ct* bat not cm, *mcp,* or *m. Wmhe*lttbtl.

Di(l)Det lz A: see ***In(l)lzA***
Df(l)Del271b: see ***T(l;2)271h***
DK\){2S7-S$_:$ Deficiency(l) forked
cytology: *Df(l)15E7-Fl;15F2-4* (Sutton).
origin: X ray induced.
discoverer: Demerec, 33k.
genetics: Deficient for /but not *vb, r,* or *os.* Male lethal and cell lethal.

**Df(l)f2S7.6*
cytology: *Di(l)15E4-Fl;15F9-16Al;16A7-Bl.*
new order: 1 - 15E4|l6Al - 20.
origin: X ray induced in *Dp(l;l)B- -Dp(l;l)15F9-16A1;16A7-B1.*
discoverer: Bridges, 1917.
references: Sutton, 1943, Genetics 28: 97-107 (fig.)-
genetics: Reversion of *B.* Deficient for f but not *vb, M(l)o,* or *os.* Male lethal.

Df(1)f257-9
cytology: *Df(l)15E7-Fl;16D2-4.*
origin: X ray induced.
discoverer: Demerec, 34c.
references: Sutton, 1943, Genetics 28: 97—107 (fig)-
genetics: Deficient for f and *B* but not *vb, un, lh,* or os. Male lethal.

****D«l)t**257-27*
cytology: *D((l)14F6-15Al;15F5-6.*
origin: X ray induced.
discoverer: Demerec, 381.
genetics: Deficient for f and *M(l)o,* but *B* not affected. Male lethal.

**Df(l)f2S7.28*
cytology: *Df(l)15E7-Fl;16E5-Fl.*
origin: X ray induced.
discoverer: Sutton, 40h.
genetics: Deficient for / and *B* regions. Male lethal.

****DKl)f2 57-31***
cytology: *Df(l)15E7-Fl;15F5-6.*
origin: X ray induced,
discoverer Bishop, 41a.
genetics: Deficient for /but not *M(l)o* or *os.* Male lethal.

[>Kl)gh Deficiency(l) garnet-lethal
cytology: *Dt(l)12A;12E* (Nicoletti).
origin: Spontaneous.
discoverer: L. V. Morgan, 24124.
genetics: Deficient for *g* and *ty* but not *wy, s, pi,* or *sd.* Lethal in male and cell lethal.

****D41)lz1: Dmiiciency(T) lozenge***
cytology: *Df(l)7Ell-Fl;8El-2* (Hannah).
origin: X ray induced.
discoverer Green.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehxe 87: 708—21.
genetics: Deficient for *lz* and *sunx.* Male lethal.

****DK1)lz2***
cytology: *Dl(l)8C14-D2;8E3-4* (Hannah).
origin: X ray induced,
discoverer Green.

references: Green and Green, 1956, Z. Induktive Abstamraungs- Vererbungslehre 87: 708-21.
genetics: Deficient for *lz* and *amx*. Male lethal.

D«1)lz3
cytology: *Dt(l)8Cl-3;8D12-E2* (Hannah).
origin: X ray induced.
discoverer: Green.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708-21.
genetics: Deficient for *lz* and amx. Male lethal.

D«l)lz5
cytology: *Df(l)8D3-5;8F-9A* (Hannah).
origin: X ray induced.
discoverer: Green.
references: Green and Green, 1956, Z. Induktive Abstammungs- Vererbungslehre 87: 708—21.
genetics: Deficient for *lz* and *amx*. Male lethal.

Df(1)lzA
cytology: *Df(l)3E;3F + Df(l)9E;9F-10A*.
origin: Associated with *In(l)lzA*.

DHVm^{259,4}: Deficiency(l) miniature
cytology: *Df(l)10C2-3;10E2-3*.
origin: X ray induced.
discoverer: Demerec, 33i.
references: Dorn and Burdick, 1962, Genetics 47: 503-18.
genetics: Male lethal. Heterozygote with *m* mutations has *m* phenotype. Heterozygote with *dy* mutations is wild type. Recombines with m^{s9}, *m*, m^{D}, *dy61a*> dy, and dy^{5}**.

DKm-30: Deficiencyd) Minute-30
origin: Spontaneous.
discoverer: Schultz.
references: 1929, Genetics 14: 366—419.
genetics: Deficient for cv and *M(1)30*. Male lethal.

Df(l)mal: Deficiency(l) maroonlike
origin: X ray induced in *In(l)sc^{s}*.
discoverer. E. H. Grell.
references: 1962, Z. Vererbungslehre 93: 371-77.
genetics: Deficient for *sw, mal,* and *su(f)* but not *car* or *M(l)n*. Male lethal.

DrTJ)N8; *Deficiencyd) Notch*
cytology: *Df(l)3B4-Cl;3D6-El*.
origin: Spontaneous,
discoverer: Mohr, 18j7.
references: 1919, Genetics 4: 275—82.
1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 202.
Slizynska, 1938, Genetics 23: 291-99 (fig.),
genetics: Deficient for *w, rst, fa, spl,* and *dm*. Male lethal.

Df(1)N25
origin: Spontaneous.
discoverer. Mohr, 28k22.
genetics: Not deficient for w. Male lethal.

Df(1)N26
cytology: *Di(l)3C4-5;3C8-9* (Suttoa).
origin: Spontaneous,
discoverer: Mohr, 28Jc29.
gewetics: Deficient for *la* and *spl* but not *w, nt,* or *dm*. Male lethal.

Df(1)N29
origin: Spontaneous.
discoverer: Eker, 36el2.
genetics: Deficient for *w*. Male lethal.

Df(1)N33h
cytology: *Df(l)3C6-7;3D2-3* (Sutton).
origin: Spontaneous.
discoverer: Ives, 33h29.
references: Plough and Ives, 1934, DIS 1: 31.
1934, DIS 2: 10, 34.
Demerec, 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Deficient for *fa* but not *pn, w,* or ec. Male lethal.

Df(1)N38g
cytology: *Df(l)3C4-5;3C7-8* (Sutton).
origin: Spontaneous,
discoverer Curry, 38g.
genetics: Deficient for *fa* and *spl* but not *w, rst,* or *dm*. Male lethal.

Df(1)N63b
cytology: *Df(l)3C2-3;3E2-3*.
origin: X ray induced.
references: Lefevre and Wilkins, 1966, Genetics 53: 175-87.
genetics: Deficient *(or N*. Carries *w^^{3b}*, a white allele causing marbled pigmentation of the eyes. *Df(l)N^{63b}/w* resembles *W^{S}P/W*. *Df(l)N6^{3b}/ Df(l)w^{258-4S}* survives and has lighter eye color than *w^{a}P/Df(l)w258-45*.

Df(1)N264-2
cytology: *Df(l)3C6-7;3C7-8*.
origin: X ray induced.
discoverer: Demerec, 33j.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *spl* and *fa* but not *w, rst,* or ec. Male lethal.

D#l)N264-7
cytology: *Df(l)3C6-7;3C8-9*.
origin: Associated with *In(iy^{i}i^{2}64-7*.

Df(1)N264-13
cytology: *Df(l)3C6-7;3C10-ll* (Demerec and Hoover),
origin: X ray induced,
discoverer: Demerec, 34a.
genetics: Deficient for fa, *spl,* and *fa^{n}* but not *w, rst, dm,* or ec. Male lethal.

Df(1)N264-15
cytology: *Dt(l)3C6-7;3C7-8* (Sutton).
origin: X ray induced.
discoverer: Demerec, 34c.
genetics: Deficient for *fa* and *spl* but not *w*. Male lethal.

Df(l)N264.19
cytology: *Df(l)3C6-7;3C7-8*.
origin: X ray induced,
discoverer: Demerec, 34k.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *fa* but not *w* or ec. Male lethal.

Df(1)N264-30
cytology: *Df(l)3A4-S;3C7-9*.
origin: X ray induced.

discoverer: Demerec, 36d.
references: Slizynska, 1938, Genetics 23: 291—99 (fig-).
genetics: Deficient for *w, rst,* and *fa* but not pn, *kz,* or *dm.* Male lethal.

**D«1)N264-31*

cytology: *Df(l)3B4-Cl;3D2-3,*
origin: X ray induced.
discoverer: Demerec, 36d.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *w, rst, fa,* and *dm* but not *pn* or ec. Male lethal.

**D«l)N264-32*

cytology: *Df(l)3C3-S;3C7-8.*
origin: X ray induced.
discoverer: Demerec, 36h.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *rst* and *fa* but not *w* or *dm.* Male lethal.

**Df(l)N264.33*

cytology: *Df(l)3C6-7;3C7-8.*
origin: X ray induced,
discoverer: Hoover, 36h.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *fa* but not *rst* or *dm.* Male lethal.

**Df(1)N264-36*

cytology: *Df(l)3A3-4;3D2-3.*
origin: X ray induced.
discoverer. Demerec, 37b.
references: Slizynska, 1938, Genetics 23: 291—99 (fig.).
genetics: Deficient for *w, rst, fa,* and *dm.* Male lethal.

**W(1)N 264-37*

cytology: *Df(l)3C6-7;3C7-8.*
origin: X ray induced.
discoverer: Demerec, 37b.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for *fa* but not *w, rst,* or *dm.* Male lethal.

Di(l)N 2 64-3 8

cytology: *D%l)2D3-4;3E2-3.*
origin: X ray induced.
discoverer Demerec, 37b.
references: Slizynska, 1938, Genetics 23: 291—99 (fig-).
genetics: Deficient for *pn, kz, w, rst, fa,* anS *dm* but not *br, M(1)3E,* or ec. Male lethal.

Df(1)N264-39

cytology: *Df(l)3C6-7;3C7-8* (Slizynska, 1938, Genetics 23: 291-99; Welshons, 1959, Proc. Natl. Acad. Sci. U.S. 44: 254-S8). Recent re-examination of chromosomes in males from lines marked jy*264-39* reveals presence of 3C7 (Welshons).
origin: Spontaneous.
discoverer: Slizynska, 1937.
genetics: Deficient for /a. Male lethal.

**Df(1)N264-41*

cytology: *Dt(l)3C6-7;3C8-9* (Sutton).
origin: Spontaneous.
discoverer: Slizynska, 37®.
genetics: Deficient for *fa* but not *rst* or dm. Male lethal.

**Df(1)N264-42*

cytology: *Df(l)3C4-5;4B4-6* (Hoover).
origin: X ray induced.
discoverer: Demerec, 37e.
genetics: Deficient for *fa, dm,* and ec but not *w, rst,* or *bi.* Male lethal.

**D#1)N264.46*

cytology: *Df(l)3C6-7;3C7-8.*
origin: X ray induced.
discoverer: Demerec, 37f.
genetics: Deficient for *fa* but not *w, rst,* or dm. Male lethal.

**D((J)N264-48*

cytology: *Df(l)lB6-7;lB10-ll.*
origin: Associated with $In(l)N^{264-48}$.

**D%1)N264.49*

cytology: *Df(l)3C4-5;3E8-Fl* (Sutton).
origin: X ray induced.
discoverer: Demerec, 37j.
genetics: Deficient for *fa, dm,* and *M(1)3E* but not *w, rst,* ec, or *bi.* Male lethal.

**DK1)N264-51*

cytology. *Df(l)3C6-7;3C7-8* (Sutton).
origin: Found among progeny of radium-treated male.
discoverer: Demerec, 37k.
genetics: Deficient for *fa* but not *w, rst,* or *dm.* Male lethal.

**D«1)N264-S4*

cytology: *Dt(l)3C3-5;3C7-8* (Hoover).
origin: X ray induced.
discoverer: Demerec, 38b.
genetics: Deficient for *fa,* but not *w, rst,* or *dm.* Male lethal.

DHDM264-58

cytology: *Df(l)3B2-3;3D6-7.*
origin: Aneuploid segregant from $T(l;3)N^{26}4\text{-}58/+$,

**Df(1)N264-68*

cytology: *Df(l)3A10-Bl;3E8-Fl* (Demerec).
origin: X ray induced.
discoverer Demerec, 38k.
genetics: Deficient for *w, rst, dm, and M(1)3E* but not *pn, kz,* or ec. Male lethal.

**Df(l)N264.72*

cytology: *Dt(l)3C6-7;3C7-9* (Sutton).
origin: X ray induced.
discoverer Demerec, 38k.
genetics: Deficient for *fa* but not *rst* or *dm.* Male lethal.

**DK7)N264-73*

cytology: *D%l)3C3-4;4C6-7* (Demerec).
origin: X ray induced.
discoverer: Demerec, 381.
genetics: Deficient for *fa, rst, dm, M(1)3E,* ec, and *M(l)4BC* but not *w, bi,* or *rb.* Male lethal.

**D#l}N264-76*

cytology. *Df(l)3B4-Cl;3E4~5* (Sutton).
origin: X ray induced,
discoverer Demerec, 39b.
genetics: Deficient for *w, rst, fa, dm,* and *M(1)3E* but not *pn* or ©c. Male lethal.

***D(1)N264-77**

cytology: *Dt(l)3B4-Cl;3C7-8* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39b.
genetics: Deficient for *w, fa,* and *dm* but not *pn* or ec. Male lethal.
other information: Right break disagrees with inclusion of *dm.* Either breakpoint is farther to the right or *dm* is mutant instead of missing.

***D1(1)N264-79**

cytology: *Di(l)2C10-Dl;3C6-7* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39c.
genetics: Weak Notch phenotype; *fa* is affected. Deficient for *kz, pn, w,* and *rst* but not *br* or dm. Male lethal.

***D(1)N264-81**

cytology. *Df(l)3C6-7;3C7-8* (Sutton).
origin: X ray induced,
discoverer: Demerec, 39d.
genetics: Deficient for *fa* but not *rst* or *dm.* Male lethal.

***D(1)N264-86**

cytology: *Df(l)3C7-8;3E5-6.*
origin: Aneuploid segregant from $T(l;4)N^{264\text{-}86}$/+.

***DKl)N26489**

cytology: *Df(l)3B2-3;3F2-3* (Sutton).
origin: X ray induced.
discoverer Demerec, 39j.
genetics: Deficient for *w, rst, fa, M(1)3E,* and ec but not *pn.* Male lethal.

***D(1)N264-90**

cytology: *Dt(l)3C7-8;3E8-Fl* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39j.
genetics: Deficient for *spl, dm, M(1)3E,* and ec but not *pn or w.* Male lethal.

***D(1)N264-93**

cytology: *Dt(l)3B4-Cl;3F3-4* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39k.
genetics: Deficient for *w, spl, dm, M(1)3E,* and ec but not *pn* or *bi.* Male lethal.

***D(1)N264-96**

cytology: *Df(iy3C6-7;3C7-8* (Sutton).
origin: X ray induced.
discoverer Demerec, 39k.
genetics: Deficient for *spl* but not *w, rst, dm,* or ec. Male lethal.

***D(1)N264-99**

cytology; *Df(l)2D2-3;3Cll-12* (Sutton).
origin: X ray induced.
discoverer Demerec, 40«.
genetics: Deficient for pn, *kz, w, rst, spl,* and *dm* but not ec *or bi.* Male lethal.

***D(1)N264-100**

cytology: *Dt(l)3B4-Cl;4B4-5.*
origin: Aaeuploid s«gregant from *T(l;3yst*64-100/+.*

***D(1)N264-101**

cytology: *D§(l)3C4'S;3C7'g* (Sutton),
origin: *X* ray induced.
discoverer: Demerec, 40a.
genetics: Deficient for *spl* but not *w, rst,* or *dm.* Male lethal.

***D(1)N264-105**

cytology: *Df(l)3C6-7;3D2-3* (Sutton).
origin: X ray induced.
discoverer: Demerec, 40a.
genetics: Deficient for *spl* and *dm* but not *w, rst,* or ec. Male lethal.

***D#l)N264-106**

cytology: *Df(l)3C6-7;3C7-8* (Sutton).
origin: X ray induced.
discoverer: Demerec, 40a.
genetics: Deficient for *spl* but not *pn, w, rst,* or *dm.* Male lethal.

***D«1)N264.}** 08

cytology: *Df(l)3C3-5;3E7-S.*
origin: Associated with $In(iysi^{264\text{-}10S}$.

***D(1)N264-110**

cytology: *Df(l)3B4-Cl;3D2-3* (Sutton).
origin: X ray induced.
discoverer: Demerec, 40a.
genetics: Deficient for *w, rst, spl,* and *dm* but not *pn* or ec. Male lethal.

***Df(l)N264.111**

cytology: *Df(l)3C3-5;3C12-Dl* (Sutton).
origin: X ray induced.
discoverer: Demerec, 40b.
genetics: Deficient for *spl* and *rst* but not *pn, w, dm,* or ec. Male lethal.

***D«J)N264-114**

cytology: *Df(l)3C6-7;3D4-5* (Sutton).
origin: Spontaneous.
discoverer: Kaufmann, 40d.
genetics: Deficient for *rst, spl,* and *dm* but not *w* or ec. Male lethal.

*** D«l)N264.n 5**

cytology: *Df(l)3C3-5;3E2-3* (Sutton).
origin: X ray induced.
discoverer Sutton, 40e.
genetics: Deficient for *rst, spl,* and din but not *w, M(1)3E,* or ec. Male lethal.

***D(1)N264-117**

cytology: *Dt(l)3A6-7;3E2-3* (Sutton).
origin: X ray induced,
discoverer: Demerec, 40g.
genetfcs: Deficient for *w, rs t, spl,* and *dm* but not *pn, ec,* or *bi.* Male lethal.

***D(1)N264-118**

cytology: *Df(l)3C6-7;3C7-9* (Sutton).
origin: Spontaneous.
discoverer Demerec, 40h.
genetics: Deficient for *spl* but not *pn, w, rst,* or *dm.* Male lethal.

***D«1)N264** -720

cytology: *Df(l)3C6-7;3D2-3* (Sutton).
origin: X ray induced,
discoverer: Demerec, 40j.
genetics: Deficient for *spl* and *dm* but not *kz, w, rst,* or ec. Male lethal.

***D(1)N264-125**

cytology: *Dt(l)3C4-5;3C7-8* (Sutton).
origin: X ray induced.

discoverer: Demerec, 41a.
genetics: Deficient for *spl* but not *kz, w, rst, dm,* or ec. Male lethal.

***Df(1)N264-126**
cytology: *Df(l)3C3-5;3D4-5* (Sutton).
origin: Spontaneous.
discoverer: Bishop, 401.
genetics: Deficient for *rst, spl* and *dm* but not *w.* Male lethal.

**Df(l)N264-127*
cytology: *D£(l)3C6-7;3C7-8* (Sutton).
origin: X ray induced.
discoverer: Demerec, 41b.
genetics: Deficient for *spl* but not *kz, w, rst,* or *dm.* Male lethal.

***Df(1)N264-128**
cytology: *Df(l)3C6-7;3C7-8* (Sutton).
origin: X ray induced.
discoverer: Demerec, 41b.
genetics: Deficient for *spl* but not *w, rst,* or *dm.* Male lethal.

**Df(l)N264.130*
cytology: *Df(l)3C6-7;3C7-8* (Sutton).
origin: Spontaneous.
discoverer: Neel, 41c.
references: 1942, Genetics 27: 530.
genetics: Deficient for *fa* but not *w, rst,* or *dm.* Male lethal.

**D«1)NB: Deficiency^) Notch of Bernstein*
cytology: *Di(l)3C4-5;3C12-Dl* (Sutton).
origin: Spontaneous.
discoverer: Bernstein, 28a7.
genetics: Deficient for *fa* but not *w, rst,* or *dm.* Male lethal.

***Df(1)NEZ**
cytology: *Df(l)3C6-7;3C7-8* (Sutton).
origin: Spontaneous,
discoverer: Morgan, 1929.
genetics: Deficient for *fa* but not *w.* Male lethal.

D#1)04: Deficiency(J) of Oliver
origin: Aneuploid segregant from *T(l;3)O4/+.*

DfCi)pn^{noAc4,} · Deficiencyd) prune
cytology: *Df(l)2C8-9;3Al-2* superimposed on *In(l)lB3-4;20B-Dl^{L}IB2-3;20B-Dl^{R} + In(l)4D7-Bl;llF2-4.*
new order: 1A - 1B3|2OB - 11F4|4E1 - 11F2|4D7 - 3A2|2C8 - 1B3|2OD1 - 20F.
origin: X ray induced in *In(l)sc^{stL}sc^{8R}+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DB 41: 58.
genetics: Deficient for *pn.*

Df(l)pn-ec: Defic'tency(1) prune to echinus
cytology: *Df(l)2Dl-2,-3F7-4A4.*
origin: Aneuploid segregant from *T(l;A)pn-ec/+.*

D*(J>ras-W7Cc8; *Deficiency(l) raspberry to vermilion*
cytology: *Df(l)9E3-4;10A4-5* superimposed on *ln(l)lB3-4;20B-Dl^{L}lB2-3;20B-Dl^{R}* 4- *In(l)4D7-El;llF2-4.*
new order 1A - 1B3J20B - UF4J4E1 - 9E3|l0A5 - 11F2|4D7 - 1B3J2OD1 - 20F.
origin: X ray induced *in ln(l)sc^{SiL}mc^{8R}+dI'49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Deficient for *ras* and v.

Df(l)rbKlSBH3: DeficiencyO) ruby
cytology: *Df(l)4B4-5;4D5-6.*
origin: X ray induced in *R(l)2.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Deficient for *rb.*

Df(l)rst^{2}: Deficiency(l) roughest
cytology: *Df(l)3C3-4;3C6-7* (Schultz; Sutton).
origin: Spontaneous.
discoverer: Bridges, 33d7.
references: Gersh, i965, Genetics 51: 477—80 (fig.)-
genetics: Deficient for *rst* and *vt.* Homozygous viable.

Df(l)sc4L$_{sc}$8R
cytology: *Df(l)19F-20Cl;20B-Dl +Dp(l;l)lB2-3:1B3-4.*
origin: Associated with *In(l)sc^{4L}sc^{8R}.*

Df(1)sc4L$_{sc}$L8R
cytology: *Df(l)19F-20Cl;20B-C.*
origin: Associated with *In(l)sc^{4L}sc^{L8R}.*

DrT7)sc8; DeficiencyfJ) *scute*
origin: Spontaneous in *In(l)sc^{a}.*
discoverer. Noujdin.
references: 1935, Zool. 2h. 14: 317-52.
genetics: Deficient for *y, ac,* andHw. Male lethal; dies as late embryo; larva nearly complete (Poulson, 1940, J. Exptl. Zool. 83: 271-325).

**Df(J)sc*25b*
cytology: Like *In(l)sc^{s}* in mitotic prophase, but without heterochromatic segments *hB* and most of *hA,* are ordinarily carried distally in *In(l)sc8,*
origin: Spontaneous derivative *oiln(l)sc^{8}; Y* chromosome not demonstrably involved.
discoverer: Lindsley, 1952.
synonym: sc*c.o. *X 25b.*
references: 1958, Z. Vererbungslehre: 89: 103—22.
genetics: Deficient for *y* and *ac;* mutant for *bb.* Male lethal with normal *Y;* viable with *y^{+}Y.*

***Df(1)sc^{8}89a**
cytology: Like *In(l)sc^{8}* in mitotic prophase.
origin: Spontaneous product of recombination between the distal heterochromatin of *In(l)sc^{a}* and

discoverer: Lindsley, 1952.
synonym: *sc^{8}c.o. X 89a.*
references: 1955, Genetics 40: 24—44.
genetics: Deficient for *y* and ac but not *bb.* Carries *KS,* the fertility complex of *Y^{s}* distaliy. Male lethal with normal *Y,* viable with *y*Y.*
other Information: Four similar deficiencies, *D%iysc*E$_{lt}$ D%l)mc^{8}P$_{0t}$* Dfi>c*916, and *DSCl)»cH7h$_{t}$* also described by Ltadtley (1955).

**D«1)sc*99c*
cytology: Like *In(l)mc^{8}* in mitotic prophase.
origin: Spontaneous derivative of *In(l)mc^{8}; Y* chromosome not demonstrably involved,
discoverer Lindsley, 1952.
synonym: ®*c^{9}c,o. X 99c.*
references: 1958, Z. Veitrrbttafslefar®: 89t 103-22.

genetics: Deficient for *y* and ac but not for *bb.* Male lethal with normal *Y,* viable with *y*Y.*

Df(1)sc^8B1

cytology: Like *In(l)sc^8LBN^R* in mitotic prophase but with the part of heterochromatic segment *hA* ordinarily carried distally and a portion of *hB* missing.

origin: Spontaneous derivative of *In(l)sc^SLEN^R; Y* chromosome not demonstrably involved. Postulated to be a product of exchange between the distal heterochromatin of one chromatid and the proximal heterochromatin of its sister.

discoverer. Lindsley, 1950.

synonym: *sc^8ENc.o. X Bl.*

references: 1958, Z. Vererbungslehre: 89: 103—22.

genetics: Deficient distally for *y* and *ac.* Male viable.

other information: Two similar deficiencies, *Df(l)sc*C6* and *Df(l)sc^8D8,* described (Lindsley, 1958).

Df(1)sc^8C4

cytology: Like *In(l)sc^8LiEN^R* in mitotic prophase.

origin: Spontaneous derivative of *In(l)sc^8LEN^R; Y* chromosome not demonstrably involved. Postulated to be a product of exchange between the distal heterochromatin of one chromatid and the proximal heterochromatin of its sister.

discoverer: Lindsley, 1950.

synonym: *sc^8ENc.o. X C4.*

references: 1958, Z. Vererbungslehre: 89: 103-22.

genetics: Deficient distally for *y* and *ac.* Male viable.

other information: Five similar deficiencies, ***Dt(l)sc*C13, Df(l)sc^8D6, Df(l)sc*F7, Df(l)sc*O7,*** and *Df(l)ac^853c* also described (Lindsley, 1958).

Df(l)sc*J3

cytology*. Like *In(l)sc^8LEN^R* in mitotic prophase, but with part of heterochromatic segment *hA,* ordinarily carried distally and portion of *hB* missing.

origin: Spontaneous derivative of *In(l)ac^8LEN^R; Y* chromosome not demonstrably involved. Postulated to result from exchange between distal and proximal heterochromatin of sister chromatids.

discoverer. Lindsley, 1950.

synonym: *ac^8ENc.o. X J3.*

references: 1958, Z. Vererbungslehre: 89: 103-22.

genetics: Deficient distally for *y* and *ac;* mutant for 66. Male viable.

Df(1)sc^8K1

cytology: Like *In(l)sc^8LEN^R* in mitotic prophase but carrying only heterochromatic segments *hC* and *hD* distally.

origin: Spontaneous derivative of *In(l)sc^8LEN^R; Y* chromosome not demonstrably involved. Postulated to result from exchange between distal and proximal heterochromatin of sister chromatids.

discoverer: Lindsley, 1950.

synonym: *ac*ENc.o. X Kl.*

references: 1958, Z. Vererbungslehre: 89: 103-22.

genetics: Deficient distally for *y* and *ac;* mutant for *bb.* Male viable.

Df(1)sc^8M

origin: Spontaneous in *In(l)sc^8.*

discoverer: Mather, 1937.

genetics: Deficient for *y, ac,* and *bb.* Male lethal.

Df(1)sc^8P7

cytology: Like *In(l)sc^SL,EN^R* in mitotic prophase.

origin: Spontaneous product of recombination between the distal heterochromatin of *In(l)sc^8LEN^R* and *Y^s.*

discoverer: Lindsley, 1950.

synonym: *sc^8ENc.o. X P7.*

references: 1955, Genetics, 40: 24—44.

genetics: Deficient distally for *y* and *ac* but not *bb.* Carries *KS,* the fertility complex of *Y^s* distally. Male viable.

other information: Three similar deficiencies, ***Df(l)sc^8L7, Df(l)sc^8P0,*** **and** ***Dt(l)sc^835a,*** **also** described .by Lindsley (1955).

D«l)sc*Ql

cytology: Like *In(l)sc^8LEN^R* in mitotic prophase, but portion of heterochromatic segment *hA* ordinarily carried distally missing.

origin: Spontaneous derivative of *In(l)sc^8LEN^R; Y* chromosome not demonstrably involved. Postulated to result from exchange between distal and proximal heterochromatin of sister chromatids.

discoverer: Lindsley, 1950.

synonym: *sc^8ENc.o. X Ql.*

references: 1958, Z. Vererbungslehre: 89: 103—22.

genetics: Deficient distally for *y* and *ac.* Male viable.

Df(1)sc^8S7

cytology: Like *In(l)sc^8LEN^R* in mitotic prophase but carrying only heterochromatic segments *hC* and *hD* distally.

origin: Spontaneous derivative of *In(l)sc^8LEN^R; Y* chromosome not demonstrably involved. Postulated result of exchange between distal and proximal heterochromatin of sister chromatids.

discoverer: Lindsley, 1950.

synonym: *sc^8ENc.o. X S7.*

references: 1958, Z. Vererbungslehre: 89: 103—22.

genetics: Deficient distally for *y, ac,* and *bb.* Male viable,

other information: A similar deficiency, *Df(l)sc^8W0,* also described (Lindsley; 1958).

Df(1)sc^8Lsc^4R

cytology: ***Df(l)lB2-3;lB3-4.***

origin: Associated with *In(l)sc^8Lsc^4R.*

Df(1)sc^8Lsc^L8R

cytology: ***Df(l)lB2-3;lB3'4.***

origin: Associated with *In(l)sc^8Lsc^L8R.*

D«J)sc*L.scS1R

cytology: ***Df(l)lB2-3;lB3-4.***

origin: Associated with *In(l}sc^8Lac^slR.*

Df(1)sc^10.1

cytology. ***Dt(l)lBl-2;lB2-3;lB14-Cl.***

new order 1A - 1B1J1B14 - lB3|lCl - 20; 1B2 missing.

origin: X-ray-induced derivative of *ln(l}ac^3* = ***In(l)lB2-3;lB14-Cl.***

discoverer: Sturtevant, 1930.

references: 1935, DIS 3: 15.
1936, Genetics 21: 444-66.
genetics: Mutant for *sc;* viability low.

***Df(1)sc^{15}**
origin: X ray induced.
discoverer: Muller.
references: Patterson and Muller, 1930, Genetics 15: 495-577.
Dubinin, 1933, J. Genet. 27: 443-64.
genetics: Mutant for *sc;* deficient for *y* and ac. Apparently, y^{+}and *ac** loci were inserted into an autosome and subsequently lost. Originally tested as an allele of sc only. Male lethal.

Df(1)sc^{19}
cytology: *Df(l)lBl-2;lB4-7.*
origin: Aneuploid segregant from *T(J;2)sc$^{i\ 9}$*/+.

***Df(1)sc$^{260\text{-}25}$**
cytology. *Di(l)lB2-3;* terminal deficiency.
origin: Aneuploid recombinant from *In(1LR)sc$^{260\text{-}25}$*/+.

D1(l)sc^{Fah}: Deficiencyil) scute of Fahmy
cytology: *D((l)lA8-Bl;lB2-3.*
origin: Induced by DL-p-NN-di-(2-chloroethyl)amino-phenylalanine (CB. 3007).
discoverer Fahmy, 1954.
references: 1958, DIS 32: 74.
genetics: Probably mutant for *sc.* Male viable; homozygous female lethal.

Df(1)scJ': Deficiencyil) scute of Jacobs-Duller
cytology: *Df(l)lB;3A3-C2.*
origin: Associated with *T(l;3)scJ^{4}.*

Df(l)scl-8L$_{SC}$8R
cytology: *Df(l)20B-C;20B-Dl.*
origin: Associated with *In(l)sc^{L8L}sc^{8R}.*

Df(1)sc^{L8L}sc^{S1R}
cytology: *Df(l)20B-C;20B-Dl.*
origin: Associated with *In(l)sc^{L8L}sc^{slR}.*

Df(1)scV^{1}: Deficiencyil) scute of Valencia
cytology: *Df(l)lA8-C3;* terminal deficiency,
origin: Aneuploid recombinant from *In(lLR)sc^{vl}*/+.

Df(l)sn: Deficiency(1) singed
cytology: *Dl(l)7B2-3;7D22-El.*
origin: Spontaneous in *R(l)2.*
discoverer: C. Hinton.
references: Hinton and Welshons, 1955, DIS 29: 125-26.
genetics: Deficient for *sn* but not *ct, oc,* or *ptg.* Male lethal.

Df(l)sta: Deficiencyil) stubarista
cytology: *Df(l)lD3-El;2A.*
origin: Aneuploid segregant from *T(l;3)sta/+.*

Df(l)svr: Deficiencyil) silver
cytology: *Df(l)lB10-13;* apparently a terminal deficiency.
origin: Found among progeny of cold-treated female.
discoverer: L. V. Morgan.
references: 1940, DIS 13: 51.
Suttoa, 1943, Genetics 28: 213.
genetics: Deficient for *y,* ac, sc, and *swr* but not mjfs) or *etm.* Male lethal.

**Dfil)t282-l. Deficiencyil) tan*
cytology: *Df(l)8C2-3;8C14-Dl* (Sutton). Green and Green (1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708-21) suggested that the deficiency probably extends farther to the right.
origin: X ray induced.
discoverer: Demerec, 34c.
genetics: Deficiency for *t, lz,* and *amx* but not *dd, dvr, tip, ny,* or *ras.* Male lethal.

**Df(1)vB: Deficiencyil) vermilion of Bridges*
origin: Spontaneous.
discoverer: Bridges, 16e9.
references: 1919, J. Gen. PhysioL 1: 645-56.
genetics: Deficient for v. Male lethal. Genetic map shortened 1—3 units.

Df(l)w258.3. Deficiencyil) white
cytology: *Df(l)3B2-3;3Cl-2* (Sutton).
origin: X ray induced.
discoverer: Demerec, 33h.
genetics: Claimed to have *pn* affected, but cytology not in agreement with deficiency for *pn;* therefore probably an independent mutant, *w* affected, probably mutant, *br* and *fa* not affected. Male lethal.

Df(1)w$^{258\text{-}11}$
cytology: *Df(l)3A2-3;3C3-5.*
origin: X ray induced.
discoverer: Demerec, 33j.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Deficient for w but not pn, *kz, rst, fa,* or ec. Male lethal.

**Df(l)w2S8.U*
cytology: *Df(l)3A3-4;3Cl-2.*
discoverer: Demerec, 33k.
references: Slizynska, 1938, Genetics 23: 291—99.
genetics: Mutant or deficient for *w* but not *pn, kz, rst,* or *fa.* Male lethal.

Df(l)$_{w}$2S8-42
cytology: *Df(l)3A6-8;3C3-S* (Sutton).
origin: X ray induced.
discoverer. Demerec, 38i.
genetics: Deficient for w but not pn, *kz,* or *rst.* Male lethal.

DfU)$_{w}$2S8-4S
cytology: *Dt(l)3B4-C2;3Cl-4;* is *Df(l)3B4-Cl;3Cl-2* according to Sutton and *Df(l)3Cl-2;3C3-4* according to Schultz. May lack 3C2 (Lefevre and Wilkins, 1964, Genetics 50: 264).
origin: X ray induced.
discoverer Demerec, 381.
genetics: Mutant or deficient for *w* but not *pn, kz, rst,* or *fa.* Male lethal.

Df(1)w2S8.48
cytology: *Df(l)3A9-Bl;3Cl-2* (Sutton).
origin: X ray induced,
discoverer Demerec, 39c.
genetics: Mutant or deficient for *w* but not *pn, kz, rst,* or *fa.* Male lethal.

Df(1)w^{m4L}rst^{3R}
cytology: *Dt(l)3Cl-2;3C3-4 + Dt(l)20A;2QB.*
origin: Associated with *ln(l)w^{m4L}rst^{3Ji}.*

Df(1)w^m4L_wmJR

cytology: *Df(l)3Cl~2;3C2-3 +Df(l)20.*

origin: Associated with *In(l)w^m4^w^mJ^R*.

DfOV^m49°: *Deficiency(i) white-mottled*

cytology: *Di(l)3A10-Bl;3E2-3.*

origin: Aneuploid segregant from *T(l;3)w^m49a*/+.

Df(1)w^m53a

cytology: *Df(l)3B2-Cl;3C9-Dl.*

origin: Aneuploid segregant from *T(l;2)w^mS3a*/+,

**Df(1)wn>258-44*

cytology: *Df(l)3C3-4;4D2-El.*

origin: Aneuploid segregant from

T(l;2;3)w°>258-44/+.

****D1(1h^mDV4: Deficiency^) white-mottled of Dubinin and Volotov***

cytology: *Df(l)3C3-7;3D,*

origin: Associated with *T(1;4)W«DV4.*

Df(1)w^mJL_rst^3R

cytology: *Df(l)3C2-3;3C3-4.*

origin: Associated with *In(l)w^m^J^Lrst^3R*.

****Df(l)w^rS: Deficiency(l) white-recombinant of Green***

cytology: *Dt(l)3A3-4;3Cl-2* (E. B. Lewis).

origin: A regular product of unequal exchange between 3C1-2 of a w^a^ or *w*^2^* chromosome and 3A3-4 of certain specific homologous chromosomes. Reciprocal of *Dp(l;l)w^rG^.*

discoverer Green.

references: 1959, Genetics 44: 1243-56.

genetics: Mutant or deficient for *w* but not z. Male lethal. Survives as *w* female when heterozygous with *D£(l)w^4L_rst3R =D%l)3Cl-2;3C3-4.*

Di(J)w^rJ1: DeficiencyiV white-recombinant of Judd

cytology: *Df(l)3A2-3;3Cl'3.*

origin: A regular product of unequal exchange between the 3C1-3 region of a chromosome carrying w« and the 3A2-3 region of certain specific homologous chromosomes.

discoverer: Judd.

synonym: *w~*.*

references: 1961, Genetics 46: 1687-97 (fig.). 1964, DIS 39: 60.

genetics: Deficient for z and the lethals between z and w; mutant or deficient for *w.* Male lethal. Survives as a if female when heterozygous for the deficiency for 3C2-3, *Dt(l)w«>4Z<_mt3R = Df(l)3Cl-2;3C3-4.*

Df(1)w^rJ2

cytology: *Df(l)3A6-8;3Cl-3* [could be the same as *Df(1)w^rG*].

origin: A regular product of unequal exchange between the 3C1-3 region of a chromosome carrying *w or *w*^d^P* with the 3A4-8 region of specific homologous chromosomes. Probably reciprocal recombi**nant of *Dp(l;l)w*J^2^.*

discoverer: Judd.

•yrtonyutt *r-*.

references: 1961, Genetics 46: 1687-97 (fig.)-1964, DB 39: 59.

genetics: Carries normal alleles of *z, l(l)zwl,* Jfijcwtf, and *t(l)zw4;* deficient for the other *l(l)zw's;* mutant or deficient for *w.* Male lethal. Survives as *w* female when heterozygous with the deficiency for 3C2-3, *Df(l)w^m^*L_rst3R =Df(l)3Cl-2;3C3-4.*

Df(1)w^rJ3

cytology: *Df(l)3Cl-3;3C12-D3.*

origin: Product of unequal exchange between the 3C1-3 region of a chromosome carrying *w^a^* and region 3C12-D3 of a specific homolog.

discoverer: Judd.

synonym: *w~^r^ N.*

references: 1961, Genetics 46: 1687-97 (fig.)-1964, DIS 39: 59.

genetics: Deficient for N; mutant or deficient for *w* and *dm.* Male lethal. Survives as a *w* female when heterozygous with *Di(l)w^258-45^ =Dt(l)3B4-C2;3Cl-4, Df(l)_wrJl = Df(l)3A2-3;3Cl-3,* and *Dt(l)w^r^J^2^ =Df(l)3A6-8;3Cl-3.*

Df(l)w^vco: Deficiency(l) white-variegated cobbled

cytology: *Dt(l)2B17-Cl;3C4-5.*

origin: Aneuploid segregant from *T(l;3)w^vco^*/+.

Df(l)w-ec: Deficiency(l) white-echinus

cytology: *Df(l)3Cl-2;3E7~8.*

origin: Aneuploid segregant from *T(l;2)w-ec/+.*

synonym: *Df(w-ec)^64d^.*

Df(1)y^3PL_sc^8R

cytology: *Df(l)lA;lB2-3.*

origin: Associated with *In(l)y^3PL^sc^SR^.

Df(1)y^4L_sc^4R

cytology: *Df(l)lA8-Bl;lB3-4 + Df(l)18A3-4;19F-20C1.*

origin: Associated with *In(l)y^4L^sc^4R^.

Df(1)y^4L_sc^8R

cytology: *Di(l)lA8-Bl;lB2-3 + Df(l)18A3-4;20B-Dl.*

origin: Associated with *In(l)y^4L^sc^8R^.

D«l)y4L_sc9R

cytology. *Df(l)lA8-Bl;lB2-3 + Dt(l)18A3-4;18B8-9.*

origin: Associated with *In(l)y^4L^sc^9R^.

****Df(l)zJ: Deficien_Cy(l) zeste***

cytology: *Di(l)2C2-3;3E2-3.*

origin: X ray induced.

discoverer: Gans.

references: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.),

genetics: Deficient for *pn, z,* and *w.* Male lethal.

****Df(1)z2***

cytology: *Df(l)2D4-5;3C3-4.*

origin: X ray induced.

discoverer: Gans.

references: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.),

genetics: Deficient for *pn, z,* and *w.* Male lethal.

****D«l)x3***

cytology: *Df(l)2CS-6;3B2-3.*

origin: X ray induced.

discoverer: Gans.

reference*: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.),

genetics: Deficient for pn and z. Male lethal.

****Df(1)z4***

cytology: *D%1)2C5-6;3A9-B1,*

origin: X ray induced.
discoverer: Gans.
references: 1953, Bull. Biol. de France Belg. Suppl. 38: 1-90 (fig.),
genetics: Deficient for *pn* and *z*. Male lethal.

***D«1)z5**
cytology: *Df(l)3Al-3;3A4-6.*
origin: X ray induced.
discoverer: Gans.
references: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.).
genetics: Deficient for z. Male lethal.

***D«l)z6**
cytology: *Di(l)3A6-8;3C10-ll.*
origin: X ray induced in *z*.
discoverer: Gans.
references: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.).
genetics: Deficient for *w* but not *z*. Male lethal.

***D«Y)bb: Deficiency(Y) bobbed**
cytology: Metaphase chromosomes show short arm of *Y* reduced to one-third normal size.
origin: Spontaneous,
discoverer: Schultz, 33k8.
genetics: Deficient for *bb* but not *KL* or *KS*.

Dt(2)M-33a: see ***Df(2R)M-c33a***

D«2L)64j
cytology: *Dt(2L)34E5-Fl;35C3-Dl.*
origin: X ray induced.
discoverer: E. H. Grell, 1964.
genetics: Deficient for *rk, b, j, el, Sco, Su(H), pu,* and *Adh* but not for *nub, M(2)e, rd,* or *M(2)m*. Homozygous lethal.

Df(2L)al: Deficiency(2L) aristaless
cytology: *Df(2L)21B8-Cl;21C8-Dl.*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51,
genetics: Deficient for *al, ex* and *ds* but not for *l(2)gl, net,* or S. Homozygous lethal.

***DK2L)bt>: Deficiency(2L) black-Dominant**
cytology: *Df(2L)3SC;35D* (Kodani).
origin: Spontaneous.
discoverer: Goldschmidt, 1945.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 504, 520.
genetics: Possibly deficient for 6. Homozygous lethal.

Df(2L)C263: Deficlency(2L) **Crossover *suppressor***
cytology: *DB(2L)25F;26F.*
origin: Associated with *ln(2L)C263.*

Df(2L)Cy^{L}t^{R}
cytology: *Dt(2L)22Dl-2;22D3-El + Dt(2L)33FS-34Al;34A8-9.*
origin: Associated with *Jn(2L)Cy^{L}t^{R}.*

***EM(2L)d: Defici«ncy(2L) dachs**
origin; Spcntaaeoos in *d* stock.
dis«©'vee®« Bridges, 15j6.
synonym: *dh dachs-lethal.*
references: Bridges and Morgan, 1919, Carnegie Inst. Wash. Publ. No. 278: 277.
genetics: Homozygous lethal. Gives decreased crossing over in *d-b* region.

D«2L)G
cytology: *Dt(2L)36B5-6;40F.*
origin: Aneuploid segregant from *T(Y;2)G/+.*

***Df(2L)H**
cytology: *Df(2L)37B2-3;40B2-3.*
origin: Aneuploid segregant from *T(Y;2)H/+.*

Df(2L)M-B: see ***Bi(2L)U-z^{B}***

Df(2L)M-C: see ***Df(2L)M-zC***

D«2L)M-zB: Deficiency(2L) Minute-z-B
cytology: *Df(2L)24E2-Fl;25Al-2.*
origin: Spontaneous.
discoverer: Bridges, 38dl2.
synonym: *Df(2L)M-B.*
references: Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 276—77.
Curry, 1939, DIS 12: 46.
1941, DIS 14: 50.
genetics: Deficient for *M(2)z, dp,* and *dw-24F* but not *ed, ft, G, M(2)S1, l(2)cg,* or *tkv*. Homozygous lethal.

***Df(2L)M-z^{C}**
cytology: *Df(2L)24D2-5;25A2-3.*
origin: Spontaneous.
discoverer: Curry, 37g27.
synonym: *Df(2L)M-C.*
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 307.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 276—77.
genetics: Deficient for ed, *ft, G, M(2)z, dp,* and *dw-24F* but not *M(2)S1, l(2)cg,* or *tkv*. Homozygous lethal.

***DK2L)SS6f: Deficiency(2L) Star**
cytology: *D%2L)21C6-D1;22A3-B1.*
origin: Associated with *In(2LR)S56f.*

***DK2L)S-dmr: Deficiency(2L) Star derived**
cytology: *Di(2L)21D4-El;21E2~3.*
new order: YJ21D4 - 21A;
60 -21E3|101.
origin: Synthetic; a combination of *2L^{D}Y^{P}* from *T(Y;2)21E = T(Y;2)21D4-E1* and *4^2^{P}* from *T(2;4)ast^{v} ~ T(2;4)21E2-3;101.*
discoverer: E. B. Lewis,
references: 1945, Genetics 30: 137—66.
genetics: Deficient for S and *ast.* Homozygous lethal.

***D«2L)S1**
cytoIogy: *Df(2L)21C3~4;22A2-3.*
origin: X ray induced,
discoverer E. B. Lewis, 1940,
references: 1945, Genetics 30: 147—51.
genetics: Deficient for ds, S, and *ast* but not *1(2)0, net, al, ex, shr,* or ho. Homozygous lethal.

DK2L)S2
cyfology: *Df(2L)21 C6-D1;22A6-B1.*
origin: X my induced,
discoverer: E. B. Lewis, 1940.

references: 1945, Genetics 30: 147-51.
genetics: Deficient for *ds, S, ast,* and shr but not *l(2)gl, net, al, ex,* or *ho.* Homozygous lethal.

D«2L)S3
cytology: *Df(2L)21D2-3;21F2-22A1.*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
genetics: Deficient for S and *ast* but not *l(2)gl, net, al, ex, ds, shr,* or *ho.* Homozygous lethal.

**D«2L)S4*
cytology: *Df(2L)21C3-4;22B2-3.*
origin: X ray induced,
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
genetics: Deficient for *ds, S, ast,* and *shr* but not *l(2)gl, net, al, ex,* or *ho.* Homozygous lethal.

**D«2L)S5*
cytology: *Df(2L)21C2-3;22A3-4.*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
genetics: Deficient for ex, ds, S, and *ast* but not *1(2)0, net, al, shr,* or *ho.* Homozygous lethal.

**DK2L)S7*
cytology: *Df(2L)21C3-4;21F2-22A1.*
origin: X ray induced in *net ho.*
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 147—51.
genetics: Deficient for *ds, S,* and *ast* but not *l(2)gl, al, ex,* or *shr.* Homozygous lethal.

D«2L)Sw-L: Deficiency(2L) Swedish-L
cytology: Tip of *2L* contains deficiency,
origin: Naturally occurring condition in some Swedish strains,
discoverer: Gustafson, 1937.
genetics: No phenotypic effect.

D«2R)42
cytology: *Dt(2R)42C3-8;42D2-3.*
origin: Probably X ray induced. Found on chromosome with vg^s.
discoverer: Bridges, 36b.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304-9.
genetics: Deficient for no tested loci. Homozygous lethal.

**Df(2R)a*"»2: DeiiciencyUR) arc-broadangular*
cytology: *Dt(2R)S8D5-6;5SD7-8.*
origin: Spontaneous.
discoverer: Goldschmidt.
references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 363-73, 388-89.
genetics: Associated with a^{6*2}.

D«2R)bwS. Deficiency(2R) brown
cytology: *Dt(2R)59D10-El;59E4-Fl.*
origin: Spontaneous.
discoverer. Motor, 31k28.
genetics: Deficient for *bw.* Homozygous lethal.

**Df(2R)bwALCyR*
cytology: *D%ZR)41;42A2-3.*
ofigin: Associated with *In(2R)bwALCyR.*

**Df(2R)bwR4<>: Deficiency(2R)brown-Rearranged*
cytology: *Dt(2R)59C5-6;59E2-3.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with bw^{R40},

Df(2R)bwV34kLCyL
cytology: *Df(2R)41;42A2-3.*
origin: Aneuploid recombinant from *In(2R)bwV 34k+cy/+,*

Df(2R)bwVDe1LCyR
cytology: *Df(2R)41B2-Cl;42A2-3.*
origin: Associated with $In(2R)bw^{VDe>1L}Cy^R$.

Df(2R)bwVDe2LCyR
cytology: *Di(2R)41A-B;42A2-3.*
origin: Associated with $In(2R)bwV^{De2L}Cy^R$.

Df(2R)CyLbwVDe1R
cytology: *Di(2R)58A4-Bl;59E2-4.*
origin: Associated with $In(2R)Cy^Lbw^{v\wedge elR}$.

Df(2R)CyLbwVDe2R
cytology: *Df(2R)58A4-Bl;59D6-El.*
origin: Associated with *In(2R)CyLbwVDe2R.*

Df(2R)CyRbwV34kR
cytology: *Df(2R)58A4-Bl;59.*
origin: Aneuploid recombinant from *In(2R)bwV34k+Cy/+.*

DfT2R)M-c"a. Deficiency^/?) Minute-c
cytology: *Df(2R)60E2-3;60Ell-12.*
origin: X ray induced.
discoverer Schultz, 33a7.
synonym: *Df(2)M-33a.*
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
genetics: Deficient for *M(2)c.* Homozygous lethal.

**Df(2R)M-l*
cytology: *Dt(2R)57Fll-S8Al;58F8-59Al.*
origin: Spontaneous.
discoverer: Bridges, 23gl5.
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 231.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
genetics: Deficient for *px, l(2)Su(H), M(2)l,* and probably a. Homozygous lethal.

DK2R)M-S2: Deficiency(2R) Minute of Schultz 2
cytology: Salivary chromosomes apparently normal. Located in chromocentric region of 41A.
origin: X ray induced.
discoverer: Schultz, 33al2.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
Morgan, Schultz, and Curry, 1940, Carnegie Inst. Wash. Year Book 39: 251-55.
genetics: Lethal homozygous; mutant phenotype with *stw* but not *Jag, It, ti, ap, tk, std,* or *mat;* judged a deficiency on this basis.

Df(2R)M-S24
cytology. Salivary chromosomes apparently normal,
origin: X ray induced,
discoverer Schultz, 33a5.

synonym: *Df(2R)M-S4.*
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
Morgan, Schultz, and Curry, 1940, Carnegie Inst. Wash. Year Book 39: 251-55.
genetics: Gives mutant phenotype with *stw* and *ap.* Lethal homozygous and with *M(2)S2, l(2)Sp9c, l(2)Spll,* and *l(2)SpJ5.* No interaction with *Jag, It, rl, tk, std,* or *msf.* Judged a deficiency on basis of genetic evidence.

Df(2R)M-S2[8]
cytology: Salivary chromosomes appear normal.
origin: X ray induced.
discoverer: Schultz, 33a3.
synonym: *Df(2R)M-S8.*
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273—77.
genetics: Lethal homozygous and with *M(2)S2, l(2)Sp9c, l(2)Spll,* and *l(2)Spl5.* Gives mutant phenotype with *stw* but not r/ or *ap.*

Df(2R)M-S2[10]
cytology: *Df(2R)41A.* In mitotic metaphase *2R* about three-fourths normal size,
origin: X ray induced,
discoverer. Schultz, 32k22.
synonym: *Dt(2R)M-S10.*
references: Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 273-77.
Morgan, Schultz, and Curry, 1940, Carnegie Inst. Wash. Year Book, 39: 251-55.
1941, Carnegie Inst. Wash. Year Book 40: 282—87.
genetics: Lethal homozygous and with *M(2)S2, l(2)Sp9c, l(2)Spll,* and *l(2)Spl5.* Gives mutant phenotype with *rl* but not *stw* or *ap.*

Df(2R)M-S2[D]
cytology: *Df(2R)41A;41C.*
origin: Associated with *T(Y;2;3)D.*

***D«2RM-$2v9ih* Deficiency^/?) *Minute of Schultz 2 from vestigial* 77**
cytology: *Df(2R)40F-41Al;42A19-B1.*
origin: X ray induced; arose simultaneously with *vgU.*
discoverer Ruch, 1931.
synonym: *Df(2R)M-vg[11].*
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 306.
Morgan, Schultz, Bridges, and Curry, 1939, Carnegie Inst. Wash. Year Book 38: 275.
genetics: Deficient for *rl, M(2)S2, stw, ap, tk,* and msf but not *ltd.* Homozygous lethal.

Dt(2R)MS4:* see *Di(2R)M-S2*
Df(2R)MS8:* see *Df(2R)M-S2s
Df(2R)M-S10:* see *Df(2R)MS2*<>**
Df(2R)M-vgi i:* see *Df(2R)M-$2v6i'

DK2R)Np:* Deficiency^/?) *HotopIeuro!
cytology: *Df(2R)44Fl-2;45El-2* (Bridges),
origin: Spontaneous.
discoverer: Nichols-Skoog, 33b20.
references: Bridges, Skoog, and Li, 1936, Genetics 21: 788-95 (fig.).
Li, 1936, Peking Nat. Hist. Bull. 11: 39-48.
genetics: Not deficient for en, Wo, or en. *Df(2R)Np/T(2;3)dp* lethal and homozygous lethal.

Df(2R)0re-R: Deficiency(2R) Oregon-R
cytology: *Df(2R)60F2-3;* terminal deficiency.
origin: Naturally occurring in Oregon-R stock,
discoverer: Bridges, 3615.
genetics: No detectable phenotypic effect in homozygote.

DH2R)P
cytology: *Dt(2R)58E3-Fl;60D14-E2.*
origin: Aneuploid segregant from *T(2;3)P/+.*

D«2R)Px:* Deficiency^/?) *Plexate
cytology: *Df(2R)60B8-10;60Dl-2.*
origin: Spontaneous.
discoverer: Bridges, 22f6.
references: 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
genetics: Deficient for *1(2)NS, sp, bs,* 6a, and *Pin* but not *or, Fo, pd, 11, mr,* or *l(2)ax.* Homozygous lethal.

Df(2R)Px2
cytology: *Df(2R)60C5-6;60D9-10.*
origin: X ray induced.
discoverer. Schultz, 3211.
references: Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
genetics: Deficient for 6s, *ba,* and *Pin* but not *1(2)NS, sp,* or *M(2)c.* Homozygous lethal.

Df(2R)Px4
cytology: *Dt(2R)60B;60Dl-2.*
origin: Associated with *In(2LR)Px[4].*

Df(2R)PxS
origin: Spontaneous in *In(2LR)bw[vl].*
discoverer Thompson, 1957.
references: 1963, DIS 38: 28.
genetics: Deficient for *bs* and *ba* but not *sp.* Homozygous lethal.

Df(2R)Sw: Deficiency(2R) Swedish
cytology: *Dl(2R)60F3-4;* terminal deficiency.
origin: Natural condition of Swedish-b.
discoverer Catcheside, 36120.
genetics: No phenotypic effect.

Df(2R)vgB: Deficiency(2R) vestigial-Beaded
cytology: *Df(2R)49D3-4;S0A2-3.*
origin: Spontaneous.
discoverer Bridges, 28dll.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—6.
genetics: Deficient for *vg* and *1(2)C* but not sea. Homozygous lethal.

D1(2R)vgC: Deficiency(2R) vestigial-Carved
cytology: *Df(2R)49B2-3;49E7-Fl.*
origin: X ray induced.
discoverer. Demerec, 28c3.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—6.
genetics: Deficient for *mca, vg,* and *I(2)C,* Homozygous lethal.

DK2R)vgt>: Deficiency(2R) vestigial-Depilate
cytology: *Df(2R)49Cl-2;49E2-6.*
origin: Spontaneous.
discoverer: Bridges, 31a22.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—6.
genetics: Deficient for sea, *vg,* and *1(2)C.* Homozygous lethaf.

**DK2R)vgh Deficiency(2R) vestigial-Incised*
cytology: *Dt(2R)49C2-Dl;S0A2-3.*
discoverer Bridges, 36d20.
references: Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304—6.
genetics: Deficient for *sea, vg,* and *1(2)C.* Homozygous lethal.

Df(2R)vgS: DeiiciencyHR) vestigial-Snipped
cytology: *Di(2R)49B12-Cl;49F15-50Al.*
origin: X ray induced.
discoverer: Muller, 1929.
references: 1930, J. Genet. 22: 299—334.
Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 304-6.
genetics: Deficient for sea, *vg,* and *l(2)C.* Homozygous lethal.

**D«3L)D: Deficiency(3L) from T(Y;2;3)D*
cytology. *Df(3L)61E2-Fl;62A4-6.*
origin: Associated with *T(Y;2;3)D.*

**D«3L)hl00.390: Deficiency(3L) hairy*
cytology: *Di(3L)66D2-5;66D14-El.*
origin: X ray induced.
discoverer. Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for ft. Hornozygous lethal.

Df(3L)Hn: Deficiency(3L) Henna
cytology: *Df(3L)66A;66B.*
origin: X ray induced simultaneously with *T(2;3ytin = T(2;3)53E-54A;77A;94F;96A.*
discoverer. Van Atta, 30k.
references: 1932, Am. Naturalist 66: 93—95.
1932, Genetics 17: 637-59.
Lewis, 1956, DIS 30: 130.
genetics: Mutant or deficient for *Hn.* Homozygous lethal.

**Df(3L)K: Deficiency(3L) of Krivshenko*
cytology: *Df(3L)61 Cl-2;* apparently a terminal deficiency.
origin: Probably X ray induced,
discoverer: Krivshenko, 5614.
synonym: *Df-SL^-.*
references: 1959, DIS 33: 95.

D^3L)Ly: Defidency(3L) Lyra
cytology: *Dt(3L)70A2-3;70A5-6.*
origin: X ray induced.
discoverer: Dubinin, 1929.
references: Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301.
genetics: Associated with the mutant, *Ly.* Lethal homosrfgous and in combination with *Df(3L)M-h*[331].

**DH3L)M-h*3l: Deficimcy(3L) Minuto-h*
cytology: Probably includes bands in 70A.
origin: X ray induced,
discoverer: Demerec, 33J25.
references: 1935, DIS 3: 27.
Coyne, 1935, DIS 4: 59.
Mossige, 1938, Hereditas 24: 110-16.
genetics: Deficient for *M(3)h;* lethal homozygous and in combination with *Df(3L)Ly.*

**Df(3L)Mz: Deficiency(3L) from Minute(2) z stock*
cytology: Loss of several bands from tip of *3L.*
origin: Spontaneous.
discoverer: Bridges, 36h28.

DH3DN264-6: Deficiency(3L) Notch
cytology: *Df(3L)73E;8OC.*
origin: Aneuploid segregant from $T(l;3)N^{264\text{-}6}$/+.

**Df(3L)rul00.392: Deficiencyi3L) roughoid*
cytology: *Df(3L)61Ej62A10-Bl.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for ru. Homozygous lethal.

**Df(3L)rul00.393*
cytology: *Df(3L)61F2-3;62A4-6.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for ru. Homozygous lethal.

**D«3L)ru300.234*
cytology: *Dt(3L)61E;62A2-4.*
origin: X ray induced.
discoverer. Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for ru. Homozygous lethal.

**Df(3L)ru-Kl: Deficiency(3L) roughoid of Krivshenko*
cytology: *Di(3L)62A12-Bl;62B2-3.*
origin: X ray induced,
discoverer: Krivshenko, 1957.
references: 1958, DIS 32: 81.
genetics: Has rough and slightly reduced eyes in combination with ru but, judging from cytology, probably not deficient for *ru.*

**Df(3L)ru-K2*
cytology: *Df(3L)61F4-S;62A10-Bl.*
origin: X ray induced.
discoverer: Krivshenko, 1957.
references: 1958, DIS 32: 81.
genetics: Deficient for ru.

**Df(3L)sf100.62: Deficiency(3L) scarlet*
cytology: *D£(3L)73A2-3;73A10-Bl.*
origin: X ray induced,
discoverer: Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for *at.* Homozygous lethal.

**Df(3L)sfi oo.i7i*
cytology: *D%3L)72E4-5;74C2-3.*
origin: X ray induced,
discoverer: Alexander.

references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for *st.* Homozygous lethal.

***D«3L)sti 00.200**
cytology: *Df(3L)72E4-5;73A10-Bl.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for *st.* Homozygous lethal.

***D«3L)thl00.i0S. Deficiency<3L) thread**
cytology: *Df(3L)72A2-Bl;73A4-5.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for *th* and *st.* Homozygous lethal.

***Df(3L)Vn: Deficiency(3L) Vein**
cytology: *Df(3L)64C12-Dl;65D2-El.*
origin: Spontaneous.
discoverer Mohr, 28J21.
references: 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 190-212.
1938, Norske Videnskaps-Akad. 4: 1-7.
Mohr and Mossige, 1943, Norske Videnskaps-Akad. 7: 1-51 (fig.).
genetics: Deficient for *jv, dv,* and *Me* but not for *a-3, Hn,* or se. Mutant or deficient for *Vn.* Homozygous lethal.

***D«3R)89EF**
cytology: *Dt(3R)89D7-El;90A2-3.*
origin: Synthetic. Made by combining the $3R^D4^P$ element of one *T(3;4)* with the 4^D3R^P element of another.
discoverer: Dubovsky and Kelstein.
references: 1936, Eksperim. Med. No. 11: 65—84.
Kelstein, 1938, Biol. Zh. (Moscow) 7: 1145-69.
Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.
phenotype: Heterozygote (presumably with two *X's)* resembles female intersexes and is sterile. Male has rotated genitalia.
genetics: One of a series of deficiencies for the middle of 3R synthesized and carefully studied by Dubovsky and Kelstein. Heterozygous male has rotated genitalia which may be feminized both in structure and color; has sex combs. Heterozygous female sterile.

***Df(3R)bxdl00; D*ficiency(3R) bithoraxoid**
cytology: *D%3R)89B5-6;89E2-3.*
origin: Aneuploid recombinant from $Tp(3)bxd^{i00}$/+.

***Df(3R)bxd^{110}**
cytology: *Dt(3R)9lC7-Dl;92A2-3.*
origin: Aneuploid recombinant from $Tp(3)bxd^{llo}$/+.

***D#3R)Dh Deficiency{3R) Delta**
cytology: *D§(3R)90D2-4;9QD5-El.*
origin: Spontaneous.
discoverer: Schultx.
genetics: Found in *Dl* but, judging from other information placing the locus of *Dl* in region 91, *Df(3R)Dl* is separable from *Dl.* Homozygous lethal.

***DK3R)DIH**
cytology: *Df(3R)91C6-Dl;92A2-3* (Slizynski).
origin: Induced by unspecified chemical,
discoverer: Auerbach.
references: 1943, DIS 17: 49.
genetics: Deficient for *Dl.* Homozygous lethal.

***Df(3R)e4.39. Deficiency(3R) ebony**
cytology: *Df(3R)93B;93F.*
origin: X ray induced.
discoverer: Alexander.
references: 1960, Genetics 45: 1019-22.
genetics: Deficient for e. Homozygous lethal.

***Df(3R)e l00.172**
cytology: *Df(3R)93B7-10;93F10-94Al.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for e. Homozygous lethal.

***D«3R)ei 00.256**
cytology: *Df(3R)93A5-Bl;93F5-9.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for e. Homozygous lethal.

***D«3R)M-S31: De(iciency(3R) Minute of Schultz**
origin: X ray induced.
discoverer: Schultz, 33alO.
references: 1940, DIS 13: 51.
genetics: Termed deficiency on basis of Minute phenotype and mutant interaction with *cu* but not *ma.* Homozygous lethal.

***D%3R)Na: Deficiency(3R) from Naples**
cytology: *Dt(3R)96Fll-97Al;97A2-S.*
origin: Associated with *In(3R)Na.*

***Df(3R)PJ4: Deficiency(3R) from Pasadena**
cytology: *Df(3R)9OC2-Dl;91A2-3,*
origin: X ray induced.
discoverer. £. B. Lewis.
genetics: Deficient for *sr* and *gl* but not *k* or *Dl.* Homozygous lethal.

***Df(3R)ry: Deficiency(3R) rosy**
cytology: *Df(3R)87D-E;87E-F,*
origin: X ray induced.
discoverer: E. H. Grell, 1960.
references: 1962, Z. Vererbungslehre 93: 371—77.
genetics: Deficient for *kmr* and *ry.* Homozygous lethal.

***Df(3R)rY^{27}**
origin: *X* ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kemaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *1(3)S3,* mi, *ry, pic, 1(3)54, 1(3)S5, l(3)S6, 1(3)26,* and *1(3)S7* but not *1(3)S1, l(3)S2,* or *kar.* Homozygous lethal.

D«3R)ry28
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *ry* and *1(3)26.* Homozygous lethal.

D«3R)ry29
origin: X ray induced in cu *kar* chromosome.
discoverer Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *kar, mes, ry, pic, 1(3)S4, 1(3)SS,* and *1(3)S6* but not *1(3)S2, 1(3)26,* or *1(3)S7.* Homozygous lethal.

D«3R)ry3°
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *ry* and *1(3)26* and probably for *mes* and *pic.* Homozygous lethal.

Df(3R)ry31
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *ry* and probably *mes and pic* but not for *1(3)26.* Homozygous lethal.

Df(3R)ry32
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *ry* and *1(3)26* and probably formes and pic Homozygous lethal.

Df(3R)ry33
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *kar, mes, ry, pic, 1(3)S4, 1(3)S5,* and *1(3)S6* but not *1(3)S2, 1(3)26,* or *1(3)S7.* Homozygous lethal.

Df(3R)ry34
origin: X ray induced in *cu kar* chromosome.
discoverer. Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *ry* and probably mes and *pic* but not for *1(3)26.* Homozygous lethal.

Df(3R)ry36
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *kar, mes,* arid *ry* but not for *1(3)S2, pic, 1(3)84, 1(3)S5, 1(3)S6, 1(3)26,* or *1(3)S7.* Homozygous lethal.

Df(3R)ry51
origin: X ray induced in *cu kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *l(3)S2, kar, mes, ry, pic, 1(3)S4, 1(3)S5, 1(3)S6,* and *1(3)26* but not *1(3)S7.* Homozygous lethal.

Df(3R)ryS2
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *1(3)S3, mes, ry, pic, l(3)S4, 1(3)S5,* and *1(3)S6* but not *1(3)S2, kar, 1(3)26,* or *1(3)S7.* Homozygous lethal.

Df(3R)ry66
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *mes, ry, pic, 1(3)S4, 1(3)S5, 1(3)S6,* and *1(3)26* but not *1(3)S2, kar,* or *1(3)S7.* Homozygous lethal.

DK3R)ry70
origin: X ray induced.
discoverer: Kernaghan.
references: Schalet, 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for mes, *ry, pic, 1(3)S4, 1(3)S5,* and *1(3)S6* but not for *1(3)S2, kar, 1(3)26,* or *1(3)S7.* Homozygous lethal.

Df(3R)ry74
origin: X ray induced.
discoverer: Schalet.
genetics: Deficient for the right portion of the *mes* region and for *ry* but not for *1(3)S3,* the left portion of the mes region, or *pic.* Homozygous lethal.

Di(3R)ry75
origin: X ray induced in kar^2 chromosome.
discoverer: Schalet.
genetics: Deficient for *1(3)S3, mes, ry, pic, 1(3)S4,* and *1(3)S5* but not *kar* or *l(3)S6.* Homozygous lethal.

Df(3R)ry76
origin: X ray induced in kar^2 chromosome.
discoverer Schalet.
genetics: Deficient for *1(3)S2, kar, 1(3)S3, mes, ry, pic, 1(3)S4,* and *1(3)S5* but not for *1(3)S1, 1(3)S6,* or *1(3)26.* Homozygous lethal.

Df(3R)ry77
origin: X ray induced in kar^2 chromosome.

discoverer: Schalet.
genetics: Deficient for *1(3)S3, mes, ry,* and *pic* but not *1(3)S1, 1(3)S2, kar,* or *1(3)26.* Homozygous lethal.

**Df(3R)ry78*
origin: X ray induced in *kar*^{2} chromosome.
discoverer: Schalet.
genetics: Deficient for *mes, ry, pic,* and *1(3)26* but not for *kar,* or *1(3)S3.* Homozygous lethal.

Df(3R)ry*^{K}*: Deficiency(3R) rosy of Kernaghan
origin: X ray induced in *cu kar* chromosome.
discoverer: Kernaghan.
references: 1964, DIS 39: 62—64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient for *1(3)S1, 1(3)S2, kar, l(3)S3, mes, ry, pic, 1(3)S4, 1(3)S5, 1(3)S6,* and *1(3)26* but not *l(3)S7.* Homozygous lethal.

Df(3R)sbdlOS: Deficiency(3R) stubbloid
cytology: *Df(3R)88F9-89Al;89B4-5.*
origin: X ray induced.
discoverer: E. B. Lewis.
references: 1948, DIS 22: 72-73.
genetics: Deficient for *c(3)G, sbd,* and *Sb* but not *kar, cv-c, ss,* or *bx. Df(3R)sbd* 05/+* shows decreased crossing over in *X* (Hinton, 1966, Genetics 55: 157—64). Homozygous lethal.

****Df(3R)sri00.394; Deficiency(3R) stripe***
cytology: *Df(3R)90C2-7;90F3-7.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for sr. Homozygous lethal.

****D«3R)sr300.24***
cytology: *Df(3R)90C2-4;91A2-5.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for *sr.* Homozygous lethal.

****D«3R)sr300.J0i***
cytology: *Df(3R)90D2-4;91A6-8.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Deficient for sr. Homozygous lethal.

D«4)3
cytology: *Di(4)102E;102F;* inferred from genetic data.
origin: X ray induced,
discoverer. Gloor and Green, 1957.
genetics: Lethal in homozygote and in combination with *Df(4)G, Dt(4)ll, Dt(4)34,* and *spa*^{c}*«** but not *1(4)9* or *1(4)29* (Hochman).

Df(4)11
cytology: *Df(4)102E2-10;102F2-10* (Hochman); salivary chromosome bands missing in sections 102E and perhaps some from 102F, but distal tip of *4R* is present.
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)11.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Permits pseudodominant expression of sv and *spa* alleles. Heterozygote with *spa* shows slight sparkling effect but the effect is extreme in heterozygote with *spaP*^{oJ}. Lethal homozygous and with *spa*^{Cat}, *1(4)9, 1(4)29, Df(4)3, Di(4)12, Df(4)24, Df(4)34,* and *Df(4)G.*

D«4)12
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)12.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109—26.
genetics: Heterozygote with *spa* is wild type and with *spaP*^{o1} is slight sparkling. Lethal homozygous and with *spa^**, 1(4)9, 1(4)29, Df(4)3, Df(4)ll, Dt(4)24, Di(4)34,* and *Df(4)G.*

Df(4)17
origin: X ray induced.
discoverer: Gloor and Green.
synonym: *1(4)17.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Lethal homozygous and when heterozygous with *ci*^{D} or Ce^{2}. Does not interact with any other factor in *Df(4)M.*

Df(4)24
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)24.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Heterozygote with *spa* is sparkling and with *apaP*^{o1} is poliert. Lethal homozygous and with *spa*^{Cat}, *1(4)9, 1(4)29, D((4)3, Di(4)ll, Df(4)12, Df(4)34,* and *D£(4)G.*

D«4)31
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)31.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Lethal homozygous and when heterozygous with *ci*^{D} or Ce^{2}. Does not interact with any other factor in *Df(4)M.*

D«4)34
origin: X ray induced.
discoverer: Gloor and Green, 1957.
synonym: *1(4)34.*
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Lethal homozygous and when heterozygous with *Df(4)G, Df(4)ll, Di(4)3,* and *®pa*^{Cat} but not with *1(4)9* or *1(4)29.*

D44)G: Deficiency(4) of Gloor and Green
cytology: *D£(4)102E2-10;* tip of *4R* lost and remainder of chromosome *4* capped with X-chromosomal material, including 1A (Hochman).
origin: X ray induced.

discoverer: Gloor and Green, 1957.
references: Hochman, Gloor, and Green, 1964, Genetica 35: 109-26.
genetics: Lethal homozygous and in heterozygous **combination with *Df(4)3, Df(4)ll, Df(4)12, Df(4)24, Df(4)34, spa^{c}*t, 1(4)9,* and *1(4)29.* Recessives at** sv and *spa* loci expressed fully in heterozygote. Loci of y^{+} and ac^{+} linked to the chromosome.

Df(4)M: Deficiency) Minute

cytology: *Df(4)101E-F;102B6-17;* right break to the left of 102B9-10 according to Bridges, to the right according to Slyzinski (1944, J. Heredity 35: 322-24). Hochman has not succeeded in distinguishing between these alternatives.
origin: Spontaneous.
discoverer: Bridges, 25128.
synonym: *Df(4)M-4.*
references: 1935, Biol. Zh. (Moscow) 4: 401—20. 1935, Tr. Dinam. Razvit. 10: 469.
genetics: Deficient for *at, ci, gvl, 1(4)1, 1(4)13, 1(4)18, 1(4)25, M(4),* and Sen but not *bt, 1(4)2, sv,* or *spa.* Homozygous lethal.

*Df(4)M^{2}

origin: X ray induced.
discoverer Schultz, 32k29.
references: Bridges, 1935, Biol. Zh. (Moscow) 4: 401-20.
genetics: Deficient for *at, ci,* and ci^{D}. Homozygous lethal.

*Df(4)M^{3}

cytology: *Dt(4)101E;102B;* similar to *Df(4)M* (Bridges, 1935, Tr. Dinam. Razvit 10: 470).
origin: X ray induced.
discoverer: Schultz, 33a8.
synonym: *Df(4)M-43.*
genetics: Deficient for *at, ci, gvl,* and *M(4)* but not *bt,* ey, or sv. Homozygous lethal.

Df(4)M^{4}

origin: X ray induced.
discoverer: Glass, 42hl2.
references: 1944, DIS 18: 40.
genetics: Deficient for Ce, *ci, and M(4)* but not for ey or sv. Homozygous lethal.

Df(4)M^{62e}

cytology. *Df(4)101E; 102D13-E1.*
origin: Recovered among progeny of male injected **with *Drosophila* DNA.**
discoverer: Fahmy, 62e.
genetics: Deficient for *at, ci, gvl,* and ey; Fahmy claimed it was also deficient for spa but not sv. If we assume that $Df(4)M^{62e}$ is a simple interstitial deficiency, Fahmy's claim contradicts all other evidence on the order of sv and *spa.* Hochman finds that *Dt(4^4^{62e}/BpaP°l* is poliert. Homozygous lethal.

Df(4)M^{62f}

cytology: *Dt(4)101E;W2B10-17* (Fahmy); *Dt(4)101E-F;102B2-5* (Hochman).
origin: Gamma ray induced,
discoverer. Fahmy, 62f.
genetics: Deficient for *BT, ci, gvl,* and *M(4)* but not *bt, ey, av,* or *spa.* Homozygous lethal.

Df(4)M^{63a}

cytology: *Df(4)101F2-102Al;102A2-5* (combined from observations of Fahmy and Hochman).
origin: Recovered from progeny of male injected with thymus extract from leukemic mice (Gross Factor).
discoverer Fahmy, 63a.
genetics: Deficient for *ci* and *M(4)* but not *ar, gvl, bt, ey, sv, spa,* or the lethal effect of ci^{D}. Homozygous lethal.

Df(w-ec)^{6}^{d}:* see *Df(l)w-ec*
Doublet: see *Dp(l;l)BSRMG*
Dp(l)3Cl: see *Dp(l;l)w^{TG}*

DUPLICATIONS

**Dp(l;l)lOO: Duplication(l;l) 100*

origin: Spontaneous product of exchange between *Dp(l;f)100* and proximal heterochromatin of *C(1)RM.*

**Dp(1;1)105*

cytology: Metaphase *X* chromosome has one arm of normal length and one about 40 percent normal length.
new order: 1 — 20|6 — 1.
origin: X-ray-induced deletion of most of A" euchromatin was recovered as a *C(l)JRM/Dp(l;f)105* female, which by detachment produced *Dp(l;l)105* in the succeeding generation.
discoverer: Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains wild-type alleles of y through *dx* and also probably *bb.*

Dpd;l)U2

origin: Spontaneous product of exchange between *Dp(l;i)112* and proximal heterochromatin of an attached *X.*

**Dp(l;l)m*

origin: X-ray-induced deletion of most of *X* euchromatin that was recovered as a *C(1)RM/Dp(l;f)138* female, which by detachment produced *Dp(l;l)138* in the subsequent generations.
discoverer: Dobzhansky, 1930.
references: 1935, Z. Induktive Abstammungs-Vererbungslehre 68: 134—62.
genetics: Extends from locus of r to base of *X;* carries *B.* Female nearly wild type, but male has low viability and is sterile.

**Dp(1;1)258-46*

cytology: *Dp(l;l)2B4-7;3A4-6;* reversed repeat (Sutton).
new order 1 - 2B4|3A4 - 2B7|2B7 - 20 or 1 - 3A4J3A4 - 2B7|3A6 - 20.
origin: X ray induced.
discoverer: Demerec, 381.
genetics: Originally appeared as *w* but reverted to ***w^{+}. M(l}Bld, tw, bt, pn, kz,* and *gt* not affected.**

Dp(l;l)B: Duplication(l;l) Bar

cytology: *Dp(l;l)15F9-16Al;16A7-Bl;* a tandem duplication (Bridges, 1936, Science 83: 210-11; Muller, Prokofyeva-Belgovskaya, and Kossikov, 1936, Dokl. Acad. Nauk SSSR 1: 87-88).
new order: 1 - 16A7J16A1 - 20.

origin: Spontaneous.
discoverer: Tice, 13b.
references: 1914, Biol. Bull. 26: 221-30.
genetics: Position effect for *B,* apparently resulting from juxtaposition of 16A1 with 16A7, which may undergo mutation to less extreme forms (e.g., *B*).* Produces normal and triplicated _*Dp(l;l)BB*\ products by unequal crossing over.

***Dp(1;l)B263.28**

cytology: ***Dp(l;l)15F9-16Al;16A3-4;16A6-7;16A7-B1.***
new order: 1 - 16A3|l6A7|l6Al - 20.
origin: X-ray-induced deletional derivative of ***Dp(l;l)B^{l}B^{i} = Dp(l;l)15F9-16Al;16A7-Bl.***
discoverer: Demerec, 34b.
references: Sutton, 1943, Genetics 28: 97—107.

***Dp(l;l)B263.48**

cytology: ***Dp(l;l)3E2-3;15F9-16Al;20A2-3.***
origin: Recombinant product from *Tp(l)B^{263}"•**/+.*

Dp(l;l)BSRAG: Duplication(l;l) Bar of Stone Reversed Acrocentrigenic

cytology: ***Dp(l;l)15F9-16Al;20.***
new order: -20|lA - 20|20 - 16Al|lO2F.
origin: Spontaneous recombinant between the distal **AT of a *C(1)RA* and *4^{D}X^{P}* from *T(1;4)BS.***
discoverer: Lindsley and Sandier.
references: 1963. In Methology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc., pp. 390—403.
genetics: Generates reversed acrocentric compound *X* chromosomes in *Dp(l;l)B^{s}RAG/+* female, usually by a double exchange in which one exchange occurs between the duplicated segment of one strand and the homologous region of its sister and the other between the duplication-bearing *X* and its normal homolog. Rate of *C(1)RA* generation about 6 X10-4.

Dp(l;l)B^{s}RMG: Duplication(T;l) Bar of Stone Reversed Metacentrigenie

cytology: ***Dp(l;l)15F9-16Al;20.***
new order: 1 - 20-20 - 16Al|lO2F.
origin: Spontaneous recombinant between *C(1)RM* and the *4®X^{P}* element of *T(1;4)B^{S}.*
discoverer Muller.
synonym: *Doubter,*
references: 1936, DIS 6: 8.
Lindsley and Sandier, 1963. In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc., pp. 390-403.
genetics: Generates reversed metacentric compound *X* chromosomes in *Dp(l;l)B^{s}RMG/+* female by crossing over between the duplicated segment and either the *X* to which it is attached or the homologous *X* at a rate of about 2.5 X 10—^{4}.

Dp(1;l)BSTAG: Duplication(ljl) Bar of Stone Tandem Acrocentrigenic

cytology: ***Dp(l;!)15F9-16Al;20.***
new order «20 - 1AJ20 - 16Al|lO2F.
origin: X-ray-induced recombinant between Hi® distal heterochrot&atin of an *X* chromosome with a terminal beterochromatic segment derived from *y*Y* and the proximal heterochromatin of the *4^{D}X^{P}* element **of *T(1;4)B^{S}.***
discoverer: Lindsley and Sandier.
references: 1963. In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc., pp. 390-403.
genetics: Ineffective in generating tandem acrocentric compound *X* chromosomes.

Dp(l;l)B^{s}TMG: Duplication(l;l) Bar of Stone Tandem Metacentrigenie

cytology: *Dp(l;l)15F9-16Al;20* added as a second **arm to *In(l)sc*^{L}EN^{R}.***
new order: 1A - B2|20B - lA|20-20 - 16Al|lO2F.
origin: Spontaneous recombinant between the *X* in normal sequence of a *C(1)TM* and the *4^{D}X^{P}* element **of *T(1;4)BS.***
discoverer: Lindsley and Sandier.
references: 1963. In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc., pp. 390—403.
genetics: Generates tandem metacentric compound *X* chromosomes in *Dp(l;l)B^{s}TMG/+* female by recombination between the duplication and the base of a homolog in normal sequence, at a rate of about 20 X 10-^{4}.

Dp(l;l)BSTRG: Duplication(l;1) Bar of Stone Tanalem Ring-genic

See *C(l)TMB^{s},* subsection on compound chromosomes.

Dp(1;1)bb^{D}fLCl^{R}

cytology: ***Dp(l;l)4A5-Bl;4D2-3 + Dp(l;l)17A6-Bl;20B-C.***
origin: Associated with *In(l)bb^{Dtl}^Cl^{R}.*

Dp(J;1)bbDfLy4R

cytology: ***Dp(l;l)lA8-Bl;4D2-3 + Dp(l;l)18A3-4;20B-C.***
origin: Associated with *In(l)bb$^{D(}$L$_{y}$4R.*

Dp(l;l)BB: Duplication(l;1) Bar Bar

cytology: *Dp(l;l)15F9-16Al;16A7-Bl;* a tandem triplication [Bridges, 1936, Science 83: 210-11 (fig.)].
new order: 1 - 16A7|l6Al - 16A7J16A1 - 20.
origin: Spontaneous through unequal crossing over infi/B female.
discoverer Zeleny.
references: 1920, J. Exptl. Zool. 30: 292—324, Sturtevant, 1925, Genetics 10: 117-47.
genetics: Either or both *B* regions may carry a less extreme derivative of *B;* e.g., *B^{l}B, BB^{1},* or *B^{l}B^{l}.* Number of duplicated segments may be either increased or decreased by unequal crossing over.

***Dp(1;l)Bt: Duplication(l;1) Branch!et**

cytology: *Dp(l;l)3B2-Cl;6F6-7;* tandem repeat (Darby).
new order. 1 — 6F4|3C1 — 20.
origin: Induced by P^{32}.
discoverer: Bateman, 1950.
references: 1950, DIS 24: 54.
1951,DIS25:77.

Dp(1;1)Bx': Dup!ication(J;1) Bzadex-recessive

cytology: *Dp(l;l)17A;17E-F* (E. B. Lewis).
origin: Spontaneous.

discoverer: Ives, 35k.
references: 1937, DIS 7: 6.
Green, 1952, Proc. Natl. Acad. Sci. U.S. 38: 949-53.
1953, Genetics 38: 91-105.
1953, Z. Induktive Abstammungs- Vererbungslehre 85: 435-49.
genetics: Duplicated for os^+, Bx^+, and iu^+. Does not yield unequal crossovers as does Bx^{r49k}.

Dp(l;l)Bxr49k
cytology: *Dp(l;l)17A;17C* (E. B. Lewis).
origin: Spontaneous.
discoverer: Mossige, 49k22.
references: 1950, DIS 24: 61.
Green, 1953, Z. Induktive Abstammungs- Vererbungslehre 85: 435—49.
genetics: Duplicated for Bx^+ but not for os^+ or fu^+. Unequal crossing over yields wild types and triplications. Quadruplications have also been produced.

Dp(l;1)Cll-y4R
cytology: ***Dp(l;l)lA8-Bl;4A5-Bl.***
origin: Associated with $In(l)C]^L y^{4R}$.

Dp(l;l)Co: Duplication(l;l) Confluens
cytology: *Dp(l;l)3C4-5;3D6-El;* tandem duplication (Schultz, 1941, DIS 14: 54-55).
new order: 1 — 3D6|3C5 — 20.
origin: Recovered among progeny of cold-treated fly.
discoverer: Gottschewski, 34c.
references: 1937, Z. Induktive Abstammungs- Vererbungslehre 73: 131—42.
1935, DIS 4: 7, 14, 16.
1937, DIS 8: 12.
genetics: The *Co* phenotype arises from a duplication of the Notch locus (salivary band 3C7).

Dp(l;1)Hw: Duplication(l;l) Hairy wing
cytology: *Dp(l;l)lA8-Bl;lB2-3;* tandem repeat (Demerec and Hoover, 1939, Genetics 24: 68).
new order: 1A1 - lB2|lBl - 20.
origin: Spontaneous.
discoverer: Bridges, 23cl2.
genetics: Duplication produces *Hw* phenotype.

****Dp(h1)NBB-8***
cytology: *Dp(l;l)16A;17E;* tandem duplication.
new order: 1 - 17E|l6A - 20.
origin: Spontaneous as nonrecombinant strand from */ B os/+ B +* mother.
discoverer: Peterson and Laughnan.
references: 1963, Proc. Natl. Acad. Sci. U.S. 50: 126-33.
genetics: Male viability reduced. Has a *BB* phenotype.

Dp(1;1)sc^{4L}sc^{8R}
cytology. ***Dp(l;l)lB2-3;lB3-4.***
origin: Associated with $In(l)sc^{4L}sc^{8R}$.

Dp(1;1)$c4i-y4R
cytology: ***Dp(l;l)lA8-Bl;lB3-4 + Dp(l;l)18A3-4;19F-2OC1.***
origin; Associated with $In(l)\&c^{4I}*y^{4R}$.

Dp(1;1)sc8L$_S$c4R
cytology: ***Dp(l;l)l9F-20Cl;20B-Dl.***
origin: Associated with $Irv(l)sc^{SL}ac^{4R}$.

Dp(1;1)sc^{8L}sc^{L8R}
cytology: ***Dp(l;l)20B-C;20B-Dl.***
origin: Associated with $In(l)sc^{SL}sc^{L8R}$.

Dp(1;1)sc^{8L}y^{4R}
cytology: ***Dp(l;l)lA8-Bl;lB2-3 + Dp(l;l)18A3-4;2OB-D1.***
origin: Associated with $In(l)sc^{8L}y^{4R}$.

Dp(l;l)sc260.2S
origin: Aneuploid recombinant from $In(lLR)sc^{26}$°-25_m

Dp(l;l)sci-aL$_{5c}$4R
cytology: ***Dp(l;l)19F-20Cl;20B-C.***
origin: Associated with $In(l)sc^{L8L}sc^{4R}$.

Dp(T;l)sct-8L$_S$c8R
cytology: ***Dp(l;l)lB2-3;lB3-4.***
origin: Associated with $In(l)sc^{L8L}sc^{8R}$.

Dp(1;l)scS"-$_{sc}$4R
cytology: ***Dp(l;l)19F-20Cl;20B-Dl.***
origin: Associated with $In(l)sc^{slL}sc^{4R}$.

Dp(T;l)scSii-$_{sc}$8R
cytology: ***Dp(l;l)lB2-3;lB3-4,***
origin: Associated with $In(l)scSl\text{^}sc^{8R}$.

Dp(1;l)scS1L$_{sc}$L8R
cytology: ***Dp(l;l)20B-C;20B-Dl.***
origin: Associated with $In(l)sc^{slI}$-'sc^{L8R}.

Dp(1;1)sc^{v1}: Duplication(l;l) scute of Valencia
cytology. ***Dp(l;l)lA8-C3.***
origin: Aneuploid recombinant from $In(lLR)sc^{vl}$/+.

****Dp(l;1)Th: Duplication(l;l) Theta***
origin: X-ray-induced detachment of *C(1)RM* with X-ray-induced deletion of most of the *X* euchromatin.
discoverer: Muller.
references: Muller and Painter, 1929, Am. Naturalist 63: 197.
Patterson, 1930, Genetics 15: 141-49.
Muller, 1932, Proc.Intern. Congr. Genet., 6th. Vol. 1: 213-55.
genetics: Fragment of *X* chromosome, including y^+, sc^+, and bb^+ attached to right of *X* centromere. Causes development of interalar bristle not ordinarily present in *D. melanogaster* (Stern, 1956, Arch. Entwicklungsmech. Organ. 149: 1—25).

Dp(J;J)w: Duplication(l;l) white
cytology: ***Dp(l;l)3A;3C.***
new order 1 - 3C|3A - 20.
origin: Spontaneous as a recombinant from w^{ctt}/w^sP.
discoverer. E. B. Lewis, 55j.
references: 1957, DIS 31: 84.
genetics: Loci of *w* and *r&t* within duplicated section. Unequal crossing over gives normal and triplicated products. Quintuplication also produced.

Dp(l;l)w60h2i. see Dp(l;l)wG
Dp(l;l)w6 0h3o. seeDp(l$_J$-l)wrG2

Dp(J;1)w": Duplication(l;l) white-apricot
cytology: *Dp(l;l)3A10-Bl;3C3-5* (Gersh, 1962, Genetics 47: 1393-98).
new order: 1 - 3C3|3B1 - 20.
origin: Spontaneous from w^/w* female; recovered once as a recombinant and once as a presumed recombinant.

discoverer Green.
references: 1959, Genetics 44: 1243-56.

Dp(7;7V^{rG}-* *Duplication(l;l) white-recombinant of Green*
cytology: *Dp(l;l)3A3-4;3Cl-2.*
new order: 1 - 3Cl|3A4 - 20.
origin: A regular product of asymmetric exchange between 3C1-2 of a w^a or w^{a2} chromosome and 3A3-4 of specific homologs. Reciprocal of *Dt(l)w*^{G}*.
discoverer: Green, 60h21.
synonym: *Dp(l)3Cl; Dp(l;l)w60h21,*
references: 1961, Genetics 46: 1555—60.
Gersh, 1962, Genetics 47: 1393-98 (fig.).

Dp(J;l)wrG2
cytology: *Dp(l;l)3B2-Cl;3C3-5* [Gersh, 1962, Genetics 47: 1393-98 (fig.)].
new order: 1 - 3C3J3C1 - 20.
origin: Spontaneous by recombination.
discoverer: Green, 60h30.
synonym: *Dp(l;l)w^°h3 0^*

Dp(l;l)wrJ^2:Duplication(l;l)white-recombinant ofJudd
cytology: *Dp(l;l)3A6-8;3Cl-3* [could be same as *Dp(l;l)w^{rG}*\.
new order: 1 - 3Cl|3A8 - 20.
origin: A regular product of unequal exchange between the 3C1-3 region of a chromosome carrying *wrdp* with the 3A4-8 region of specific homologs. Probably reciprocal recombinant of *Dt(l)w^{r}J^3*.
discoverer: Judd, 1961.
synonym: *w^T>^{du}P.*
references: 1961, Proc. Natl. Acad. Sci. U.S. 47: 545-50.

Dp(1;1)y^{3PL}sc^{8R}
cytology: *Dp(l;l)lA;lB2-3.*
origin: Associated with *In(l)y^{3PL}sc^{8R}*.

Dp(l;l)yt>l: Duplication(l;l) yellow-bristle
cytology: *Dp(l;l)lB2-3;4F8-9;5D4-5* (Nicoletti, Lindsley).
new order 1A - 1B2J5D4 - 4F9|lB3 - 20.
origin: Spontaneous.
discoverer: Sandier.
references: Sandier, Hart, and Nicoletti, I960, DIS 34: 103-4.
genetics: Mutant for *y;* duplicated for cv. Regularly generates further rearrangements; has produced losses of the duplicated segment, which are accompanied by changes In phenotype from y^{bl} to y-like and a translocation between the tips of *X* and *2L* accompanied by a change from y^{bl} to y^+,

****Dp(1;J)zh Duplication(l;1) zeste***
cytology: *Dp(l;l)lE2-3;4B4-5;* tandem repeat.
new order 1A - 4B4|lE3 - 20.
origin: X ray induced.
discoverer Gans.
references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90.
genetic*: Male lethal.

****Dp(l;l)z2***
cytology: *Dp(l;l)2ClQ-Dl;4D2'4.*
origin: Associated with *Jn(l)m2.*

****Dp(l'l)z4***
cytology: *Dp(l;l)2B16-Cl;3B-Cl.*
new order: 1 - 3BJ3C1 - 2Cl|3Cl - 20.
origin: X ray induced.
discoverer: Gans.
references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90.
genetics: Duplication male viable and fertile. Homozygous female viable but poorly fertile.

****Dp(hl)z8***
cytology: *Dp(l;l)2B18-Cl;4B4-S.*
new order 1 - 4B4|2C1 - 20.
origin: X ray induced.
discoverer: Gans.
references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90.
genetics: Lethal in male.

Dp(1;l)z59d
cytology: *Dp(l;l)2F5-3Al;3A4-5* (Gersh).
new order: 1 - 3A4|3A1 - 20.
origin: X ray induced in *y^2 su(w^a) z.*
discoverer Green, 59dl5.
references: 1961, Genetics 46: 1555-60.
Gersh, 1962, Genetics 47: 1393-98 (fig.).

Dp(1;2)51b
cytology: *Dp(l;2)3Cl-2;3D6-7;52F.*
origin: Aneuploid segregant from *T(l;2)51b/+.*

****Dp(l;2)A12: Duplication(l;2) from Austin***
cytology: *Dp(l;2)7A;7B.*
origin: Aneuploid segregant from *T(1;2;4)A12/+.*

****Dp(l;2)A124***
cytology: *Dp(l;2)10A;13Al-2;59.*
origin: Segregant from *T(1;2)A124/+.*

Dp(1;2)cf7c?; *Duplication(l;2) cut
cytology: *Dp(l;2)7B2-3;8E2-3;25C.*
origin: Aneuploid segregant from *T(l;2)ct^{7cl}/+.*

Dp(l;2)Kl: Duplication(T;2) of Krivshenko
cytology: *Dp(l;2)lA5-B3;2Q;29A.*
origin: Associated with *T(1;2)K1.*

Dp(l;2)scl9: Duplication(l;2) scute
cytology: *Dp(l;2)l Bl-2;lB4-7;25-26.*
origin: Aneuploid segregant from *T(l;2)sc$^{iS>}$/+.*

****Dp(l;2)w"'52b12; Duplication(l;2) white-mottled***
cytology: *Dp(l;2)lE5-Fl;3C3-4;40-41.*
origin: Aneuploid segregant from *TXl;2)w^{taS2bl2}/+.*

***Dp(1;2)w^{m53a}**
cytol ogy: *Dp(l;2)3B2-Cl;3C9-D1;4O-41,*
origin: Aneuploid segregant from Tf7;2>w^{n}'53«/-K

****Dp(l;2)wm2S8.44***
cytology: *Dp(l;2)3C3-4;4D2-El;56El-Fl,*
origin: Aneuploid segregant from *T(1;2;3)w$^{m258-44}$/+.*

Dp(l;3)126
origin: X ray induced.
discoverer Dobzhansky, 1930.
references: 1935, Z. Induktive Abstammungs-Vererbungslehre 68: 143.
genetics: Duplicated for r, *M(l)o, f,* and *B* but not *si* or o«; variegates for / and Mffjo (Schultz). Duplicated section inserted into chromosome *3* between

st and *cu*. Also an inversion in *3L*. Viability.,fertility, and phenotype of *Dp(l;3)126/+* male and female normal.

Dp(J;3)ct11<>: Duplication(l;3) cut
cytology: *Dp(l;3)lB;7B2-3;84B.*
origin: Aneuploid segregant from $T(l;3)ct^{lla}$/+.

Dp(J;3)cti2ci
cytology: *Dp(l;3)7B2-3;7D2-6;85.*
origin: Aneuploid segregant from $T(l;3)ct^{12cl}$/+.

Dp(1;3)ct^{268-37}
cytology: *Dp(l;3)5D2-3;7B2-3;80C-F.*
origin: Aneuploid segregant from $T(l;3)ct^{26s\cdot37}$.

Dp(J;3)K2: Duplication(l;3) of Krivshenko
cytology: *Dp(l;3)20A-B;20D-F;80-8l.*
origin: Associated with *T(1;3)K2.*

Dpd;3)NS0k11: Duplication(l;3) Nofch
cytology: *Dp(l;3)lE3-4;3C6-7;89A.*
origin: Aneuploid segregant from $T(l;3)N^{s0kl1}$ /+.

Dp(1;3)N^{264-58}
cytology: *Dp(l;3)3B2-3;3D6-7;80D-F.*
origin: Aneuploid segregant from *T(l;3)N264-58/+,*
synonym: $Dp(l;3)w^{m}264\text{-}S8$.

Dp(l;3)N264.ioo
cytology: *Dp(l;3)3B4-Cl;4B4-5;80.*
origin: Aneupioid segregant from $T(l;3)N2^{6}4\text{-}100/+$.

Dp(l;3)04: Duplication(l;3) of Oliver
origin: Aneuploid segregant from *T(1;3)O4/+.*

Dp(l;3)ras^{v}: Duplication(l;3) raspberry-variegated
cytology: *Dp(l;3)9E;13C;81F.*
origin: Aneuploid segregant from $T(l;3)ras^{v}$/+.

Dp(1;3)sc260-20: Duplica1ion(l;3) scute
cytology: *Dp(l;3)lA8-Bl;61Al-2.*
origin: Aneuploid segregant from *T(l;3)sc260-20/+.*

Dp(1;3)sc^{J4}: Duplication(l;3) scute of Jacobsduller
cytology: *Dp(l;3)lB;61A.*
origin: Aneuploid segregant from *T(l;3)scJ*/+.*

DtfJtfhnl**^{1}: Duplication(l;3) singed
cytology: *Dp(l;3)6C;7C9'Dl;72D2-El.*
origin: Aneuploid segregant from $T(l;3)sn^{i3al}$/+.

Dp(l;3)sta: Duplication(l;3) stubarista
cytology: *Dp(l;3)lD3-El;2A;89B21-C4.*
origin: Aneuploid segregant from *T(l;3)8ta/+.*

Dp(J;3)w»49a: Duplication(l;3) white-mottled
cytol ogy: *Dp(l;3)3A 10-Bl;3E2-3;80.*
origin: Aneuploid segregant from $T(l;3)w^{m}49a$/+^

Dp(1;3)w^{m264-58}: see Dp(1;3)N^{264-58}

Dp(1;3)w^{vce}: Dvplication(l;3) white-variegated cobbled
cytology: *Dp(l;3)2B17-Cl;3C4-5;77D3-5;81.*
origin: Aneuploid segregant from $T(l;3)w^{yco}$/+.

Dp(l;4)Ah buplicatioMb*) from Austin
cytology: *Dp(l;4)9B;20;101-102.*
origin: Aneuploid segregant from *T(1;4)A1/+.*

Dp(l;4)A12
cytology: *Dp(l;4)lB-C;7A;7B;13B1-5;101-102.*
origin: Anettploid segregant from *T(1;2;4)A12/+.*

Dp(l;4)N2"'*S; QwpUcation(h4) Notch
cytol of y: *Dp(l;4)3B4-Cl?6A 2-Bl;101 F-102A.*
origin: Anettpioid segregaot from $TXl;2;4yNi^{*4\cdot95}$.

Dp(1;4)N264.86
cytology: *Dp(l;4)3C6-7;3E5-6;10lF-102.*
origin: Aneuploid segregant from $T(l;4)N^{26}4\text{-}86/+$.

Dp(l;4)r^{+}: Duplication(l;4) rudimentary-wild type
origin: X-ray-induced derivative of $T(1;4)B^{S}$ = *T(l;4)16A6-Al;102F2-3;* probably a deletion of most of the *X* euchromatin from the $X^{D}4^{P}$ element.
discoverer Green.
references: 1963, Genetica 34: 242-53.
genetics: Carries normal alleles of r and /appended to the right end of chromosome *4.*

Dp(J;4V^{m57e}.' ***Duplication(l;4) white-mottled***
cytology: *Dp(l;4)3C2-3;3C4-7;101.*
origin: Aneuploid segregant from $T(l;4)w^{m51c}$/+-

Dp(l;4)w^{vD1}: Duplication(l;4) white-variegated of Demerec
cytology: *Dp(l;4)3Cl-4;101A-D.*
origin: X ray induced in *y.*
discoverer: Demerec 33J19.
genetics: Variegated for *w* but not ci. *X* broken between *w* and *rst; 4* probably broken in left arm.

Dp(l;A)pn-ec: Duplicationfl;Autosome) prune to echinus
cytology: *Dp(l;A)2Dl-2;3F7-4A4;40-41* or *80-81.*
origin: Aneuploid segregant from *T(l;A)pn-ec.*

Dp(l;f)l: Duplicationd;free)
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Muller.
synonym: *Del(l)l.*
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller and Painter, 1932, Z. Induktive Abstammungs- Vererbungslehre 62: 316—65.
genetics: Contains wild-type alleles of *y, sc, br, pn,* and 66.

0p(l.f)2
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer. Muller.
synonym: *Det(l)2.*
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller and Painter, 1932, Z. Induktive Abstammungs- Vererbungslehre 62: 316—65.
genetics: Contains wild-type alleles of y, sc, *br,* and 66.

Dp(l;f)3
cytology: *Dp(l;f)lD;19-20* (Gersh) 3.7-4 times the size of chromosome *4* at metaphase; lacks only the distalmost part of heterochromatic segment *hD* (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Weltroan, 1954.
references; Lindsley and Sandier, 1958, Genetics 43: 547-63.
Grell, 1964, Genetics 50: 151-66.

genetics: Carries wild-type alleles of *y, ac, sc, su(f),* and 66 but not *s^w*), dor, pn,* or *car.* Disjoins regularly from *XY,* 3 percent nondisjunction from *C(l)RM$_t$* and causes 18 percent nondisjunction *otIn(l)dl-49* from + in *In(l)dt-49/+/Dp(l;f)3* female.

*Dp(l;f)10

origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Carries wild-type alleles of *y, ac,* and sc but not *su(f)* or 66. 61 percent nondisjunction from *XY,* 45 percent from *C(1)RM,* and regular disjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;f)10* female.

*Dp(l;f)12

cytology: 3.4—4 times the size of chromosome *4* at metaphase; lacks only the distalmost part of heterochromatic segment *hD* (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer. Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Contains wild-type alleles of *y,* ac, sc, *su(w^a), su(f),* and 66 but not *pn* or *car.* Disjoins regularly from *XY,* 4 percent nondisjunction from *C(1)RM,* and causes 19 percent nondisjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;f)12* female.

*Dp(l;f)U

origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Muller.
synonym: *Del(l)14.*
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller and Painter, 1932, Z. Lnduktive Abstammungs- Vererbungslehre 62: 316—65.
genetics: Contains wild-type alleles of *y, sc,* and 66 but not 6r.

Dp(1;f)18

cytology: *Dp(l;t)lF-2A; 19-20* (Gersh).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Contains wild-type alleles of *y, ac, sc, mi(w*),* and 66 but not *pn* or *car.*

Dp(J;f)24

cytology: *Dp(l;f)lA-B;l9~20* (Gersh).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Muller.
synonym: *Del(l)24,*
references: 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 213-55.
genetics: Contains wild-type alleles of *1(1}JI, y,* and *ac* but not *su(w^a).*

Dp(l;f)52

cytology: *Dp(l;f)lB10-C4;19-20* (Gersh). 3.7-4 times the size of chromosome *4* at metaphase; lacks only the distalmost part of heterochromatic segment *hD* (Cooper).
origin: X-ray-induced deletion of *X* euchromatin.
discoverer: Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Contains wild-type alleles of *y, ac, sc, su(f),* and 66 but not *su(w^a), pn,* or car. Segregates normally from *XY,* 3 percent nondisjunction from *C(1)RM,* and causes 13 percent nondisjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;f)52.*

Dp(l;f)60g

origin: A spontaneous exchange between the distally located heterochromatin of *In(l)sc^8, y3ld* $_{anc}$j *fa$_e$* proximal heterochromatin of a normal *X.* Occurred in a triploid female.
discoverer: Mohler, 60g.
references: 1960, DIS 34: 52.
genetics: Carries *y^{3id},* ac$^+$, and *su(f)$^+$* but not *car*.*
other information: The reciprocal product, a reversed acrocentric compound *X [C(l)RA60g* was recovered from the same fly.

cytology: Two-thirds the length of normal *X* at metaphase.
origin: Spontaneous deletion of most of *X* euchromatin.
discoverer: L. V. Morgan, 221.
synonym: *sc-Dp.*
references: 1938, Genetics 23: 423—62.
genetics: Contains wild-type alleles of *y,* ac, sc, *svr, sta, tw, br, pn, hi, car,* and 66 but not *gt, w, os,* or *Bx.* Phenotype of duplication-bearing female nearly wild type, but occipital bristles and hairs are present, eyes are a trifle smaller and rougher, and wings have straighter outer margins and sometimes scalloped inner margins. In male, duplication more than 99 percent lethal.

cytology: *Dp(l;f)2A2-Bl;19F5-2QA;* one-fourth the length of normal *X* at metaphase.
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Dobzhansky, 1930.
references: 1932, Tr. Lab. Genet. (Leningrad) 9: 193-216.
1935, Z. lnduktive Abstammungs- Vererbungslefare 68: 134-62.
genetics: Contains wild-type alleles of *y,* sc, *svr,* ®*u(a), dor,* and 66 but not *kz* or car (Schulte and Bridges, 1932, Am. Naturalist 66: 323—34; Lewis, 1954, J. Exptl. Zool. 126: 235-75). With duplication, both sexes viable and wild type except for presence of occipital bristles.

*Dp(1;f)W2

cytology: One-fifth the length of normal *X* at metaphase.
origin: X-ray-induced deletion of most of *X* euchromatin.

discoverer: Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509. 1935, Z. Induktive Abstammungs- Vererbungslehre 68: 134-62.
genetics: Contains y^+ to rb^+ inclusive and not bb^+. Usually male lethal, but female survives and has occipital bristles, narrow parallel-sided wings, branched posterior crossveins, and heavier bristles on thorax.

***D_P(l;f)l06**
cytology: Metaphase length about four times that of chromosome *4.*
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer. Dobzhnasky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains wild-type alleles of *y, sc,* and *svr* but not *bb.*

Dp(l;f)107
cytology: Metaphase length about one-fifth that of a normal *X.*
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains wild-type alleles of *y, sc, svr,* and *bb.*

Dp(l;f)112
cytology: *Dp(l;t)lE4-Fl;19-20* (Gersh); slightly longer than chromosome *4* at metaphase.
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer. Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains wild-type alleles of *y, sc, svr,* and *au(w*)* but not *bb.* Both sexes viable and have occipital bristles.

Dp(1;f)118
cytology: About one-fourth the length of normal *X* at metaphase.
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains wild-type alleles of *y, sc, svr,* and *bb* but not *kz.*

Dp(I;f)122
cytology: *Dp(l;t)lE4-Fl;19-20* (Gersh).
origin: X-ray-induced deletion of most of X euchromatin.
discoverer Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Carries wild-type alleles of *y, ac, sc,* and *bb* but not *&u(w*), pn, car,* or *su(f).* Disjoins regularly from *XY,* 6 percent nondisjunction from *C(t)RM,* and causes 9 percent nondisjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l,f)122.*

***Dp(l;0134**
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Dobzhansky, 1931.
references: 1935, Z. Induktive Abstammungs-Vererbungslehre 68: 134—62.
genetics: Contains wild-type alleles of *y, sc, svr,* and *br;* variegates for *y, sc,* and *svr.* Both sexes viable and wild type except for presence of occipital bristles.

Dp(l;{)135
origin: X-ray-induced deletion of most of *X* euchromatin from y^2.
discoverer: Dobzhansky, 1930.
references: Sivertzev-Dobzhansky and Dobzhansky, 1933, Genetics 18: 173-92.
genetics: Contains y^2 and wild-type alleles of sc, SVT, and *bb.* Both sexes wild type except for presence of occipital bristles.

***Dp(1;f)136**
cytology: Metaphase length about one-fourth that of normal *X.*
origin: X-ray-induced deletion of most of *X* euchromatin from y^2.
discoverer: Dobzhansky, 1930.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains y^2 and wild-type alleles of *sc, svr, kz, pn,* and *bb.* Variegates for *y* (Schultz). Viability low. Shows spread wings and occipital bristles.

***Dp(l;f)137**
cytology: About one-fifth the length of normal *X* at metaphase.
origin: X-ray-induced deletion of most of *X* euchromatin from y^2.
discoverer: Dobzhansky, 1931.
references: 1932, Biol. Zentr. 52: 493-509.
genetics: Contains y^2 through w^+ but not bb^+.

*Dp(l;f)U3-3
origin: Associated with *T(l;3)143-3.*

Dp(l;0164
cytology: *Dp(l;f)lB; 19-20* (Gersh).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer. Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63-
genetics: Carries wild-type alleles of *y* and *ac* but not sc, $su(w^a)$, *pn, car, su(f),* or *bb.* Disjoins essentially randomly from *XY,* 36 percent nondisjunction from *C(1)RM,* and does not interfere with disjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;t)164* female.

*Dpd;f)U7
cytology: 3.7—4 times the size of chromosome *4* at metaphase; lacks only the distalmost heterochromatic segment *hD* (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Carries wild-type alleles of *y, ac,* sc, *suCw*), &u(f),* and *bb* but not pn or *car.* Disjoins regularly from *XY,* 3 percent nondisjunction from

C(1)RM, and causes 16 percent nondisjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;f)167* female.

Dp(l;f)J79

origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Weltman, 1954.
references: Lindsley and Sandier, 1958, Genetics 43: 547-63.
genetics: Carries wild-type alleles of *y, ac, sc,* and *8u(w°)* but not *pn, car, su(f),* or 66. Disjoins regularly from *XY,* 20 percent nondisjunction from *C(1)RM,* and causes 2 percent nondisjunction of + from *In(l)dl-49* in *In(l)dl-49/+/Dp(l;f)179* female.

**Dp(l;{)749*

cytology: *Dp(l;t)lB12-13;2Q;* frequently associated with nucleolus in salivary preparations (Krivshenko); 3—4 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1953.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and 66 but not *pn.*

Dp(l;f)797

cytology: *Dp(l;f)2B4-5;20;* frequently associated with nucleolus in salivary preparations (Krivshenko); 2—3 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1953.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and *bb* but not *pn.*

Dp(1;f)816

cytology: Invisible in salivary preparations (Krivshenko); 0.7 the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of majority of *X* euchromatin.
discoverer: Krivsbenko and Cooper, 1953.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32,
genetics: Carries wild-type alleles of *y, ac,* and sc but not *mj(w^a), dor, pn, su(f),* or 66. Causes 10 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(1;f)819

cytology: *Dp(l;f)lD3-4;20;* usually associated with nucleolus in salivary preparations (Krivshenko); 2.9 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1953.
genetics: Carrie* wild-type alleles of *y,* ac, sc, *@vr,* and *bb* but not *pn.*

Dp(hM56

cytology; *Dp(l;f)lD3-4;2O:* frequently associated wife raadeoiaa in salivary preparations (Krivsbenko); three times the length of chromosome *4* at neta-phase; has nucleolus organiser (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and 66 but not *su(w^a), dor, pn,* or stiff). Causes 2.4 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(l;M144

cytology: Invisible in salivary preparations (Krivshenko); 1.1 times the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of y and *ac* but not *sc, svr, suCw^0), dor, pn, su(f),* or 66. Causes 36.6 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(1;f)1148

cytology: Twice the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^8.*
discoverer Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not *sc, svr,* or *pn.*

Dp(l;{)1156

cytology: 2.6 tiroes the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^8.*
discoverer Krivshenko and Cooper, 1955.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not *sc* or *pn.*

Dp(T;f)1158

cytology: 2.3 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^8.*
discoverer Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not sc or *pn.*

Dp(1;f)1159

cytology: 2.7 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^8.*
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of y and ac but not *sc* or *pn.*

Dp(1;f)1160

cytology: 3.1 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^s.*
discoverer Krivshenko and Cooper, 1955.
genetics: Carries wild-type alleles of y, *ac,* and 66 but not sc or *pn.*

Dp(l;f)1162

cytology: One-half the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer. Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y* and ac but not *sc, su(w*^{a}*), dor, pn, su(f),* or 66. Causes 3.8 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

****Dp(hf)1170***

cytology: 1.9 times the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y* and ac but not sc, pn, or *bb.*

Dp(l;f)1173

cytology: 3.2—3.6 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and *bb* but not *sc* or *pn.*

Dp(1;f)1185

cytology: 1.8 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)ac*^{s}.
discoverer. Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not sc or pn.

Dp(l;f)im

cytology: 1.6 times the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin of *In(l)ac*^{8}.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.•
genetics: Carries wild-type alleles of y and ac but not *sc, mtfw*), dor, pn, svt(f),* or 6b. Causes 14.2 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(hf}lW

cytology: Less than 0.3 the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *ln(I}ac*^{s}.
discoverer: Krivahenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type atleles of *y* and *ac* but not «c, *mtCw"), dot, pn,* suff), or 6.6. Has no effect on disjunction of cforofaosone *4* when added to normal diploid female genotype.

Dpf7/01797

cytology: Seven-tenths the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954,
genetics: Carries wild-type alleles of y and *ac* but not sc, *pn,* or 66.

Dp(l;f)im

cytology: Same length as chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y* and *ac* but not sc, *su(w*^{a}*), dor, pn, su(f),* or 66. Causes 22.8 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(J;f)n94

cytology: 3.1 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not sc or *pn.*

Dp(l;f)12Dl

cytology: 2.2 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not sc, or *pn.*

Dp(hf)1204

cytology: Nine-tenths the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y* and *ac* but not sc, su(w^{a}.), *dor, pn, su(f),* or 66. Causes 18.9 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(1;f)1205

cytology: Seven-tenths the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc*^{8}.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y* but not *ac, sc, pn,* or 66.

Dp(l;f)12O6

cytology: One-half the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)mc*^{8}.

discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y* but not *ac, sc, pn,* or 66.

Dp(l;f)1208
cytology: Twice the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^{s}*.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not sc or *pn.*

Dp(l;f)1209
cytology: 1.9 times the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin from *In(l)sc^{s}*.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* and 66 but not *sc* or *pn.*

Dp(l;f)1328
cytology: *Dp(l;f)2A2~3;20;* usually associated with nucleolus in salivary preparations (Krivshenko); 2.1 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr, su(w^{a}),* and 66 but not *dor, pn,* or *su(f). In(l)sc^{4L}sc^{SR}/Dp(l;f)1328* dies. Causes 3.8 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

****Dp(l;f)1330***
cytology: *Dp(l;f)2B10-ll;20* (Krivshenko); 2.6 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper),
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac, sc,* svr, and 66 but not pn.

****Dp(l;f)1331***
cytology: *Dp(l;f)lE-F;20* (Krivshenko); 1.9 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper),
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac,* sc, svr, and 66 but not *pn.*

Dp(l;f)1337
cytology: *Dp(l;f)lF4-2A3; 19-20* (Gersh; left breakpoint originally given as 2B8-9 by Krivshenko); usually associated with chromocenter in isalivary preparations (Krivshenko); 1.4 times the length of chromosome *4* at metaphase; lacks nucleolus orgaganizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, su(w^{a}),* and *dor* but not *pn, su(t),* or *bb.* Variegates for *dor* in male with no *Y* chromosome. Causes 11.9 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(l;f)1339
cytology: *Dp(l;f)lD-E;20;* usually associated with chromocenter in salivary preparations (Krivshenko); 1.1 times the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and *su(w^{a})* but not *dor, pn, su(f),* or 66. Causes 17.5 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

****Dp(l;f)1341***
cytology: *Dp(l;f)2C-D;20* (Krivshenko); more than three times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and 66 but not *pn.*

Dp(l;f)J342
cytology: More than three times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and 66 but not *pn.*

Dp(l;f)J343
cytology: *Dp(l;i)lF;20;* usually associated with chromocenter in salivary preparations (Krivshenko); 2.6 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151—66.
genetics: Carries wild-type alleles of *y,* ac, sc, svr, *sti(w*),* and *bb* but not *dor, pn,* or *au(f).*

****Dp(l;f)134S***
cytology: *Dp(l;f)lC;20;* always associated with nucleolus in salivary preparations (Krivshenko); 1.7 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivsheoko and Cooper, 1954.
genetics: Carries wild-type alleles of *y,* ®*c,* sc, svr, and 66 bat not *pn.*

Dp(l;f)1346

cytology: *Dp(l;t)lB12-13;20;* usually associated with nucleolus in salivary preparations (Krivshenko); twice the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1954.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and *bb* but not *su(w^a), dor, pn,* or *su(f). In(l)sc*^{L}sc*^{R}/Df(l;i)1346* dies. Causes 8.6 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(l;0U79

cytology: *Dp(l;f)lC;20;* usually associated with nucleolus in salivary preparations (Krivshenko); 2.1 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1955.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and *bb* but not *pn.*

Dp(J;{)1488

cytology: *Dp(l;f)2A;20;* frequently associated with nucleolus in salivary preparations (Krivshenko); 2.5 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1955.
references: Grell, 1964, Genetics 50: 151-66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr, au(w^a),* and *bb* but not *dor, pn,* or *su(f).* Causes 3.8 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

**Dp(l;f)1489*

cytology: *Dp(l;f)lD;20;* usually associated with nucleolus in salivary preparations (Krivshenko); 1.8 times the length of chromosome *4* at metaphase. Lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1955.
genetics: Carries wild-type alleles of *y,* ac, *ac,* svr, and *bb* but not pn.

Dp(l;f)1492

cytology. *Dp(I;f)lB10-12;20;* always associated with nocleolus *in* salivary preparations (Krivshenko); 1.9 tines the length of chromosome *4* at metaphase; lacks nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchro- **auttin.**
discoverer: Krivshenko and Cooper, 1955.
genetics: Carries wild-type alteles of y, ac, ®c, *avr,* and *fob bat* not pn. *In(1)sc*^{4L}*sc*^{8R}*/Dp(1;f)1492* dies.

DpCl;t)U94

cytology: *Dp(l;f)lB10~14;20;* usually free of nucleolus in salivary preparations (Krivshenko); 2.7 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1955.
genetics: Carries wild-type alleles *y, ac, sc, svr,* and *bb* but not *pn.*

Dp(l;f)U98

cytology: *Dp(l;i)lF;20;* usually free of nucleolus in salivary preparations (Krivshenko); 3.3 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1955.
references: Grell, 1964, Genetics 50: 151—66. 1964, Proc. Natl. Acad. Sci. U.S. 52: 226-32.
genetics: Carries wild-type alleles of *y, ac, sc, svr, suCw*),* and *bb* but not dor, *pn,* or *su(t).* Causes 3.2 percent nondisjunction of chromosome *4* when added to normal diploid female genotype.

Dp(l;f)lS01

cytology: *Dp(l;f)2A;19E4-Fl;* usually free of nucleolus in salivary preparations (Krivshenko); 4.4 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer Krivshenko and Cooper, 1956.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and bb but not pn.

Dp(l;f)1512

cytology. *Dp(l;f)lF;19E4-Fl;* usually free of nucleolus in salivary preparations (Krivshenko); 3.6 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1956.
genetics: Carries wild-type alleles of *y, ac,* sc, *svr,* and *bb* but not *pn.*

Dp(l;f)1513

cytology: *Dp(l;f)lB10-14;20;* usually associated with nucleolus in salivary preparations (Krivshenko); more than twice the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin; X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1956.
genetics: Carries wild-type alleles of y, ac, sc, *svr,* and *bb* but not *pn.*

Dp(l;f)15U

cytology. *Dp(l;f)lB12~13;20;* usually associated with the nucleolus in salivary preparations (Krivshenko); 1.9 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper).
origin: X-ray-induced deletion of most of *X* euchromatin.

discoverer: Krivshenko and Cooper, 1956.
genetics: Carries wild-type alleles of *y, ac, sc, svr,* and *bb* but not *pn.*

Dp(l;f)1518
cytology: *Dp(l;f)2A4-Bl;20;* usually free of nucleolus in salivary preparations (Krivshenko); 3.9 times the length of chromosome *4* at metaphase; has nucleolus organizer (Cooper),
origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Krivshenko and Cooper, 1956.
genetics: Carries wild-type alleles of *y,* ac, sc, svr, and *bb* but not *pn.*

**Dp(l;f)Al: Duplication(l;free) from Austin*
origin: Aneuploid segregant from *T(1;3)A1/+.*

**Dp(l;f)A12*
cytology: *Dp(l;f)lB-C;13Bl-S.*
origin: Aneuploid segregant from *T(1;2;4)A12/+.*

**Dp(l;f)eq: Duplication(T;free) from eqvational producer*
origin: X-ray-induced deletion of most of euchromatin from *X* chromosome carrying *eq.*
discoverer: Schultz, 34k4.
genetics: Contains y^+ to pn^+, inclusive, and bb^+. Male fertile but rather inviable; has occipital bristles; eyes rough, wings spread, wing veins thickened. Female has occipital bristles; wings straight edged and coarse textured. Female with two duplications occasionally survives and shows extreme spread wings and rough eyes.

Dp(l;f)R: Duplication(l;free) from Ring X
cytology: *Dp(l;f)lA3-4;3A;l9F-20A1.*
new order: |lA4 - 3A|20-20F - 20Al|.
origin: Spontaneous deletion of most of euchromatin from *R(l)2.*
discoverer Schultz, 35dlO.
synonym: *Dp(l;f)X^,*
genetics: Covers y to *kz* but not *bb.* Variegation for *dor,* ac, svr, *pn,* and *kz;* decreased as *Y's* are added. Variegation of *y* insensitive to F's.

**Dp(l;f)Rl*
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer: Pontecorvo.
synonym: *Del(X^c*)l.*
references: 1942, DIS 16: 65.

**Dp(l;f)R35*
cyto Iogy: *Dp(l;t)lA3-4;l 7A4-S;19F-2OA1.*
new order. |l7A5 - 20-20F|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer: Pontecorvo.
synonym: *Del(X^)35.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(hW36*
cytology: *Dp(l;i)lA3-4;17A4-5;l9F-20Al.*
new order. |l7A5 - 20-2OF|,
origin: X-ray-induced deletion of most of euchromatin from *R(l)2,*
discoverer Pontecorvo.
synonym: *Del(X^c)36.*
reference.: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R37*
cytology: *Dp(l;f)lA3-4;16F2-3;19F-20Al.*
new order: |l6F3 - 20-2OF|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer Pontecorvo.
synonym: *Del(X^c2)37.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R38*
cytology: *Dp(l;f)lA3-4;lF;20.*
new order: J1A4 - 1F|2O.2OF - 20Al|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer Pontecorvo, 1942.
synonym: *Del(X^c2)38.*
references: 1942, DIS 16: 65.

**Dp(l;f)R4Q*
cytology: *Dp(l;f)lA3-4;lF4-5;2Q.*
new order: |lA4 - 1F4|2O-2OF - 20Al|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer: Pontecorvo.
synonym: *Del(X^c2)40.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R41*
cytology: *Dp(l; 1)1A3-4;1F4-5;2O.*
new order: |lA4 - 1F4|2O-2OF - 20Al|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer Pontecorvo.
synonym: *Del(X<:2)41.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R42*
cytology: *Dp(l;i)lA3-4;2A2-3;20.*
new order. |lA4 - 2A2|20-20F - 20Al|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer Pontecorvo.
synonym: *Del(X^c^)42.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R43*
cytology: *Dp(l;f)lA3-4;lF4-5;20.*
new order: |lA4 - 1F4|2O.2OF - 20Al|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer Pontecorvo.
synonym: *D&I(X^c^)43.*
references: Slizynska, 1942, DIS 16: 67.

**Dp(l;f)R53d*
cytology: *Dp(l;f)lA3-4;lF~2A;20.*
new order: |lA4 - 1F[2(K20F - 2QAl|.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer: S. Brown, 1953.
synonym: *Del(X^c2)53d.*
references: 1955, DIS 29: 70.
Brosseau, 1955, DIS 29: 106.
genetics: Contains wild-type allele® of *y,* ac, *me,* and *mu*(®%- covers *Dl(l)26*®-*1,* Female tolerates two duplications; male tolerates only one. Fly heal- or

homozygous for *y* and the duplication shows mosaicism for *y*. There is probably both variegation for y and loss of the duplication.

***Dp(l;f)RA**

cytology: *Dp(l;f)lA3-4;lF-2A;20* (Slizynska).
new order: |lA4 - 1F|2O-2OF - 21A11.
origin: X-ray-induced deletion of most of euchromatin from *R(l)2.*
discoverer: Pontecorvo.
references: 1942, DIS 16: 65.

***Dp(l;0sc260-27; Duplicathn(l;free) scute**

cytology: *Dp(l;f)lA8-Bl;19F.*
origin: Aneuploid segregant from *T(l;2)sc2^{6}°-27/+.*

***Dpd;f)w">3: Duplication(l;free) white-mottled**

cytology: *Dp(l;f)3C-D;19-20;* breakpoints inferred from genetic data,
origin: X ray induced.
discoverer Muller, 1925.
references: 1930, J. Genet. 22: 299-334.
genetics: *w/Dp(l;f)w^{m3}* male has variegated eyes and is sterile; *C(1)RM, w/Dp(l;f)w^{m3}* female has variegated eyes and is fertile.

Dp(1;f)Xc*:* **see *Dp(l;f)R

***Dp(l;f)y-sc: Duplication(l;free) for yellow and scute**

origin: X-ray-induced deletion of most of *X* euchromatin.
discoverer: Oliver, 32k21.
references: 1937, DIS 7: 19.
phenotype: Carries wild-type alleles of y and sc but not *pn.*

***Dp(l;f)z9: Duplication(l;free) zeste**

cytology. *Dp(l;f)3E7-Fl; 19-20.*
origin: X-ray-induced deletion of most of euchromatin from z-bearing *X* chromosome.
discoverer Gans.
references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90 (fig.).
genetics: Contains z and wild-type alleles of y through *dm.*

Dp(2;J)C239: Duplication(2;l) Crossover suppressor

cytology: *Dp(2;l)7A-B;36C;39E.*
origin: Aneuploid segregant from *T(l,;2)C239/+.*

Dp(2;l)OR19: DupHcation(2;l) from Oak Ridge

cytology: *Dp(2;l)20;48E;51F;S7C.*
origin: Aneuploid segregant from *T(1;2)OR19/+.*

Dp(2;Y)bw^{+}: Duplication(2;Y) brown-wild type

cytology: *Dp(2;Y)Y^{L};$8Fl-59A2;6QE3-Fl.*
origin: Aneuploid segregant from *T(Y;2)bw*Y/+.*

Dp&Y)G

eytology:*Dp(2;Y)36B4-S;40F.*
origin: Aneuploid segregant from *T(Y;2)G/+.*

***Dp(2;Y)H**

cytology: *Dp(2;Y)37Bl-2;4QB2-3.*
origin: Aneaploki segregant from *T(Y;2)H/+.*

***Dp(2;Y)R24**

cytology. *Dp(2;Y)45A;51E.*
origin: Aneuploid segregpnt from *T(Y;2)R24.*

Dp(2;2)41A

cytology: Tandem duplication for material in 41A.
origin: Spontaneous in the *In(2L)Cy + In(2R)Cy* chromosome of a balanced *In(2L)Cy +In(2R)Cy/ M(2)S2^{10}* **stock.**
discoverer: Schultz, 1945.
genetics: Acts as a suppressor of *M(2)S2,* and perhaps as a partial suppressor of L. Fly heterozygous for the duplication appears more stocky than normal.

***Dp(2;2)bw*i-CyR**

cytology: *Dp(2;2)58A4-Bl;59D.*
origin: Associated with *In(2R)bw^{AL}Cy^{R}.*

D$_{P}$(2;2)bwV34kLCyL

cytology: *Dp(2;2)41;42A2-3.*
origin: Aneuploid recombinant from *In(2R)bw^{V34k}+Cy/+.*

Dp(2;2)bw^{VDe1}LCy^{R}

cytology: *Dp(2;2)58A4-Bl;59E2-4.*
origin: Associated with *In(2R)bwVDeiLc$_{y}$R.*

Dp(2;2)bw^{VDe2}LCy^{R}

cytology: *Dp(2;2)58A4-Bl;59D6-El.*
origin: Associated with *In(2R)bwVDe2Lc$_{y}$R.*

Dp(2;2)C619

cytology: *Dp(2;2)26A;28E.*
new order: 21 - 28E|26A — 60.
origin: X ray induced in oocyte.
discoverer: Roberts and Thomas, 1965.
references: Roberts, 1966, Genetics 54: 969-79. Thomas and Roberts, 1966, Genetics 53: 855—62.
genetics: Homozygous viable. Reduces recombination in *2L.* Map distance between *al* and *pr* reduced from 44.2 to 7.3 in *Dp(2;2)C619/+* and to 17.0 in *Dp(2;2)C619* homozygotes.

Dp(2;2)Cy^{L}bw^{VDe1}R

cytology: *Dp(2;2)41B2-Cl;42A2-3.*
origin: Associated with *In(2R)Cy^{L}bv?^{VD}°lR.*

Dp(2;2)Cyl-bwVD*2

cytology: *Dp(2;2)41A-B;42A2-3.*
origin: Associated with *In(2R)Cy^bw^{VD}°2R.*

Dp(2;2)Cy*bwV34kR

cytology: *Dp(2;2)58A4-Bl;59.*
origin: Aneuploid recombinant from ***ln(2R)bwV3** + Cy/+.***

Dp(2;2)Px*: Dp(2;2) Plexate

cytology: *Dp(2;2)60B;60Dl-2.*
origin: Associated with *In(2LR)S56f.*

Dp(2;2)S: Duplication(2;2) Star

cytology: *Dp(2;2)21D2-3;21E2-3;* tandem repeat.
new order: 21A - 21E2|21D3 - 60.
origin: Spontaneous as an asymmetrical crossover.
discoverer: E. B. Lewis, 39i.
references: 1941, Proc. Na'l. Acad. Sci. 27: 31-35. 1945, Genetics 30: 137-66.
genetics: Duplicated segment contains the loci of S and *ast. ast* mutant in both members of the duplication (+ *ast* + *ast).* Duplication appears wild type when homozygous or when heterozygous with *mat.* Heterozygous with *S,* it has normal or only slightly roughened eyes. Various combinations of S and *ast* alleles have been introduced into the duplication.

Through unequal crossing over, a triplication and a quintuplication of the region have been synthesized.

Dp(2;2)S56f
cytology: *Dp(2;2)21C6-Dl;22A3-Bl.*
origin: Associated with *In(2LR)Px*^{4}.

Dp(2;2)SM5
cytology: *Dp(2;2)42A2-3}42D;53C;58A4-Bl;58F.*
origin: Associated with *In(2LR)SM5.*

Dp(2;3)C328: Duplication(2;3) Crossover *suppressor*
cytology: *Dp(2;3)55C;58B;80.*
origin: Aneuploid segregant from *T(2;3)C328/+.*

Dp(2;3)dp: Duplication(2;3) dumpy
cytology: *Dp(2;3)34D;41A;80;81.*
origin: Aneuploid segregant from *T(2;3)dp/+.*

Dp(2;3)P: Duplication(2;3) Pale
cytology: *Dp(2;3)58E3-F2;60D14-E2;96B5-Cl.*
origin: Aneuploid segregant from *T(2;3)P/+.*

Dp(2;3)P32: Duplication(2;3) from Pasadena
cytology: *Dp(2;3)41A;42D-E;44C-D;89D7-El.*
origin: Aneuploid segregant from *T(2;3)P32/+.*

Dp(2;f)1: Duplication(2; free)
cytology: *Dp(2;f)21;41* (left breakpoint tentative) superimposed on *In(2LR)40F;59E.*
new order: 21J41 - 40F|S9E - 60.
Tentative,
origin: X-ray-induced derivative of *In(2LR)bw*^{V32}*6;* possibly a deletion of most of the long arm.
discoverer: E. H. Grell, 1959.
genetics: Carries normal alleles of *or, sp, bs, Pin,* and *Px,* but not of *al* or *px.*

Dp(3;J)N264-6: Duplication(3;l) Notch
cytology- *Dp(3;l)3C9-Dl;73E;80C.*
origin: Aneuploid segregant from *T(l;3)N*$^{264\text{-}6}$*/+.*

Dp(3;l)O5: Duplication(3;l) of Oliver
cytology: *Dp(3;l)4F2-3;88A-C;92C-D.*
origin: Aneuploid segregant from *T(1;3)O5/+.*

Dp(3;1)ry35: Duplication(3;l) rosy
cytology: *Dp(3;l)20;87C-E;91B-C.*
origin: Aneuploid segregant from *T(l;3)ry*^{3S}*/+.*

Dp(3;3)bxdlOO: Duplication(3;3) bithoraxoid
cytology: *Dp(3;3)66C;89B5-6;89E2-3.*
origin: Aneuploid recombinant product from *Tp(3)bxdl00/+,*

Dp(3;3)bxd"0
cytology: *Dp(3;3)89E2-3;91C7-Dl;92A2-3.*
origin: Recombinant product from *Tp(3)bxd*^{llo}*/+.*

Dp(3;4)ry+: Duplication(3;4) rosy-wild type
cytology: *Dp(3;4)86D2-3;88B;101A-D;101F.*
new order: 88B - 86D3|l01F - 101D;
Tentative.
origin: X-ray-induced derivative of the *3R*^{D}*4*^{P} element of *T(3;4)86I> = T(3;4)86D2-3;101F.*
discoverer E. H. Grell, 1960.
references: 1962, Z. Vererbungslehre 93: 371-77.
genetics: Carries normal alleles of cu, *kmr,* and *ry.* Shows tendency toward somatic elimination.

INVERSIONS

In(l)65: Inversion(l) 65
cytology: *In(l)lC;10B.*
origin: X ray induced simultaneously with *T(l;3)65* in *y.*
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Inseparable from *y.* About 1 percent nondisjunction*and 21.8 percent recombination in *In(l)65/+* female; 25.9 percent nondisjunction and 19.7 percent recombination in *Jn(l)65/+/Y* female (Grell, 1962, Genetics 47: 1737-54).

tn(l)94-2A
cytology: *In(l)lF-2A;5E-6A* (Lindsley).
origin: Derived by recombination from *C(1)94-2A.*
discoverer: Rosenfeld.
genetics: Leads to partial stabilization of tandem ring compound *X* chromosome. Recoverable in derivative single ring, *R(l)9-4.* Exists in three interchangeable configurations in the *C(1)TR* (e.g., Novitski and Braver, 1954, Genetics 39: 197—209).

**tn(l)272-13*
cytology: *In(l)lA6-Bl;llA7-8;llF2-12Al;18A4-Bl.*
new order: 1A1 - 1A6J12A1 - 18A4|llA7 - 1B1|11A8 - 11F2|18B1 - 20.
origin: X ray induced.
discoverer Demerec, 1940.
references: Sutton, 1943, Genetics 28: 213.
genetics: Mutant for sc and *1(1)272-13* but not ac or SVT. Male lethal.

**ln(l)303-1*
cytology: *In(l)2B13-15;7Bl-3,9Dl-3.*
new order. 1 - 2B13|9D1 - 7B3|2B15 - 7Bl|9D3 - 20.
origin: X ray induced.
discoverer Demerec.
synonym: *Tp(l)303-l.*
references: Hoover, 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420—34 (fig.).
genetics: Nearly lethal.

In(T)481
cytology: *In(l)12E-F;14B.*
origin: X ray induced simultaneously with *D*$f(1)bb^{l\text{-}481}$.
discoverer. Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649—70.

In(J)A99b: Inversion(1) from Austin
cytology: *In(l)W3-El;19D-E.*
origin: X ray induced.
discoverer: Stone,
genetics: Viability, fertility, and egg hatch good.

H1)AB
cytology: *In{l)9F;13Fl-10.*
discoverer: Bodeman.
references: Stone and Thomas, 1935, Genetica 17: 170-84.
genetics: Primary nondisjunction 0.5 percent, secondary 29.3 percent; recombination 18.2 percent in

In(l)AB/+ and 26.3 in *In(l)AB/+/Y* female (Grell, 1962, Genetics 47: 1737-54). Stone and Thomas (1935) obtained 14.3 percent recombination in *In(1)AB/+*.

In(l)ac^3: Inversion(l) achaete

cytology: ***In(l)lB2-3;lB14-Cl.***
origin: X ray induced.
discoverer: Dubinin, 1929.
synonym: ***In(l)sc^{10}.***
references: 1930, Zh. Eksperim. Biol. 6: 300-24.
1932, J. Genet. 25: 163-81.
1933, J. Genet. 27: 447.
genetics: Associated with *ac^3*.

In(1)AM

cytology: ***In(l)8C17-Dl;16E2-3*** **(Hoover).**
discoverer: Mackensen.
references: Stone and Thomas, 1935, Genetica 17: 170-84.
Hoover, 1938, Z. Inductive Abstammungs-Vererbungslehre 74: 420-34 (fig.).
genetics: Homozygous female sterile and therefore used as an *X* chromosome balancer. Inversion deparis slightly from wild-type phenotype in that eyes are rounded and slightly bulging. Total recombination 3.8 percent in *In(l)AM/+* (Stone and Thomas, 1935).

In(J)At: Inversion(l) Attenuated

cytology: ***In(l)16A4-5;18C4-6;20A2-3*** **superimposed on** ***In(l)lB3-4;20B-Dl*<lB2-3;20B-DlR + In(l)4D7-El;llF2-4.***
new order: 1A - 1B3|2OB - 20A3|l6A5 - 18C4J20A2 - 18C6|l6A4 - 11F4|4E1 - 11F2|4D7 - 1B3J20D1 - 20F.
origin: X ray induced in ***In(l)sc^{SiL}sc^{8R}+dl-49.***
discoverer: Valencia and Valencia, 1949.
synonym: *Tp(l)At.*
references: 1949, DIS 23: 64.
genetics: Associated with *At.* Male and homozygous female viable and fertile.

**In(VB263-S: Inversion(l) Bar*

cytology: ***In(l)15F9-16Al;16A7-Bl;17A3-4,*** **Left** break occurs between repeated regions associated **with** ***Dp(l;l)B=Dp(l;l)15F9-16Al;16A7-Bl*** (Kaufmann and Sutton).
new order: 1 - 16A7|l7A3 - 16A1J17A4 - 20.
origin: X ray induced in *B.*
discoverer: Demerec, 33k.
references: Sutton, 1943, Genetics 28: 97—107.
genetics: *B* reversed; lethal; *un, vb, t, lh,* and *os*° not affected.

**In(1)B263.24*

cytology: ***In(l)10C2-Dl;12D2-El;15F9~16Al;16A7-Bl;*** right breakpoint between first and second segments of *B^{l}B′* triplication,
new order: 1 - 1OC2J16A7 - 12E1J10D1 - 12D2|l6Al - 16A7|l6Al - 20.
origin: X ray induced in ***Dp(l;l)B^{i}B^{i} = Dp(l;l)15F9-16A1;16A7-B1.***
discoverer: Demerec, 34a.
synonym: ***Tp(l)B363-24,***
references: Sutton, 1943, Genetics 28: 97-107.
genetics: Reversal of *B^{l}B^{l}* to wild type; *un, vb, t, lh,* and *os* not affected. Male lethal.

**In(1)B$^{263-47}$*

cytology: ***In(l)16A2-4;20A2-3.***
origin: X ray induced.
discoverer: Demerec, 38d.
references: Sutton, 1943, Genetics 28: 97—107.
genetics: Position effect at *B.*

In(l)BM ': Inversion(l) Bar of duller

cytology: *In(l)16A2-5;20A3-B* (Sutton, 1943, Genetics 28: 97-107).
origin: X ray induced.
discoverer: Muller, 34e.
references: 1935, DIS 3: 29.
genetics: Position effect at *B.* Primary nondisjunction 0.4 and secondary 18.5 percent; recombination 32 percent in *In(l)B^{M1}/+* and 35.4 percent in *In(l)B^{M1}/+/Y* female (Grell, 1962, Genetics 47: 1737-54).

*In(l)B>*2*

cytology: *In(l)16A2-5;20E* (Sutton, 1943, Genetics 28: 97-107).
origin: X ray induced.
discoverer: Muller, 34e.
references: 1935, DIS 3: 29.
genetics: Position effect at *B.*

**In(l)B^{r*y-2}: Inversion(l) Bar-reversed*

cytology: *In(l)3F8-4Al;16A2-4;* right break in right **section of** ***Dp(l;l)B =Dp(l;l)15F9-16Al;16A7-Bl.***
new order: 1 - 3F8|l6A2 - 16Al|l6A7 - 4Al|l6A4 - 20.
origin: X ray induced in *Dp(l;l)B.*
discoverer: Bishop, 1940.
references: Sutton, 1943, Genetics 28: 100.
genetics: Reversal of *B.*

**In(1)B^{rev-3}*

cytology: ***ln(l)15F9-16Al;16A7-Bl;20AS-Bl;*** **right** break between segments of *Dp(l;l)B =Dp(l;l)15F9-16A1;16A7-B1.*
new order: 1 - 16A7J20A5 - 16Al|20Bl - 20F.
origin: X ray induced in *B.*
discoverer: Bishop, 1940.
references: Sutton, 1943, Genetics 28: 100.
genetics: *B* reversion.

ln(1)bbDf: Inversion(l) bobbed-Deficiency

cytology: ***ln(l)4D2-3;20B-C;20C-D;*** **deficient for** 20C-D; two-thirds normal length at metaphase.
new order: 1 - 4D2|20B - 4D3|20D - 20F.
origin: X ray induced.
discoverer: Sivertzev-Dobzhinsky and Dobzhansky, 31b.
references: 1933, Genetics 18: 173-92.
Sturtevant and Beadle, 1936, Genetics 21: 554-604.
genetics: Right breakpoint between *tb* and *rg.* Deficient for *bb. In(l)bb^{Df}/+* female produces about 2 percent exceptional sons from four-strand double exchange within inverted segment. Secondary exceptions about 13 percent.

In(l)bb^{DfL}Cl*: Inversion(l) bobbed-Deficiency Left Cl-Right

cytology: *In(l)4D2-3;20B-C^{L}4A5-Bl;17A6-BlR;* duplicated for 4B1-D2 and 17B1-20B.

origin: Recombinant containing left end of *In(l)bb^{Di}* and right end of *In(l)Cl.*

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Duplicated for *bi, rb, fu,* and car but not ec, rg, *f, os,* or 66. Survives as small male with less convex outer wing margins than normal and usually one or more notches at wing tips; sterile, with collapsed testes. Heterozygous female fertile, with slightly narrowed wings.

In(l)bbt>fL$_{Y}$4R: Inversion(l) bobbed-Deficiency Left yellow-4 Right

cytology: *In(l)4D2-3;20B-C^{L}lA8-Bl;18A3-4^{R};* duplicated for 1B1-4D2 and 18A4-20B.

origin: Recombinant containing left end of/nCIJ&fr^{0}* and right end of *In(l)y^{4}.*

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Duplicated for ac through *rb* and *fu* through car. Heterozygous female has stubby posterior verticals and disarranged scuteliars; outer wing margin less convex than normal; fair viability and fertility. Enhances expression of heterozygous *B.* Male lethal.

ln(1)Br: Inversion(T) Bridged

origin: X ray induced.

discoverer: Muller, 2713.

references: 1935, DIS 3: 29.

genetics: Associated with dominant mutant, *Br.* Crossing over suppressed to right of v, about normal to left.

ln(l)C18: Inversion(l) Crossover suppressor

cytology: *In(l)3F;17Al-6.*

origin: X ray induced.

discoverer: Roberts, 1964.

genetics: Eliminates sc-f recombination. Male viable.

ln(1)CU6

cytology: *In(l)lF;14A,*

origin: X ray induced.

discoverer: Roberts, 1965.

genetics: Eliminates sc-/recombination. Male fertile.

ln(l)C206

cytology: *In(I)8F;llA;16A.*

new order: 1 - 8FJ16A - 11A|8F - HA|l6A - 20.

origin: X ray induced.

discoverer. Roberts, 1965.

genetics: Eleven percent recombination between sc and f. Male lethal.

ln(l)CI: Inversion(l) Cl

cytology. *In(l)4A5-Bl;17A6-Bl* (Hoover, 1938, Z. Induktive Abstatmmmgs- Vererbuagslehre 74: 429).

origin: Spontaneous in a sc *t^{3} v si B* chromosome.

discoverer: Muller, 20j.

references: 1928, Genetics 13: 279—357. Gershenson, 1935, J. Genet. 30: 115—25. Sturtevant and Beadle, 1936, Genetics 21: 554—604.

genetics: Left break between ec and *bi;* right break between os and *fu; 1(1)C* associated with left break (Muller). About 0.35 percent primary and 37 percent secondary exceptions. Total recombination about 1 percent.

other information: *In(l)Cl, sc 1(1)C & v si B* is the *C1B* chromosome, described in the section on balancers.

In(l)CH-bbDfR: Inversion(l) Cl-Left bobbed-Deficiency Right

cytology: *In(l)4A5-Bl;17A6-B1^4D2-3;20C-DR;* deficient for 4B1-D2 and 17B1-20C.

origin: Recombinant containing left end of *In(l)Cl* and right end of *In(l)bbDt.*

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Deficient for *bi, rb, fu,* car, and 66 but not ec, *tg, f,* or os. Both *bi* and *fu* lethal when heterozygous for/n(7$_{j}$)C/^{l}'66$^{z>'}$-^{R}. Heterozygous female extreme Minute *\M(1)4BC +M(l)n],* with abnormal wing shape; ovaries normal but female sterile. Male lethal.

ln(\)Cll-y4R: Inversion(T) Cl-Left yellow-4 Right

cytology: *In(l)4A5-Bl;17A6-Bl^lA8-Bl;18A3-4R;* duplicated for 1B1-4A5, deficient for 17B1-18A3.

origin: Recombinant containing left end *otln(l)Cl* and right end of *In(l)y^{4}.*

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Duplicated for ac through ec; deficient for *fu* but not /, v6, *os,* or *car.* Heterozygous female has irregular acrostichal rows and wings smaller and with less-convex posterior margin than normal. Enhances expression of heterozygous *B.* Male lethal.

****ln0)cf3a2: Inversion(l) cut***

cytology: *In(l)7B2-Cl;19-20.*

origin: X ray induced.

discoverer: Hannah, 47g.

genetics: cr affected but not cm, *sn,* or oc. Male lethal.

****ln(1)ct3bl***

cytology: *Jn(l)3A4-Bl;7B2-5.* May be a duplication for 3A3-4 or insertion of material from another chromosome.

origin: X ray induced,

discoverer: Hannah, 47g.

genetics: cr affected but not *pa, w, cm, m,* or oc. Male lethal.

****ln(1)ct^{12a2}***

cytology: *In(l)4E2-3;7B2-4* (Hannah).

origin: X ray induced,

discoverer: De Frank, 47g.

genetics: *ct* affected but not r6, ex, rg, *cm, sn,* or *oc.* Male lethal.

****ln(1)ct^{13a1}***

cytol ogy: *In(l)7B2-3;l 9-20.*

origin: X my induced.

discoverer: Hannah, 47g.

genetics: *ct* affected but not *cm, sn,* or oc. Male lethal.

***In(1)ct^{14a3}**

cytology: *In(l)7B2-3;20;* position of heterochromatic breakpoint with respect to centromere unknown.
origin: X ray induced in *R(l)2.*
discoverer Hannah, 14a3.
genetics: *ct* affected but not *y, ac, sc, cm, sn,* or oc. Male lethal.

***In(1)ct^{14b2}**

cytology: *In(l)3D2-5;7B2-4.*
origin: X ray induced,
discoverer: Hannah, 47g.
genetics: *ct* affected but not an, sn, or oc. Male lethal.

In(1)ct^{43aH1}

cytology: *In(l)4Bl-4;7B4-Cl + In(l)10D5-6;20B-C.*
origin: X ray induced.
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Associated with *ct^{43aH1}.*

***In(l)ct268-13**

cytology: *In(l)2E3-Fl;2F2-3;7B2-3;7B4-5;l9A4-5;19A6-B1* superimposed on *R(1)1A3-4;19F-2OA1.* 2F1-2, 7B3-4, and 19A5-6 missing.
new order: |lA4 - 2E3|7B2 - 2F3|l9A4 - 7B5|19B1 - 20-20F - 20Al|.
origin: X ray induced in *R(l)2.*
discoverer: Demerec, 34f.
references: Hoover, 1937, Genetics 22: 634—40 (fig-).
1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34 (fig.).
genetics: Deficient for *ct* but not *scp* or *sn.* Male lethal.

***In(1)ct$^{268-18}$**

cytology: *In(l)7B2-3;7B4-5;llD8-9;* 7B3-4 missing.
new order. 1A - 7B2|llD8 - 7B5J11D9 - 20.
origin: X ray induced.
discoverer: Hoover, 1938.
references: 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34 (fig.),
genetics: Deficient for cr but not *scp* or sn. Male lethal.

***In(1)ct$^{268-20}$**

cytology: *In(l)6Fll-7Al;7B5-6;10Bll-12.* 7A1-B5 missing.
new order: 1 - 6Fll|lOBll - 7B6|lOB12 - 20.
origin: X ray induced,
discoverer: Demerec, 35g.
references: Hoover, 1938, Z. Induktive Abstam- mungs- Vererbungslehre 74: 420—34 (fig.).
genetics: Deficient for *ct* but not *cm, scp,* or sn. Male lethal.

***In(1)ct$^{268-27}$**

cytology: *In(l)3D6'El;7B3-5.*
origin: X ray induced.
discoverer. Hoover, 35j.
references: 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34 (fig.).
genetics: *ct* affected but not cm, *scp,* or *sn.* Male lethal.

In(l)Dl: Inversion(l) from deoxycytidine

cytology: *In(l)13B;16A.*
origin: Induced by tritiated deoxycytidine.
discoverer: Kaplan, 1965.
references: 1966, DIS 41: 59.
genetics: Male lethal.

In(l)dl-49: Inversion(l) delta-49

cytology: *In(l)4D7-El;llF2-4* [Painter; Hoover, 1938, Z. Induktive Abstammungs- Vererbungslehre 74: 420-34 (fig.)].
discoverer: Muller, 26k.
references: Muller and Stone, 1930, Anat. Record 47: 393-94.
Stone and Thomas, 1935, Genetica 17: 170-84.
Sturtevant and Beadle, 1936, Genetics 21: 554-604.
genetics: Left break between *rb* and *cv;* right between *tw* and *g.* Measures of recombination vary from 5.5 percent (Grell, 1962, Genetics 47: 1737-54) to about 15 percent (Sturtevant and Beadle, 1936); secondary exceptions from 33 percent (Grell, 1962) to 44 percent (Sturtevant and Beadle, 1936).
other information: Used as a balancer either with markers *y Hw m^2 g^4* or *y w lz^a* with *Hw* and *lz^8* sterilizing homozygous female.

**In(1)drp: Inversion(l) droop wings*

cytology: *In(l)12B;20B.*
origin: Spontaneous from *hi.*
discoverer Ives, 48f.
synonym: *In(l)hil; Inversion(l) droop.*
references: 1949, DIS 23: 58.
genetics: Associated with mutant droop wings. Male viable.

**In(l)dta: Inversion(l) delta wing*

cytology: *In(l)6B2-3;15E7-F2.*
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 69.
genetics: Associated with *dta.* Female sterile.

In(1)e(bx): Inversion(l) enhancer of bithorax

cytology: *In(l)3A;4F.*
origin: Gamma ray induced.
discoverer: £. B. Lewis, 53b.
references: 1959, DIS 33: 96.
genetics: Associated with *e(bx).*

h(l)EH: Inversion(l) Entire

cytology: *In(l)lA;20;20B-C.* At prophase, distal end carries a single heterochromatic segment about equal in size to chromosome *4;* proximally it carries a very short heterochromatic segment and as a second arm two larger heterochromatic segments (Lindsley).
new order: 20 - 1A|2OC - 20F-20.
Tentative,
origin: Spontaneous opening out of *R(l)l, y.*
discoverer Novitski.
references: 1949, DIS 23: 94-95.
Lindsley, 1958, Z. Vererbungslehre 89: 103-22.
genetics: Entire chromosome, including *l(lXfl$^+$,* and *y,* inverted. Carries mutant alleles of 66 at each end, which acting together produce 66$^+$phenotype.

In(l)EN2

cytology: *In(l)lA3-4;19F-20Al;20.* Inferred from origin,
new order: 20 - 1A3|2OA1 - 2OF«2O. Tentative.
origin: Spontaneous opening of *R(l)2,* y^+.
discoverer: Muller.
references: 1956, DIS 30: 140-41.
genetics: Entire chromosome inverted like *In(l)EN* but carries y^+ rather than y.

**In(l)EN2B: Inversion(l) Entire 2 of Bender*

cytology: *In(l)lA3-4;19F~20Al;20.* Inferred from origin,
new order: 20 - 1A3|2OA1 - 20F-20. Tentative.
origin: Spontaneous opening of *R(l)2, y v.*
discoverer: M- A Bender, 55e6.
references: 1955, DIS 29: 69.

**In(J)exr: Inversion(l) extra venation*

cytology: *In(l)12E8-10;15Dl-3.*
origin: Induced by triethylenemelamine (CB. 1246).
discoverer: Fahmy, 1952.
references: 1958, DIS 32: 70.
genetics: Affects *exr.*

In(1)f257.4: Inversion(l) forked

cytology: *In(l)15F2-16Al;16D2-El.*
origin: X ray induced,
discoverer: Demerec, 33j.
genetics: *(* affected.

In(l)FM3: Inversion(l) First Multiple

cytology: *In(l)3E-F;16A-B;19F-20B;* superimposed on *In(l)lB2-3;20B-Dl + In(l)4D7-El;llF2-4.*
new order: 1A - lB2|20B|l6B - 19F|3F - 4D7|llF2 -4El|llF4 - 16A|3E - 1B3|2OD1 - 2OF.
origin: X ray induced in $In(l)sc^8$+*dl-49,* $_y$*31d* $_s$*8* cfo, *B.*
discoverer: R. F. Grell, 1954.
references: Mislove and Lewis, 1954, DIS 28: 77.
genetics: Mutant for two lethals, one allelic to *l(l)Jl* and therefore covered by y^+F and the other covered by B^SY; both *In(l)FM3/y+Y/*B^sY and *In(l)FM3/*B^sY y^+ males survive. The treated chromosome carried y^{31d}, but *ln(l)FM3/y* variegates for yellow bristles.
other information: Used as a first chromosome balancer, described as *FM3* in the section on balancers.

ln(l)FM4

cytology. *In(l)3C;4E-F* superimposed on *ln(l)lB2-3;2OB-D1 + In(l)4D7-El;llF2-4.*
new order: 1A - 1B2|2OB - 11F4|4E|3C - 4D7|llF2 - 4F|3C - 1B3|2OD1 - 20F.
origin: X ray induced in $In(l)sc^s$+*d1-49,* $_y$*31d* $_{sc}$*8 dm B.*
discoverer R. F. Grell, 1954.
references: Mislove and Lewis, 1954, DIS 28: 77.
genetics: Male viable and fertile.
other information: Used as a first chromosome balancer, described as *FM4* in the section on balancers.

ln(l)FM6

cytology: *In(l)15D-E;20A-B* superimposed on *ln(l)lB2-3;20B-Dl + In(l)3C;4E-F + In(l)4D7-El;llF2-4.*
new order: 1A - 1B2|20B|15E - 20A|l5D - 11F4|4E|3C - 4D7|llF2 - 4F|3C - 1B3|2OD1 - 20F.
origin: X ray induced in *In(l)FM4, y3ld* sc^8 *dm B.*
discoverer: R. F. Grell, 55i.
references: Grell and Lewis, 1956, DIS 30: 70.
genetics: Male viable and fertile. Female sterile owing to *dm.*
other information: Used as first chromosome balancer, described as *FM6* in the section on balancers.

ln(l)g^{17Ba6}*: Inversion(l) garnet*

cytology: *In(l)12B14-15;19F* superimposed on *In(l)lB3-4;20B-Dl*^{L}*lB2-3;20B-DlK + In(l)4D7-El;llF2-4.*
new order: 1A - 1B3|2OB - 19F|l2B15 - 19F|l2B14 - 11F4|4E1 - 11F2|4D7 - 1B3|2OD1 - 20F.
origin: X ray induced in $In(l)sc^{si\ L}sc^{SR}$+ *dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Associated with *gl7B»6,*

ln(l)g^w*: Inversion(l) garnet-wild*

cytology: Breakpoints unknown.
origin: X ray induced.
discoverer: Muller.
references: 1946, DIS 20: 67.
Chovnick, 1958, DIS 32: 88.
1961, Genetics 46: 493-507 (fig.).
genetics: Associated with g^w.

ln(1)g^x*: Inversion(l) garnet from X irradiation*

cytology: *In(1)12; 19-20.*
origin: X ray induced.
discoverer: Muller.
references: 1946, DIS 20: 67.
genetics; Mutant for *g.*

In(l)hil: see *ln(l)drp*

**ln(l)hi2: lnversion(1) from high*

cytology*. *In(l)lF;20.*
origin: Spontaneous in hi.
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

**lnO)hi3*

cytology: *ln(l)4D;20.*
origin: Spontaneous in *hi.*
discoverer: Ives,
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

**l*$_n$*(1)hi4*

cytology: *ln(l)4C;20.*
origin: Spontaneous in *hi.*
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19—28.
genetics: Male lethal.

ln(l)hi5
cytology: *In(l)lF;20.*
origin: Spontaneous in hi.
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(1)hi7
cytology: *In(l)12E;20.*
origin: Spontaneous in *hi.*
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(l)hi8
cytology: *In(l)3C;20.*
origin: Spontaneous in *hi.*
discoverer. Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(l)hi9
cytology: *In(l)8F;20.*
origin: Spontaneous in *hi.*
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(1)hi10
cytology: *In(l)4E2-3;8Al-2.*
origin: Spontaneous in *hi.*
discoverer Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(l)hm
cytology: *Jn(l)5C;7B;20A-F.*
new order: 1 - 5C|7E - 20A|7E - 5CJ20F.
origin: Recovered among progeny of Florida high.
discoverer. Ives.
synonym: *Tp(l)hill.*
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(l)hn2
cytology: *ln(l)lC3;20.*
origin: Spontaneous in *hi.*
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

ln(l)ha3
cytology: *In(l)4E;20.*
origin: Spontaneous in *hi.*
discoverer: Ives.
references: Hinton, Ives, and Evans, 1952, Evolution 6: 19-28.
genetics: Male lethal.

IMDHv: hvcrsion(l) Hooked veins
cytology: Breakpoints unknown.
discoverer: Tanaka, 3S®4.
references: 1937, DIS 8: 11.
genetics: Associated with *Hv.*

ln(l)Hw^2: Inversion(l) Hairy wing
cytology: *In(l)lA2-3;lA8-Bl;lB2-3.*
new order: 1A1 - lA2|lB2 - lA3|lBl - 20.
origin: Spontaneous derivative of *Dp(l;l)Hw = Dp(l;l)lA8-Bl;lB2-3.*
discoverer: Nichols-Skoog. 35a9.
genetics: Associated with *Hw^2.*

ln(1)K2: Inversion(i) of Krivshenko
cytology: *In(l)6A;9A-B.*
origin: Spontaneous.
discoverer: Krivshenko, 54c24.
references: 1956, DIS 30: 75.
genetics: Homozygous viable.

ln(l)t-272-13: Inversion(l) lethal
cytology: *In(l)lA6-Bl;llA7-8;llF2-12Al;18A4-Bl.*
new order: 1A1 - lA6|l2Al - 18A4|llA7 - lBl|llA8 - HF2|l8Bl - 20.
origin: X ray induced.
discoverer: Demerec, 1940.
synonym: *Tp(1)1-272-13.*
references: Sutton, 1943, Genetics 28: 210—17.
genetics: Associated with *1(1)272-13. sc* affected but not *y,* ac, or *svr.*

In(l)l-v59: Inversion(l) lethal-variegated
cytology: *In(1)3-4; 19-20.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male fertile.

In(l)l-vl32
cytology: *In(l)4E;19-20.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal; male fertile.

ln(1)l-v146
cytology: *In(l)5-6;19-20.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
refereñces: I960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male fertile.

In(l)l-v227
cytology: *ln(l)l-2;19-20.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male fertile.

In(l)l-v231
cytology: *ln(l)lC-D;19-20.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male fertile.

Ind)l-zwl931: Inversionfl) lethat-zeste white
cytology: *ln(l)3A;6.*
origin: X ray induced.
discoverer: Judd, 62g31.
genetics: Mutant for *l(l)zwl.*

In(1)l-zw3b12
cytology: *Jn(l)3A8-Bl;13.*
origin: X ray induced.
discoverer: Judd, 62bl2.
genetics: Mutant for *I(l)zw3.*

**ln(l)lz^{sB}: Inversion(l) lozenge-spectacled of Bishop*
cytology: *Jn(l)8;20* (Green).
origin: X ray induced;
discoverer: Bishop.
references: Oliver, 1947, Texas Univ. Publ. 4720: 167-84.
genetics: Associated with *lz^{sB}*.

ln(l)lzl: Inversion(l) lozenge
cytology: *In(l)8D;20D* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
genetics: Mutant for spectacled-like allele of *lz*.

ln(l)lz2
cytology: *In(l)8D;20D* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
genetics: Mutant for a spectacled-like allele of *lz*.

ln(l)lz3
cytology: *In(l)4D;8E2-3* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
genetics: Mutant for a spectacled-like allele of *lz*.

ln(l)lz4
cytology: *In(l)8A2-Bl;8D* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708—21.
genetics: Mutant for a spectacled-like allele of *lz*.

ln(l)lzS
cytology: *ln(l)8D;18F2-19Al* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708-21.
genetics: Mutant for a spectacled-like allele of *lz*.

In(1)lz6
cytology: *In(l)8D;9B12-Cl* (Hannah).
origin: X ray induced.
discoverer: Green and Green.
references: 1956, Z. Induktive Abstatnmungs-Vererbungslehre 87: 708—21.
genetics: Mutant for a spectacled-like allele of *lz*.

ln(Vlz7
cytology: *In(l)8D;20D* (Hannah).
origin: X ray induced.
discoverer Green and Green.
references: 1956, Z. Induktive Abstammungs-Verartnmgslehre 87: 708-21.
genetics: Mutant for a spectacled-like allele of *lz*,

ln(l)lzA
cytology: *In(l)3E;3F;9E;9F-10A;* inferred from Mackensen's figure; bands in 3E-F and 9E-F missing.
new order: 1 - 3EJ9E - 3FJ10A1 - 20.
synonym: *Df(l)Del lz A.*
references: Mackensen, 1935, J. Heredity 26: 163—74 (fig.).
genetics: Mutant or deficient for *v* but not *lz* or *ras*. No clue to reason for *lz* appearing in name.

ln(l)m^{K}; Inversion(T) miniature of Krivshenko
cytology: *In(l)10E;20B.* In mitotic chromosomes, right breakpoint is near juncture of heterochromatic elements *hC* and *hD* to the left of the nucleolus organizer but to the right of right breakpoint of *In(l)sc<* (Cooper, 1959, Chromosoma 10: 535-88).
origin: X ray induced.
discoverer: Krivshenko, 5513.
synonym: *IntflyK-.*
references: 1956, DIS 30: 75.
genetics: Variegated for *m*.

**ln(l)N21*: Inversion!!) Notch*
cytology: *In(l)3C;20;* position of right breakpoint with respect to centromere of ring not determined.
origin: X ray induced in *R(l)2*.
discoverer: Barigozzi.
references: 1942, Rev. Biol. (Perugia) 34: 59—72.
genetics: Variegates for *w* and ec but not *pn, dm,* or cv. Seems to carry intermediate allele of *N*.

tn(l)N264.7
cytology: *In(l)3C6-7;3C8-9;8C5-7;* 3C7-8 missing (Hoover).
new order: 1 - 3C6|8C5 - 3C9J8C7 - 20.
origin: X ray induced,
discoverer: Demerec, 33k.
genetics: Deficient for *fa, &pl,* and *fa^{n}* but not w, *rst,* or *dm*.

In(1)N264-48
cytology. *In(l)lB6-7;lB10-ll;3C7-8;* 1B7-10 missing (Hoover).
new order: 1A1 - 1B6J3C7 - lBll|3C8 - 20.
origin: X ray induced,
discoverer: Demerec, 37f.
genetics: Deficient for *fa* but not sc, *svr, tw, bt, kz, w, rst, dm,* or ec.

ln(l)N264.52
cytology: *In(l)3C3-5;20B2-Cl.*
origin: X ray induced,
discoverer: Demerec, 38a.
genetics: Variegates for *rst, fa, dm,* ec, and *bi* but not *w, peb,* or *rb*.

In(1)N264-57
cytology: *ln(l)3C9-ll;20D2-El* (Hoover),
origin: X ray induced.
discoverer: Demerec, 38d.
references: 1941, Proc. Intern, Congr. Genet., 7th. pp. 09-103.
genetics: *N* and *rst* mutant but not *w, fa, dm,* or ec.

in(l)N264-71
cytology: *In(l)3C6-7;2QD-E* (Sutton).
origin: X ray induced.
discoverer: Demerec, 38k.

references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Carries mutant allele of *N* and normal alleles of *w, rst, dm,* and ec.

ln(l)N264.84
cytology: *ln(l)3C6-7;20A-B* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39c.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *fa* and *dm* but not *w, rst,* or *bi.*

****ln(l)N264.108***
cytology: *In(l)3C3-5;3E7-8;20A4-5;* 3C5-E7 missing (Sutton).
new order: 1 - 3C3|20A4 - 3E8|20A5 - 20F.
origin: X ray induced.
discoverer: Demerec, 40a.
genetics: Deficient for *spl, dm,* and *M(1)3E* but not for w or ec.

****l_n(1)N264.J12***
cytology: *ln(l)3C6-7;3F5-6* (Sutton).
origin: X ray induced.
discoverer: Demerec, 40b.
genetics: Carries normal alleles of *w, dm,* and ec.

****h(l)N264.JU***
cytology: *ln(l)2C8-10;3C7-9* (Sutton).
origin: X ray induced.
discoverer: Sutton, 40e.
genetics: Carries normal alleles of *pn, w, rst,* and *dm.*

ln(J)NP: Inversion(l) Notch from P*2
cytology: *In(l)3C;8E* (Darby).
origin: Induced by P32.
discoverer: Bateraan, 1950.
references: 1950, DIS 24: 55.
1951, DIS 25: 77.
genetics: Carries normal allele of *w.*

****ln(l)Nel.A: Inversion(l) of Nel-A***
cytology: *In(l)12A;18D.*
origin: Spontaneous.
discoverer: Nel.

****ln(l)Nel.B***
cytology: *In(l)llA;12F.*
origin: Spontaneous.
discoverer: Nel.

****ln(l)ney: Inversion(T) narrow eye***
cytology: *In(l)10A;16D.*
origin: X ray induced.
discoverer: Becker, 1950.
references: 1952, DIS 26: 69.
genetics: Associated with *ney.*

ln(l)pdf: Inversion(l) podfoot
cytology: *Jn(l)16B;19F-20A.*
origin: X ray induced.
discoverer: Welshons, 57h6.
references: I960, DIS 34: 54.
genetics: Associated with *pdt.*

****ln(l)Pub: Inv»rsion(1) Pub***
discoverer: P. Farnsworth.
references: Lefevre, 1954, DIS 28: 75.
genetics: Associated with *Pub.* Called inversion because of reduction in crossing over; less than 1 percent recombination with *spl* and about 10 percent with *B.*

****ln(l)r^K: Inversion(l) rudimentary of Krivshenko***
cytology: Proximal break in heterochromatin.
discoverer: Krivshenko.
references: Agol, 1936, DIS 5: 7.
genetics: Mutant for r.

ln(l)rb">4^{8aH}5: Inversion(l) ruby-mottled
cytology: *In(l)3E3-4;llA7-8;20F* superimposed on *In(l)lB3-4;20B-Dl^{L}lB2-3;20B-Dl^R + In(l)4D7-El;llF2-4.*
new order: 1A - 1B3|2OB - 11F4|4E1 - 11A7|3E3 - 1B3|2OD1 - 20F-(3E4 - 4D7|llF2 - 11A8)|2OF.
origin: X ray induced in *In(l)sc$^{sl\ L}$sc^{8R}+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Associated with *rb^{m4}SoH5$_t$*

****ln(l)rg?: Inversion(l) rugose***
cytology: *In(l)4E;7A* (J. I. Valencia).
origin: X ray induced.
discoverer: Cantor, 46d20.
genetics: Mutant for *rg.*

****ln(1)rg^p: Inversion(l) rugose from P32***
cytology: *In(l)3C;4E* (Darby).
origin: Induced by P32,
discoverer: Bateman.
references: 1951, DIS 25: 77-78.
genetics: Mutant for *rg.*

ln(l)rst^3: Inversion(l) roughest
cytology. *In(l)3C3-4;20B.* Right breakpoint about one-fourth the distance between the heterochromatic-euchromatic junction and the centromere, approximately between heterochromatic segments *hC* and *hD* (Cooper, 1959, Chromosoma 10: 535—88).
origin: X ray induced.
discoverer: Gruneberg, 33116.
references: 1935, DIS 3: 27.
1935, J. Genet. 31: 163-84 (fig.).
1937, J. Genet. 34: 169-89.
genetics: Left breakpoint between *w* and *rst;* right breakpoint to the left of *bb* [Emmens, 1937, J. Genet. 34: 191-202 (fig.); Kaufmann, 1942, Genetics 27: 537-49 (fig.)]. Mutant for *rst* and in *X/0* male variegates for *w* (Gersh, 1963, DIS 37: 81). Precise reinversion of *Jn(l)rst^3* accompanied by reversion of phenotype reported to occur spontaneously (Grtinberg, 1934) and after X irradiation of oocytes (Novitski, 1961, Genetics 46: 711—17) but not after irradiation of sperm (Kaufmann, 1942).

****ln(l)rstl: Inversion(i) roughestlike***
cytology: Breakpoints unknown,
origin: X ray induced,
discoverer: Oliver, 29d3.
references: 1935, DIS 3: 28.
genetics: Associated with *rstl.*

fn(l)S: Inversion(l) of Sinitskaya
cytology: *In(l)6Al-3;10F10-llAl* (Slizynski, 1948, DIS 22: 77).
origin: X ray induced simultaneously with *In(l)sc^{si}.*
discoverer: Sinitskaya.

references: Muller and Prokofyeva, 1934, Dokl. Akad. Nauk SSSR, n.s. 4: 74-83.

other information: *In(l)sc^{sl}+S* used as a crossover suppressor in certain balancers, e.g., *Base.*

ln(1)sc^4: Inversion(l) scute

cytology: *In(l)lB3-4;19F-20Cl* (Muller and Prokofyeva, 1934, Dokl. Akad. Nauk SSSR n.s. 4: 74-83; Prokofyeva-Belgovskaya, 1937, Izv. Akad. Nauk SSSR, Ser. Biol. 2: 393-426; Schultz and Redfield, 1951, Cold Spring Harbor Synp. Quant. Biol. 16: 175—97). In mitotic chromosomes, the right break is to the right of and near the euchromatic-heterochromatic juncture in the heterochromatic segment termed *hD* (Cooper, 1959, Chromosoma 10: 535-88).

origin: X ray induced in a *y* chromosome.

discoverer: Agol, 1928.

references: 1929, Zh. Eksperim. Biol. 5: 86—101. 1931, Genetics 16: 254-66.

Serebrovksy and Dubinin, 1930, J. Heredity 21: 259-65.

Sturtevant and Beadle, 1936, Genetics 21: 554—604.

Muller and Raffel, 1940, Genetics 25: 541-83.

genetics: Mutant at *sc;* also carries *y.* Left break to the right of sc and to the left of *l(l)sc* inferred from observations that *In(l)sc^{8lj}sc^{4R}* is deficient for sc (Sturtevant and Beadle, 1936) and *In(l)sc^{4L}sc^{9R}* is male lethal except in the presence of *Dp(l;2)sc^{19}* (Muller, 1935, Genetica 17: 247). Right break in the proximal heterochromatin to the left of *bb* inferred from observation that *In(l)sc^{4L}sc^{8R}* is deficient for *bb* (Gershenson, 1933, J. Genet. 28: 297-313; Sturtevant and Beadle, 1936). *In(l)sc*/+* female produces about 6 percent exceptional males from four-strand double exchange. Secondary exceptions about 4 percent.

ln(l)sc^{L}sc^{81}*: Inversion(l) scute-4 Left scute-8 Right*

cytology: *In(l)lB3-4;19F-20Cl^{L}lB2-3;20B-Dl^R;* duplicated for 1B3, mitotic chromosomes deficient for the proximal third of *hD,* all of *hC* and *hB,* and the distal majority of *hA* (Cooper, 1959, Chromosoma 10: 525-88). About 0.6 the length of a normal *X* at metaphase.

origin: Recombinant containing left end of *In(l)sc^4* and right end of *In(l)sc^8*.

discoverer: Gershenson.

references: 1933, J. Genet. 28: 297-313. 1933, Biol. Zh. (Moscow) 2: 145-59, 419-24.

genetics: Duplicated for the sc locus, carrying both *ac^4* and sc^8; deficient for the *bb* locus and the nucleolus organizer [i.e., *Dl(l)bb^G].* Shown by Ritossa and Spiegelmann (1965, Proc. Natl. Acad. Sci. U.S. 53: 737-45) to be deficient for all the DNA that is complementary to ribosomal RNA present in a haploid chromosome set. In the male, *In(l)Bc^{4L}sc^{SR}* frequently fails to pair with the *Y* and when it does the unpaired *X* and *Y* usually proceed to the same pole (Peacock, 1965, Genetics 51: 573—83). Furthermore, reciprocal meiotic products are not recovered with equal frequency. which Peacock interpreted as the result of nonrandom orientation of the first meiotic division with respect to the postulated functional pole of the primary spermatocyte. Irregularities in meiotic behavior of *In(l)sc^{4lj}sc^{8R}* in the male are affected by the *Y* chromosome present (Peacock, 1965) and the temperature at which meiosis occurs (Zimmering, 1963, Genetics 48: 133-38).

In(l)sc^{4L}sc^{8R}/Y/Y male gives quite regular segregation of the two *Y's* and low recovery of the *X.*

ln(l)sc4^{L}sc9R: Inversion(l) scute-4 Left scute-9 Right

cytology: *In(l)lB3-4;19F-20Cl^lB2-3;18B8-9^R;* left breakpoint data inconsistent with genetic observations. Duplicated for 18B9-19F.

origin: Recombinant containing left end of *In(l)sc^4* and right end of *In(l)sc^9*.

discoverer: Muller.

references: 1935, Genetica 17: 237-52.

genetics: Deficient for *l(l)sc.* Duplicated for loci right of 18B9 including *car$^+$* but not *bb$^+$*. Male lethal but viable in presence of *Dp(l;2)sc$^{i\ 9}$ = Dp(l;2)lBl-2;lB4-7;25-26.*

/n(7)sc^^{L}sc^{L8R}: Inversionfl) scute-4 Left scute of Levy 8 Right

cytology: *In(l)lB3-4;19F-20Cl^{L}lB3-4;20B-C^R.* Mitotic chromosomes deficient for the proximal one-third of *hD,* all of hC, and the distal half of hB (inferred from Cooper, 1959, Chromosome 10: 535—88).

origin: Recombinant containing left end of *In(l)sc^4* and right end of Jnfi^sc^*.

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.

genetics: Deficient for bb and the nucleolus organizer.

ln(l)sc^{4L}sc51^R: tnversion(l) scute-4 Left scute of Sinitskaya I Right

cytology: *In(l)lB3-4;19F-20Cl^{L}lB3-4;20B-Dl^R;* deficient for proximal third of *hD,* all of *hC* and *hB,* and the distal majority of *hA* (Cooper, 1959, Chromosoma 10: 535—88). About 0.6 the length of a normal *X* at metaphase.

origin: Recombinant containing left end of *In(l}sc^4* and right end of *In(l)sc^{Si}*.

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.

genetics: Deficient for *bb.* Behavior in meiosis of the male like that of *In(l)t}C^{4L}'Sc8^R.*

In(1)sc^{4L}y^4^: Inv&rsion(1) scute-4 Left yellow-4 Right

cytology: *In(l)lB3-4;l9F-20Cl^{L}1AS-B1;1SA3-4^R;* duplicated for 1B1-3 and 18B1-19F.

origin: Recombinant containing left end of *In(l)&c^4* and right *end* of *In(I)y^4*.

references: Sturtevant and Beadle, 1936, Gen#tics 21: 554-604.

genetics: Duplicated for the loci of ac, «c, car, and *M(J)n;* either deficient for *y* oc carries *y^4*. Both male and female look normal.

In(l)sc7

cytology: *In(l)lB4-6;5D3-6* (Schultz).
origin: X ray induced in a w^a chromosome.
discoverer: Dubinin, 1929.
references: 1930, Zh. Eksperitn. Biol. 6: 300—24.
Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65.
Dubinin, 1933, J. Genet. 27: 443-64.
Sturtevant and Beadle, 1936, Genetics 21: 554-604.
genetics: Mutant for *sc*. Normal disjunction and 33 percent recombination in $In(l)sc^7/+$ female; 26 percent secondary nondisjunction and 27 percent recombination in *In(l)sc?/+/Y* female (Grell, 1962, Genetics 47: 1737—54). w^a removable from the inversion by double crossing over in triploid.

In(1)sc8

cytology: *In(l)lB2-3;20B-Dl* (Muller and Prokofyeva, 1934, Dokl, Akad. Nauk SSSR n.s. 4: 74-83; Prokofyeva-Belgovskaya, 1937, Izv. Akad. Nauk SSSR. Ser. Biol. 2: 393-426; Schultz and Redfield, 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 185). Mitotic chromosomes show break in proximal heterochromatin extremely close to the centromere in proximal part of element *hA* (Cooper, 1959, Chromosoma 10: 535—88).
origin: X ray induced.
discoverer: Sidorov, 1929.
references: 1931, Zh. Eksperim. Biol. 7: 28—40.
1936, Biol. Zh. (Moscow) 5: 1-26.
Noujdin, 1935, Zool. Zh. 14: 317-52.
Patterson and Stone, 1935, Genetics 20: 172—78.
Sturtevant and Beadle, 1936, Genetics 21: 554—604.
genetics: Mutant for sc and shows a Hw effect; variegates for *ac, y,* and probably *1(1)]I* (Hess, 1962, Verhandel. Deut. Zool. Ges., Zool. Anz., Suppl. 26; 87-92) in *X/0* male. Left break between *ac* and sc because induced deficiencies for the terminal uninverted portion of $In(l)sc^s$ are deficient for *y* and *ac* but not sc* (Patterson and Stone, 1935) and because $In(l)sc^{8L}sc^{4R}$ is deficient for *sc* (Sturtevant and Beadle, 1936). Right break between 66 and centromere because deficiencies for terminal genes are frequently deficient for *bb* (Patterson, 1933, Genetics 18: 32—52) as is $In(l)ac^{4L}sc^{aR}$ (Gershenson, 1933, J. Genet. 28: 297-313; Sturtevant and Beadle, 1936). *ln(l)ac*/+* female produces about 3 percent exceptional sons from four-strand double crossing over within the inversion and about 8.7 percent recombination.
$In(l)nc^8$/-¥/*Y* female produces 19 percent secondary nondisjunction and 12 percent recombination (Sturtevant and Beadle, 1936; Grell, 1962, Genetics 47: 1737-54).

In(1)sc^8^EN^R: Inversiond) scuto-S Left Entire Right

cytology: *In{l)lB2-3;20B-Dl^{L}lA;20;20B-C^R.*
origin: Reccfflbinant containing left end of $In(l)sc^8$ and right end of *In(l)EN.*
references: Lixtdsiey, 1958, Z. Vererbungslehre 89: 103-22.
genetics: Carries *1(1)] 1* $^+$, y^+ (or y^{31d}), and ac^+ distally and *1(1)J1*$^+$, *y,* and ac^+ proximally on long arm. Carries heterochromatic short arm of *In(l)EN.* Carries 66^+ in distal heterochromatin derived from $In(l)sc^8$ and a mild allele of 66 in proximal heterochromatin derived from *In(l)EN.*

ln(l)sc^{8L}sc^{4R}: Inversion(i) scute-8 Left scute-4 Right

cytology: *In(l)lB2-3;20B-Dl^{L}lB3-4;19F-20Cl^R;* deficient for 1B3 and duplicated for proximal part of *hD,* all of *hC* and *hB,* and the distal majority of *hA.* About 1.4 times the length of a normal *X* at metaphase.
origin: Recombinant containing left end of $In(l)sc^8$ and right end of $In(l)sc^4$,
references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.
genetics: Deficient for sc; duplicated for $66^+$and the nucleolus organizer. $In(l)sc^{aL}sc^{4R}$/ + female often has crippled legs. Male survives rarely and is extreme *sc.*

ln(l)sc^{8L}sc^{LSR}: Inversionfl) scute-8 Left scute of Levy 8 Right

cytology: *In(l)lB2-3;20B-Dl^lB3-4;20B-C^R;* deficient for 1B3 and mitotic chromosomes duplicated for the proximal half of *hB* and the distal majority of *hA* (inferred from Cooper, 1959, Chromosoma 10: 535-88).
origin: Recombinant containing left end of $In(l)sc^s$ and right end of $In(l)sc^{La}$.
references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87-93.
genetics: Deficient for *sc.*

ln(l)sc^{8L}sc^{s1R}: Inversionfl) scute-8 Left scute of Sinitskaya 7 Right

cytology: *In(l)lB2'3;20B-Dl^lB3-4;20B-Dl^R;* deficient for 1B3.
origin: Recombinant containing left end of $ln(l)sc^8$ and right end of $In(l)sc^{si}$.
genetics: Deficient for sc. A few extreme sc males survive.

ln(l)sc^{L}y3^p*: lnversion(l) scute-8 Left yellow-3 of Patterson Right*

cytology: *In(l)lB2-3;20B-Dl^{L}lA;20^R;* duplicated for 1A-B2.
origin: Recombinant containing left end of $In(l)sc^8$ and right end of $In(l)y^{3P}$.
references: Muller, 1935, J. Heredity 26: 469-78.
genetics: Duplicated for y and *ac* loci; not deficient for 66. Male viable.

ln(l)sc^{8L}y4^R: Inversionfl) scute-8 Left yellow-4 Right

cytology. *In(l)lB2-3;20B-Dl^lA8-Bl;18A3-4^R;* duplicated for 1B1-2 and 18A4-20B.
origin: Recombinant containing left end of $In(l)sc^8$ and right end of $In(l)y^4$.
references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.
genetics: Duplicated for *ac, car, M(l)n,* and 66. Both male and female survive and show *Hw* effect of *In(l)* sc*.

In(l)sc9

cytology: *In(l)lB2-3;18B8-9* (J. I. Valencia). Left breakpoint irreconcilable with Muller's genetic evidence (1935, Genetica 17: 237-52) that the left break of *In(l)sc** is to the right of that of *In(l)sc*[4].

origin: X ray induced.

discoverer: Levit, 1929.

references: 1930, Arch. Entwicklungsmech. Organ. 122: 770-83.

Norton and Valencia, 1965, DIS 40: 40.

genetics: Mutant for sc. Left break to right of *sc* and *1(4)sc,* inferred from observation that *In(l)sc*[4L]*sc*[9R] is lethal in male unless *Dp(l;2)sc*[1]^ is present (Muller, 1935). Right break right of *sby, smd,* and coc and left of *car,* as shown by the deficiency for *sby, smd,* and coc of *In(l)y*[4L]*sc9*[R] (Norton and Valencia, 1965).

In(l)sc*o. see ***In(l)ac3***

***ln(l)sc*[29]**

cytology: *In(l)lB,13A2-5* (Raffel) .

discoverer: Agol, 1930.

genetics: Mutant at sc. Left break to right of *1(1)sc* (Muller).

****ln(1)scS2c***

origin: Spontaneous.

discoverer: Green, 52c.

references: 1952, DIS 26: 63.

genetics: Mutant for *sc* and *su(s);* i.e., *su(s)*[s3c]. Inversion inferred from failure of *sc$2c* ^[o] recombine with *ras* or v.

****ln(l)sc90***

cytology: *In(l)lB4-7;1D2-E1;* inferred from Goldat's fig. 2.

origin: X-ray-induced derivative of *set.*

discoverer: Goldat.

references: 1936, Biol. Zh. (Moscow) 5: 803—12.

genetics: Mutant for *sc.*

***In(1)sc*[260-14]**

cytology: *In(l)lB2-3;llD3-8.*

origin: X ray induced.

discoverer: Sutton, 39b.

references: 1943, Genetics 28: 210—17.

genetics: Mutant for sc but not *y,* ac, or svr.

ln(l)sc260-22

cytology: *In(l)lB2-3;lE2-3.*

origin: X ray induced.

discoverer: Sutton, 39f.

references: 1943, Genetics 28: 210—17.

genetics: Mutant for *sc* but not *y,* ac, or svr.

****ln(1)sc*[A]*: Inversion(l) scute of Agol***

discoverer: Agol.

references: 1936, DIS 5: 7.

genetics: Mutant for *sc;* semilethal. Genetically, appears to extend from *sc* to near r (54.5).

ln(l)sc*[J1]*: Inversion(l) scute of Jacobs-Muller

cytology: *ln(l)lA4-5;lB4-5.*

discoverer: Jacobs-Muller.

references: Muller, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1: 225.

Muller, Prokofyeva, and Raffel, 1935, Nature 135: 253-55.

genetics: Mutant for sc and *1(1)J1.*

In(1)sc*[L]^: Inversion(i) scute of Levy

cytology: *In(l)lB3-4;20B-C;* inferred from genetic data. In mitotic chromosomes, right break is in center of heterochromatic segment *hB* (Cooper, 1959, Chromosoma 10: 535-88) to right of nucleolus organizer.

discoverer: Levy, 1932.

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87-93.

Muller and Raffel, 1938, Genetics 23: 160.

Raffel and Muller, 1940, Genetics 25: 541-83.

genetics: Mutant for sc. Left break between *sc* and *l(l)sc,* probably based on viability of reciprocal recombinants with *In(l)sc*[4] and *In(l)sc*[sl] (Raffel and Muller, 1940). Right break to right of 66 because *In(l)sc*[4L]*sc*[LSR] deficient for 66 (Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937).

ln(l)sc*[L6L]*sc**[R]*: Inversion(l) scute of Levy 8 Left scute-4 Right

cytology: *In(l)lB3-4;20B-C*[L]*lB3-4;19F-20Cl*[R]. Mitotic chromosomes duplicated for proximal third of *hD,* all of *hC,* and the distal half of *hB* (inferred from Cooper, 1959, Chromosoma 10: 535—88).

origin: Recombinant containing left end of *In(l)scL8* and right end of *In(l)sc*[4].

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.

genetics: Duplicated for 66 and the nucleolus organizer.

ln(1)sc*[L]*8L*[sc]*8R: Inversion(l) scute of Levy 8 Left scute-8 Right

cytology: *ln(l)lB3-4;20B-C*[L]*lB2-3;20B-Dl*[R]*;* duplicated for 1B3 and mitotic chromosomes deficient for proximal half of *hB* and distal majority of *hA* (inferred from Cooper, 1959, Chromosoma 10: 535—88).

origin: Recombinant containing left end of *In(l)sc*[L]*8* and right end of *In(l)sc8.*

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.

genetics: Duplicated for sc but not 66. Survives as *X/0* male and homozygous female.

ln(l)scl-8L*[sc]*S1R: Inversion(l) scute of Levy 8 Left scute of Sinitskaya 7 Right

cytology: *In(l)lB3-4;20B-C^lB3-4;20B'DlR;* mitotic chromosome deficient for proximal half *of hB* and distal majority of *hA* (inferred from Cooper, 1959, Chromosoma 10: 535—88).

origin: Recombinant containing left end of *In(l)sc*[LS] and right end of fnfl>c[5]^.

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87—93.

genetics: Homozygous viable and fertile. Does not affect expression of variegation of *bw*[4].

In(l)sc^{s1}: Inversion(l) scute of Sinitskaya

cytology: *In(l)lB3-4;20B-Dl;* inferred from genetic identity of left break with that of *ln(l)sc** and of right break with that of *In(l)sc^{8}*. In mitotic chromosomes, right break is in proximal part of most proximal heterochromatic segment, *hA* (Cooper, 1959, Chromosoma 10: 535-88).

origin: X ray induced simultaneously with *In(l)S.* **discoverer Sinitskaya, 34c.**

references: Muller and Prokofyeva, 1934, Dolk. Akad. Nauk SSSR 4: 74-83.
Muller and Raffel, 1938, Genetics 23: 160.
Raffel and Muller, 1940, Genetics 25: 541-83.
Crew and Lamy, 1940, J. Genet. 39: 273-83.

genetics: Mutant for *sc.* Left break between *sc* and *lfl^c,* probably based on the viability of reciprocal recombinants with *In(l)sc^{4}* and *In(l)sc^{LS}* (Raffel and Muller, 1940). Right break to right of *bb* because *In(l)sc^{4L}sc^{SiR}* is deficient for *bb* (Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87-93).

ln(1)sc$^{s/lL}$sc^{4R}: Inversion(l) scute of Sinitskaya 1 Left scufe-4 Right

cytology: ***In(l)lB3-4;20B-Dl^lB3-4;l9F-20C1R;*** duplicated for proximal part *oihD,* all of *hC* and *hB,* and distal majority of *hA.* About 1.4 times the length of a normal *X* at metaphase.

origin: Recombinant containing left end of *ln(l)sc^{s}l* and right end of *ln(l)sc^{4}*.

genetics: Duplicated for *bb^{+}* and the nucleolus organizer. Carries twice the amount of DNA that is complementary to *Drosophila* ribosomal RNA and Is found in a normal haploid chromosome set (Ritossa and Spiegelmann, 1965, Proc. Natl. Acad. Sci. U.S. 53: 737-45).

ln(l)sc^{s1L}sc^{8R}: fnversion(l) scute* of *Sinitskaya 7 Left scute-8 Right

cytology: ***In(l)lB3-4;20B-Dl^{L}lB2-3;20B-DlR;*** **duplicated** for 1B3.

origin: Recombinant containing left end of *Jn(l)sc^{si}* and right end of *In(l)sc^{8}*.

genetics: Duplicated for sc.

ln(l)scSlL$_{sc}$L8R: Invetshnf T) scute of Sinitskaya 1 Left scute of Levy 8 Right

cytology. In(l)lB3-4;20B-Dl^lB3-4;20B-CR; **mitotic** chromosomes duplicated for proximal half of *hB* and distal majority of *hA* (inferred from Cooper, 1959, Chromosoma 10: 535—88).

origin; Recombinant containing left end of *In(l)sc^{si}* and right end of *In(l)sc^{L8}*.

references: Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya, 1937, Genetics 22: 87-93.

tn(l)sc^{v2}: Inversion(l) scute of Valencia

cytology: *In(l)lB2-3;20B-F;* inferred from genetic identity with *In(l)sc^{8}*. Mitotic *X* has break at right end of proximal beterochromatic element *hA* very close to centromere (Cooper, 1959, Chromosoma 10: 535-88).

origin: Gamma ray induced.

discoverer: J. I. Valencia, 23h46.

references; Mailer and Valencia, 1947, DIS 21: 70.

genetics: Mutant for *sc.* Left break between ac and *sc* and right break between *bb* and the centromere; determined by the viability and bb^{+} phenotype of reciprocal recombinants with *In(l)sc^{8}*. Muller and and Valencia (1947) presume the right break to be to the right of that of *In(l)sc^{8}* because of the more extreme *ac* and *sc* phenotype of *In(l)sc^{V2}*.

****ln(J)sd^{2}: Inversion(i) scalloped***

origin: X ray induced.

discoverer: Panshin, 33g7.

references: 1935, DIS 3: 28.

genetics: Mutant for sd. Crossing over inhibited.

ln(J)sdS8d

origin: Gamma ray induced.

discoverer: Ives, 58dl4.

references: 1961, DIS 35: 46.

genetics: Mutant for *sd.* Not a translocation genetically; reduces recombination between ras and f by 80 percent.

ln(J)sdx: Inversion(l) spreadex

origin: X ray induced.

discoverer: Muller.

references: 1965, DIS 40: 35.

genetics: Associated with *sdx.*

****ln(l)stx: Inversion(l) streakex***

origin: X ray induced.

discoverer: Muller, 26k30.

references: 1935, DIS 3: 30.

genetics: Associated with *stx.*

ln(l)sx: Inversion(l) sexcombless

cytology: ***In(l)llD4-6;14B8-9 + In(l)llE2-6;15E2-4.***

new order: 1 - HD4|l4B9 - 15E2|llE2 - 11D6|14B8 - HE6|l5E4 - 20.

origin: X ray induced.

discoverer: Muller, 261.

references: Mukherjee, 1963, DIS 38: 62 (fig.),

genetics: Associated with mutant *sx,* which is male **sterile.**

****ln(l)Thl: Inversion(l) Thymidine***

cytology. ***In(l)12C;16C***

origin: Induced by ingested H^{3}-thymidine.

discoverer: Kaplan.

genetics: Male lethal.

ln(l)vao: Inversion(l) varied outspread

cytology: ***In(l)18C5-6;l9E7-8.***

origin: Induced by triethylenemelamine (CB. 1246).

discoverer: Fahmy, 1953.

references: 1959, DIS 33: 94.

genetics: Mutant for *vao;* variegated for an eye color, possibly car. Male sterile.

****ln(1)w2S8-S2: Inversion(l) white***

cytology: ***In(l)3C7-9;8Ell-8Fl*** **(Sutton).**

origin: X ray induced.

discoverer: Demerec, 40a.

genetics: Mutant for *w* and *rst* but not for *spl, Iz,* ***dvr,* or *tip.***

****ln(1)w^{G}; Inversion(l) white of Goldschmidt***

cytology: *In(l)3C;3D-E* (Kodani).

origin: X ray induced in *In(l)y^{o} = In(l)lA;lC3-4.*

discoverer: Goldschmidt.

references: 1945, Univ. Calif. (Berkeley) Publ. Zool. 49: 522.

In(1)wm4: Inversion(l) white-mottled

cytofogy: *In(l)3Cl-2;20A* (Sutton). Right breakpoint in mitotic chromosomes is to the left of 66 in hC or *hD* (Cooper, 1959, Chromosoma 10: 535-88).
origin: X ray induced.
discoverer: Muller, 1929.
references: 1930, J. Genet. 22: 299-334.
genetics: Variegated for w. Left break to the left of *w.*

In(l)w»4^{L}rst^{3R}: Inver$ion(l) white-mottled 4 Left roughest-3 Right

cytology: ***In(l)3Cl-2;20A^{L}3C3-4;20B^{R}*** **deficient for** 3C1-2.
origin: Recombinant containing left end of *In(l)w^{m4}* and right end of *In(l)rst^{3}*.
genetics: Deficient for *w* and *1(1)3C3* but not *rst* (Lefevre and Wilkins, 1966, Genetics 53: 175-87).

In(l)w^{m4l}-w^{m}-^{iR}: Inversion(l) white-mottled 4 Left white-mottled of Jons son Right

cytology: ***In(l)3Cl-2;20A^{L}3C2-3;20^{R};*** **deficient for** 3C2 and for an undetermined portion, including the centromere, of the base of the *X.*
new order: 1 -3Cl|20A - 3C3|lO2C - 101A.
origin: Recombinant containing left end of *In(l)w^{m4}* and right end of *In(l)w^{m}J,* which is part of ***T(1;4)W"J.***
references: Lefevre, 1963, DIS 37: 49-50.
Lefevre and Wilkins, 1966, Genetics 53: 175-87.
genetics: Deficient for white; male viable and therefore not deficient for *l(l)3C3.* Also deficient for proximal heterochromatin, probably including 66.

In(l)w»SIb

cytology: *In(l)3Cl-2;20;* right break proximal to the nucleolus organizer (Gersh).
origin: X ray induced.
discoverer: Baker, 51bl9.
genetics: Variegated for w and *rst.* Recombinant carrying left end of *In(l)w^{mSib}* and right end of the 4-centric element of *T(l;4)w^{m}J = T(1;4)3C2-3;20;102C* is white eyed and male viable, indicating **that *In(l)w^{mS1}*>,* like *In(l)W»^{4}–~In(l)3Cl-2;20A,*** is broken between 3C1 and 2 (Gersh).

ln(J)$_{w}$m53i

cytology: ***In(l)lA;3C3-5;20;20B-C;20C-F.*** **Inferred** from origin.
new order: 20 - 3C5|20C|lA - 3C3|20F-20. Tentative.
origin: X ray induced in *In(l)EN = In(l)lA;20;20B-C.*
discoverer: M. A Bender, 53j.
references: 1955, DIS 29: 69.
genetics: Variegated for *w.*

In(1)wm541

cytology: ***In(l)3C3-5;20D.***
origin: Neutron induced.
discoverer Mickey, 5413.
references: 1963, DIS 38: 29.
genetics: Variegated for *w,*

ln(lh^{m5Sb}

cytology: ***In(l)lA3-4;3C3-5;20;19F-20Al;20Al-F.*** Inferred from origin. Appears as a rod in metsphase.
new order: 20 - 3C5|20Al|lA4 - 3C3|20F«20. Tentative.
origin: X-ray-induced derivative of *R(l)2 = R(1)1A3-4;19F-2OA1* opened in inverted order.
discoverer: M. A Bender, 55b28.
references: 1955, DIS 29: 69.
genetics: Variegated for *w.*

ln(l)w<»^{J}; Inversion(l) white-mottled of Jonsson

cytology: ***In(l)3C2-3;20.***
origin: Associated with *T(l;4)w™J = T(1;4)3C2-3;20;102C.*

In(1)w^{lt}>^{Jl}-rst^{3R}: Inversion(T) white-mottled of Jonsson Left roughest-3 Right

cytology: ***In(l)3C2-3:20^{L}3C3-4;20B^{R};*** **deficient for** 3C3.
origin: Recombinant carrying left end of *In(l)w^{m}J,* which is part of *T(l;4)w^{m}J,* and right end of ***In(l)rst3.***
references: Lefevre, 1963, DIS 37: 49—50.
Lefevre and Wilkins, 1966, Genetics 53: 175-87.
genetics: Deficient for *1(1)3C3* but not *w.*

ln(l)w^{m}Mc: Inversian(l) white-mottled of McLean

cytology: *In(l)3Cl-2;20A-C;* inferred from genetic data.
origin: X ray induced.
discoverer. McLean.
references: Muller, 1946, DIS 20: 68.
genetics: Variegates for *w* and *rst.* Complementary single recombinants between *In(l)w^{m4} =In(l)3Cl-2;20A* and *In(l)W"Mc* $_{are}$ viable, fertile, and 66^{+}. Left breakpoints therefore identical and right breakpoints on the same side of 66.

In(l)w*C: Inversion(l) white-variegated of Catcheside

cytology: *ln(l)3C1-2; 19-20* superimposed on ***R(1)1A3-4;19F-2OA1.***
new order: |lA4 - 3C1J19- 3C2|20«20F - 20Al|.
origin: X ray induced in *R(l)2.*
discoverer Catcheside.
references: Hinton, 1955, Genetics 40: 952—61.
genetics: Variegates for *w, rst, spl,* and *N* but not y. *X/Y* male viability reduced; *X/Y/Y* male more viable. Characterized by variable degree of instability manifested by production of gynandromorphs, *X/0* males, and dominant lethals. An extreme example gave 140 females, 106 gynandromorphs, 181 *X/0* males, and 868 dominant lethals among 1295 putative ring/rod zygotes. Small ring-shaped duplications are generated infrequently (analysis by Hinton, 1955). Behavior of rod derivatives of *In(l)w^{vC}* (Hinton, 1957, Genetics 42: 55-65) suggests generation of dicentrics through sister-strand fusion rattier than exchange. Fusion postulated to occur in heterochromatin of the 3C1J19 reunion point of *In(I)w^{vC}.* Mitotic abnormalities in cleavage of *In(l)w^{vC}* embryos described (Hinton, 1959, Genetics 44: 923-31). Chromosome tends to become stable in stocks. Viability and fertility correlated with stability.

In(l)y^{3P}: Inversion(l) yellow-3 of Patterson

cytology: *In(l)lA;20.* Reported as *In(l)lBl-2;20* by Muller and Prokofyeva (1935), but this is contradictory to subsequent observations placing *y* in 1A.

origin: X ray induced.

discoverer: Patterson, 31e25.

references: Muller, 1935, Genetica 17: 237-52. Muller and Prokofyeva, 1935, Proc. Natl. Acad. Sci. U.S. 21: 16-26. Sidorov, 1936, Biol. Zh. (Moscow) 5: 3-26.

genetics: Variegated for *y* and, to a lesser extent, for *Hw*. Genetic breaks between *1(1)J1* and *y* and between *bb* and centromere. Inversion slightly longer than *In(l)sc^{8}*.

ln(l)y3Pl-s$_C$8R: Inversion(l) yellow-3 of Patterson Left scute-8 Right

cytology: *In(l)lA;20^{L}lB2-3;20B-Dl^;* deficient for 1A-B2.

origin: Recombinant containing left end of *In(l)y^{3P}* and right end of *In(l)sc^{s}*.

references: Muller, 1935, J. Heredity 26: 469-78.

genetics: Deficient for y and ac but not *1(1)J1, sc,* or *bb*. Male viable.

WVy*

cytology: *In(l)lA8-Bl;l8A3-4* (Norton and Valencia, 1965, DIS40: 40).

origin: X ray induced.

discoverer. Serebrovsky.

references: Dubinin and Friesen, 1932, Biol. Zentr. 52: 147-62. Sturtevant and Beadle, 1936, Genetics 21: 554—604.

genetics: Mutant for *y*. Right break between *1(1)J1* and ac; left break between fu on left and *sby, smd,* and coc on right; shown by deficiency of ***In(l)y*^{L}8C^{9R}* for ac, *sby, smd,* and coc but not** *1(1)]1* or *fu* (Norton and Valencia, 1965). *In(l)y^{4}/+* female produces about 2 percent exceptional sons from four-strand double exchange in the inverted regions; *In(l)y^{4}/+/Y* female produces about 7 percent secondary exceptions (Sturtevant and Beadle, 1936).

ln(J)y^{4t}-sc^{4R}: Inversion(l) yellow-4 Left scute-4 Right

cytology: *Jn(l)lA8-Bl;18A3-4^{L}lB3-4;19F-20Cl^{R};* deficient for 1B1-3 and 18A4-19F.

origin: Recombinant containing left end of *In(l)y^{4}* and right end of *In(l)sc^{4}*.

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Deficient for ac, *sc, car,* and *M(l)n* but not *pn, rat,* or o*. Heterozygous female Minute and poorly viable but fertile. Male lethal.

/ttfJiriLscSR; *Inversiond) yellow-4 Left scute-8 Right*

cytology: *In(l)lA8-Bl;18A3-4^{L}1B2-3;2OB-Dl;*** deficient for 1B1-2 and 18A4-20B.

origins Recombitmnt containing left end of *ln(l)y^{4}* and right end of *lrt(*ljsc*.

references: Sturtevant and Beadle, 1936, Genetics 21: 554-604.

genetics: Deficient for *ac, car, M(l)n,* and *bb* but not *svr;* either deficient for *y* or carries *y^{4}*. Heterozygous female Minute and poorly viable but fertile. Male lethal.

ln(l)y^{4L}sc^{9R}: Inversion(l) yellow-4 Left scvte-9 Right

cytology: *In(l)lA8-Bl;l8A3-4^{L}lB2-3;l8B8-9*;* deficient for 1B1-2 and 18A4-B8.

origin: Recombinant containing left end of *In(l)y^{4}* and right end of *In(l)sc^{9}*.

references: Norton and Valencia, 1965, DIS 40: 40.

genetics: Deficient for *ac, sby, smd,* and *coc* but **not *1(1)J1, fu, hdp, bkl, obi, crk, ton, bk, Oil,* or** *pph.* Either deficient for *y* or carries *y^{4}*. Male lethal.

****ln(l)yS***

cytology: *In(l)lA-B;14D* (Muller and Raffel).

discoverer: Patterson.

genetics: Mutant for y. Recessive lethal associated with right breakpoint.

****ln(l)y^{G}: Inversion(l) yellow of Goldschmidt***

cytology: *In(l)lA;lC3-4* (Kodani).

origin: Spontaneous.

discoverer Goldschmidt.

synonym: *In(l)yP^{x} ^{bt}*.

genetics: Mutant for y.

****ln(l)z2: Inversion(l) zeste***

cytology: *Dp(l;l)2C10-Dl;4D2-4;18F-19A.*

new order: 1 - 4D2|l8F - 2Dl|l9A - 20.

origin: X ray induced.

discoverer: Gans.

references: 1953, Bull. Biol. France Belg., Suppl. 38: 1-90.

JnjflJK; *seeln(l)mK*

ln(1LR)l-vl39: Inversion(lLR) lethal-variegated

cytology: *In(lLR)3C6-7.*

origin: X ray induced.

discoverer Lindsley, Edington, and Von Halle.

references: 1960, Genetics 45: 1649—70. Gersh, 1965, Genetics 51: 477-80 (fig.).

genetics: Variegated for *w, rst,* and a lethal; requires two *Y* chromosomes for survival; *X/Y/Y* male fertile. Recombinant carrying left end of the ***4^{D}X^{p}* element of *TXl;4)w™5 = T(l;4)3C3-4;101Fl-2*** and right end of *In(lLR)l-vl39* variegates for *w* but not for *rat* or the lethal.

****ln(JLR)sc260.25: Inversion(lLR) scute***

cytology: *Jn(lLR)lB2-3.*

origin: X ray induced.

discoverer. Sutton, 39k.

synonym: *Tp(l)4sc^^0-25,*

references: 1940, Genetics 25: 628—35 (fig.).

genetics: Mutant for sc; variegated for *y* and *ac,* but not svr. Genetic tests indicate loci of *1(1}J1, y* and *ac* are located at the base of *X* to the right of 64. Sutton judged it to be a transposition of 1A1-B2 into the proximal heterochromatin, but since this requires three breaks with one to the left of 1A1, a pericentric inversion is deemed more probable. Recombination between ***In(1LR)sc$^{260-25}$***

and a normal sequence yields *Df(l)sc$^{260\sim 2S}$* = *Df(l)lB2-3* and *Dp(l;l)sc2 60-25* = *Dp(l;l)lB2-3.* The deficiency is deficient for *1(1)]1, y,* and ac (Sutton, 1940).

ln(lLR)sc^1: Inversion(lLR) scute of Valencia

cytology: *In(lLR)lA8-C3;* inferred from genetic results.
origin: Gamma ray induced.
discoverer: J. I. Valencia, 46h23.
synonym: *Jnp(l)sc^{vl}* (*Inp* symbolizes a pericentric inversion).
references: Muller and Valencia, 1947, DIS 21: 69—70.
genetics: Mutant for *ac* and sc. A single exchange between *In(lLR)sc^{vl}* and a normal *X* chromosome produces one recombinant with the left end of *In(lLR)sc^{v}l* that is deficient for the tip of *X, Df(l)sc^{vi},* and one with the right end of *In(lLR)sc^{v}** that is duplicated for the tip of *X, Dp(l;l)sc^{v}l.* Left break between ac and *M(l)Bld* based on observation that *Dp(l;l)sc^{vi}* is duplicated for ac, and *Df(l)sc^{Vi}* is deficient for ac but not *M(l)Bld.* Right break in *XR. Dp(l;l)sc^{vi}* carrying *y* in normal position and y^{+} in duplicated region provides an excellent marker system for right end of the *X.*

****ln(2)bw^{R1s}: Inversion(2) brown-Rearranged***

cytology: *ln(2)40F-41A;59E4-Fl.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R1}8.*

****ln(2)bw*3****

cytology: *In(2)40F-41A;59Dll-El.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R3S}.*

****ln(2)bw*45***

cytology: *In(2)40F-41A;59E3-4.*
origin: X-ray-induced derivative of *bw.*
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with *bw^{R4S}.*

****ln(2)bw^{R47}***

cytology: *In(2)40'41;59Dll-El.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with *bw^{R47}.*

****ln(2)bw*56***

cytology: *In(2)40F-41A;59D-E.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with *bw^{RS6}.*

****ln(2)bw^{R67}***

cytology: *In(2)4QF-41A;59E4-Fl.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R67}.*

****ln(2)bw*73***

cytology: *In(2)40F-41A;59E4-Fl.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R7}3,*

****1n(2)bw*79***

cytology: *In(2)40F-41A;59F2-3.*
origin: X ray induced.
discoverer: Slatis, 50g26.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R7}\$.*

ln(2)C56: lnversion(2)* Crossover *suppressor

cytology: *In(2)40-41;59B;* position of left breakpoint in relation to centromere not determined.
origin: X-ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination between *b* and sp strongly reduced.

ln(2)C113

cytology: *In(2)40-41;46D;* position of left break with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between *b* and *sp* reduced.

ln(2)CU2

cytology: *In(2)36B-C;40-41;* position of right breakpoint with respect to centromere not determined. May contain a *T(2;3).*
origin: X ray induced.
disoveren Roberts, 1965.
genetics: Homozygous viable. Recombination between *al* and *b* reduced rather sharply.

H2K224

cytology: *ln(2)25E;40-41;* position of right breakpoint with respect to centromere not determined,
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between *al* and *b* virtually eliminated.

ln(2)C282

cytology: *In(2)31E;40-41;* position of right b*e»kpoint with respect to centromere not determined.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous viable. Recombination between *al* and *b* strongly reduced.

****ln(2L)SJd***

cytology: *In(2L)25A;29F.*
origin: Neutron induced.
discoverer: Mickey, 53d4.
references: 1963, DIS 38: 29.
other information: Eye color mottled.

tn(2L)A

cytology: *In(2L)26A;33E.*
origin: Naturally occurring inversion.
discoverer: Oshima and Watanabe.
references: 1965, DIS 40: *BB.*

In(2L)ast™2: Inversion(2L) asteroid-reverted
cytology: *In(2L)21E2-3;31.*
origin: X ray induced inas(.
discoverer: E. B. Lewis, 1942.
references: 1945, Genetics 30: 158.
genetics: Partial reversion of *ast.*

In(2L)C123: Inversion(2L)* Crossover *suppressor
cytology: *In(2L)23D-E;38C;39A.*
new order: 21 - 23D|39A - 38C|23E - 38C|39A - 60.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *2L.*

In(2L)C127
cytology: *In(2L)23C;32A.*
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous viable. Recombination between *al* and *b* virtually eliminated.

In(2L)C236
cytology: *In(2L)22B;25F.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between al and *b*reduced.

In(2L)C263
cytology: *In(2L)24C;2SF;26F;* 25F-26F missing.
new order: 21 - 24C|25F - 24C|26F - 60.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: *In(2L)C263/SMl* and *In(2L)C263/SM5* females nearly sterile. Recombination reduced in *2L.* Homozygous lethal.

In(2L)Cy: Inversion(2L) Curly
cytology: *In(2L)22Dl-2;33F5-34Al.*
origin: Naturally occurring inversion.
discoverer: Ward, 2If.
references: 1923, Genetics 8: 276—300. Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 20.
genetics: Exists with and without *Cy.* Homozygous viable without *Cy.* Crossing over in *In(2L)Cy/+* heterozygote greatly reduced in *2L.*
other information: The combination of *In(2L)Cy + In(2R)Cy* often used to balance chromosome 2. Balancers usually carry a dominant such as Cy, S^2, *Bl,* or L^4 and one or more of the following: a/2, *dptvl, dp^{lv}l, E(S), b, pr, ltf, cn^2, bw^{45a}, sp^2, ar^{45a}.

tn(2L)Cyl-t*: Inversion(2L) Curly-Left t-Right
cytology: *In(2L^2Dl-2;33F5-34A1^22D3-EI;34A8-9^R.* Deficient for 22D2 and 34A1-8.
origin: Recombinant carrying left end of *In{2L)Cy* and right end of *In(2L)t.*
discoverer: Bridges.
references: Morgan, Bridges, and Schultz, 1937, Carnegie lust. Wash. Year Book 36: 300—1.
genetics: Acts as suppressor of S; usually carries *Cy.*

In(2L)dp^{olvR}: Invershn(2L) dumpy-oblique lethal vortex Ruffled
cytology: *In(2L)25A;25B3-4.*
origin: X ray induced.
discoverer: Schultz, 33a25.
genetics: Mutant at *dp.* Homozygous lethal.

In(2L)ho40: Inversion(2L) heldout
cytology: *In(2L)21D4-El;22E2-3.*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
synonym: *In(2L)ho.*
references: 1945, Genetics 30: 137—66.
genetics: Mutant for *ho* but not S or *ast.* Homozygous male sterile.

In(2L)K
cytology: *In(2L)22D;26B.*
discoverer Oshima and Watanabe.
references: 1965, DIS 40: 88.

In(2L)lt'»2: Inversion(2L) light-mottled
cytology: *In(2L)22F-23A;40B-F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

In(2L)lt">20
cytology: *In(2L)32C;40B-F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

In(2L)lt">26
cytology: *In(2L)27C;40B-F.*
origin: X ray induced,
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

In(2L)Ml: tnversion(2L) of Mourad
cytology: *In(2L)38E;40F.*
origin: Spontaneous.
discoverer Mourad and Mallah.
references: 1960, Evolution 14: 166-70.

In(2L)M2
cytology: *In(2L)2lF;33A.*
origin: Spontaneous.
discoverer Mourad and Mallah.
references: 1960, Evolution 14: 166—70.

In(2L)NS: Inversion(2L) from Nova Scotia
cytology: *In(2L)23E2-3;35Fl-2* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 292).
origin: Naturally occurring inversion.
discoverer Sturtevant, 13i.
synonym: *CIIL; C2L.*
references: Sturtevant, 1919, Carnegie Inst. Wash. Publ. No. 278: 305-41.
genetics: Crossing over in *2L* greatly reduced; none between S and *b;* 0.3 percent between *b* and *pr.*

In(2L)t: Inversion(2L) t
cytology. *In(2L)22D3-El;34A8-9* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 292).
origin: Naturally occurring inversion.

discoverer: Bridges, 21a30.
synonym: *C(2;3); C(2L)T; C(2L)HR.*
references: Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 20.
other information: Found in many natural populations (e.g., Waiters, 1944, Texas Univ. Publ. 4445: 129-74; Oshima and Watanabe, 1965, DIS 40: 88).

ln(2L)Tg: lnversion(2L) Tegula
cytology: *In(2L)2l6;22F.*
origin: X ray induced.
discoverer: E. B. Lewis, 1962.
references: Mora, 1963, DIS 38: 32.
genetics: Associated with *Tg.*

**ln(2LR)40d*
cytology: *In(2LR)26D;41A-B.*
origin: X ray induced.
discoverer: T. Hinton and Atwood, 40d.
references: Demerec, Kaufmann, Sutton, and Fano, 1941, Carnegie Inst. Wash. Year Book 40: 225-34.
Hinton, 1942, DIS 16: 48.
genetics: Variegated for a dominant dark eye color and irregular facets; more extreme at low temperature. Homozygous lethal. Certain stocks containing *In(2LR)40d* fail to grow on media lacking RNA or adenine (Hinton, Ellis, and Noyes, 1951, Proc. Natl. Acad. Sci. U.S. 37: 293-99). This was true at pH 7.0 but not at pH 5.0 (Ellis, 1959, Physiol. Zool. 32: 29-39).

ln(2LR)102
cytology: *In(2LR)26A;51C + In(2R)41;57A.*
new order: 21 - 26A|51C - 41 |57A - 51C|26A - 41 |57A - 60.
origin: X ray induced in ds^{w} sp^{3}.
discoverer: R. F. Grell, 53k.
references: Kramer and Lewis, 1956, J. Heredity 47: 132-36.
Grell and Lewis, 1956, DIS 30: 71.
other information: Useful as a balancer.

**ln(2LR)aM60. lnversion(2LR) arc* of Meyer
cytology: Breakpoints unknown.
origin: X ray induced.
discoverer: Meyer, 60f.
references: 1963, DIS 37: 50.
genetics: Associated with $a^{M6\circ}$.

**ln(2LR)alM60. lnversion(2LR) aristaless* of Meyer
origin: X ray induced.
discoverer Meyer, 60f.
references: 1963, DIS 37: 50.
genetics: Mutant for a/. Homozygous lethal. Inversion inferred from crossing over inhibition in *2L* and *2R.*

**ln(2LR)ah: lnversion(2LR) aristaless-variegated*
cytology: *In(2LR)21B-Cl;41.*
origin: X ray induced.
discoverer: E. B. Lewis, 1940.
references: 1945, Genetics 30: 137—66.
genetics: Variegated for *at.* Homozygous lethal.

ln(2LR)bwR3: lnversion(2LR) brown-Rearranged
cytology: *In(2LR)40F;SlF;55E;57E;58DS-9.*
new order: 21 - 40F|55E - 51F|57E - 55E|57E - 59D8|51F - 40F|59D9 - 60.
origin: X-ray-induced derivative of *bw.*
discoverer: Slatis, 48kl6.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw&3.*

**ln(2LR)bw*20*
cytology: *In(2LR)40D;59D5-6.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with $bwR20_{t}$

**ln(2LR)bw*5S*
cytology: *In(2LR)24Bl-D;42B + In(2R)40F' 41A;59D4-5.*
new order: 21 - 24D|42E - 41A|59D4 -42E|24E1 - 40F|59D5 - 60.
origin: X ray induced.
discoverer: Slatis, 50d23.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^SS.*

ln(2LR)bwV1: lnversion(2LR) brown-Variegated
cytology: *In(2LR)21C8-Dl;60Dl-2 + In(2LR)40F;59D4-El.*
new order. 21A - 21C8|6OD1 - 59El|40F - 59D4|40F - 21Dl|60D2 - 60F.
origin: X ray induced.
discoverer: Muller, 1929.
synonym: *Ins(2LR)Pm: Inversion(2LR) Plwn.*
references: 1930, J. Genet. 22: 299-334 (fig.).
Glass, 1934, J. Genet. 28: 69-112 (fig.).
1934, Am. Naturalist 68: 107-14.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.
genetics: Mutant for *ds;* variegated for *It, bw, mi,* and *abb. al** arose after origin. Double crossovers in *2L* but not *2R* fairly frequent. Single exchange in region 21D1-40F of *2L* between $In(2LR)bw^{v}$* and a normal sequence produces a recombinant carrying left end of normal chromosome 2, which is duplicated for 21A1-C8 and deficient for 60D2-F5. Heterozygote for this recombinant poorly viable, fertile, brown-Variegated, Minute, and dwarf with pebbled arc wings; deficient for locus of *M(2)c.* Reciprocal recombinant deficient for 21A1-C8 and duplicated for 60D2-F5; heterozygote poorly viable, fertile, *bw* Minute giant;* deficient for *al* and *M(2)21Cl-2.*

In(2LR)bw^{V29}
origin: X ray induced.
discoverer: Van Atta.
references: 1932, Genetics 17: 637-59.
genetics: Variegated for *bw.* Breaks most probably just to the left of centromere and near *bw.*

ln(2LR)kwV30kl
origin: X ray induced.
discoverer Van Atta.
references: 1932, Genetics 17: 637-59.
genetics: Variegated for *kw.* Breaks most likely just to the left of centromere and near *hw.*

In(2LR)bw^{V32}
cytology: *lti(2LJR)40F;S9E.*

origin: X ray induced.
discoverer: Dobzhansky, 32g6.
synonym: *In(2LR)Pm^3: Inversion(2LR) Pltxm-2.*
references: Schultz and Dobzhansky, 1934, Genetics 19: 344-64.
Schultz, 1936, Proc. Natl. Acad. Sci. U.S. 22: 27-33.
genetics: Variegated for *bw.*

ln(2LR)C251: lnvershn(2LR)* Crossover *suppressor
cytology: *In(2LR)36F;57B.*
origin: X ray induced,
discoverer Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *2R.*

ln(2LR)D
cytology: *In(2LR)36F;49B.*
discoverer: Oshima and Watanabe.
references: 1965, DIS 40: 88.

In(2LR)dp:* see *T(2;3)dp

ln(2LR)Gla: lnversion(2LR) Glazed
cytology: *In(2LR)27D;51E* superimposed on *In(2L)22Dl-El;33F4-34A9* (Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293; Grell and Grell, 1962, DIS 36: 71).
new order: 21 - 22Dl|33F5 - 27D|51E - 34A9|22E1 - 27D|51E - 60.
origin: X ray induced in chromosome containing *In(2L)Cy = In(2L)22Dl-2;33F5-34Al* or *In(2L)t = In(2L)22D3-El;34A8-9.*
genetics: Associated with *Gla.* Effective crossover suppressor; no single or double crossovers recovered to the left of c (Alexander, 1952, Texas Univ. Publ. 5204: 219-26).

ln(2LR)lt"3: lnversion(2LR) light-mottled
cytology: *In(2LR)40B-F;60D.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

****ln(2LR)lt'«9***
cytology: *In(2LR)40B-F;S6E.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

ln(2LR)ltmi2
cytology: *In(2LR)40B-F;60D.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

****ln(2LR)lt'*22***
cytology: *In(2LR)40B-F;S9D.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

****ln(2LR)lt>»2S***
cytology: *ln(2LR)40B'F;57C-D.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

****ln(2LR)lt>*33***
cytology: *In(2LR)40B-F;58E.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

ln(2LR)0: lnversion(2LR) of Oster
cytology: *In(2LR)30E-F;50C10-Dl* superimposed on *In(2L)22D1-2;33F5-34Al+In(2R)42A2-3;58A4-Bl* (Lindsley).
new order: 20 - 22Dl|33F5 - 3OF|5OD1 - 58A4|42A2 - 34Al|22D2 - 30E|50C10 - 42A3|58B1 - 60.
origin: X ray induced in *In(2L)Cy +In(2R)Cy, Cy dp^{lvI}pr ct\2.*
discoverer: Oster.
references: 1956, DIS 30: 145.
other information: Used as a balancer for chromosome *2,* described as *CyO* in the section on balancers.

In(2LR)Pnt:* see *In(2LR)b$_W$vi

In(2LR)Pm»:* see *In(2LR)bwV32g

****ln(2LR)pxS2g;. InversionQLR) plexus***
origin: X ray induced in en *crs.*
discoverer: Iyengar and Meyer, 52g.
references: 1956, DIS 30: 73.
Meyer, 1956, DIS 30: 81.
1958, DIS 32: 83.
genetics: Mutant for px. Pericentric inversion with breakpoints between *dp* and 6 and between *px* and *sp.* Homozygous female fertile but male sterile. Male genitalia rotated. Sterility factor not allelic to a6 and not covered by duplication in *bw$^+$Y,* as is crs, the male sterility factor present in original chromosome.

ln(2LR)Px4: lnversion(2LR) Plexate
cytology: *In(2LR)22A3-Bl;60B-C^;21 C8-D1;6OD1-2^R + In(2R)42A2-3;58A4-Bl;* deficient for 60B-D1 and duplicated for 21D1-22A3.
new order: 21A - 22A3|60B - 58B1 |42A3 - 58A4|42A2 - 21Dl|60D2 - 60F.
origin: Synthetic. This chromosome is a recurrent product of recombination in region 33F-40F between *In(2LR)21C8-Dl;60Dl-2* from *ln(2LR)bw^{V1} \jn(2LR)2lC8-Dl;60Dl-2 + In(2LR)40F;59D4-El]* and *ln(2LR)22A3-Bl;60B-C* from *SMI [jn(2L)Cy = In(2L)22Dl-2;33F5-34Al + In(2LR)22A3-Bl;60B-C + In(2R)Cy =In(2R)42A2-3;S8A4-Bl].* Recombinant carries tip of *2L* and *In(2R)Cy* from *SMI* and tip of 2R and most of *2L* from *In(2LR)bwVi.* The reciprocal recombinant is *In{2LR)S56f.*
discoverer: Thompson.
references: Burdick, 1956, DIS 30: 69.
genetics: Deficient for *bs,* 6a, *Pin, Px,* and probably sp; duplicated for S.

ln(2LR)Rev: Inversion(2LR) Revolute
cytology: *In(2LR)40F;52Dl0-El* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293).
origin: X ray induced.

discoverer: Dobzhansky, 31b5.
genetics: Variegated for *It* and .Rev.

ln(2LR)Rev&: lnversion(2LR) Revolute of Bridges

cytology. *In(2LR)40;52C-E* (E. B. Lewis).
origin: Spontaneous.
discoverer: Bridges, 36e22.
synonym: *In(2LR)Rvd.*
references: Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293.
genetics: Mutant or variegated for *Rev.*

ln(2LR)S56f: lnversion(2LR) Star

cytology: *In(2L)22Dl-2;33F5-34Al + In(2LR)21C8-Dl;60Dl-2^{L}22A3-Bl;60B-CR + ln(2LR)40F;59D4-El;* deficient for 21D1-22A3 and duplicated for 60B-D1.
new order: 21A - 21C8|60Dl - 59El|40F - 59D4J40F - 34Al|22Dl - 33F5|22D1 - 22Bl|60C - 60F.
origin: Synthetic. This chromosome is a recurrent product of recombination in region 33F-40F between *In(2LR)21C8-Dl;60Dl-2* from *In(2LR)bw^{vl} \jn(2LR)21C8-Dl;60Dl-2 + In(2LR)40F;59D4-El]* and *In(2LR)22A3-Bl;60B-C* from *SMI \jn(2L)Cy = In(2L)22Dl-2;33FS-34Al + In(2LR)22A3-Bl ;60B-C + In(2R)Cy =In(2R)42A2-3;58A4-Bl* Recombinant carries the tip of *2L* and *In(2LR)40F;59D4-El* from *In(2LR)bwVl* and the tip of *2R* and *In(2L)Cy* from *SMI.* Reciprocal recombinant is *In(2LR)Px^{4}.*
discoverer: Thompson.
references: Burdick, 1956, DIS 30: 69.
genetics: Deficient for S; duplicated for Px.

ln(2LR)S325

cytology: *In(2LR)21D2-3;21D3-E2;21E2-3;41.*
new order. 21A - 21E2|41 - 21D3|41 - 60. Tentative.
origin: X ray induced in *Dp(2;2)S = Dp(2;2)21D2-3;21E2-3.*
discoverer E. B. Lewis.
genetics: Break in *2L* either in or between duplicated segments of *Dp(2;2)S.*

****ln(2LR)SK: lnversion(2LR) Star of Krivshenko***

cytology: Breakpoints near ends of *2L* and *2R.*
discoverer: Krivshenko.
references: 1936, DIS 5: 8.
genetics: Associated with *S^{K}.*

ln(2LR)SMh lnversion(2LR) Second Multiple

cytology: *In(2LR)22A3-Bl;60B-C* superimposed on *In(2L)22Dl-2;33F5-34Al + In(2R)42A2-3;58A4-Bl.*
new order 21 - 22A3|&0B - 58B1 [42A3 - 58A4|42A2 - 34Al]22D2 - 33F5J22D1 - 22B1 |6OC - 60F.
origin: X ray induced in *In(2L)Cy + In(2R)Cy.*
discoverer R. F. Grell, 1953.
references: 1953, DIS 27: 58.
genetics: The pericentric inversion, *In(2LR)22A3-B1;6QB-C,* enhances balancing power of *In(2L)Cy + In(2R)Cy* since it causes the single crossover between the two *Cy* inversions to yield complementary products that are dominant lethal.
other information: Used as a balancer for chromosome *2,* described as *SMI* in the section on balancers.

ln(2LR)SM5

cytology: *In(2L)21D2-3;36C + In(2L)29C-E;40F + In(2R)42D;53C;58F* superimposed on *In(2L)22Dl-2;33F5-34A1 + In(2LR)22A3-Bl;60B-C + In(2R)42A2-3;58A4-Bl.* Duplicated for regions 42A3-D and 58B1-F.
new order: 21A - 21D2|36C - 40F|29C - 22D2|34A1 - 36C|21D3 - 22A3|60B - 58Bl|42A3 - 42D|42D - 42A3|58B1 - 58F|53C - 42D|53C - 58A4|42A2 - 40F|29E - 33F5|22D1 - 22Bl|60C - 60F.
origin: X ray induced in several steps in *In(2LR)SMl.*
discoverer: R. F. Grell, 1955.
references: Mislove and Lewis, 1955, DIS 29: 75.
genetics: Variegated for *It* owing to *In(2L)29C-E;40F. In(l)SM5/M(2)l* lethal (C. Hinton); probably related to break in 58F.
other information: Excellent balancer for all of chromosome *2,* described as *SM5* in the section on balancers.

ln(2LR)U: lnversion(2LR) Upturned

origin: X ray induced.
discoverer Ball, 32a27.
references: 1935, DIS 3: 17.
genetics: Associated with *U.*

ln(2R)41-47

cytology: *In(2R)41A;47A.*
origin: X ray induced simultaneously with *T(l;2)B*>d.*
discoverer: Bridges.
references: Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 291.
genetics: Probably not separable from *T(l;2)B^{bd} = T(l;2)16Al-2;48C2-3.*

****ln(2R)bw^: lnversion(2R) brown-Auburn***

cytology: *In(2R)41;59D.*
origin: X ray induced.
discoverer: Dubinin.
synonym: *In(2R)Pm^{D1}.*
references: 1936, Biol. Zh. (Moscow) 5: 851-66,
genetics: Variegated for *bw* and *mi;* variegation for *bw* dominant to *bw.* Dubinin claims brown-Variegated effect exists at both ends of the inversion.
other information: Ninety-one secondary rearrangements derived from irradiation of *In(2R)bw^{A}* analyzed by Dubinin.

****ln(2R)bw^{AL}Cy^{R}; lnversion(2R) brown-Auburn Left Curly-Right***

cytology: *ln(2R)4t;59D^{L}42A2-3;$8A4~Bl^{R};* deficient for 41-42A2 and duplicated for 58B1-59D.
origin: Recombinant carrying left end of *In{2R)bw^{A}* and r%ht end of *In(2R)Cy.*
references: Dubinin, 1936, Biol. Zh. (Moscow) 5: 851-66.
genetics: Variegated for *bw;* Minute, presumably owing to deficiency for *M(2)S2.* Wings divergent with incised inner margins.

In(2R)bw^{R32}: Inversion(IR) brown-Rearranged
cytology: *In(2R)41A;59D.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R32}*.

In(2R)bw*33
cytology: *In(2R)41;59D~E.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R33}*.

In(2R)bwV2: Inversion(2R) brown-Variegated
origin: X ray induced,
discoverer: Harris, 1929.
references: Muller, 1930, J. Genet. 22: 299—34.
Glass, 1933, J. Genet. 28: 69-112.
1934, Am. Naturalist 68: 107-14.
genetics: Variegated for *bw.* Linkage data indicate that one break is just to the right of centromere.

In(2R)bwV7
origin: X ray induced.
discoverer: Winchester, 1932.
references: 1938, DIS 9: 23.
Glass, 1939, DIS 12: 47.
genetics: Variegated for *bw.* One break at *bw* and another to the right of spindle attachment of *2R.* Gives viable recombinants with *In(2R)Cy* = *In(2R)42A2-3;S8A4-B1.*

In(2R)bwV3Okio
origin: X ray induced.
discoverer. Van Atta, 30klO.
references: 1932, Genetics 17: 637—59.
genetics: Variegated for *bw.*

In(2R)bwV34k
cytology: *In(2R)41;59E* superimposed on *In(2R)42A2-3;S8A4-B1.*
new order 21 - 41 |59E - 58Bl|42A3 - 58A4|42A2 - 4l|59E - 60.
origin: X ray induced in *In(2R)Cy.*
discoverer: Oliver, 34k22.
references: 1937, DIS 7: 19.
genetics: Variegated for *bw.* Recombination in region 43A3-58A4 between *In(2R)bwV34k+Cy* and a normal sequence produces reciprocal duplication-deficiency types: *D%2R)bwV34*Lc$_y$L + Dp(2R)Cy^{R}bwV3^{4kR} = Df(2R)41;42A2*3 + Dp(2R)58A4-Bl;59* (i.e., 21 - 41J59E - 58BI |42A3 - 60) and *Dp(2R)bwV34kLCyL + D%2R)Cy^{R}bwV3^{4kR} *=Dp(2R)41;42A2-3 + Df(2R)58A4-Bl;59* (i.e., 21 - 58A4J42A2 - 4l|59 - 60).

In(2R)bwV40b
cytology: *In(2R)41A-B;59D-E,*
origin: X ray induced.
discoverer: T. Hinton, 40b.
references: Atwood, 1942, DIS 16: 47.
genetics: Variegated for *bw.*

In(2R)bwV54a
cytology. *In(2R)41A-B;59D4-9.*
origin: Gamma ray induced,
discoverer: Mickey, 54®6.
references: 1963, DIS 38: 29.
genetics: Variegated for *bw.*

In(2R)bwV54b
cytology: *In(2R)41A;60D9-ll* (seems unlikely that right break at 60D9-11; perhaps at 59D9-11).
origin: Neutron induced.
discoverer: Mickey, 54bl2.
references: 1963, DIS 38: 29.
genetics: Variegated for *bw.*

In(2R)bwV54c
cytology: *In(2R)41;59El.*
origin: Neutron induced.
discoverer: Yanders, 54c5.
references: Mickey, 1963, DIS 38: 29.
genetics: Variegated for *bw.*

/n(2RJiwVD»': Inversion(2R) brown-Variegated of Demerec
cytology: *In(2R)41B2-Cl;59E2-4* [Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55].
origin: X ray induced.
discoverer: Demerec, 33i28.
genetics: Variegated for *bw.*

In(2R)bwVD°U-CyR. Inversion(2R) brown-Variegated of Demerec 1 Left Curly-Right
cytology: *In(2R)41B2-Cl;59E2-4^{L}42A2-3;58A4-Bl^R;* deficient for 41C1-42A2 and duplicated for 58B1-59E2.
origin: Recombinant carrying left end of *In(2R)bw^{VDel}* and right end of *In(2R)Cy.*
genetics: Deficient for *M(2)S2* but not *rl* or *M(2)p;* duplicated for *M(2)l, bw,* and mi.

In(2R)bw^{VD*2}
cytology: *In(2R)41A-B;59D6-El* [Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55].
origin: X ray induced.
discoverer: Demerec, 33J14.
genetics: Variegated for *bw.* Left break to the right of rf and right break between *bw* and *mi.*

In(2R)bwVD°2l-CyR; Inversion(2R) brown-Variegated of Demerec 2 Left Curly-Right
cytology: *In(2R)41A-B;59D6-El^{L}42A2-3;58A4-B1^R;* deficient for 41B-42A2 and duplicated for 58B1-59D6.
origin: Recombinant carrying left end of *In(2R)bwV^D*2* and right end of *In(2R)Cy.*
genetics: Duplicated for *M(2)l* and *bw* but not *mi;* deficient for *M(2)S2* but not *rl* or *M(2)p.*

In(2R)bwVI; In(2R)brown-Variegated of Ives
cytology: *In(2R)41A;59D.*
origin: Spontaneous.
discoverer Ives, 38113.
references: 1950, DIS 24: 58.
genetics: Associated with *bw^{VI}*.

In(2R)C72; Inversion(2R) Crossover suppressor
cytology: *In(2R)50E;57F;60D.*
new order: 21 - 5OE|S7F - 60D|57F - 5OE|6OD - 60F.
origin: X ray induced.
discoverer. Roberts and D. Stewart, 1964.

genetics: Homozygous viable. Recombination between *b* and *sp* sharply reduced.

in(2R)C129

cytology: *In(2R)43F;56E.*
origin: X ray induced.
discoverer: Roberts, 1965-
genetics: Homozygous lethal. Recombination between *b* and *sp* reduced.

ln(2R)Cy: lnversion(2R) Curly

cytology: *In(2R)42A2-3;58A4-Bl* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 292).
origin: Spontaneous.
discoverer: L. Ward, 21f.
references: 1923, Genetics 8: 276—300.
Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421:20.
Graubard, 1932, Genetics 17: 81-105.
genetics: Left breakpoint between *ap* and *pk.* Homozygous viable and fertile. Crossing over in *2R* strongly reduced. Carries en^2 in most laboratory stocks,
other information: Used in combination with *In(2L)Cy* as a balancer for chromosome 2.

h(2R)CyLbwV>eiR: lnversion(2R) Curly-Left brown-Variegated* of *Demerec* 7 *Right

cytology: *ln(2R)42A2-3;58A4-B1^41B2-Cl;59E2-4^R;* duplicated for 41C1-42A2 and deficient for 58B1-59E2.
origin: Recombinant carrying left end of *In(2R)Cy* and right end of *In(2R)bw^{VD}*l.*
genetics: Deficient for *M(2)l, bw,* and *mi,* duplicated for *M(2)S2* but not *rl* or *M(2)p.*

ln(2R)Cy'-bwy'>*2R: foyersion(2R) Curly-Left brown-Variegated of* Demerec 2 *Right

cytology: *ln(2R)42A2-3;58A4-Bl^{L}41A-B;59D6-El^R;* duplicated for 41B-42A2 and deficient for 58B1-59D6.
origin: Recombinant carrying left end of *ln(2R)Cy* and right end of *In(2R)bw^{VD}<>2.*
genetics: Deficient for *M(2)l* and *bw* but not *mi;* duplicated for *M(2yS2* but not *rl* or *M(2)p.*

ln(2R)G: lnversion(2R) Gallup

cytology: *In(2R)50E;54D* (T. Hinton).
origin: Spontaneous.
discoverer: Ives.
references: 1957, DIS 31: 83.
genetics: Associated with *N-2G.* Crossing over in *2R* reduced to about 13 percent.

ln(2R)M: lnversion(2R)* of *Mourad

cytology: *In(2R)S4Fl-55A1;58F-59A.*
origin: Spontaneous.
discoverer: Mourad and Mallah.
references: 1960, Evolution 14: 166—70.

***ln(2R)HS: lnversion(2R) from Nova* Scof/a**

cytology: *In(2R)52A2-Bl;56F9-13* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 292-3).
origin: Naturally occurring inversion.
discoverer: Sturtevant, 13i.
synonym: *C(2)R.*
references: Sturtevant, 1919, Carnegie Inst. Wash. Publ. No. 278: 305-41.
1931, Carnegie Inst. Wash. Publ. No. 421: 1-27.
genetics: Crossing over reduced to about 1.5 percent between centromere and inversion and to about 0.1 percent between inversion and tip of chromosome.
other information: Found in many natural populations (e.g., Warters, 1944, Texas Univ. Publ. 4445: 129—174; Oshima and Watanabe, 1965, DIS 40: 88).

In(2R)PmDi.* see *In(2R)bw*

ln(2R)Pu^K: lnversion(2R) Punch of Krivshenko

cytology: *In(2R)41;57E-F,*
origin: X ray induced.
discoverer: Krivshenko, 53k24.
synonym: *In(2R)Pm^K.*
references: 1954, DIS 28: 75.
genetics: Associated with *Pu^K* (Rowan). *Pu^K/Pu^2* is lethal.

ln(2R)vg^u: lnversion(2R) vestigial-Ultra

cytology: *In(2R)49Cl-2;50Cl-2* (Ratty and Lindsley, 1964, DIS 38: 30).
origin: Gamma ray induced.
discoverer: Ives, 55131.
references: 1956, DIS 30: 72-73.
genetics: Associated with *vg^u.* Homozygous lethal.

ln(3)C41: lnversion(3) Crossover *suppressor*

cytology: *In(3)80-8l;91E-F;* position of left breakpoint with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination between *st* and *ca* reduced.

ln(3)C229

cytology: *In(3)67B;80-81;* position of right breakpoint with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between ve and *st* sharply reduced.

ln(3)C289

cytology: *In(3)80-8l;93E;* position of left breakpoint with respect to centromere not determined. May also contain a *T(2;3).*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between *st* and ca reduced.

ln(3)$_P$l00.48; lnvcrsion(3) pink

cytology: *In(3)80-81;85A6~Bl;* position of left breakpoint with respect to centromere not determined.
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for p.

In(3)pi 00.88

cytology: *In(3)80-81;94Dll-El;* position of left breakpoint with respect to centromere not determined.

origin: X ray induced.
discoverer: Alexander,
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for p.

***ln(3L)l00.307**
cytology: *In(3L)62E2-4;64C2-4.*
origin: X ray induced simultaneously with *$100,307*
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.

***tn(3L)100r2**
cytology: *In(3L)76A4-Bl;80* superimposed on ***Dp(l;3)3B4-Cl;4B4-5;80.***
new order: 61 - 76A4|(3C1 - 4B4)|80 - 76Bl|80 - 100.
origin: X ray induced in *Dp(l;3)N264-l00*
discoverer: Gersh, 1959.
synonym: *N264-100,2.*
references: 1959, Genetics 44: 163-72.
genetics: Selected because white variegation darker than *Dp(l;3yN^{26}*-^{100}*. Removes duplication from centromere region.

ln(3L)100r8
cytology: *ln(3L)73Fl-74Al;80* superimposed on ***Dp(l;3)3B4-Cl;4B4-5;80.***
new order: 61 - 73Fl|(3Cl - 4B4)|80 - 74Al|80 - 100.
origin: X ray induced in *Dp(l;3)N^{264}-^{10}0.*
discoverer: Gersh, 1959.
genetics: Selected as a partial reversion of white mottling in *Dp(l;3)N^{264}-$^{10<}$>*. Removes duplication from centromere region.

***h(3L)100rn**
cytology: *ln(3L)65Al-Bl;80* superimposed on ***Dp(l;3)3B4-Cl;4B4-5;80.***
new order, 61 - 65Al|(3Cl - 4B4)|80 - 65Bl|80 - 100.
origin: X ray induced in *DtfltfW^{264}~^{l00}-*
discoverer: Gersh, 1959.
references: 1959, Genetics 44: 163—72.
genetics: Selected as a partial reversion from white-mottled. Removes duplication from centromere region.

***ln(3L)Apt: lnversion(3L) Apart**
cytology: Breakpoints unknown.
origin: X ray induced.
discoverer: Belgovsky, 34e23.
references: 1935, DIS 3: 27.
genetics: Associated with *Apt.*

***ln(3L)Bit: lnversion(3L) Bitten**
cytology: Breakpoints unknown.
origin: X ray induced.
dlscovere*: Lefevre, 48g5.
references: 1949, DIS 23: 5E.
genetics: Associated with *Bit.*

ln(3L)C90: lnversion(3L)* Crossover *suppressor
cytology: *tn(3L)62B;$0C.*
origin; X ray induced,
discoverer: Roberts and D. Stewart, 1964.
genetics: Homozygous lethal. Recombination between *ve* and *st* sharply reduced.

ln(3L)C299
cytology: *In(3L)63C;80.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between ve and *at* virtually eliminated.

ln(3L)C302
cytology: *In(3L)63A;71A.*
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination between ve and *st* virtually eliminated.

ln(3L)D: lnversion(3L) Dichaete
cytology: *In(3L)69D3-El;70C13-Dl* (Bridges).
origin: Spontaneous.
discoverer: Bridges, 15a3.
references: Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301.
genetics: Associated with *D.*

ln(3L)hlO0.12: hversion(3L) hairy
cytology: *In(3L)61A2-3;66D.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *h.*

***ln(3L)h100.239**
cytology: *In(3L)66Dll-12;80C,*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *h.*

***ln(3L)M: lnversion(3L) of Mourad**
cytology: *In(3L)66D;71D.*
origin: Spontaneous.
discoverer: Mourad and Mallah.
synonym: *ln(3L)F =In(3L)66C;71B* of Oshima and Watanabe (1965, DIS 40: 88) probably the same.
references: 1960, Evolution 14: 166—70.

ln(3L)P; lnversion(3L) of Payne
cytology: *In(3L)63C;72El-2* (Bridges and Li in Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).
origin: Naturally occurring inversion.
discoverer: Payne, 17g.
references: 1918, Indiana Univ. Studies 5 No. 36: 1-45.
1924, Genetics 9: 327-42.
Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 18.
genetics: Homozygous viable, although it often contains lethals of independent origin.
other information: Often associated with *ln(3R}P.* Much used as a balancer for *3L.* Allows only about 0.02 percent crossing over between *m* and *st.* Balancers contain recessive lethals or Afe. Balancers for all of chromosome 3 made by combining *Jn(3L)P* with *Jn(3R)P* or *ln{3R)C.* Found in many wild populations (e.g., Waiters, 1944, Texas Univ. Publ.

4445: 129—174; Oshima and Watanabe, 1965, DIS 40: 88).

In(3L)pers: Inversion(3L) persimmon
cytology: *In(3L)63C2-5;73B2-5.*
origin: X ray induced.
discoverer: Demerec, 3712.
references: 1941, OIS 14: 40.
genetics: Associated with *pers.*

**In(3LJ$pr: Inversion(3L) Spread*
cytology: Breakpoints unknown.
origin: X ray induced.
discoverer: Oliver, 32k21.
references: 1935, DIS 4: 15.
genetics: Associated with *Spr.*

**In(3L)th'00.293: Invershn(3L) thread*
cytology: *In(3L)72A2-Bl;76A4-Bl;79A4-Bl.*
new order: 61 - 72A2[79A4 - 76Bl|72Bl - 76A4|79B1 - 100.
origin: X ray induced.
discoverer: Alexander,
synonym: $Tp(3)(h^{100}-^{293})$.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *th.*

In(3LR)65;S3
origin: X ray induced simultaneously with, but subsequently separated from, $T(2;3)Sb^{v}$.
discoverer: E. B. Lewis, 1948.
references: 1956, DIS 30: 76-77.

In(3LR)100rl
cytology: *In(3LR)80;96Bl-3* superimposed on *Dp(l;3)3B4-Cl;4B4-5;80.*
new order 61 - 8O|(3C1 - 4B4)|96B1 - 80[96B3 - 100.
origin: X ray induced in $Dp(l;3yN^{2}64\text{-}100$.
discoverer: Gersh.
references: 1959, Genetics 44: 163—72.
genetics: Selected as an almost complete reversion to wild type of the white-mottled effect of $Dp(l;3)N^{26'}*\text{-}^{\wedge}00$. Duplication removed from region of the centromere.

**In(3LR)100r3*
cytology: *In(3LR)80;86Cl-Dl* superimposed on *Dp(l;3)3B4'Cl;4B4-5;80.*
new order: 61 - 8O|86C1 - 8OJ(3C1 - 4B4)J86D1 - 100.
origin: X ray induced in $Dp(l;3yN^{2}64\text{-}10Q$,
discoverer: Gersh.
references: 1959, Genetics 44: 163—72.
genetics: Does not remove duplication from region of centromere.

**In(3LR)100r7*
cytology: *In(3LR)8Q;99B-Cl* superimposed on *Dpfl; 3)3 B4- Cl;4B4-5;80.*
r»«w order: 61 - 80|99B - 8OJ(3C1 - 4B4)|99€1 - 100.
©rifin: X ray induced in $Dp(t;3pf^{264}\sim^{10}$®>
S s«©v••*m-er.* Germfe,
references: 1959, Genetics 44: 163—72.
genetics: Partial reversion of white-mottled to wild type. Duplication not removed from region of centromere.

In(3LR)100r27
cytology: *In(3LR)80;96B3-5* superimposed on *Dp(l;3)3B4-Cl;4B4-5;80.*
new order: 61 - 8O|(3C1 - 4B4)|96B3 - 80|96B5 - 100.
origin: X ray induced in *Dp(l;3)N264-XO0,*
discoverer: Gersh.
references: 1959, Genetics 44: 163-72.
genetics: Almost complete reversion of the white-mottled to wild type. Break between duplication and centromere.

In(3LR)C35: Inversion(3LR) Crossover suppressor
cytology: *In(3LR)64B;89E.*
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination practically eliminated between *ve* and *st* and reduced between s< and *ca.*

In(3LR)C1J7
cytology: *In(3LR)64D;89B.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination practically eliminated between ve and s£.

h(3LR)C165
cytology: *In(3LR)64C;83C.*
origin: X ray induced.
disocverer: Roberts, 1965.
genetics: Homozygous viable. Recombination between *ve* and *st* virtually eliminated.

In(3LR)C17S
cytology: *In(3LR)65C;95E.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination practically eliminated between ve and *st* and between *st* and ca.

In(3LR)C190
cytology: *In(3LR)69F;89D.*
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced between ve and *st* and between *st* and ca.

In(3LR)C269
cytology: *In(3LR)78C;98F.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination between *st* and *ca* virtually eliminated.

h(3LR)C334
cytology- *In(3LR)67B;88D;91F.*
new order: 61 - 67E|88D - 67EJ91F - 88D|91F - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Hoosozygous lethal. Recombination reduced between ve and *at* and between *&t* and ca.

In(3LR)CxD: Inversion(3LR)* Crossover *SuppressorDichaete

cytology: *In(3LR)71F;85C +In(3LR)80;84A;93F* superimposed on *In(3L)69D3-El;70C13-Dl.*

new order: 61A - 69D3|70C13 - 69El|70Dl - 71F|85C - 84A|80 - 84A|93F - 85C|71F - 80|93F - 100 (Bridges).

origin: X ray induced in *In(3L)D.*

discoverer: Oliver.

synonym: *CxD; Dcx.*

references: Glass, 1933, J. Genet. 28: 70.
Federova, 1937, Dokl. Acad. Nauk SSSR 14: 135-38.

genetics: Carries *D* (separates from other inversions with frequency of 0.2 percent). Crossing over strongly reduced in chromosome *3* except distal half of *3L;* virtually no crossing over between *st* and e.

other information: Name easily confused with what has been called *C(3)x,* which appears to be *In(3L)P +In(3R)P* (Lewis, 1956, DIS 30: 130).

In(3LR)DcxF: Inversion(3LR) Dichaete crossover suppressor of Federova

cytology: *In(3L)62;67* superimposed on *In(3L)69D3-El;70C13-Dl + In(3LR)71F;85C + In(3LR)80;84A;93F.* From Federova's drawings (1937), there appears to be an inversion from about 62 to 67 in addition to a complex rearrangement, **presumably *In(3LR)CxD.***

new order: 61 - 62J67 - 62|67 - 69D3|70C13 - 69El|70Dl - 71F|85C - 84A|80 - 84A|93F - 85C|71F - 80|93F - 100.

origin: X ray induced in *In(3LR)CxD.*

discoverer: Fedorova.

synonym: *In(3LR)CxF; DcxF; CxF.D.*

references: 1937, Dokl. Acad. Nauk SSSR 14: 135-38.

genetics: Carries I>. Crossing over strongly inhibited throughout chromosome *3.*

****In(3LR)Hh Inversion(3LR) Hirsute***

cytology: *In(3LR)71A;91F.*

origin: X ray induced.

discoverer. Bishop, 1939.

genetics: Associated with *Hi.*

****In(3LR)K: Inversion(JLR) of Krivshenko***

cytology: *ln(3LR)6lC6-7;100A-B;* only the left end recovered.

new order: 100F - 100B|61C7 - 100.

origin: X ray induced in oocytes.

genetics: Result of a pericentric inversion followed by an exchange or of a translocation between *3L* of one chromatid and 31? of its sister or homolog.

In(3LR)M-54c:Inversion(3LR)Minute-54c

cytology:*In(3L)73A9-1O;75D7-E1+In(3LR)61C2-3;80C4-5;93B4-5;100B8-9.*

new *mdm:* 61A - 61C2|93B5 - lQOBSlSOCS - 93B4J80C4 - 75El|73A10 - 75D7|73A9 - | - | - 61C3J100B9 - 100F. Also carries ®n inversion with unspecified breakpoints in the region between 61C3 and 73A9.

©rigim Neutron induced.

discoverer: Mickey, 54clO.

references: 1963, DIS 38: 29.

genetics: Mutant or deficient for *M(3)54c* and *st.*

In(3LR)P88

cytology: *In(3LR)61A;89C-D;* deficient for bands in 89C-D.

origin: X ray induced,

discoverer: E. B. Lewis, 55h.

genetics: Deficient for ss but not *bx.*

In(3LR)sep: Inversion(3LR) separated

cytology: *In(3LR)65E;85E* (Lewis, 1951, DIS 25: 108-9).

discoverer: Muller.

genetics: Mutant for sep. Also carries *ri* and p^p, which can be removed only with great difficulty.

In(3LR)mi: Inversion(3LR) Third Multiple

cytology: *In(3L)63C;72El-2 + In(3LR)69E;9lC + In(3R)89B;97D.*

new order: 61 - 63C|72E1 - 69E|91C - 97D|89B - 72E2|63C - 69E|91C - 89B|97D - 100.

origin: Derived from *T(2;3JMe/ri,* presumably by a double crossover with exchanges in regions 72E2-80 and 81-89B, which replaced the *T(2;3)* breakpoint in *3* with *ri.*

discoverer: E. B. Lewis.

references: 1949, DIS 23: 92.
1953, DIS 27: 58.

genetics: Carries *Me, ri,* and sbd^1.

other information: Used as a balancer for chromosome *3,* described as *TM1* in the section on balancers.

In(3LR)TM3

cytology: *Jn(3LR)71C;94D-F + In(3LR)76C;93A + In(3LR)79E;100C* superimposed on X^D3^P from *T(l;3)lA8-Bl;61Al-2 + In(3LR)65E;85E + In(3R)92Dl-El;100F2-3.*

new order: 1A1 - 1A8|61A2 - 65E|85E - 79E|l00C - 1OOF2|92D1 - 85E|65E - 7lC|94D - 93A|76C - 71C|94F - 1OOC|79E - 76C|93A - 92E1|l00F3 - 100F5.

origin: Induced by repeated irradiation of the X^D3^P element of $T(l;3)sc260\text{-}2\ 0_i$ which carried ***bi(3LR)sep + In(3R)C, y^+ ri p sep bx34e $_e$«.***

discoverer E. B. Lewis.

references: Mitchell, 1958, Cold Spring Harbor Symp. Quant. Biol. 23: 279-90.
Lewis, 1960, DIS 34: 51.

other information: Used as a balancer for chromosome *3,* described as *TM3* in the section on balancers.

In(3LR)TM6

cytology: *In(3LR)74;94* superimposed on ***In(3L)63C;72El-2 + In(3LR)61A;89CD + ln(3R)92Dl-El;tOOF2-3.***

new order: 61AJ89C - 74|94 - 100F2|92Dl - 89D|61A - 63C|72E1 - 63CJ72E2 - 74|94 - 92E1J100F3 - 100F5.

origin: X ray induced in *ln(3L)P + In(3LR)P88 +* ***In{3R)C, bx^{A4}® e.***

discoverer E. B. Lewis and F. Bacher, 66i.

SJienetics: Homoanygote lethal. Deficiency for •* but not *bx* associated with *In(3LR)P88-*

other information: Used as a balancer for chromosome *3*. Described as *TM6* in section on balancers.

In(3LR)Ubxl0i*. *!nversion(3LR) Ultrabithorax
cytology: *In(3LR)80;89D9-El.*
origin: X ray induced.
discoverer: E. B. Lewis, 1947.
references: 1949, DIS 23: 59.
genetics: Mutant for *Ubx.*

In(3LR)Ubxi30
cytology: *In(3LR)61A-C;74;89D-E;93B;96A.*
new order: 61A|96A - 93B|89D - 74|61C - 74|89E - 93B|96A - 100.
origin: X ray induced in e^s.
discoverer: E. B. Lewis.
references: 1952, Proc. Natl. Acad. Sci. U.S. 38: 955-60.
1952, DIS 26: 66.
genetics: Mutant for *Ubx;* homozygous lethal. Also carries e°.
other information: A useful balancer for chromosome *3,* described as *TM2* in the section on balancers.

In(3LR)UbxA
origin: X ray induced.
discoverer: Schalet, 1959.
references: 1960, DIS 34: 53, 55.
genetics: Mutant for *Ubx;* homozygous lethal. One breakpoint in *3L* between *h* and *st* and another left of e (probably at *Ubx).*

****In(3R)300.96***
cytology: *In(3R)89F2-90Al;99B2-4.*
origin: X ray induced simultaneously with *e300.96.*
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Carries an independent mutant for e. Homozygous viable but male sterile.

***In(3R)Antp&: Inversion(3R) Antennapedia* of Bacon**
cytology: *In(3R)84A;85E,*
origin: X ray induced.
discoverer: Bacon, 50g.
references: Lewis, 1956, DIS 30: 76.
genetics: Mutant for *Antp.*

****In(3R)Antp^{L}C: Inversion(3R) Antennapedia* o/ Le *Calvez***
cytology: *In(3R)84A5-6;92A5-6.*
origin: Neutron induced.
discoverer: Le Calvez.
references: 1948, Bull. Biol. France Belg. 82: 97—113 (fig.),
genetics: Associated with *Antp^{LC}.*

In(3R)AntpR: Inversion(3R) Antennapedia of Rappaport
cytology: *In(3R)83F;86C* (Ben-Zeev).
origin: X ray induced.
discoverer: Rappaport, 1963.
references: Falfc, 1964, DB 39: 60.
genetics: Associated with *Antp^R.*

In(3R)C
cytology: *In(3R)92Dl-El;100F2-3* (Bridges and Li in Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).
origin: Naturally occurring inversion.
discoverer: Sturtevant, 13f.
synonym: *C3; CIIIRE; In(3R)E.*
references: 1913, Science 37: 990-92.
1917, Proc. Natl. Acad. Sci. U.S. 3: 555-58.
1926, Biol. Zentr. 46: 697-702.
1931, Carnegie Inst. Wash, Publ. No. 421: 1-27.
Muller, 1918, Genetics 3: 422-99.
genetics: Homozygous viable. Crossing over in *3R* reduced to 1 percent between centromere and ss, to 0.2 percent between ss and e; no crossovers between e and tip of *3R* recovered except for rare doubles within inversion.
other information: First inversion demonstrated genetically (Sturtevant, 1926). Used as a balancer for the region from *Dl* to *3R* tip. Balancers contain *Sb,* e, *l(3)a,* or *l(3)e.* Balancer for all of chromosome *3* made by combining with *In(3L)P.* Found in wild populations (e.g., Oshima and Watanabe, 1965, DIS 40: 88).

In(3R)C133: Inversion(3R) Crossover suppressor
cytology: *In(3R)93F;97C-D2.*
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Homozygote rarely survives. Recombination between *st* and ca sharply reduced.

In(3R)C208
cytology: *In(3R)91B;96B.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable with wings held at 45° angle from body axis.

In(3R)cav; Inversion(3R) claret-variegated
cytology: *In(3R)81F;99C-E.*
origin: X ray induced.
discoverer: E. B. Lewis.
genetics: Variegates for *ca.*

In(3R)Cyd: Inversion(3R) Curlyoid
discoverer: Jollos.
references: Curry, 1939, DIS 12: 46.
genetics: Associated with *Cyd.*
other information: May be *In(3R)P.*

In(3R)DlB: Inversion(3R) Delta-Barish
cytology: *In(3R)90A;91A* (Schultz).
discoverer Schultz, 1933.
genetics: Mutant for *Dl.*

****In(3R)elO0.265*. *hversion(3R) ebony***
cytology. *In(3R)93B5-6;95E.*
origin: X ray induced.
discoverer Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for e; homozygous viable.

In(3R)E:* see *In(3R)C

In(3R)hp: Inversion(3R) humped
cytology: Breakpoints unknown.
origin: Spontaneous.

discoverer: Bridges, 31a22.
genetics: Associated with *hp.*

ln(3R)Hu: lnversion(3R) Humeral
cytology: *In(3R)84B2-3;84F2-3;86B4-Cl.*
new order: 61 - 84B2|84F2 - 84B3|86B4 - 84F3|86C1 - 100.
origin: X ray induced,
discoverer: Ruch, 1931.
genetics: Associated with *Hu.*

,ln(3R)J
cytology: *In(3R)96E;98F.*
origin: Naturally occurring inversion.
discoverer: Oshima and Watanabe.
references: 1965, DIS 40: 88.

**ln(3R)K: Inversion(3R) of Kodani*
cytology: *In(3R)86Fl-87Al;96Fll-97Al.*
origin: Spontaneous.
discoverer: Kodani.

**ln(3R)M: lnversion(3R) of Mourad*
cytology: *Jn(3R)86F,-100E.*
origin: Spontaneous.
discoverer: Mourad and Mallah.
references: 1960, Evolution 14: 166—70.

ln(3R)Mo: lnversion(3R) from Missouri
cytology: *In(3R)93D;98F2-3* (Bridges and Li in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293).
origin: Naturally occurring inversion.
discoverer Sturtevant, 1924.
references: 1931, Carnegie Inst. Wash. Publ. No. 421: 6-7.
genetics: Crossing over reduced in heterozygote to about 5 percent between centromere and *sr* and 0.3 percent between sr and *ca.*
other information: Pound in natural populations (e.g., Waiters, 1944, Texas Univ. Publ. 4445: 129-74; Oshima and Watanabe, 1965, DIS 40: 88).

ln(3R)Msc: lnversion(3R) Multiple sex *comb*
cytology: *ln(3R)84B;84F.*
origin: Spontaneous,
discoverer. Tokunaga, 64a.
references: 1966, DIS 41: 57.
genetics: Associated with Msc.

ln(3R)Na: lnversion(3R) from Naples
cytology: *In(3R)86F2>3;96Flt-97Al;97A2-5.* 97A1-2 missing.
new order: 61 - 86F2J96F11 - 86F3J97A5 - 100.
origin: Spontaneous.
discoverer: Carfagna and Nicoletti, 1960.
references: 1963, DIS 38: 32.
genetics: Carries a lethal, which may be separable from inversion or the deficiency for 97A1-2 may be the lethal.
other information: Breakpoints similar to those of *Im(3R)K* »*In(3R)86Fl-$7Al;96FlI~97Al* and may be the same.

**ln(3R)Nel-D: lnYmsion(3R) of Nel*
cytology: *tn{3R)86D;97A.*
origin: Spontaneous in natural population.
discoverer: Nel.
other information: Possibly the same as *In(3R)K* « *In(3R)S6F1-87A1;96FU'97AJ.*

**ln(3R)p'00.290: inversion(3R) pink*
cytology: *In(3R)85B3-4;85D12-15.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for p.

ln(3R)P: lnversion(3R) of Payne
cytology: *In(3R)89C2-3;96A18-19* [Bridges and Bridges, 1938, Genetics 23: 111-14 (fig.)J.
origin: Widespread in natural populations.
discoverer: Payne, 17g.
references: 1918, Indiana Univ. Studies 5, No. 36: 1-45.
1924, Genetics 9: 327-42.
Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 1-27.
genetics: Crossing over reduced in heterozygous female to 1 percent between p and sr; none between *sr* and *to;* 0.5 percent between *to* and ca.
other information; Widespread in laboratory stocks and is part of the balancers, *LVM* and *C(3)x.* Also found in many wild populations (e.g., Warters, 1944, Texas Univ. Publ. 4445: 129-74; Oshima and Watanabe, 1965, DIS 40: 88).

**ln(3R)sr*2: lnversion(3R) stripe*
cytology: *ln(3R)90Dl-El;93B-E.*
origin: X ray induced.
discoverer Alexander, 1959.
references: 1960, Genetics 45: 1019-22.
genetics: Mutant for sr.

**ln(3R)su(pr): lnversion(3R) suppressor of purple*
cytology: Breakpoints unknown,
origin: Spontaneous.
discoverer: Stern, 27c2.
synonym: *su^-pr.*
references: 1929, Z. Induktive Abstammungs- Vererbungslehre 52: 373-89.
1934, DIS 1: 35.
genetics: Associated with *su(pr).*

In(3R)Vna: see *Tp(3)Vno*

**ln(3R)W: lnversion(3R) of barters*
cytology: *In(3R)86B;92F.*
origin: Naturally occurring inversion.
discoverer: Warters.
references: 1944, Texas Univ. Publ. 4445: 129-74.

lnp(l)&cvi": see *In(lLR)scVi*

In&() : see *In()*

Ins(2LR)Pm: see *In(2LR)bw^v1*

RINGS

R(l)h Ring(l)
cytology: *R(1)1A;2OB-C;* salivary chromosomes show deficiency for roost of 1A and a duplication for 20C-D [Schultz and Catcheside, 1937, J. Genet. 35: 315-20 (fig.)]. Ring shaped in metaphase.
new order: |lA - 20-20F - 20CJ.
origin: Spontaneous from *C(1)RM, y* female.
discoverer: L. V. Morgan, 1922.
synonym: *X°; X^&.*

references: 1926, Proc. Natl. Acad. Sci. U.S. 12: 180-81.
1933, Genetics 18: 250-83.
genetics: Carries *y.* Male and homozygous female have reduced viability; *X/0* male lethal (Schultz, 1941, Proc. Intern. Congr. Genet., 7th. pp. 257-62). Somewhat unstable, tending to be eliminated during mitosis. Shows about five times as much somatic crossing over as rod *X* (Brown, Walen, and Brosseau, 1962, Genetics 47: 1573—79). Crossing over reduced in ring/rod heterozygote; only double crossovers recovered. Exceptional males result from four-strand double crossing over in *R(l)l/+* female.
other information: Tends to open out into a rod [e.g., *In(l)EN\`* spontaneously in stock.

R0)2

cytology: *R(1)1A3-4;19F-2OA1;* salivary chromosomes deficient for 1A1-3 and duplicated for all of region 20 [Schultz and Catcheside, 1937, J. Genet. 35: 315—20 (fig.)]. Ring shaped in metaphase.
new order: J1A4 - 20-20F - 20A1|.
origin: Spontaneous as a detachment of *C(1)RM,* y^+.
discoverer: Beadle, 34b (ring nature discovered by Boche).
synonym: *X°2.*
genetics: Carries y^+. More viable than *R(l)l; X/0* male survives. Ordinarily, ring elimination less than 1 percent (Battacharya, 1950, Proc. Roy. Soc. Edinburgh, B 64: 199—215; Braver and Blount, 1950, Genetics 35: 98), but nearly 20 percent of the first progeny of 11-day-old females crossed to ring-bearing males are gynandromorphs (Hannah, 1955, Z. Induktive Abstammungs- Vererbungslehre 86: 600—21). Crossing over reduced in ring/rod heterozygote; only double crossovers recovered. Exceptional males result from four-strand double exchange in *R(l)2/+* female.
other information: Ring may open out spontaneously in stock; e.g., *ln(l)EN2.*

R(1)9-1

cytology: Ring shaped in mitotic figures. Early prophase shows heterochromatic constitution, proceeding from normally proximal euchromatin, across the centromere to the normally distal euchromatin, to be as follows: a large segment, a well-defined constriction, a large segment, a constriction, a small segment, the centric constriction, a small segment.
origin: Regular product of exchange in $C(1)TMB^S9\text{-}1$.
discoverer: Lindsley and Sandier, 1963.
references: 1965, Genetics 51: 223-45 (fig.).
genetics: Carries *y. R(l)9-l/0* male survives. On basis of origin, *R(l)9-1* is euchromatically but not heterochromatically identical with *R(l)l.*

R(l)9-4

cytology: Ring shaped in mitotic figures. Early prophase shows heterochromatic constitution, proceeding from normally proximal euchromatin, across the centromere to the normally distal euchromatin to be as follows: a large segment, a constriction, a small segment, the centric constriction, a small segment.
origin: Regular product of exchange in $C(l)TMB^s9\text{-}4$.
discoverer: Lindsley and Sandier, 1963.
references: 1965, Genetics 51: 223—45 (fig.).
genetics: Carries y. *R(l)9-4/0* male viable. Based on origin, *R(l)9-4* euchromatically but not heterochromatically indentical with *R(l)l.*

R(J)63

cytology: Ring shaped in mitotic figures. Early prophase shows heterochromatic constitution, proceeding from the normally proximal euchromatin, across the centromere to the normally distal euchromatin, to be as follows: two large segments separated by an ill-defined constriction, a constriction, a small segment, the centric constriction, a small segment.
origin: Regular product of exchange in *C(1)TM2.*
discoverer: Lindsley and Sandier, 63g.
references: 1965, Genetics 51: 223—45 (fig.).
genetics: Carries y. *R(l)63/0* male survives. Based on origin, *R(l)63* is euchromatically but not heterochromatically identical with *R(l)l.*

R(J)94-2A1

cytology: *R(1)1A;1F-2A;5E-6A;17F-18A;2O;* duplicated for 1A-F and 18A-20.
new order |1A - 5E|1F - 1A|2O-2O - 6A|18A - 20|.
origin: Spontaneous product of *C(1)94-2A.* Possibly a product of breakage of double second-anaphase bridge formed by exchange between the arms of the compound.
discoverer: Armentrout, 1964.

**R(1)CJ*

cytology: Ring shaped in mitotic figures.
origin: Spontaneous derivative of $In(l)sc^{8L}EN^R$; arose by recombination between distal heterochromatic segment of $In(l)sc^8$ and heterochromatic short arm of *In(l)EN.*
discoverer: Lindsley, 1950.
references: 1958, Z. Vererbungslehre: 89: 103—22.
genetics: Carries y. On basis of origin, *R(1)C1* is euchromatically identical with *R(l)l,* but it must be different heterochromatically since *R(l)Cl/0* male viable.

R(l)l-v459

cytology: *R(1)3D-F.*
origin: Associated with *T(l;2;3)l-v459.*

R(l)y: RingCI) yellow*

cytology. *R(l)lA8-Bl;18A3-4;* deficient for 1A and duplicated for 18—20.
new order |1B1 - 20-20 - 18A4|.
origin: Regular product of exchange within inversion in *C(1)RM* heterozygous for $In(l)y^4$ * *In(l)lA8-Bl;18A3-4.*
discoverer Sturtevant and Beadle,
references: 1936, Genetics 21: 554—604.
Novitski and Sandier, 1956, Genetics 41: 194-206.
genetics: Deficient for *l(l)J 1,* duplicated for *car-bb.* Heterozygous female survives; male lethal, owing to deficiency for *1(1}] 1.*

R(Y): see *Y* Derivatives in Special Chromosomes section

TRANSLOCATIONS

T(1;?)sc260-23; Translocationd;?) scute
cytology: *T(l;?)lB2-3;* position of second break not determined.
origin: X ray induced,
discoverer, button, 1939.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for sc but not y or svr.

T(1;Y)1
cytology: *T(1;Y)16F;Y^L*.
origin: X ray induced in y^+F.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(1;Y)2
cytology: *T(1;Y)5E;11F;19F;Y^S*.
new order: 1 - 5E|Y^SP - YL;
20 - 19F|llF - 5E|l9F - 11F|Y^{SD}.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free F.

T(1;Y}3
cytology: *T(1;Y)3E;Y^S*.
origin: X ray induced in *y/y^+Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)4
cytology: *T(l;Y)llA;Y^L*.
origin: X ray induced in *y^+Y*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free F.

T(1;Y)6
cytology: *T(1;Y}11D;Y^S*.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)8
cytology: *T(1;Y)4B;Y^L*.
origin: X ray induced in *y*Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1706-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free F.

T(1;Y)9
cytology: *T(1;Y)2C;19F;Y^S*.
new order: 1A - 2C|Y^SP - Y^;
20 - 19F|2C - 19F|Y^{SD}.
origin: X ray induced in *y/y*Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(l;Y)10
cytology: *T(1;Y)3E;Y^L*.
origin: X ray induced in *y/y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free F but sterile without.

T(1;Y)11
cytology: *T(1;Y)19F;Y^S*.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free F but stecile without.

T(J;Y)U
cytology: *T(1;Y)7D;Y^L*.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)U
cytology: *T(1;Y)19F;Y^S*.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male viable; fertile with a free F but sterile without.

T(1;Y)15
cytology: *T(1;Y)14F;Y^*.
origin: X ray induced in *y^+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)J6
cytology. *T(1;Y)4C;Y^L*.
origin: X ray induced in y^+F.
discoverer: Nicoletti.

references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

***T(1;Y)18**
cytology. *T(1;Y)19F;Y^S*.
origin: X ray induced in *y$^+$Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)19
cytology: *T(1;Y)17A;Y^L*.
origin: X ray induced in *y$^+$Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)20
cytology: *T(1;Y)11A,Y^L*.
origin: X ray induced in *y$^+$Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(J;Y)2J
cytology: *T(1;Y)1F;Y^*.
origin: X ray induced in *y/y$^+$Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(1;Y)22
cytology: *T(1;Y)19E;Y^S*.
origin: X ray induced in *y*Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

***T(1;Y)WO**
cytology: *T(1;Y)13F;Y^S*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)1OJ
cytology: *T(1;Y)19E;Y^S*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)102
cytology: *T(1;Y)7D;Y^*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)103
cytology: *T(1;Y)19F;Y^S*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)W4
cytology: *T(1;Y)3D;Y^L*.
origin: X ray induced in *y/B^{s}Y* sperm,
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(l;Y)105
cytology: *T(1;Y)19F;Y^S*.
origin: X ray induced in *B^{S}Y*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)106
cytology: *T(1;Y)16A;Y^L*.
origin: X ray induced in *B^{S}Y*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97,
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)107
cytology: *T(l;Y)3C;Y^*,
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1950, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free F but sterile without.

T(l;Y)108
cytology: *T(1;Y)5D;Y^L*.
origin: X ray indticed in *B^{S}Y*.
discoverer: Nicoletti.

references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

tt7;Y)I77
cytology: ***T(1;Y)3C;Y^{L}.***
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal. Variegates for w and Af.

T(1;Y)112
cytology: ***T(1;Y)15A;Y^{L}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

****T(1;Y)1U***
cytology: ***T(l;Y)20A;Y^{s}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)1U
cytology: ***T(1;Y)3C;Y^,***
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22 (fig.).
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)115
cytology: ***T(1;Y)8F;Y^{S}.***
origin: X ray induced in ***B^{S}Y.***
discoverer. Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male lethal.

****T(1;Y)117***
cytology: ***T(1;Y)17A;Y^{L}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

Tif7;YJ77«
cytology: ***T(1;Y)16E;Y^{L}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references; Nicoletti and Linda ley, I960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)119
cytology: ***T(1;Y)19F;Y^{S}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS &4: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

****T(1;Y)120***
cytology: ***T(1;Y)17E;Y^{S}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)122
cytology: ***T(l;Y)20A;Y^{s}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

****T(1;Y)123***
cytology: ***T(1;Y)19F;Y^{S}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

U7;Y)724
cytology: ***T(1;Y)9F;Y^.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti,
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

W;Y)125
cytology: ***T(1;Y)15D;Y^{L}.***
origin: X ray induced in *B^{S}Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with or without a free **y.**

T(1;Y)128
cytology: ***T(1;Y)3C;Y^{L}.***
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer Nicoletti.

references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)129
cytology: *T(1;Y)11A;Y^L*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(1;Y)131
cytology: *T(1;Y)6E;Y^S*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(1;Y)132
cytology: *T(1;Y)19F;Y^S*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)133
cytology: *T(l;Y)19E;Y^s*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

**T(1;Y)135*
cytology: *T(1;Y)18C;Y^L*.
origin: X ray induced in *B^SY*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)137
cytology. *T(1;Y)19F;Y^S*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

**T(1;Y)139*
cytology: *T(l;Y)20A;Y^s*.
origin: X ray induced in *B^SY*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(l;Y)J40
cytology: *T(1;Y)3C;Y^L*.
origin: X ray induced in *y/B^sY* sperm,
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(1;Y)141
cytology: *T(1;Y)19B;Y^S*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)U2
cytology: *T(1;Y)13E;Y^L*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)145
cytology: *T(1;Y)11B;Y^S*.
origin: X ray induced in *B^SY*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(1;Y)U7
cytology: *T(1;Y)8F;Y^S*.
origin: X *ray* induced in fl^F.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free F.

**T(1;Y)U8*
cytology: *T(1;Y)2D;Y^L*.
origin: X ray induced in *y/B^sY* sperm,
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(1;Y)U9
cytology: *TXl;Yy6E;Y^*.
origin: X ray induced in *B^SY*.
discoverer Nicoletti.

references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(l;Y)150

cytology: *T(1;Y)3F;Y^{S}*.
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T0;Y)151

cytology: *T(1;Y)19F;Y^{S}*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

W;Y)152

cytology: *T(1;Y)13A;Y^{L}*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

T(1;Y)15S

cytology: *T(1;Y)7B;Y^{S}*.
origin: X ray induced in *B^*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y)156

cytology: *T(1;Y)7D;Y^{L}*.
origin: X ray induced in B^F.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

****T(1;Y)157***

cytology: *T(1;Y)14F;Y^{L}*.
origin: X ray induced in *B®Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

****T(l;Y)m***

cytology: *T(1;Y)11A;Y^{L}*.
origin: X ray induced in *B^{S}Y*.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(J;Y)159

cytology: *T(1;Y)18A;Y^*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(J;Y)164

cytology: *T(1;Y)3C;Y^{L}*.
origin: X ray induced in *y/B^{s}Y* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

****T(1;Y)169***

cytology: *T(1;Y)11D;Y^{S}*.
origin: X ray induced in *B^Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
1960, DIS 34: 95-97.
genetics: Male viable and fertile with or without a free *Y*.

T(l;Y)240

cytology: *T(1;Y)14A;Y^{L}*.
origin: X ray induced in *B^{S}Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
1960, DIS 34: 95-97.
genetics: Male viable; fertile with a free *Y* but sterile without.

****T(1;Y)290***

cytology: *T(1;Y)1A;2OA;Y^{S}*.
new order: 1A|Y^{SP} _ Y*<;
20F - 20A|lA - 20A|Y^{SD}.
origin: X ray induced in *y/Bty* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

****T(l;Y;2)7***

cytology: *T(1;Y)14F;Y^{S} + T(Y;2)Y^;36C*
new order: 1 — 14F|Y^{SP} - Y^{LP}J36C - 21;
20 - 14F|Y^{SD};
Y^{LD}|36C - 60.
origin: X ray induced in *y+Y*.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y;2)17

cytology: *T(1;Y;2)7B;Y^L;39.*
new order: 1 - 7B|39 - 60;
20- 7B|Y^{LD};
yS _ Y^{LP}|39 - 21.
origin: X ray induced in *y^+Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(l;Y;2)109

cytology: *T(l;Y;2)3C;Y^L;40-41;* involvement of chromosome *2* inferred from genetic data; not cytologically observable; new order therefore ambiguous.
origin: X ray induced in *y/B^SY* sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
I960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(l;Y;2)110*

cytology: *T(1;2)19D;55F + T(Y;2)Y^S;45F.*
new order: 1 - 19D|55F - 45F|Y^{SP} - yL;
20 - 19D|55F - 60;
YSD|$_4$5F _ 21.
origin: X ray induced in *B^SY.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(l;Y;2)130*

cytology: *T(l;Y;2)llF;Y^L;40-41;* involvement of chromosome *2* inferred from genetic data; not cytologically observable; new order therefore ambiguous.
origin: X ray induced in *B^SY.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22 (fig.).
I960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(1;Y;2)U6*

cytology: *T(1;Y)7D;Y^L + T(l;2)20A;57F.*
new order: 1 - 7D|Y^{LP} - Y^s;
20F - 20AJ57F - 60;
Y^{LD}|7D - 20A|57F - 21.
origin: X ray induced in B^F.
discoverer Nicoletti.
references: Nicoletti and Lindsley, I960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(J;Y;2)1S3*

cytol ogy: *T(l;Y;2)l 7A; Y^S;3SD.*
new order: 1 - 17A|35D - 60;
20 - 17A|Y^{SD};
yL _ Y^{SP}|35D -21.
origin: X ray induced in *B^SY.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male lethal.

**T(1;Y;2)16O*

cytology: *T(l;Y;2)17C;Y^s;40-41;* involvement of chromosome 2 inferred from genetic data; not cytologically observable; therefore new order ambiguous.
origin: X ray induced in *B^SY.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(J;Y;3)5*

cytology: *T(1;Y)11D;Y^L + T(1;3)14F;72.*
new order: 1 - 11D|Y^{LP} - Y^s;
20 - 14F|72 - 61;
YLD|n_D _ I4p]72 - 100.
origin: X ray induced in *y^+Y.*
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(1;Y;3)121

cytology: *T(1;Y;3)6F;Y^S;86D.*
new order: 1 — 6F|Y^{SP} - Y^L;
20 - 6F|86D - 100;
Y^SD|86D - 61.
origin: X ray induced in B^F.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y;3)127

cytology: *T(1;Y;3)19F;Y^S;85E.*
new order. 1 - 19F|85E - 61;
20 - 19F|Y^{SI}>;
YL _ YSPJ85E - 100.
origin: X ray induced,
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

**T(1;Y;3)134*

cytology: *T(1;Y)12E;Y^S + T(1;3)19B;62A.*
new order: 1 — 12E|Y^{SP} — Y**;
20F - 19E|62A - 61;
YSD|i2E - 19E|62A - 100.
origin: X ray induced in B^{iS}y.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34; 95-97.
genetics: Male viable but sterile.

*T(l;Y;3)m

cytology: *T(l;Y;3)7A;Y^L;70C.*
new order: 1 - 7A|70C - 100;
20 - 7A|YLD;
yS _ yLP|70C - 61.
origin: X ray induced in B^SY.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS*34: 95-97.
genetics: Male viable but sterile.

*T(1;Y;3)138

cytology: *T(1;Y;3)11A;Y^;84B.*
new order: 1 - 11A|84B - 61;
20-llAJYLD;
yS _ yLP|84B- 100.
origin: X ray induced in B^SY,
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
I960, DIS 34: 95-97.
genetics: Male viable but sterile.

T(1;Y;3)W

cytology: *T(1;Y)12A;Y^ + T(1;3)3F;69C.*
new order. 1 - 3F|69C - 100;
20-12A|yLD;
yS _ yLP|i2A - 3F|69C - 61.
origin: X ray induced in y/B^SY sperm.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable with a free *Y* but sterile. Male lethal without a free F.

T(1;Y;3)144

cytology: *T(1;Y;3)15E;Y^;74D.*
new order. 1 - 15E|74D - 100;
20-15E|YLD;
yS_yLP|$_7$4 _ gj,.
origin: X ray induced in B^SY.
discoverer Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male with free *Y* viable but sterile. Male without free *Y* lethal.

T(1;Y;3)IS4

cytology: *T(l;Y;3)10A;Y^s;97A.*
new order. 1 - 10A|97A - 61;
20 - 10A|ySD;
yL _ ySPJ97A _ 100,
origin: X ray induced in *B^Y.*
discoverer Nicoletti.
references: Nicoletti and Lindsley, i960. Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable bat sterile.

T(1;Y;3)U1

cytology: *TX1;Y;3)17A;Y^L;94.*
new order: 1 - 17AJ94 - 61;
20 - 17A|YLD;
Y^s _ YLP|94 _ 100.
origin: X ray induced in B^SY.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male lethal.

T(1;Y;4)U6

cytology: *T(1;Y)14D;Y^S + T(l;4)9C;101.*
new order: 1 - 9C|l01;
20 - 14D|YSD;
yL _ YSP|l4D - 9C|l02.
origin: X ray induced in B^SY.
discoverer: Nicoletti.
references: Nicoletti and Lindsley, 1960, Genetics 45: 1705-22.
1960, DIS 34: 95-97.
genetics: Male viable but sterile.

*T(I;2)7

origin: X ray induced.
discoverer: Bonner, 1931.
references: Dobzhansky, 1935, Z. Induktive Abstammungs- Vererbungslehre 68: 134—62.
genetics: *X* broken between *rb* and cv; chromosome *2* to the right of *sp.* Male and heterozygous female viable and fertile; homozygous female poorly viable and sterile. $X^{P}2^{D}$ recoverable as an aneuploid segregant that is duplicated for the loci of *y* through *rb* but is not demonstrably deficient for *2R* markers; nothing written to indicate that it is deficient for *M(2)c.*

*T(1;2)26

origin: X ray induced in *R(l)2.*
discoverer: Pontecorvo, 1941.
synonym: *T(X^{c2};2)26.*
references: 1942, DIS 16: 65.
genetics: Section of *X* including *car* and *bb* inserted into base of *2L.* Homozygous lethal.

T(l;2)51b

cytology: *T(l;2)3Cl-2;3D6-7;20A;52F.*
new order: 1 - 3C1 |20A - 3D7|20A - 20F;
21 - 52F|(3C2 - 3D6)|52F - 60.
origin: X ray induced *w.ln(l)w™4 =In(l)3Cl-2;20A.*
discoverer Lefevre, 51b7.
synonym: *T(l;2)w*Slb7*
references: 1951, DIS 25: 71.
1952, DIS 26: 66.
Ratty, 1954, Genetics 39: 513-28.
genetics: Segregant *Dp(l;2)51b = Dp(l;2)3Cl-2;3D6-7;52F* survives; duplicated for loci of *w, rst, spl, fa,* and *dm.* Duplication used to cover lethality of *N* in studies of pseudoallelism at the TV locus (Welshons and Von Halle, 1962, Genetics 47: 743-59).

*T(l;2)106

origin: X ray induced.
discoverer: Sturtevant, 1930.
genetics: Break in *X* chromosome near centromere to right of /; break in chromosome *2* near centromere, probably in *2L.* Male fertile; homozygous female viable and fertile. Crossing over and disjunction

for both chromosomes *X* and *2* normal in *T(l;2)106/+* female. *T(l;2)106/+/Y* female shows nondisjunction of *X's.*

***T(l;2)260-31**

cytology: *T(1;2)9A;24;29.*
new order: 1 - 9A|(24 - 29)|9A - 20;
21 - 24J29 - 60.
origin: X ray induced simultaneously with *y260-31%*
discoverer: Fano, 1941.
references: Sutton, 1943, Genetics 28: 210—17.
genetics: Male lethal; lethality attributable to the independent mutation to *y260-31* since *T(l;2)260-31) y260-31/D£(l)sc260-25* is lethal.

***T(l;2)271b**

cytology: *T(l;2)3C3-7;40;* inferred from Mackensen's fig. 15A, G, and H (1935).
origin: X ray induced,
discoverer: Patterson.
synonym: *Df(l)Del271b.*
references: 1932, Am. Naturalist 66: 193-206.
Mackensen, 1935, J. Heredity 26: 163-74 (fig.).
genetics: Mutant for *N.*

***T(l;2)A50b: Translocation(1;2) from Austin**

cytology: *T(1;2)2B;15F;41;* inferred from fig. 17H of Mackensen (1935).
new order: 1 - 2B|l5F - 20;
21 -41J15F - 2BJ41 - 60.
references: Mackensen, 1935, J. Heredity 26: 163—74 (fig.).
genetics: Left break in *X* between *br* and *pn;* right break between r and *t.* Mutant for f.

***T(l;2)A6Jb**

cytology: *T(1;2)15F;* breakpoint in chromosome *2* at unknown position in left arm, which also carries an inversion. Breakpoint in *X* inferred from Mackensen's fig. 17G (1935).
references: Mackensen, 1935, J. Heredity 26: 163—74 (fig.).
genetics: Mutant for f.

***TO;2)A106**

cytology: *T(l;2)6-7;12;17;* rough estimates of breakpoints in *X* from Mackensen's fig. 171 (1935); chromosome *2* broken in euchromatin of left arm.
new order: 1 — 6J17 — 20;
21 - ?|12 - 17|7 - 12|? - 60.
references: Mackensen, 1935, J. Heredity 26: 163-74 (fig.),
genetics: Mutant for *Bx.*

***T(l;2)A124**

cytology: *T(l;2)10A;13Al-2;59.*
new order: 1 - 10AJ13A2 — 20;
21 - 59|(10A - 13A1)|59 - 60.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1934.
references: Macfcensen, 1935, J. Heredity 26: 163—74 (fig.).
Patterson, Stone, and Bedichek, 1935, Genetics 2Ch 259-79 (f%.).
1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126-56.
genetics: Left break between *ras* and v; right break between *g* and *pi.* Male fertile. The segregant *Dp(l;2)A124 =Dp(l;2)10A;13Al-2;59,* which is duplicated for v^+ through g^+, survives as fairly viable and fertile female, but male carrying *Dp(l;2)A124* dies as embryo. The complementary *Dt(l)A124 -Df(l)10A;13Al-2* survives as a fertile *X/X/Df* triplpid female and as an *X/X/Di* diploid metafemale but not as an *X/Df* diploid.

***7(\;2)B**v: Translocation(1;2) Bar**

cytology: *T(1;2)15F-1$A1;33B* superimposed on *In(l)lB3-4;l 9F-20C1.*
new order: 1A1 - lB3|l9F - 16A1 |33B - 60;
20F - 20Cl|lB4 - 15FJ33B - 21.
origin: X ray induced in *In(l)sc4.*
discoverer. Yu, 48g.
genetics: Position effect at *B.* Male sterile.

***T(l;2)Bbd: Translocation(l;2) Bar-baroid**

cytology: *T(l;2)16Al-2;48C2-3 + In(2R)41A;47A* (Bridges in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 291).
new order 1 - l6Al|48C2 - 47A|41A - 47A|4lA - 21;
2 0 - 16A2J48C3 - 60.
origin: X ray induced simultaneously with *In(2R)41-47.*
discoverer: Dobzhansky, 31b5.
references: 1932, Genetics 17: 369—92.
genetics: Recessive position effect for 15. Translocation and inversion probably not separable.

***T(\;2)B*>G: Translocation(l;2) Bar of Dubinin and Goldat**

cytology: *T(1;2)4;15F-16A;20;40-41;* inferred from Dubinin and Goldat's figure,
new order: 1 - 4|l5F - 4|20;
21 - 40|(16A - 20)|41 - 60.
origin: X ray induced.
discoverer: Dubinin and Goldat, 1936.
references: 1936, Biol. Zh. (Moscow) 5: 881—84 (fig-).
genetics: Position effect for *B.* Male lethal.

***T(l;2)BId: Translocaiion0;2) Blond**

cytology: *T(1;2)1C3-4;6OB12-13 + In(2R)42A2-3;58A4-B1.*
new order: 1A - 1C3|6OB12 - 58Bl|42A3 - 58A4|42A2 - 21;
20 - 1C4|6OB13 - 60F.
origin: Spontaneous in *In(2R)Cy.*
discoverer: Burkart, 1930.
references: 1931, Rev. Fac. Argon. Vet. Univ. Buenos Aires 7: 393-491.
Burkart and Stern, 1933, Z. Induktive Abstammungs-Vererbungslehre 64: 310—25.
Bridges, 1937, Cytologia (Tokyo), Fuji! Jub. Vol. 2: 745-55.
Morgan, Bridges, and Schultz, 1938, Carnegie Inst. Wash. Year Book 37: 307.
genetics: Associated with *Bid.* Both aneuploid segregants survive. The X^D2^P element is duplicated for y, ac, sc, *Hw, svr, su(s), 1(1)7e, su(b),* and *M(l)Bld* and deficient for *sp, bs, be, Pin,* and *M(2}c;* heterozygote extreme Plexate and slight

Minute with small dark body and slow development; viability low; male sterile, female but slightly fertile. $2^{D}X^{P}$ is reciprocally duplicate-deficient; heterozygous female Blond and extreme Minute \M(l)Bld\ with short, broad, occasionally downward curved wings; ecloses 3—4 days late; male lethal.

T(1;2)C6: Translocation(l;2) **Crossover *suppressor***

cytology: *T(l;2)12E;40-41;60B;* position of breakpoint in chromosome *2* with respect to centromere not determined,
new order: 1 - 12EJ41 - 60B|40 - 21;
20 - 12E|60B - 60F.
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Male lethal. Recombination reduced in *2R.*

T(J;2)C20

cytology: *T(l;2)12E;30B.*
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Male viable but sterile. Recombination reduced in *2L.*

T(1;2)C54

cytology: *T(1;2)12E;32F.*
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Male lethal. Recombination reduced in *2L.*

T(l;2)C60

cytology: *T(l;2)20;52B.*
origin: X ray induced.
discoverer. Roberts, 1964.
genetics: Male viable and fertile. Recombination reduced in *2R.*

T(J;2)C84

cytology: *T(l;2)3F;17E-F;30A.*
new order. 1 - 3F|l7F - 20;
21 - 30A|3F - 17E|30A - 60.
origin: X ray induced.
discoverer: Roberts and D. Stewart, 1964.
genetics: Male viable but sterile. Recombination reduced *ia X* and *2L.*

T(1;2)C121

cytology: *T(l;2)20;35F;40.*
new order: 1 - 20|(35F - 40)J20;
21 -35FJ40 -60.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male viable and fertile. Recombination reduced in *2L.*

T(1;2)C171

cytology: *T(ls2)12A;40-41.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* chromosome.

T(1;2)Cm

cytology: *T(l;2)20;40-41 +ln(t)8C-D;l8D;* translocation breakpoint in chromosome 2 with respect to centromere not determined; n*w order therefore ambiguous.
new order: 1 - 8C|l8D - 8D|l8D - 20|40 - 60;
2Q|40 - 21.
Tentative.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;2)C179

cytology. *T(1;2)9A;49A +ln(l)5C;20.*
new order: 1 - 5C|20 - 9A|49A - 21;
20|5C - 9A|49A - 60.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;2)C183

cytology: *T(l;2)12E;40-41 + In(2L)24C;30A;* translocation breakpoint in chromosome 2 not determined with respect to centromere; new order therefore ambiguous.
new order: 1 — 12E|40 — 60;
20 - 12E|40 - 30A|24C - 30A|24C - 21.
Tentative.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *2L.*

T(1;2)C239

cytology: *T(1;2)7A-B;36C;39E.*
new order: 1 - 7A|36C - 39E|7B - 20;
21 - 36C|39E - 60.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome. The segregant *Dp(2;l)C239 = Dp(2;l)7A-B;36C;39E* survives.

T(1;2)C2S6

cytology: *T(l;2)2A;40-41 + In(l)7E;17A;18B;* position of breakpoint with respect to centromere in chromosome 2 not determined; new order therefore ambiguous. For example; if chromosome *2* is broken in *2L:*
new order: 1 — 2A|4O — 60;
20 - 18B|17A - 18B|7E - 17A|7E - 2A|40 - 21.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(J;2)C26J

cytology: *T(l;2)14C;40-41,'* breakpoint in chromosome 2 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* chromosome.

T(1;2)C262

cytology: *T(1;2)11A;18A;4O-41;* position of breakpoint in chromosome *2* with respect to centromere not determined.

new order: 1 — 11A|4O — 60;
20 - 18A|llA - 18A|40 - 21.
Tentative.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;2)C3U
cytology: *T(l;2)5D;40-41 + T(1;2)9D;51D + T(l;2)20;56F;* position of left breakpoint in chromosome *2* with respect to centromere not determined.
new order: 1 - 5D|40 - 51D|9D - SD|40 - 21;
20|S6F - 51D|9D - 20J56F - 60.
Tentative because heterochromatic realignments ambiguous.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* and *2R.*

T(1;2)C324
cytology: *T(l;2)15F;20;30A.*
new order: 1 - 15F|20 - 15F|3OA - 60;
20|30A - 2 1 .
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Mutant or deficient for f. Male lethal. Recombination reduced in *2L.*

T(1;2)C349
cytology: *T(1;2)6C;47D +In(l)2E;20.*
new order: 1 - 2E|20 - 6C|47D - 21;
20|2E - 6CJ47D - 60.
origin: X ray induced,
discoverer. Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;2)C357
cytology: *T(l;2)20;56F.*
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *2R.*

***T(1;2)ct^{7a}U** Translocation(l;2) cut*
cytology: *T(1;2)7B;* other breakpoints not recorded,
origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
genetics: Mutant for *ct* but not *y, ac, sc, cm,* sn, or *oc.* Male lethal.

T(1;2)ct^{7c1}
cytology: *T(1;2)7B2-3;8E2-3;25C* superimposed on *R(1)1A3-4;19F-2QA1.*
new order. |lA4 - 7B2|8E2 - 20-20F - 20Al|;
21 - 25C|(7B3 - 8E2)|25C - 60.
origin: X ray induced in *R(l)2.*
discoverer. Hannah, 1947.
genetics: Mutant for *ct* but not cm or *sn;* male lethal. *T(l;2)ct7^{c}l/Dp(l;3)m^{13a}l* male survives and is fertile. The segregant *Dp(I;2)ct7^{c1}* » *Dp(l;2)7B2-3;8E2-3;25C* survives; duplicated for an but not *cm;* male and female have darker, rooflike wings, enlarged abdomens, and are sterile.

T(1;2)ct^{14a2}
cytology: *T(l;2)7B2-4;19-20;41El-2* superimposed on *R(1)1A3-4;19F-2OA1.*
new order: |lA4 - 7B2|20-20F - 20A11;
21 - 4lEl|7B4 - 19|41E2 - 60.
origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
genetics: Mutant for *ct* but not *cm, sn,* or *oc.* Male lethal. *T(l;2)ctl4*2/Dp(l;3)sn$^{1:3al}$* male rarely survives; probably sterile.

**T(l;2)ct268-i7*
cytology: *T(l;2)7B2-5;41E2-4* (Hoover).
origin: X ray induced.
discoverer: Demerec, 34h.
genetics: Mutant for *ct* but not *scp* or *sn.* Male lethal.

**T(1;2)ct268.24*
cytology: *T(l;2)7B2-5;41F6-42Al.*
origin: X ray induced.
discoverer: Hoover, 35i.
genetics: Mutant for *ct* but not *scp* or *sn.* Male lethal.

**T(J;2)ct268-26*
cytology: *T(J;2)7B3-C1;36E.*
origin: X ray induced.
discoverer: Hoover, 35j.
genetics: Mutant for *ct* but not *scp* or sn. Male lethal.

**T(1;2)ct268.32*
cytology: *T(J;2)lE-F;3D-E;7B2-5;46* (Hoover),
new order: 1A - 1EJ3E - 7B2|46 - 21;
20 - 7B5|3D - 1F|46 - 60.
origin: X ray induced in *y.*
discoverer. Demerec, 38e.
genetics: Mutant for *ct* but not fa, *dm, scp,* or *sn.* Male lethal.

**T(l;2)ct268.33*
cytology: *T(1;2)7B2-5;41E* (Hoover).
origin: X ray induced.
discoverer: Demerec, 38e,
genetics: Mutant for *ct* but not *en.* Male lethal.

**T(l;2)ct268~4l*
cytology: *T(l;2)7B2-S;37C2-3* (Sutton).
origin: X ray induced.
discoverer Demerec, 391.
genetics: Mutant for *ct* but not cm or sn. Male lethal.

**T(J;2)DJ: Translocation(l;2) from deoxycytidine*
cytology: *T(1;2)6F;26C.*
origin: Induced by tritiated deoxycytidine.
discoverer: Kaplan, 1965.
references: 1966, DIS 41: 59.
genetics: Male lethal.

7(1;2)02
cytology: *T(1;2)8B;46B.*
origin: Induced by tritiated deoxycytidine.
discoverer: Kaplan, 1965.
references: 1966, DIS 41: 59.
genetics: Male lethal.

**T(J;2)ef: Trtmslacation(h'2} elfin*
cytology: *T(1;2)14C8-D1;2R.*
origin: Induced by triethylenernelamine (CB. 1246).

discoverer: Fahmy, 1952.
references: 1959, DIS 33: 86.
genetics: Mutant for ef. Male sterile.

***T(1;2){2S7.15**: Translocaiion(l;2) forked*
cytology: *T(l;2)13E9-10;15E2-3;24F* (Sutton).
new order: 1A - 13E9|l5E3 - 20;
21 - 24F|(13E10 - 15E2)|24F - 60.
origin: X ray induced.
discoverer: Demerec, 35a.
genetics: Mutant for f but not *M(l)o* or *B*. Male lethal.

T(J ;2)f2S7-22
cytology: *T(1;2)4D2-3;8F;15E4-F1;39E;41F-42A* superimposed on *Dp(l;l)15F9-16Al;16A7-Bl.*
new order: 1 - 4D2|(8F - 15E4)|41F - 39E|(4D3 - 8F)|39E - 21;
2 0 - 16Al|l6A7 - 16A1|16A7 - 15Fl|42A - 6 0 .
origin: X ray induced in *y* $B^{l}B^{l}$.
discoverer: Demerec, 36c.
genetics: Mutant for / but *B* unaffected. Male lethal.

T(1;2)K1: Translocation(l;2) of Krivshenko
cytology: *T(1;2)1A5-B3;2O;29A-B;* deficient for 1B3-20.
new order: 1A1 - 1A5|29B - 60;
20|29A - 2 1 .
origin: X ray induced.
discoverer. Krivshenko, 56cl2.
references: 1956, DIS 30: 75.
genetics: Homozygous lethal. Fly hyperploid for the $2L^{D}X^{P}$ element survives.

T(l;2)l-v25: Translocationfl;2) lethal-variegated
cytology: *T(1;2)19-20;40-41;* position of breakpoint in chromosome *2* with respect to centromere not determined.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal; male sterile.

T(1;2)l-v47
cytology: *T(1;2)8F-9B;* heterochromatic material inserted in *X;* genetic results suggest linkage between *X* and 2.
origin: X ray induced.
discoverer Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; g£-like phenotype.

T(J;2)l-v75
cytology: *T(l;2)19-20;41.*
origin: X ray induced.
discoverer. Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal; male sterile.

T(l;2)l'v129
cytology: *T(1;2)18B;41.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a semilethal; male sterile.

T(t;2)l-vUS
cytology: *T(t;2)l8~19;41.*
origin: X ray induced simultaneously with *T(2;3)135 = T(2;3)37;85A,* which has been lost.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal.

T(l;2)l-vJ50
cytology: *T(l;2)16-17;40.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal; male sterile.

T(l;2)l-v219
cytology: *T(l;2)10A;40.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male sterile.

T(l;2)l-v223
cytology: *T(l;2)14F;41;50E.*
new order: 1A - 14F|(41 - 50E)|l4F - 20;
21A - 41 |50E - 60.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1640—70.
genetics: Variegated for a lethal and defective external male genitalia; male sterile.

T(l;2)lt: Translocation(1;2) light
cytology: *T(1;2)20C-D;40F.*
origin: X ray induced in chromosome carrying eq.
discoverer: Schultz.
genetics: Variegated for *It.*

T(l;2)lf»i6: Translocation(l;2) light-mottled
cytology: *T(1;2)11A;12F;22D;4OB-F.*
new order: 1 - HA|l2F - 20;
21 - 22D|llA - 12F|40B - 22D|40F - 60.
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(1;2)ltm31
cytology: *T(l;2)8F;28D;40B-F.*
new order. 1 - 8F|28D - 40B|8F - 20;
21 - 28D|40F - 60.
origin: X ray induced,
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(l;2)lz: Translocation(l;2) lozenge
cytology: *T(1;2)8D12-E1;33A-B* (Hannah).
origin: X ray induced.
discoverer. Green and Green,
references: 1956, Z. Induktive Abstammungs-Vererbungslehre 87: 708-21.
genetics: Mutant for *lz.*

T(J;2)N2"'9: Translocation(l;2) Notch
cytology: *T(1;2)3C;41.* Cytology not examined; breakpoints inferred from genes affected (Schultz).
origin: X ray induced,
discoverer: Demerec, 3315.

genetics: Variegates for *rst, N, dm,* and, at low temperatures, *w;* also variegates for abnormal abdomen and *M(2)S2* but not for *stw, ap,* or *msf* (Schultz).

T(1;2)N264-io

origin: X ray induced.
discoverer: Demerec, 331.
genetics: Variegates for *rst, N,* and *dm* but not *w.* Carries normal alleles of *M(2)S2, ap, msf,* and *tk* (Schultz). *X/Y* male lethal; *X/Y/Y* survives.

****T(J;2)N264-23***

cytology: *T(1;2)3C8-9;41A* (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 35h.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-102.
genetics: Variegates for *rst* and *fa* but not *w* or *dm.*

****T(J;2)N264-24***

cytology: *T(l;2)3C8-9;40F* (Demerec).
origin: X ray induced.
discoverer: Demerec, 35h.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *w, rst,* and *fa.*

****T(l;2)N264.so***

cytology: *T(l;2)3C7-9;20Cl-F;22A2-3* (Hoover),
new order: 1 - 3C7|20F;
21 - 22A2|3C9 - 20Cl|22A3 - 60.
origin: X ray induced.
discoverer: Demerec, 37k.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *fa* but not *w, rst,* or dm.

****T(1;2)N264-S3***

cytology: *T(1;2)3C6-7;34C7-D1.*
origin: X ray induced.
discoverer: Demerec, 38a.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Carries normal alleles of *rst, fa,* and *dm.*

****T(l;2)N264.S9***

cytology: *T(l;2)3C8-9;40F* (Hoover).
origin: X ray induced.
discoverer. Demerec, 38d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *w, rst,* and *spl* but not *pn, kz,* or *dm.*

****T(l;2)N264-62***

cytology: *T(1;2)3C7-8;41A-B* (Sutton).
origin: X ray induced.
discoverer Demerec, 38e.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for w, *rst,* and *fa* but not *dm.*

T(l;2)N264-66

cytology: *T(1;2)3C6-7;41* -f *T(1;2)7C9-D1;53F* (Hoover),
new order: 1 - 3C6|41 - 53FJ7D1 - 20;
21 - 41J3C7 - 7C9|53F - 60.
origin: X ray induced,
discoverer: Demerec, 38e.
genetics: Variegates for *w, rst, fa, dm,* and ec but not *pn, kz,* or *bi.*

****T(l;2)N264-69***

cytology: *T(l;2)3C7-8;44C4-5* (Demerec).
origin: X ray induced.
discoverer: Demerec, 38k.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Carries a mutant allele of *N* and normal alleles of *w, rst,* and dm.

****T(l;2)N264-80***

cytology: *T(l;2)3C6-7;36;40 +ln(l)ll;20* (Sutton).
new order: 1 - 3C6|(36 - 40)|3C7 - 11120 - ll|20;
21 - 36|40 - 60.
origin: X ray induced,
discoverer: Demerec, 39d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Contains mutant allele of *N* but normal alleles of *w, rst, dm,* and ec.

****T(l;2)N264-82***

cytology: *T(1;2)3C3-4;41A + T(l;2)20A;57.*
new order: 1 - 3C3|41A - 57|20A - 20F;
21 - 41A|3C4 - 20A|57 - 60.
Tip of *2L* also in chromocenter (Sutton).
origin: X ray induced,
discoverer Demerec, 39d.
genetics: Variegates for *w, rst, fa,* and *dm* but not *pn,* ec, or *in.*

****T(1;2)N264-1O2***

cytology: *T(l;2)3C6-7;50E;56C* (Sutton).
new order: 1 - 3C6J(50E - 56C)J3C7 - 20;
21 - 50E|56C - 60.
discoverer: Demerec, 391.
genetics: Carries mutant allele of *N* and normal alleles of *w, rst,* and *dm.*

T(1;2)OR6: Translocation(l;2) from Oak Ridge

cytology: *T(l;2)2A;60D.*
origin: X ray induced in *y.*
discoverer Waiters, 1959.
genetics: Male viable and fertile. Homorygous female viable. X^D2^P element can replace one chromosome *2,* producing a deficiency for the tip of 2R; resulting progeny are Minute owing to inclusion of *M(2)c* locus in the deficiency.

T(\;2}OR7

cytology: *T(1;2)3A;41E.*
origin: X ray induced in *y.*
discoverer Waiters, 1959.
genetics: Male lethal. Male survives with *BSw+Y* but is sterile.

7(7/2)0*8

cytology: *T(l;2)20;4O-41;* position of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer Waiters, 1959.
genetics: Male viable and fertile. Homozygous female viable.

TO;2}OR9

cytology: *TX1;2)3A;J4F;41.*
new order. 1 - 3AJ14F - 20;
21 _ 4l|14F - 3A|41 - 60,

origin: X ray induced in *y.*
discoverer: Warters, 1959.
genetics: Male lethal; lethality not covered by $B^s w^+ Y$; therefore probably associated with break at 14F.

T(1;2)OR11
cytology: *T(1;2)14F;41.*
origin: X ray induced.
discoverer: Warters, 1959.
genetics:. Variegated for a lethal. *X/Y* male viable but sterile.

T(J;2)ORU
cytology: *T(1;2)18D;46B.*
origin: X ray induced.
discoverer: Warters, 1959.
genetics: Male quite inviable; rare survivor has unexpended wings and crossed scuteliars.

T(1;2)OR15
cytology: *T(1;2)11B;6OE.*
origin: X ray induced.
discoverer: Warters, 1959.
genetics: Male viable but sterile.

T(1;2)OR17
cytology: *T(1;2)3C;37C.*
origin: X ray induced in y.
discoverer: Warters, 1961.
genetics: Male viable but sterile, with either a normal *Y* or with $B^s w^+ Y$.

T(1;2)ORW
cytology: *T(l;2)20B;30E.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. $2L^D X^P$ element recoverable in viable hyperploids with outstretched wings.

T(1;2)OR19
cytology: *T(l;2)20;51F +In(2R)42B;48E;57C.*
new order: 1 - 20|51F - 48E|57C - 51F|20;
21 - 42B|48E - 42B|57C - 60E.
origin: X ray induced.
discoverer. Warters, 1961.
genetics: Male viable and weakly fertile. Homozygous female viable. *Dp(2;l)OR19* ≃ *Dp(2;l)20;48E;51F;57C* survives in both male and female.

T(1;2)OR20
cytology: *T(1;2)16C;43B.*
origin: X ray induced,
discoverer: Waiters, 1961.
genetics: Male lethal; lethal originated after translocation.

T(1;2)OR21
cytology: *T(1;2)19E;32D.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(J;2)OR22
cytology: *T(1;2)8D;22B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(l;2)0R23
cytology: *T(l;2)6B;40.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)0R25
cytology: *T(1;2)1B;38E.*
origin: X ray induced in y.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(l;2)0R26
cytology:' *T(1;2)15A;41.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile; *X/0* male has melanotic, distended wings.

T(l;2)0R27
cytology: *T(1;2)16D;34B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(l;2)0R28
cytology: *T(1;2)3B;39E.*
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male viable but sterile, with either a normal *Y* or $B^s w^+ Y$.

T(1;2)0R29
cytology: *T(l;2)8D;40.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR30
cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR32
cytology: *T(l;2)20;54A.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $2R^D X^P$ element survives.

T(1;2)OR33
cytology: *T(1;2)17;47A.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR36
cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR37
cytology: *T(l;2)10A;S0C.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(J;2)OR38
cytology. *T(l;2)20B;S0A.*

origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male lethal. Male hyperploid for the $2R^{D}X^{P}$ element probably survives.

T(1;2)OR39
cytology: *T(1;2)1D;46E.*
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR41
cytology: *T(1;2)12D;25E.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2)OR42
cytology: *T(1;2)12F;58F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2)OR43
cytology: *T(l;2)15E;40D.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile, with small rough eyes; perhaps mutant for *un.*

T(1;2)OR44
cytology: *T(1;2)16F;28F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR45
cytology: *T(1;2)7D;40-41;* position of breakpoint in chromosome 2 with respect to centromere not determined.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(J;2)OR47
cytology: *T(1;2)19E;53B.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR48
cytology: *T(1;2)17A;31F.*
origin: X ray induced,
discoverer. Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR49
cytology. *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR5Q
cytology: *T(1;2)19C;33F.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable and fertile. Homozygous female weakly viable.

TO;2)OR5J
cytology: *T(1;2)8D;41F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal; lethal originated after translocation.

T(J;2)OR52
cytology: *T(1;2)4F;41A.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)ORS4
cytology: *T(1;2)19E;32E.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable with slightly curled wings; sterile.

T(1;2)ORSS
cytology: *T(l;2)20A;44D.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR56
cytology: *T(1;2)18F;47D.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2)OR58
cytology: *T(1;2)11B;4O-41 + T(l;2)19C;30B;* position of right breakpoint in chromosome *2* with respect to centromere not determined.
new order: 1 - 11B|4O - 30B|l9C - 11B|41 - 60;
20 - 19C|3OB - 21.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal. Male hyperploid for $2L^{D}X^{P}$ element survives and has outstretched wings.

T(1;2)OR59
cytology: *T(1;2)19E:57B.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male lethal. Male hyperploid for the $2R^{D}X^{P}$ element survives.

T(1;2)OR60
cytology: *T(l;2)10A;52D.*
origin: X ray induced,
discoverer Warters, 1961,
genetics: Male viable but sterile.

T(1;2)OR61
cytology: *T(1;2)18D;31F,*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR62
cytology: *T(l;2)8F;17F;40-41;* position of breakpoint in chromosome *2* with respect to centromere not determined,
new order: 1 — 8F|4O — 60;
20 - 17FJ8F - 17F]40 - 21.
Tentative.
origin: X ray induced,
discoverer; Warters, 1961.
genetics: Male lethal.

T(1;2)OR64
cytology: *T(1;2)11A;53F.*
origin: X ray induced,
discoverer: Waiters, 1961.
genetics: Male lethal.

T(J;2)OR65
cytology: *T(l;2)7A;40.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2)OR66
cytology: *T(1;2)8B;23C.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable and fertile.

T(1;2)OR67
cytology: *T(1;2)12B;41 + T(l;2)20A;45B.*
new order: 1 - 12B|41 - 45B|20A;
21 - 41 |l2B - 20A|45B - 60.
Tentative.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Variegated for a lethal. Male fertile.

T(1;2)OR68
cytology: *T(1;2)16E;41 + Tp(2)25E;33A;40.*
new order: 1 - 16E|41 - 40|(25E - 33A)|40 - 33A|25E - 21;
2 0 - 16E|41 - 60.
Tentative.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR69
cytology: *T(1;2)3C;41C.*
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Variegated for a lethal; male sterile with either a normal *Y* or $B^s w^+ Y$.

TO;2)OR72
cytology: *T(l;2)l9E;29F + In(2LR)24F;54B.*
new order. 1 - 19E|29F - 54B|24F - 21;
20 - 19E|29F - 24F|54B - 60.
origin: X ray induced.
discoverer. Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for the $2R^D 2L^M X^P$ element may survive.

T(1;2)OR73
cytology: *T(1;2)19E;57E.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable bat sterile. Male hyperploid for the $2R^D X^P$ element survives.

T(1;2)OR74
cytology: *T(t;2)l9E;56C.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $2R^D X^P$ element survives.

T(1;2)OR75
cytology: *T(1;2)12E;32B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2)OR78
cytology: *T(l;2)19E;30B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $2L^D X^P$ element survives and has outstretched wings.

T(1;2)OR82
cytology: *T(l;2)13B;30B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR83
cytology: *T(1;2)12A;22B.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male lethal.

T(1;2)OR84
cytology: *T(1;2)3C;38E.*
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male viable but sterile, with either a normal *Y* or $B^s w^+ Y$.

T(1;2)OR85
cytology: *T(l;2)10;38.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2)OR86
cytology: *T(1;2)11A;32B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

****T(l;2)ret: Translocation(l;2) reticulated***
cytology: *T(l;2)20A5-B2;2R.*
origin: Induced by L-p-NN-di-(2chloroethyl)amino-phenylalanine (CB. 3025).
discoverer: Fahmy, 1953.
references: 1958, DIS 32: 73.
genetics: Associated with *ret;* male sterile.

T(T;2)sc^{19}: Transhcation(l;2) scute
cytology: *T(l;2)lBl-2;lB4-7;25-26;* breaks in *X* estimated from fig. 1 of Muller and Prokofyeva (1934, Dokl. Akad. Nauk. n.s. 4: 74-83), but the left break, which genetically is to the left of *y,* is inconsistent with the cytological location of y in region 1A5-8. Break in chromosome 2 estimated from position of y^+ 1—2 units to the right of *dp.*
new order 1A - lBl|lB7 - 20;
21 - 25|(1B2 - 1B4)|26 - 60.
origin: X ray induced,
di scoverer League.
references: Muller, 1935, Genetica 17: 237-52.
genetics: Mutant for sc. A small subterminal piece of *X* is inserted into *2L* 1 or 2 units to the right of *dp.* The two halves of the translocation are recoverable independently as *Df(l)sc^{19}* = *Df(l)lBl-2;lB4-7* and *Dp(l;2)mcl** = *Dp(l;2)lBl-2;lB4-7;25-26. Dt(l)scl9* is deficient few *y, ac, ac,* and *l(l)mc* but not *l(l)Jl, cm,* or *M(l)Bld;* it is male

lethal but survives in the heterozygous female. *Dp(l;2)sc*^{19} carries, in addition to *sc*^{19}, normal alleles of *y, ac,* and *l(l)sc;* it is viable homozygous and does not affect crossing over in *2L.*

***T(l;2)sc"s**

cytology: *T(1;2)1A6-B1;25F;* inferred from Goldat's fig. 3.
origin: X ray induced derivative of *sc*^{6}.
discoverer: Goldat.
references: 1936, Biol. Zh. (Moscow) 5: 803—12.
genetics: Mutant for sc.

***T(l;2)sc260.J7**

cytology: *T(1;2)1B2-3;31C.*
origin: X ray induced.
discoverer: Sutton, 39d.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for sc but not *y,* ac, or *svr.*

***T(l;2)sc260-26**

cytology: *T(l;2)lB4-5;41F2-3;58B2-3 + In(2LR)27D2-3;41A.*
new order: 1A - 1B4|41F3 - 58B2|lB5 - 20; 21 - 27D2|41A - 27D3|41A - 41F2|58B3 - 60.
origin: X ray induced.
discoverer: Sutton, 391.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for sc but not *y, ac,* or *svr.*

***T(l;2)sc260.27**

cytology: *T(1;2)15E;33-34;57B-C + Dp(l;f)lA8-B1;19F.*
new order: 1A1 - lA8|l9F - 20; 21 - 33|15E - 19F|1B1 - 15E|57B - 34|S7C - 60.
origin: X ray induced,
discoverer Satton, 391.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for sc but not *y, ac,* or svr. Male **sterile.** ***Dp(l;i)sc260-2 7 =Dp(l;f)lA8-Bl;19F*** **segregates** free from translocation; carries normal alleles of *y* and ac.

T(l;2)sc*^{S2}*: Translocation(1;2)* scute *of Sinitskaya

cytology: *T(1;2)1B4-7;6OC-E* (inferred from genetic results).
discoverer Sinitskaya, 1934.
genetics: Mutant for *sc. X* chromosome broken to the right of *l(l)sc* in same place as right breakpoint of *T(l;2)8c*^{19} and *2R* broken between *sp* and *M(2)c* (Muller). Aneuploid segregants $X^{D}2^{P}$ and $2R^{D}X^{P}$ should survive.

T(1;2)SP1: Translocation(1;2) from $db Paulo

cytology: *T(1;2)8B;41.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Variegated for a lethal; male sterile.

TO;2)SP4

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SPW

cytology: *T(l;2)10;50.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP16

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP18

cytology: *T(1;2)1A;56A.*
origin: Gamma ray induced in *y w.*
discoverer Lindsley and Mussatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP19

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(l-2)SP20

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP31

cytology: *T(l;2)20;56B.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for the $2R^{D}X^{P}$ element survives.

***T(J;2)SP33**

cytology: *T(l;2)14;41.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP36

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced,
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP42

cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP43

cytology: *T(l;2)16A;60C.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP48

cytology: *T(1;2)15F;35A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP49
cytology: *T(l;2)12;40-41;* position of breakpoint in chromosome *2* with respect to centromere not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(l;2)SP50
cytology: *T(l;2)20;29-30.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $2L^{D}X^{P}$ survives.

T(l;2)SPSl
cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP52
cytology: *T(1;2)12E;57F.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP5S
cytology: *T(1;2)1A;41 + T(l;2)4B;30B + In(l)12D;14B.*
new order: 1A|41 - 30B|4B - 1A|41 - 60;
20 - 14B|l2D - 14BJ12D - 4B|30B - 21.
origin: Gamma ray induced in *y w.*
discoverer. Lindsley and Musatti, 1961.
genetics: Male lethal.

T(1;2)SP58
cytology: *T(l;2)10A;34A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP60
cytology: *T(1;2)17E;35A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP61
cytology: *T(1;2)18F;47D,*
origin: Gamma ray induced,
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile,

T(1;2)SP64
cytology: *T(1;2)3C;28C.*
origin: Gamma ray induced toy w.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile, with either a normal *Y* or $B^{s}w^{+}Y$.

T(1;2)$P67
cytology: *T(l;2)20;40-41;* positions of breakpoints with respect to centromeres not determined,
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP69
cytology: *T(1;2)7C;41.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP71
cytology: *T(l;2)20;40-41;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

****T(1;2)SP75***
cytology: *T(1;2)8C;35D.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP77
cytology: *T(1;2)9A;41.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP81
cytology: *T(l;2)20;24F-25A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $2L^{D}X^{P}$ element survives.

T(1;2)SP84
cytology: *T(1;2)4C;42C.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP87
cytology: *T(l;2)9A4-Bl;58A3-4.*
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP88
cytology: *T(l;2)20;32F-33A.*
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for the $2L^{D}X^{P}$ element survives.

****T(1;2)SP89***
cytology: *T(1;2)4E;35A.*
origin: Gamma ray induced in *y w.*
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile. May be mutant for *rg.*

T(1;2)SP93
cytology: *T(1;2)18C-D;22A-B.*
origin: Gamma ray induced,
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for the $2L^{D}X^{P}$ element survives.

T(1;2)SP94
cytology: *T(1;2)14B-C;23F.*
origin: Gamma ray induced,
discoverer. Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP96
cytology: *T(l;2)20;40-41;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.

discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

*T(1;2)SP97
cytology: *T(1;2)9E-F;35A-B.*
origin: Gamma ray induced *in. y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

W;2)SP102
cytology: *T(1;2)16A;41.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
geneticsf Male viable but sterile.

*T(1;2)SP106
cytology. *T(l;2)6B;40.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP11O
cytology: *T(1;2)13A;57E.*
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2)SP111
cytology: *T(l;2)20;40-41;* position of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(J;2)Sy: Translocation(l;2) Stubby
origin: Spontaneous.
discoverer: Ives, 34J31.
genetics: Associated with *Sy.* Male sterile. Probably reciprocal translocation with breaks near the base of *X* and *2L.*

*T(l;2)$v^{267,4}$: Translocation(l;2) vermilion
cytology: *T(l;2)llA7-8;36* (Sutton).
origin: X ray induced.
discoverer: Hoover, 35i.
genetics: Mutant for v (breakpoint not at *v* locus). Semilethal. *ras, dwx, sbr, m, dy,* and *fw* not affected.

T(l;2)w+sib?: see *T(l;2)51b*

T(l;2)w 13G2: Translocation(l;2) white
cytology: *T(1;2)3C3-5;56F;* also inversion in *2R.*
origin: X ray induced.
discoverer: Gans.
genetics: Variegated for *w.*

*T(l;2)w^{mS2b12}: Translocation(l;2) white-mottled
cytology: *T(l;2)lE5-Fl;3C3-4;20B;40-41.*
new order: 1A - 1E5|2OB - 3C4J20B - 20F;
21 - 4O|(1F1 - 3C3)|41 - 60.
origin: X ray induced *inln(l)rst3- -In(l)3C3-4;20B.*
discoverer: Ratty, 52bl2.
references: Lefevre, 1953, DIS 27: 57.
genetics: Variegated for *w. Dp(l;2)w^^2bl2* « *Dp(l;2)lES-Fl;3C3-4;40-41* survives.

cytology: *T(l;2)3B2-Cl;3C9-Dl;40-41.*
new order: 1 - 3B2J3D1 - 20;
21 - 4O|(3C1 - 3C9)|41 - 60.
origin: X ray induced,
discoverer: P. Farnsworth, 53a4.
references: Lefevre, 1953, DIS 27: 57.
genetics: Variegated for *w.* The segregant *Dp(l;2)W"5^{3}°* = *Dp(l;2)3B2-Cl;3C9-Dl;40-41* survives and is duplicated for the loci of *w, rst,* and TV. *Df(l)w^{m}^3a -- Df(l)3B2-Cl;3C9-Dl* survives as Notch female; deficient for *w, rst,* and *N.*

TO;2)w">S3
cytology: *T(l;2)3C3-4;20A2-3;58F8-59Al.*
new order: 1 - 3C3|58F8 - 21;
20F - 20A3|3C4 - 20A2|59Al - 60.
origin: Neutron induced,
discoverer: Mickey, 53ell.
synonym: *T(X'2)In^{x} *nd 3.*
references: 1963, DIS 38: 29.
genetics: Variegated for *w.*

*T(l;2)w>»2S8-34
cytology: *T(1;2)3C3-5;41A* (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 38b.
genetics: Variegated for *w* but not *rst, fa,* or dm. Male viable.

*T(l;2)w«> 258-3 6
cytology: *T(l;2)3C6-7;4C2-3;41A-B;41F5-6* (Demerec and Hoover).
new order. 1 - 3C6J(41B - 41F5)|4C3 - 20;
21 - 41A|(3C5 - 4C2)|41F6 - 60.
Insertions said to be in inverted order but not specified with respect to centromere or numerical order.
origin: X ray induced.
discoverer: Demerec, 38b.
references: Sutton, 1940, Genetics 25: 534—40 (fig-)-
genetics: Variegated for *w* and *rat* but not *pn, fa,* or *dm.* Male viable. Cytology predicts that each element of the translocation should survive as aneuploid but not so recorded.

*T(7;2)w»258-37
cytology: *T(I;2)3C3-4;40-41A* (Sutton),
origin: X ray induced.
discoverer Demerec, 33j.
genetics: Variegated for *w* but not *kz, rat, fa,* or *dm.*

*T(l;2)w°2S8-39
cytology: *T(l;2)3C3-5;40E-F* (Demerec and Hoover),
origin: X ray induced,
discoverer: Demerec, 38e.
genetics: Variegated for *w* but not *pa, r&t, fa,* or *dm.* Male viable.

*T(1;2)wm 258-40
cytology: *T(1;2)3C3S;41* (Demerec and Hoover),
origin: X ray induced.
discoverer Demerec, 38e.
genetics: Variegated for *w* and *rst* but not *pn, kz, fa,* or *dm.*

*T(7;2>w"»OI: *Translocation(l;2) white-mottled of Dubinin*
cytology: *T(l;2)3B;19-20;21F.*
new order: 1 — 3BJ21F — 60;
20|3B - 19J21F - 21A.
origin: X ray induced,
discoverer: Dubinin.
references: Sachorov, 1936, Biol. Zh. (Moscow) 5: 293-302.

T(l;2)w^{vD4}: Translocation(1;2) white-variegated ofDemerec

cytology: *T(1;2)3D6-E1;4OF* (Schultz).
origin: X ray induced.
discoverer: Demerec, 33k2.
genetics: Variegated for A?, *rst, w,* and dm. *X/Y* male survives only rarely as *rst* with mottled eye color; *X/Y/Y* male more viable, slightly *rst,* and sterile. Variegation for *It* in *X/X/Y* female.

T(J;2)w-ec: Translocation(l;2) white-echinus

cytology: *T(1;2)3C1-2;3E7-8;37D.*
new order: 1 - 3Cl|3E8 - 20;
21 - 37DJ(3C2 - 3E7)|37D - 60.
origin: X ray induced.
references: Lefevre and Wilkins, 1966, Genetics 53: 175-87.
genetics: *T(l;2)w-ec* male is phenotypically white and echinus; TV not affected. Does not complement with *w"P.* Gives rise to *Df(l)w-ec.*

T(J;2)y260-13: Translocation(l;2) yellow

cytology. *T(1;2)1A4-5;36D.*
origin: X ray induced.
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210-17.
genetics: Mutant for *y.*

T(1;2)y^{v}h Translocation(l;2) yellow-variegated

cytology: *T(1;2)1A;39.*
origin: X ray induced.
discoverer. Schultz, 33all.
genetics: Variegated for *y.*

T(1;2;3)58i

origin: X ray induced.
discoverer: Imazumi.
references: 1961, DIS35: 87-88.
1962, DIS 36: 80.
1962, Cytologia 27: 212-28 (fig.).
genetics: Distal one-third of *2L* appended to *X* chromosome as short arm. Also *T(2;3)* with *2R* broken between en and *vg* and *3L* broken between se and *st.* Male lethal in embryo.

W;2;3)220

cytology: *T(1;2;3)14A;50A;75C.*
new order: 1 - 14A|50A - 21;
20 - 14A|75C - 61;
60 - 50A|75C - 100.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649—70.
genetics: Male viable but sterile.

T(l;2;3)C232: Translocation(l;2;3) Crossover suppressor

cytology: *T(2;3)35D;71E;* additional presence of *T(l;2)20;40-41* or *T(l;3)20;80-81* inferred from genetic data,
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable and fertile; homozygous female lethal. Recombination reduced in *2L.*

W;2;3)C312

cytology: *T(2;3)32C;87E;* additional presence of *T(t;2)20;40-41* or *T(l;3)20;80-81* inferred from genetic data.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male sterile. Recombination reduced in *2L.*

TO;2;3)ct268-40.Translocation(l;2;3)cut

cytology: *T(l;2;3)7D2-3;10A5-6;21B-C;28-29;40-41;75B-C;87D;88C;92;* new order not determined.
origin: X ray induced.
discoverer: Demerec, 39k.
references: Sutton, 1940, Genetics 25: 534-40 (fig-)-
genetics: Mutant at *ct* but not *scp, cm, sn, v, sbr, dy> £> ty>* na, *ph ^d,* or *me.* Male lethal.

T(l;2;3)Din: Translocation(l;2;3) Dinty

cytology: *T(1;3)3C;63A + T(2;3)39D;73A* (Lindsley).
new order: 1A - 3C|63A - 73A|39D - 60;
20 - 3C|63A - 61;
21 - 39D|73A _ 100.
origin: X ray induced.
discoverer: Braver, 55a.
references: 1955, DIS 29: 70.
Pollock, 1963, DIS 38: 50.
genetics: Associated with *Din.* Male viable and fertile. The two translocations should be easily separable, and *Din* is, in all probability, associated with only one.

T(l;2;3)l-v2U: Translocation(l;2;3) lethal-variegated

origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male sterile.

T(l;2;3)l-v459

cytology: *T(l;2;3)3D-F;XR;50;80-81.*
new order: 1A - 3D|50 - 21;
|3F - 20F-;
20F-80 - 61;
6 0 - 50-81 - 100.
Tentative.
Postulated that centromere of chromosome *3* split or double with one half capped by $2R^{D}$ and the other by XR^{D}. X^{p} in the form of a ring.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
genetics: Variegated for a lethal; male fertile.

T(1;2;3)N264.74: Translocation(h2;3) Notch

cytology: *T(l;2;3)3C10-ll;20D-E;40C-D;92E6-8;* 20D-E break claimed to be to the left of the nucleolus organizer (Sutton).
new order: 1 - 3C10|40D - 60;
20F - 20E|40C - 21;
61 - 92E6|20D - 3C11 |92E8 - 100.
origin: X ray induced.
discoverer: Demerec, 38k.
references: Sutton, 1940, Genetics 25: 534—40 (fig.)-
genetics: Variegates for *w, rst,* and *N* but not *kz, pn,* or *dm.*

T(l;2;3)N264-87

cytology: *T(l;2;3)3C7-9;10A2-Bl;45F-46A;59F' 60A;97C-D;100E-F* (Sutton).

new order: 1 - 3C7|97D - 100E|59F - 46A|lOBl - 20;
21 - 45F|3C9 - 10A2|60A - 60F;
61 - 97C|lOOF.
origin: X ray induced.
discoverer: Demerec, 39j.
references: Sutton, 1940, Genetics 25: 534—40.
genetics: Carries a mutant allele of/V but normal alleles of *w, rst,* and *dm.*

T(1;2;3)OR9: Translocation(l;2;3) from Oak Ridge
cytology: ***T(l;2;3)19-20;49F;81F.***
new order: 1 — 19|81F — 61;
20|49F - 60;
21 _ 49F|8lF - 100.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2;3)OR10
cytology: ***T(l;2;3)18A;41;73F.***
new order: 1 - 18A|73F - 100;
20 - 18A|41 - 60;
21 - 4l|73F - 61.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2;3)OR12
cytology: ***T(1;2)3A;41 + T(1;3)7E;78F.***
new order: 1 - 3A|41 - 21;
20 - 7E|78F - 61;
60 - 4l|3A - 7E|78F - 100.
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male viable but sterile, with either a normal *Y* or $B^{s}w^{+}Y$.

T(7;2;3)ORU
cytology: ***T(1;2;3)5E;21D;62C.***
new order: 1 — 5E|21D — 60;
20 - 5E|62C - 61;
21A - 21D|62C - 100.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable and fertile. Homozygous female viable.

T(1;2;3)ORU
cytology: ***T(1;2)1A;57D + T(l;3)20;72E.***
new order: 1A|57D — 21;
20|72E - 61;
60 - 57D|lA - 20|72E - 100.
origin: X ray induced in y.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2;3)OR17
cytology: *T(1;2;3)20;40-41;61F;* neither breakpoints in *X* and 2 with respect to centromere nor new order determined.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;2;3)OR23
cytology: ***T(l;2,3)14C;27D;87B.***
new order: 1 - 14C|87B - 61;
20 - 14C|27D - 21;
60 - 27D|87B - 100.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;2;3)0R24
cytology: ***T(1;2)14B;39D + T(l;3)2C;80C + T(1;3)19;87A,***
new order: 1 - 2C|80C - 87A|l9 - 14BJ39D - 21;
20 - 19|87A - 100;
60 - 39D|l4B - 2C|80C - 61.
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male lethal.

T(J;2;3)OR25
cytology: *T(l;2;3)19E;29B;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined; therefore new order ambiguous.
new order: 1 - 19EJ80 - 100;
20 - 19E|29B - 21;
60 - 29B|80 - 61.
Tentative.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Hyperploid male, presumably carrying $2L^{D}X^{P}$, survives.

T(l;2;3)0R26
cytology: ***T(1;2)2D;56F + T(1;3)3F;96B,***
new order: 1 - 2D|56F - 21;
20 - 3F|96B - 100;
60 - 56F|2D - 3FJ96B - 61.
origin: X ray induced in *y.*
discoverer: Warters, 1961.
genetics: Male viable and fertile.

T(l;2;3)0R31
cytology: ***T(l;3)20;92A + T(2;3)38D;87E.***
new order. 1 - 20J92A - 87E|38D - 60;
20J92A - 100;
21 - 38DJ87E - 61.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $3R^{D}X^{P}$ element survives.

T(1;2;3)0R34
cytology: ***T(1;3)18F;84B + T(2;3)28B;75F + T(2;3)44C;63A.***
new order: 1 - 18FJ84B - 75F|28B - 21;
20 - 18F|84B - 100;
60 - 44C|63A - 75FJ28B - 44C|63A - 61.
Tentative.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

****T(l;2;3)sc260.l8. Translocation(l;2;3)*** **scute**
cytology: ***T(1;2)1A6-B1;4W-E + T(1;3)7A2-B1;®QC.***
new orden 1A1 - 1A6|41D - 21;
20 - 7B1J80C - 61;
60 - 41B|lBl - 7A2J8QC - 100.
origin: X ray induced.
discoverer. Suttoa, 39d.

references: 1943, Genetics 28: 210-17.
genetics: Mutant for *sc* but not *y, ac,* or *svr.* Male sterile.

***T(l;2;3)sc260.29**
cytology: *T(1;2;3)1A6-B1;22A-B;34A-B;75C-E.*
new order: 1A1 - 1A6|34A - 22B|34B - 60;
20 - 1B1|75C - 61;
21 -22AJ75E - 100.
origin: X ray induced.
discoverer: Sutton, 40a.
references: 1943, Genetics 28: 210-17.
genetics: Mutant for sc but not *y, ac,* or *svr.*

*T(l;2;3)scPi: Translocation(l;2;3) scute o/ Panshin

discoverer: Panshin, 1934.
genetics: Mutant for sc.

T(1;2;3)SP3: Translocation(l;2;3) from Sdb Paulo

cytology: *T(l;2;3)20;23A-B;96B.*
new order: 1 — 20|96B - 61;
20|23A - 21;
60 - 23BJ96B - 100.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male lethal. Male hyperploid for $2L^{D}X^{P}$ element survives.

T(1;2;3)SP5

cytology: Six-break rearrangement with two breaks in *2R,* one in *3L,* and two in *3R.*
new order: X^{D}|2RP - 2L;
$X^{P}|X^{M}|3R^{M}|3L^{D}$;
2RDJ3LP - 3RP|3RD.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male sterile.

T(1;2;3)SP6

cytology: *T(l;2;3)20;40-41;80-81;* neither position of breakpoints with respect to centromeres nor new order determined.
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2;3)SP8

cytology: *T(l;2;3)5;17F;44B;90A.*
new order. 1 - s|17F - 20;
21 - 44B|5 - 17F|90A - 100;
61 - 90A|44B - 60.
origin: Gamma ray induced,
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

***T(1;2;3)$P25**
cytology: *T(l;2;3)19;54;86.*
new order: 1 — 19J54 - 21;
20 - 19|86 - 100;
60-54|&6- 61.
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $3R^{D}X^{P}$ apparently survives.

T(1;2;3)SP29

cytology: *T(1;2;3)10E-11A;40;60D;64D.*
new order: 1 - 10E|40 - 60D|64D - 61;
21 - 11A|6OD - 60F;
21 - 40|64D - 100.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(l;2;3)$P40

cytology: *T(l;2;3)4-5;50A;80 + T(2;3)40;86.*
new order: 1 _ 4 J80 — 86|40 - 21;
20 - 5|50A - 60;
61 - 80|50A - 40|86 - 100.
Tentative.
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Variegated for a lethal. Male sterile.

W;2;3)SP57

cytology: *T(l;2;3)20;40-41;75A;* breakpoint in chromosome 2 inferred from genetic data.
new order: 1 — 20|75A — 100;
20|40 - 21;
60 -40|75A - 61.
Tentative.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;2;3)SP65

cytology: *T(1;2;3)18A;39E;76A.*
new order: 1 - 18A|76A - 100;
20 - 18A|39E - 21;
60 - 39E|76A - 61.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T0;2;3)w>»2SB-44: Translocation(l;2;3) white-mottled

cytology: *T(1;2;3)3C3-4;4D2-E1;56E1-F1;8OD* (Sutton).
new order: 1 - 3C3|80D - 100;
20 -4E1J80D - 61;
21 - 56El|(3C4 - 4D2)|56F1 - 60.
origin: X ray induced.
discoverer: Demerec, 38k.
genetics: Variegated for *w* but not *pn, rst,* or *la.* $T(l;2;3)w^{m258}$*-44* may be separated into ***T(l;3)vi^3S8-44 „ T(l;3)3C3-4;4D2-El;8QD,*** **which** is deficient for 3C4 through 4D2 (i.e., ***Df(l)w^258-44 = Dt(l)3C3-4;4D2-El),*** **and** ***Dp(t;2)wo>2S8-44 = Dp(l;2)3C3-4;4D2-El;56El-Fl,*** which is duplicated for the same region. The deficiency includes the loci of *fa, dm, M(1)3E, ec,* ***M(1)4BC,*** **W,** ***peb,*** **and** ***rb*** **but not** ***rat*** **or** ***rg.*** **3C3-4** breakpoint inconsistent with genetic data on *rst.* ***Dp(1;2)w^m258-4**** should be viable.

*T(l;2;3)wy274.2: Tra$_n$slocation(l;2;3) wavy

cytology: *T(l;2)8F-9A;20A-B;26B-D + T(1;3)11D-E;65C-D* (Sutton).
new order: 1 — 8FJ26D — 60;
20F - 20B|9A _ 11D165C - 61;
21 - 26BJ20A - 11E|65D - 100.
origin: X ray induced.

discoverer: Demerec, 34a.
genetics: Mutant for *wy* but not *iw, dy, g,* or s. Male lethal.

T(l;2;3;4)l-v454: Translocation(J;2;3;4) lethal-variegated

cytology: ***T(1;2;3)12B;22-23;81 + T(2;4)44F;101F.***
new order 1 — 12B|81 — 61;
20 - 12B|22 - 21;
60 - 44F|l01F - 101 A;
100 - 81 (23 - 44F|l01F - 102.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Associated with *I(l)vf54#* Male sterile.

**T(1;2;4)A12: Trarrslocation(l;2;4) from Austin*

cytology: ***T(l;2;4)lB-C;7A;7B;13Bl-5; 101-102;*** breakpoints in chromosomes 2 and *4* not determined (Mackensen, 1935, Texas Univ. Publ. 4032: frontispiece).
new order: 1A - 1B|13B5 - 20;
21 - ?|(7A - 7B)|? - 60;
10l|((lC - 7A)|(7B - 13Bl))|lO2.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: Stone, 1934, Genetica 16: 506—19.
Mackensen, 1935, J. Heredity 26: 163-74.
Patterson, Stone, and Bedichek, 1935, Genetics 20: 259-79.
1937, Genetics 22: 407-26.
genetics: A section from between sc and *br* on the left to between *g* and *sd* on the right is inserted into chromosome *4.* The *ct* locus but not cm, sn, or *oc* is deleted from the insertion; i.e., *Df(l)A12 = Df(l)7A;7B,* and inserted into chromosome *2;* i.e., ***Dp(l;2)A12 = Dp(l;2)7A;7B.*** **Female hyperploid for the X^DX^P element; i.e., *Dp(l;t)A12 =Dp(l;f)lB-C;13Bl-5,*** survives and is claimed to be fertile. Female hyperploid for X^M; i.e., *Dp(l;4)A12 = Dp(l;4)lB-C;7A;7B;13Bl-S;101-102,* **occasionally** survives and is sterile.

**T(1;2;4)N264.85: Translocation(l;2;4) Notch*

cytology: ***T(l;2;4)3B4-Cl;6A2-Bl;60A4-5;101F-102A*** [Sutton, 1940, Genetics 25: 534-40 (fig.)],
new order: 1 - 3B4|60A4 - 21;
20 - 6Bl|60A5 - 60F;
101A - 1O1F|(3C1 - 6A2)|lO2A - 102F.
origin: X ray induced,
discoverer. Demerec, 39d.
genetics: Variegates for *w, rst, fa,* dim, *rg, ex, cv,* ***nix,* and *va* but not *pn, ec, bi, peb,* or *rb.*** **Carries** normal alleie of *ci* (Stern). *Dp(l;4)$N^{264,85}$* - ***Dp(l;4)3B4-Cl;6A2-Bl;101F-102A*** **viable in both** sexes but sterile in male. Complementary ***D%ipj^{a64}~^{ss}*** **inviable.**

T(l;2;4)0R24: Translocation(l;2;4) from Oak Ridge

cytology: ***T(1;2)3C;38A + T(1;4)11A;1O2C.***
new order: 1 - 3C|38A - 60;
20 - 11AJ102C - 102F;
21 - 38AJ3C - 11A|1O2C - 101A.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Produces a hyperploid female that may carry the 4^DX^P element.

TC7;2;4)w"6wV; *Translocation(l;2;4) white-mottled brown-Variegated

cytology: ***T(l;2)12F3-4;59C4-5 + T(1;4)3C3-4;101E4-5.***
new order: 1 - 3C3|l01E4 - 101A;
20 - 12F4|59C5 - 60;
21 - 59C4|l2F3 - 3C4|l0lE5 - 102F.
origin: Neutron induced.
discoverer: Mickey, 53fl5.
references: 1963, DIS 38: 30.
genetics: Variegated for w. Also claimed to variegate for *bw,* which is unusual since the *T(l;2)* is completely euchromatic.

**T(1;2;4)wyD2: Translocation(l;2;4) white-variegated of Demerec*

cytology: ***T(l;2;4)3C4-5;18F;38;101A-C*** **(Schultz).**
new order: 1 - 3C4|l01C - 102F;
20 - 18F|3C5 - 18F|38 - 21;
60 - 38|l01A.
Tentative.
origin: X ray induced,
discoverer: Demerec, 33k27.
genetics: Variegates for *w* but not *rst* in male and for w and occasionally for *rst* in female. Absence of effect on *ci* a criterion for postulating break in *4L.* Fly hyperploid for the X^D4^P element survives.

**T(J;3)3*

origin: X ray induced.
discoverer: Bonner, 1931.
references: Dobzhansky, 1935, Z. Induktive Abstammungs- Vererbungslehre 68: 143—46.
genetics: *X* chromosome broken between *rb* and *rg; 3R* broken to the right of ca. Male and homozygous and heterozygous females viable and fertile. Crossing over in heterozygous female nearly absent in left end of *X;* rises to about normal around *ct;* may be increased at right end. Crossing over in chromosome *3* in translocation heterozygote normal between e^8 and *TO* and reduced to two-thirds normal between *ro* and ca. Male carrying the X^D3^P element in place of a normal *3* nearly lethal; female has narrow wings, occipital bristles, and branched posterior veins. Crossing over between normal *X* chromosomes about one-third of normal at left end in duplication-bearing female, but nearly normal to right of *ct.*

**T(1;3)S4a*

origin: X ray induced,
discoverer: Lefevre, 54a4.
synonym: ***T(l;3)w+54*4,***
references: 1955, DIS 29; 73.
genetics: A section of *X* chromosome including w^+ but not *Bpl* inserted into chromosome *3.*

**W;3)$4c*

origin: X ray induced.
discoverer: L*fevre, 54c10.
synonym; *T(1;3)w+54c10.*

references: 1955, DIS 29: 73.
genetics: Section of *X* chromosome including w^+ inserted into chromosome *3*.

***T(1;3)65**
cytology: *T(1;3)16-17;79D.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: I960, Genetics 45: 1649—70.
genetics: Male viable but sterile.

***TO;3)102**
prig in: X ray induced.
discoverer: Sturtevant, 1930.
references: Dobzhansky, 1932, Biol. Zentr. 52: 495.
genetics: Breakpoint in *X* chromosome between *bb* and centromere; break in *3L* between *TU* and se. Crossing over in *3L* greatly reduced. Male and homozygous female fertile. Male and female hyperploid for the $3L^DX^P$ element survive and are fertile; duplicated for locus of ru but not se, ft, *car,* or *bb.*

***T(l;3)107**
discoverer: Sturtevant, 1930.
genetics: Probably a segment from chromosome *3* is .intercalated into *X* chromosome since segregants are a Minute-bearing *3,* presumably *Df(3)107,* and a Minute-suppressing *X,* presumably *Dp(3;l)107.* Male viable but homozygous female lethal.

***T(1;3)U3-3**
origin: X ray induced.
discoverer: Neuhaus.
synonym: *T(l;3)DeU43-3.*
references: 1941, DIS 15: 16.
genetics: Two breaks in *X* chromosome, one between *sc* and *br* and another near the centromere. A break in chromosome *3* is between *st* and the centromere of *3.* The y^+ and sc^+ loci are then attached to proximal end of *3L,* and the distal end of *3L* is attached to centromere of *X.* Bulk of the *X* chromosome is acentric and lost.

***T(1;3)26Q-21**
cytology: *T(l;3)6C;70E-F.*
origin: X ray induced simultaneously with *In(1)y260-21.*
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210—17.

***T(l;3)Ah Translocathn(h3} from Austin**
origin: X ray induced,
discoverer Muller, 1926.
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
genetics: Breakpoints in *X* chromosome between dm and ec and between car and *bb.* Midsection of *X* translocated to *3R.* Fly hyperploid for *Dp(l;i)Al* survives; duplicated for loci of *y* through *dm* as well as *bb* (Schultz).

T(1;3)Awm6096*:** see ***T(1;3)wm6096

***T(1;3)BS8I; Transtocation(l;3} Bar**
cytology: *T(1;3)16A;88F.*
origin: X ray induced.
discoverer: E. B. Lewis, 5814.
references: Ogaki, 1960, DIS 34: 97.
1960, Japan J. Genet. 35: 282.
genetics: Position effect at *B.* Male sterile.

T(l;3)B^{s3i}: Translocation(l;3) Bar-Super inserted in chromosome 3
cytology: *T(l;3)15F9-16Al;16A7-Bl;19-20;Y;66B13-Cl* (Muller; Lindsley); translocation between *Dp(l;l)B =Dp(l;l)15F9-16Al;16A7-Bl* and chromosome *3. X* break can be shown genetically to separate f^+ from *B* and is assumed here to separate the two halves of the Bar duplication.
new order: 1 — 16A1 |20-Y^s;
61 - 66B13|(16A1 - 19)|66C1 - 100.
Tentative.
origin: Neutron induced in *X*-Y^s, *sc w B.*
discoverer: Norby.
references: Muller and Norby, 1949, DIS 23: 61.
genetics: Associated with B^{S3i}. Male viable. Homozygous female lethal. Chromosome *3* containing inserted *X* material survives as duplication in presence of normal *X* chromosomes; male sterile; female fertile. Duplication has extreme *B* phenotype.

***T(l;3)Bb: Translocation(l;3) Bubble**
cytology: *T(1;3)13E;84F* (Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301).
origin: X ray induced.
discoverer: R. L. King, 32d.
genetics: Associated with *Bb.* Male sterile.

T(1;3)C48: Translocation(l;3)* Crossover *suppressor
cytology: *In(l)10E-F;l8C-D;* additional presence of *T(l;3)20;80-8l* inferred from genetic data.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;3)C151
cytology: *T(l;3)9D;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* chromosome.

T(1;3)C152
cytology: *T(l;3)20;90E + Df(3R)88B-C;94A.*
new order 1 - 20|(90E - 88C|94A - 90E)|20;
61 -88B|94A- 100.
origin: X ray induced,
discoverer. Roberts, 1965.
genetics: Male fertile. Recombination reduced in *3R.*

T(1;3)C160
cytology. *T(l;3)14B;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Male lethal. Recombination reduced in *X* chromosome.

T(1;3)C195

cytology: ***T(1;3)1W;71A-B.***
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* chromosome.

T(l;3)C250

cytology: *In(l)9F;15D-E;* additional presence of *T(l;3)20;80-81;* inferred from genetic data.
origin: X ray induced.,
discoverer: Roberts, 1965.
genetics: Male viable and fertile; homozygous female viable. Recombination reduced in *X* chromosome.

T(1;3)C291

cytology: ***T(l;3)16C;20;87F;98E.***
new order: 1 _ 16C|98E - 87F|(16C - 20)|87F - 61; 20|98B - 100.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male viable and fertile; homozygous female viable. Recombination reduced in *3R.*

T(l;3)C300

cytology: ***T(1;3)12C;61F;66E;68D.***
new order: 1 — 12C|68D — 100;
61 - 61F|66E - 61F|68D - 66E|l2C - 20.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Male dies in third larval instar. Recombination reduced in *3L.*

T(1;3)C315

cytology: ***T(l;3)20;70F.***
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male fertile; homozygous female lethal. Recombination reduced in *3L.*

T(1;3)C329

cytology: *T(l;3)3F;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Male viable but sterile. Recombination reduced in *X* chromosome.

T(7;3Jcf$^{n\circ}$: *Translocation(1;3)cut*

cytology: *T(1;3)IB;7B2-3;8E-F;84B* superimposed on ***R(1)1A3-4;19F-2OA1.***
new order. |lA4 - 1B|8E - 7B3|8F - 2O-2OF - 20Al|;
61 - 84B|(1B - 7B2)|84B - 100.
origin: X ray induced in *R(l)2.*
discoverer Hannah, 1947.
genetics: Mutant for *ct* but not *y, me, sc, cm, mi,* or *oc.* Male lethal. Female carrying *Dp(l;3)ct^{llm}* = *Dp(l;3)lB;7B2-3;84B* survives and has small eyes and arclike wings with deltalike venation; duplicated for cm.

T(1;3)ct^{12c1}

cytology: *T(l;3)7B2-3;7D2-6;85* superimposed on ***R(1)1A3-4;19F-2QA1.***
new order: [lA4 - 7B2|7D6 - 20-20F - 20A11;
61 - 85|(7B3 - 7D2)|85 - 100.
origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
genetics: Mutant for *ct* but not *cm* or sn. Male **lethal. The derived *Dp(l;3)ct*2cl = Dp(l;3)7B2-3;7D2-6;85*** survives as female and as sterile male; duplicated for sn.

**T(l;3)ct268-5*

cytol ogy: ***T(l;3)7B2-3;90C4-Dl.***
origin: X ray induced.
discoverer: Demerec, 33k.
genetics: Mutant for *ct* but not *scp* or en.

T(1;3)ct268.2i

cytology: ***T(1;3)7B3-4;7B4-5;96F.***
new order: 1A - 7B3|96F - 61;
20 - 7B5|96F - 100;
deficient for 7B4.
origin: X ray induced.
discoverer: Hoover, 35i.
genetics: Mutant for *ct* but not scp or *sn.* Male lethal.

**T(l;3)ct268-n*

cytol ogy: ***T(1;3)3D2-3;7B2-5;84D4-5;86B4-C1;88F*** (Hoover),
new order: 61 - 84D4|(3D3 - 7B2)|88F - 100;
remainder not described,
origin: X ray induced.
discoverer: Demerec, 38d.
genetics: Mutant for *ct* and *dm* but not *scp, sn,* or *fa.* Male lethal.

T(l;3)ct268-36

cytology: *T(1;3)7B2-C1;66F* (Sutton).
origin: X ray induced.
discoverer: Demerec, 39j.
genetics: Mutant for *ct.* Male lethal.

**T(1;3)ct268-37*

cytology: ***T(l;3)5D2-3;7B2-3;80C-F.***
new order: 1 - 5D2|7B3 - 20;
61 - 80C|7B2 - 5D3|80F - 100.
origin: X ray induced,
discoverer: Demerec, 39k.
references: Sutton, 1940, Genetics 25: 534—40 (fig-).
Demerec, 1940, Genetics 25: 618—27.
genetics: Mutant for *ct;* variegated for *tux* and vs; *shf, cm,* and sn not affected. The segregant ***Dp(l;3)ct^{268}-37 = Dp(i;3)5D2-3;7B2-3;80C-F*** viable and fertile in both male and female. Its **complement, *Dt(l)ct268-37 ^Df(l)5D2-3;7B2-3,*** survives as a Minute female; deficient for *M(l)30, TUX, vs,* shf, and cm but not *r&, ex, cv,* or annuitant for *ct.*

***T(l;3)cul°0.69. Trafislocation(l;3)* cwr/ec/**

cytology: ***T(l;3)6Bl-Ct;88A4-Bl.***
origin: X ray induced,
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for cu.

T(l;3)Del 143-3: see *T(l;3)143-3*

T(1;3)D3
cytology: *T(1;3)4F;62A.*
origin: Induced by tritiated deoxycytidine.
discoverer: Kaplan, 1965.
references: 1966, DIS 41: 59.
genetics: Male lethal.

****T(1;3)f[2]57-29. Translocation(l;3) forked***
cytology: *T(1;3)15F5-16A1;64.*
origin: X ray induced,
discoverer: Bishop, 401.
genetics: Mutant for / but not *M(l)o, B,* or *os.* Male viable but sterile.

****T(l;3)fd: Translocation(l;3) furled***
cytology: *T(1;3)7A;86E* superimposed on *In(3R)89C;96A* (Darby),
new order: 1 - 7A|86E - 61;
20 - 7A|86E - 89C|96A - 89C|96A - 100.
origin: Induced by $P3^2$ in *In(3R)P.*
discoverer: Bateman, 1949.
references: 1950, DIS 24: 54.
1951, DIS 25: 77.
genetics: Associated with *Id,*

****T(1;3)H: Translocation(l;3) Hairless***
discoverer Efroimson.
references: Kamshilov, 1933, Biol. Zh. (Moscow) 2: 161-83.
genetics; Break in *X* chromosome to the left of *w; 3R* broken near *H.*

T(1;3)K2: Translocation(l;3) of Krivshenko
cytology: *T(l;3)20A-B;20D-F;80-8l* superimposed on *ln(l)lB2-3;20B-Dl.* Inferred from genetic data since salivary chromosomes do not reveal an aberration. In ganglia 1 metaphase, chromosome J is a rod-shaped and a J-shaped element.
new order: 1A - 1B2|2OBJ8O - 100;
20F|80 - 6 1 .
Tentative.
origin: X ray induced in $In(l)sc^8$.
discoverer: Krivshenko, 55g3.
references: 1956, DIS 30: 76.
genetics: Irradiated $In(l)sc^8$ broken in distal region between y^+ and $6fe^+$ and also near the centromere. Chromosome *3* broken near the centromere, whether to left or right of the centromere is not known. Tip of *X* chromosome with y^+ and ac^+ is attached to the chromosome *3* centromere and one arm of this chromosome is attached to the *X* centromere. Bulk of the *X* chromosome is thus acentric and lost. Homozygote viable and moderately fertile. This chromosome may be considered as *Dp(l;3)K2.*

****T(1;3H-184: Translocation(h3) lethal***
cytology: *T(1;3)18A;81.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649-70.
gtMrici: Associated with *1(1)184.*

T(l;3)I-v3: Translocatiort(l;3) lethal-variegated
cytology: *T(1;3)4A;81.*
origin: X ray induced.
discoverer: Lixklsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated fora lethal. Male sterile.

T(l;3)l-vl63
cytology: *T(l;3)17A-B;80-81;* position of chromosome *3* breakpoint with respect to centromere not determined.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal. Male sterile.

****T(l;3)l-v252***
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal. Male sterile.

T(l;3)l-v361
cytology: *T(l;3)19-20;80-81;* position of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal. Male sterile.

T(l;3)t-v453
cytology: *T(l;3)12D;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal. Male sterile.

T(1;3)l-v455
cytology: *T(1;3)3C;81.*
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle.
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for *w* and a lethal. Male sterile.

T(1;3)l-v463
cytology: *T(l;3)19-20;81-82;* position of breakpoints with respect to centromeres not determined,
origin: X ray induced.
discoverer: Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649—70.
genetics: Variegated for a lethal. Male sterile.

****T(1;3)lz268.29. Translocation(l;3) lozenge***
cytology: *T(1;3)8D8-9;81F.*
origin: X ray induced.
discoverer: Hoover, 38d.
genetics: Mutant for *Iz* and independently for *ct* but not *sn, t, dvr, tip,* or ras. $T(l;3)lz268\text{-}29/_{lz}$ f_{ema}le fertile. Male lethal.

****T(1;3)N34b. Translocation(h3) Notch***
origin: X ray Induced.
discoverer Oliver, 34b3.
references: 1937, DIS 7: 19.
genetics: Carries mutant allele of TV and normal alleles of *w* and ec.
other information: Reported as suspected of being a *T(l;3);* basis of suspicion not given.

T(l;3)NS0kii
cytology: *T(1;3)1E3-4;3C6-7;3C8-9;89A;* 3C7-8 missing (Lefevre).

new order: 1A1 - 1E3|3C9 - 20;
61 - 89A|(1E4 - 3C6)|89A - 100.
origin: X ray induced,
discoverer: Lefevre, 50kll.
references: 1951, DIS 25: 71.
1952, DIS 26: 66.
Ratty, 1954, Genetics 39: 513-28.
genetics: Mutant for *N*. The segregant *Dp(l;3)N^{50k11} =Dp(l;3)lE3-4;3C6-7;89A* is viable and carries normal alleles of *pn, w,* and *rst.*

T(J;3)N264.6

cytology: *T(l;3)3C9-Dl;62A;73E;80C* (Schultz).
new order: 1 - 3C9|80C - 73E|3D1 - 20;
61 - 62A|73E - 62A|80C - 100.
origin: X ray induced.
discoverer: Demerec, 33k20.
genetics: Variegates for *w* and *N;* position effect on *pb* and *Dfd. X/Y* male lethal; *X/Y/Y* viable and sterile. *Dp(3;ipi$^{264\,r6}$ – Dp(3;l)3C9-Dl;73E;80C* viable. *DitfLyX^{2}*^{4}-^{6} = Df(3L)73E;80C* survives and is Minute, possibly deficient for *M(3)S34.*

****T(l;3)N264-29***

cytology: *T(l;3)3D4-5;80* (Hoover).
origin: X ray induced.
discoverer: Demerec, 36d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *rst, fa,* and *dm* but not *w* or ec. *X/Y* male lethal; *X/Y/Y* occasionally survives.

**T(l;3)N264-34*

cytology: *T(l;3)3C3-5;70C2-3* (Hoover).
origin: X ray induced.
discoverer: Demerec, 37a,
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Contains mutant allele of TV but normal alleles of *w, rst,* and *dm.*

****TO;3)N264.ss***

cytology: *T(l;3)3D4-5;80F9-81Fl;* chromosome *3* claimed broken in *3R.*
origin: X ray induced,
discoverer: Demerec, 38b.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *w, rst, fa,* and *dm* but not *pn, kz,* or ec.

****T(1;3)N264-S6***

cytology: *T(l;3)3D4-5;80* (Sutton).
origin: X ray induced.
discoverer: Demerec, 38c.
genetics: Variegates for *w* and probably *N.*

T(1;3)N$^{264-58}$

cytology: *T(l;3)3B2-3;3D6-7;80D-F* (Sutton).
new order. 1 - 3B2|3D7 - 20;
61 - SCOLDS - 3B3J80F - 100.
origin: X ray induced,
discoverer: Demerec, 3&d.
synonym: *TXltfysv**^{364}-**.*
references: 1940, Genetics 25: 618—27.
Sutton, 1940, Genetics 25: 534-40 (fig.).
genetics: Variegates for *w, rst, N,* and its pseudoalleles (Cohen, 1962, Genetics 47: 647—59); seems to carry a mutant allele of *dm.* The segregant, *Df(iyM$^{264-58}$ =Df(l)3B2-3;3D6-7* survives in>heterozygous female and is deficient for *w, rst, fa,* and *dm* but not pn or ec. *Dp(l;3)N^{264-S8} = Dp(l;3)3B2-3;3D6-7;80D-F* survives as both male and female.

****T(1;3)N 264-64***

cytology: *T(l;3)3E5-6;80C-F* (Hoover).
origin: X ray induced.
discoverer: Demerec, 38e.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Variegates for *w, rst, fa,* and *dm* but not ***pn, kz,* or ec.**

****T(1;3)N 264-65***

cytology: *T(l;3)2B10-16;3D4-5;81F;96C4-5* (Hoover).
new order: 1 - 2B10J(81F - 96C4)|3D5 – 20;
61 - 81F|(2B16 - 3D4)|96C5 – 100.
origin: X ray induced.
discoverer: Demerec, 38e.
genetics: Variegates for *w, rst, fa,* and dm but not *kz.*

****T(T;3)N264-70***

cytology: *T(l;3)3C4-5;80D-F + T(1;3)6F2-7Al;100B2-3* (Sutton).
new order: 1 - 3C4|80F - 100B2|6F2 - 3C5|80D - 61;
20 - 7Al|lO0B3 - 100F.
origin: X ray induced.
discoverer: Demerec, 38k.
references: Sutton, 1940, Genetics 25: 534—40.
genetics: Variegates for *w, rst, fa,* and *dm* but not ***kz, pn,* ec, cm, scp, or *shf.***

****T(l;3)N264-83***

cytology: *T(l;3)3C6-7;12F2-4;79E2-3 +In(3R)81;88* (Sutton).
new order: 1 - 3C6|l2F2 - 3C7|79E3 - 81 [SB - 8l]88 - 100;
20 - 12F3|79E2 - 6l.
origin: X ray induced.
discoverer: Demerec, 39d.
references: 1941, Proc. Intern. Congr. Genet., 7th. pp. 99-103.
genetics: Carries mutant allele of *N* but normal alleles of *w, rst,* and *dm.*

****T(1;3)N$^{264-100}$***

cytology: *T(l;3)3B4-Cl;4B4-S;80* [Suttoo, 1940, Genetics 25: 534—40 (fig.); Gersh, 1959, Genetics 44: 163-72].
new order: 1 - 3B4|4B5 - 20;
61 - 80|4B4 - 3C1J80 - 100.
origin: X ray induced.
discoverer: Demerec, 391.
references: 1940, Genetics 25: 618—27.
genetics: Variegates for *w, rat, fa, dm,* and *me* bat not *pn* or *hi.* The segregant, *D§(1)N^{3}*$^{4\,n1O}$@ « Df(l)3B4'Ct;4B4-S,* deficient for IV *&nd M{1)3E,* survives In heterozygous female. *Dp(l;3)N264-10Q = Dp(l;3)3B4-Cl;4B4~5;80* originally survived in female but not mate; more recently, male carrying duplication foond to awvive (Gersh, 1959).

***T(J;3)N264-104**

cytology. ***T(1;3)3C7-9;87D1-E1 + In(l)lB4-5;18-19*** (Sutton).

new order: 1A1 - lB4|l8 - 3C9|87D1 - 61;
20 - 19|lB5 - 3C7J87E1 - 100.

origin: X ray induced,

discoverer: Demerec, 39j.

genetics: Mutant for *svr* and *N* but not *ac, sc, sta,* ***tw, w, rst, p, ss, k,* or e.**

***T(l;3)N264.m**

cytology: ***T(1;3)3C7-9;81F;86B6-C1*** **(Sutton).**

new order: 1 - 3C7|81F - 86B6|81F - 61;
2O-3C9|86C1 - 100.

origin: X ray induced.

discoverer: Demerec, 40j.

genetics: Carries mutant allele of *N* and normal alleles of *kz, w,* and *dm.*

T(1;3)O4:* Trons/ocaf/on(7;3) of *Oliver

origin: X ray induced.

discoverer: Oliver, 29k24.

references: Dobzhansky and Schultz, 1934, J. Genet. 28: 373-77.
Oliver, 1937, DIS 7: 19.

genetics: X chromosome broken between m and *g* and between f and car. Center section of *X* then inserted into *3L*. The segregant *Df(l)O4* is inviable when added to a normal male genotype, poorly viable when added to a normal female genotype, and survives well when added to an intersex *(2X:3A)* genotype, where it confers a low degree of fertility. The reciprocal segregant, *Dp(l;3yO4,* is lethal in the male, survives well in the female, and poorly in intersexes.

T(l;3}05

cytology: ***T(1;3)4F2-3;62B-C;88A-C;92C-D*** **(Lewis,** 1951, DIS 25: 108-9).

new order, 1 - 4F2|88C - 92C|4F3 - 20;
61 - 62B|88A - 62BJ92D - 100.

origin: X ray induced.

discoverer: Oliver, 29130.

references: 1937, Am. Naturalist 71: 560—66.
1938, Genetics 23: 162.

genetics: Male viable and fertile. Homozygous female viable but sterile. The segregant, *Dp(3;l)O5* = ***Dp(3;l)4F2-3;88A-C;92C-D*** **is viable and fertile in** male and female. It is duplicated for loci of red, ***jvl,* cv-c, *so(Hw), sbd,* ss, bar; *at, gl, k,* and *Dl* but** not *cu, ry, kar,* or e (Lindsley and Grell, 1958, DIS 32: 136; E. B. Lewis). Produces roughish eyes, spread, nicked wings, coarse bristles, and a darkly pigmented abdomen.

T(1;3)O6

origin: X ray induced.

discoverer: Oliver, 34d24.

genetics: Mutant for ec. Break in *3L* between *nt* and *h.* Break in *X* not determined. Male and homozygous female viable and fertile.

T(1;3)OR1: Translocation(l;3) from Oak Ridge

cytology: ***T(l;3)5A;20;66B;79E.***

new order: 1 - 5Ai79E - 66B]SA - 20J79E - 100;
20}66B - 6 1 .

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Male lethal. Male hyperploid for $3L^{D}X^{P}$ element survives.

T(1;3)OR6

cytology: ***T(1;3)4D;87F.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Male viable but sterile.

T(1;3)OR7

cytology: ***T(1;3)14D;91E.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Male viable but sterile.

W;3)OR9

cytology: ***T(1;3)6D;66B.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Variegated for a lethal; male sterile. Male has small rough eyes; perhaps mutant for rux.

T(l;3)0R11

cytology: ***T(1;3)18F;84B.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Male viable but sterile.

T(h3)OR12

cytology: ***T(1;3)2B6-13;84A + T(1;3)18D;98F-99A*** (Becker),

new order: 1 - 2B6|84A - 98F|l8D - 2B13|84A _ 61;
20 - 18D|99A - 100.
Tentative.

origin: X ray induced in *y.*

discoverer: Warters, 1961.

genetics: Male viable but sterile. Male hyperploid for $3R^{P}X^{D}$ element survives.

T(1;3)OR13

cytology: ***T(1;3)15A;84E.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Male viable but sterile.

T(l;3)0RU

cytology: ***T(l;3)17A;80B.***

origin: X ray induced.

discoverer: Warters, 1961.

genetics: Variegated for a lethal; male sterile.

T(1;3)OR1S

cytology: ***T(1;3)18D;88A.***

origin: X ray induced,

discoverer: Warters, 1961.

genetics: Male viable but sterile. Subsequently acquired a male lethal.

T(1;3}OR17

cytology; ***T(t;3)19E;67C.***

origin: X ray induced,

discoverer: Warters, 1961.

genetics: Male viable and fertile. Homozygous female viable. Male hyperploid for $3L^{D}X^{P}$ survives.

T(1;3)OR18

cytology: ***T(1;3)19B;8OA.***

origin: X ray induced,

discoverer: Warters, 1961.

genetics: Male viable but sterile.

T(1;3)OR19
cytology: *T(1;3)12E;75F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(J;3)OR2J
cytology: *T(1;3)19E;61F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile; *X/0* male dies. Male hyperploid for $3L^{D}X^{P}$ element survives.

T(1;3)OR22
cytology: *T(1;3)6C;98C.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable and fertile. Homozygous female viable.

T(1;3)OR23
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined,
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(];3)OR24
cytology: *T(l;3)12F;80B.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR25
cytology: *T(l;3)20B;99B.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $3R^{D}X^{P}$ element survives.

T(1;3)OR28
cytology: *T(1;3)11A;8OC*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;3)0R29
cytology: *T(1;3)16F;84B.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(T;3)OR3O
cytology: *T(1;3)19E;65D.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $3L^{D}X^{P}$ element survives.

T(1;3)OR31
cytology: *T(l;3)10A;68D.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR32
cytology. *T(1;3)16A;71B.*
origin: X ray induced,
discoverer: Waiters, 1961.
genetics: Male viable but sterile.

T(1;3)OR33
cytology* *7X1;3)13E;62F.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male virtually lethal.

T(1;3)OR34
cytology: *T(1;3)3A;65A.*
origin: X ray induced in *y,*
discoverer: Warters, 1961.
genetics: Male viable but sterile, with either a normal *Y* or $B^{s}w^{+}Y$.

T(1;3)OR35
cytology: *T(1;3)19E;75C.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR36
cytology: *T(1;3)7D;62A;87E.*
new order 1 - 7D|62A - 87E|62A - 61;
20 - 7D|87E - 100,
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR37
cytology: *T(1;3)3C;97F.*
origin: X ray induced in *y.*
discoverer Warters, 1961.
genetics: Male viable and fertile; homozygous female viable.

T(h3)OR38
cytology: *T(1;3)18D;61D.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $3L^{D}X^{P}$ survives.

T(1;3)OR39
cytology: *T(1;3)6B'F;75C.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR40
cytology: *T(1;3)6F;62D + r(l;3)16B;20;84F.*
new order 1 - 6F|62D - 84F|20 - 16BJ84F - 100;
20|I6B - 6FJ62D - 61.
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR41
cytology: *T(1;3)9F;98E.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR43
cytology: *T(l;3)20A;97D.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable but sterile. Male hyperploid for $3R^{D}X^{P}$ element survives.

T(1;3)OR45
cytology: *T(1;3)17A;61D.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR46
cytology: *T(l;3)12C;80A.*
origin: X ray induced.
discoverer: Waiters, 1961.
genetics: Variegated for a lethal; male sterile.

T(1$)OR47
cytology: *T(l;3)20;93D.*
origin: X ray induced.
discoverer. Waiters, 1961.
genetics: Male viable and fertile; homozygous female viable. Male hyperploid for $3R^{D}X^{P}$ element survives.

T(1;3)OR49
cytology: *T(1;3)11A;66D.*
origin: X ray induced,
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR51
cytology: *T(1;3)12D;97A.*
origin: X ray induced.
discoverer. Warters, 1961.
genetics: Male lethal.

T(J;3)OR52
cytology: *T(l;3)19E;70C;83F.*
new order. 1 - 19EJ83F - 7OCJ83F - 100;
20 - 19E|70C - 61.
Tentative.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(U3)ORS4
cytology: *T(1;3)12F;83A.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male lethal.

****T(1;3)OR55***
cytology: *T(1;3)11C;67C.*
origin: X ray induced,
discoverer: Waiters, 1961.
genetics: Male viable but sterile.

****T(l;3)ORS7***
cytology: *T(1;3)3E;5B;61C.*
new order: 1 - 3E|5B - 3E|61C - 100;
20 - 5BJ61C - 61A.
origin: X ray induced in *y.*
discoverer. Warters, 1961.
genetics: Male lethal. Lethality not covered by $B^{s}w^{+}Y$; therefore probably associated with break in SB.

T0',3)0RS9
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male lethal.

T(1;3)OR60
cytology: *T(1;3)4B;88A.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male lethal.

T(1;3)OR62
cytology:*7X1;3)1OF;88C.*
origin: X ray induced.
discoverer Warters, 1961.
genetics: Male viable but sterile.

T(J;3)OR63
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male sterile.

T(1;3)OR66
cytology: *T(1;3)3F;71E,*
origin: X ray induced in *y.*
discoverer Warters, 1961.
genetics: Male lethal; lethality not covered by $B^{s}w^{+}Y$.

T(1;3)OR67
cytology: *T(1;3)4C;73C.*
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR69
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR71
cytology: *T(l;3)20;71D.*
origin: X ray induced,
discoverer: Warters, 1961.
genetics: Male viable but sterile.

T(1;3)OR72
cytology: *T(l;3)20;80-8l;* positions of breakpoints with respect to centromeres not determined.
origin: X ray induced.
discoverer: Warters, 1961.
genetics: Variegated for a lethal. Male sterile.

T(l;3)os^{b}<i": Translocation(l;3) outstretched small eye-bending wings
cytology: *T(l;3)16E;80C* (Nicoletti).
origin: X ray induced.
discoverer: Halfer, 1960.
genetics: Associated with os^{bdw}. Male sterile.

T(J;3)P104: Translocation(l;3) from Pasadena
cytology: *T(l;3)l9-20;87F-88A.*
origin: X ray induced.
discoverer. E. B. Lewis.

7(l;3)ras^: TranslocationfJ;3) raspberry-variegated
cytology: *T(1;3)9E;13C;81F* (E. B. Lewis).
new order. 1 - 9EJ13C - 20;
61 - 81F|(9E - 13C)|81F - 100.
origin: Fast neutron induced.
discoverer: E. B. Lewis, 1953.
references: Brokaw, 1954, DIS 28: 73.
genetics: Shows recessive variegation for *ras* and a rough eye and dominant variegation for a wing effect resembling *Bg/+.* No variegation for *m, vb,* sot, *si,* or un. Is probably an enhancer of J3; a few ms^{v}/rmm^{v} female® somewhat resemble £?/+. *Dp(l;3)r®$s^{v} » Dp(l;3)9E;13C;81F* male dies but fe-

male survives; duplicated for *ras. v, m, dy,* and *g* but not un or r. *Df(l)ras*^{v} is lethal in both sexes.

***T(l;3)rst: Translocation(J;3) roughest**

origin: X ray induced.
discoverer Ball, 32b25.
genetics: Associated with *rst.* Breakpoints in *X* chromosome near w and *bb;* position of breakpoint in chromosome *3* unknown.

***T(l;3)ry*^{3}*5: Translocation(l;3) rosy**

cytology: *T(l;3)20;87C-E;91B-C* (Lindsley).
new order: 1 - 20|(87E - 91B)|20;
61 - 87C|91C - 100.
origin: X ray induced in cu *kar* chromosome.
discoverer: Schalet.
references: 1964, DIS 39: 62-64.
Schalet, Kernaghan, and Chovnick, 1964, Genetics 50: 1261-68.
genetics: Deficient, mutant, or variegated for *ry* and pic. The segregant, *Dp(3;l)ry35 = Dp(3;l)20;87C-E;91B-C* is viable and fertile in male and female; duplicated for loci of *Sb* and *Ubx.*

***T(1;3)sc260-J5: TranslocationO;3) scute**

cytology: *T(1;3)1B4-5;71C-D.*
origin: X ray induced,
discoverer: Demerec, 381.
references: Sutton, 1943, Genetics 28: 210—17.
genetics: Mutant for *sc* but not *y* or ac. Male sterile.

***k*T(l;3)sc260-20**

cytology: *T(l;3)lA8-Bl;61Al-2.*
origin: X ray induced.
discoverer: Sutton, 39e.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for sc but not *y, ac,* or *svr.* Male and homozygous female viable and fertile. The two halves of the translocation are recoverable independently. The *3L*^{D}*X*^{P} element should be deficient for y and *ac* but carry sc^{2}*^{0}"^{20}; it presumably is male lethal but survives in heterozygous female. The *X*^{D}*3*^{P} element carries normal alleles of *y* and ac but not *sc*^{260}~^{20} or *svr*$^{+}$*;* should also carry normal alleles of ve and *ru.*

T(l;3)sc*^{J4}*: TranslocationO;3) scute* of *Jacobs-duller

cytology: *T(1;3)1B;3A3-C2;61A* (inferred from genetic tests); 1B-3A3 lost.
new order. 1A1 - 1B|61A - 100;
2 0 - 3C2|61A.
origin: X ray induced.
discoverer Jacobs-Muller.
references: Muller, 1932, Proc. Intern. Congr. Genet., 6th. Vol. 1; 225.
1934, DIS 2: 60.
genetics: The section of the *X* chromosome from IB through 3A was presumably inserted elsewhere in the genome; it subsequently separated from the rest of the configuration and was lost. Base of the *X,* presumably capped by the indemonstrable terminus of *3L,* i.e., *3*^{D}*X*^{p}*, is* deficient for the tip of *X* through z and may be stocked in combination with a duplication for the tip of *X, much mm* the *X*^{D}*4*^{P} element from *T(l;4)w®»5* or *Dp(l;f)x*^{9}. The *X*^{D}*3*^{P} segregant carries normal alleles of *1(1)J 1, y,* and *ac* but is not demonstrably deficient for *3L* factors since it is homozygous viable. y^{+} localizes about four units to the left of *ru.*

T(l;3)sc*^{K}*: TranslocationO;3) scute* of *Krivshenko

discoverer: Krivshenko.
references: Agol, 1936, DIS 5: 7.
genetics: Mutant for sc. Three-break rearrangement with *X*^{D} translocated to *3L*^{P}*; 3L*^{D} translocated to *3R*^{p}, and *3R*^{D} translocated to *X*^{p}.

T(1;3)scK3

cytology: *T(l;3)lB2-3;61Al-2.*
origin: X ray induced.
discoverer: Krivshenko, 53j29.
references: 1959, DIS 33: 95-96.
genetics: Mutant for *sc.* Male fertile. Two halves of the translocation recoverable separately. *X*^{D}*3*^{P} element is viable homozygous, although males are somewhat infrequent. *3*^{D}*X*^{P} is inviable in male and homozygous female but survives in heterozygous female.

T(l;3)sn*^{13al}*: TranslocationO;3) singed

cytology: *T(l;3y6C;7C9-l0;79D2-El;* chromosome *3. X* material inserted into chromosome *3.*
new order: |lA4 - 6C|7C10 - 20-20F - 20Al|;
61 - 79D2|(6C - 7C9)|79E1 - 100.
origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
references: Valencia, 1966, DIS 41: 58.
genetics: Mutant for &n. The segregant *Dp(l;3)sn*^{13al} *= Dp(l;3)6C;7C9-Dl* survives and is duplicated for *cm* and *ct.*

***T(1;3)sn*^{19B65}**

cytology: *T(l;3)3Cl-2; 7C9-10;72A-B* superimposed on *In(l)lB3-4;2QB-Dll*iB2-3;20B-DlR +Ia(l)4D7-El;llF2-4.*
new order: 1A - 1B3|2OB - 11F4|4E1 - 7C9|3C1 - 1B3|2OD1 -2 OF;
61 - 72A|(3C2 -4D7|l1F2 - 7C10)|72B - 100.
origin: X ray induced in *ln(l)sc*^{s}*i*^{1L}*sc*^{8R}*+dl-49.*
discoverer: Muller, Valencia, and Valencia, 1946-53.
references: Valencia, 1966, DIS 41: 58.
genetics: Associated with *an*^{1} **Bb5.* $_{w\ no}$t affected.

***TO;3}SP2: TranslocationO;3) from $db Paulo**

cytology: *T(l;3)20;90E.*
origin: Gamma ray induced in y *w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP11

cytology: *T(l;3)20;7SB.*
origin: Gamma ray induced in y *w.*
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP13

cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined,
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SPU
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

****T(1;3)SP15***
cytology: *T(l;3)20;67.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $3L^{D}X^{P}$ element survives.

T(1;3)SP21
cytology: *T(1;3)1B;83F.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3}SP22
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Mussati, 1961.
genetics: Male viable but sterile.

T(1;3)SP26
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP34
cytology: *T(1;3)8A;84A.*
origin: Gamma ray induced.
discoverer Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP37
cytology: *T(1;3)8F;64E.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics; Male viable but sterile.

T(1;3)SP38
cytology: *T(l;3)10;84.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP41
cytology: *T(1;3)3E;67C-D.*
origin: Gamma ray induced in *y* w.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP44
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined,
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP46
cytology: *T(l;3)ll;98.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T0;3)SPS3
cytology: *T(l;3)12;92.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP54
cytology: *T(l;3)20;67B.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $3L^{D}X^{P}$ element survives.

T(1;3)SP59
cytology: *T(l;3)20;83C.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP62
cytology: *T(l;3)20;89A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP63
cytology: *T(l;3)20;65.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for the $3L^{D}X^{P}$ element survives.

T(1;3)SP68
cytology: *T(1;3)11A;8O-81.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(l;3)SP70
cytology: *T(l;3)20;80-81;* positions of breakpoints with respect to centromeres not determined.
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

****T(J;3)SP73***
cytology: *T(l;3)20;89E.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Mutant for *Ubx.* Male viable but sterile.

T(1;3)SP79
cytology: *T(1;3)13D;64A.*
origin: Gamma ray induced,
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

****T(h3)SP90***
cytol ogy: *T(l;3)18C;l 00A.*
origin: Gamma ray induced in *y w.*
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile. Male hyperploid for $3R^{D}X^{P}$ element survives.

T(1;3)SP82
cytology: *T(1;3)5B-C;81.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP8S
cytology: *T(l;3)16B;80-81;* position of chromosome *3* breakpoint with respect to centromere not determined.

origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(l;3)SP90
cytology: *T(1;3)18D;68A.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP99
cytology: *T(1;3)12E;64E.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)SP112
cytology: *T(1;3)11B;8SD.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(J;3)SP122
cytology: *T(1;3)11E;92E.*
origin: Gamma ray induced.
discoverer: Lindsley and Musatti, 1961.
genetics: Male viable but sterile.

T(1;3)ss^{v}: Translocation(l;3) spineless-variegated
cytology: *T(1;3)20;89B;100F;* breakpoint in *X* chromosome inferred from genetic results; not visible cytologically.
new order: 1 - 20|(89B - 100F)|20;
61 - 89BJ100F.
Tentative.
origin: X ray induced.
discoverer: E. B. Lewis.
genetics: Variegated for ss and mutant for aristapedia. Male viable but sterile.

T(l;3)sta: Translocation(l;3) stubarfsta
cytology: *T(1;3)1D3-E1;2A;89B21-C4* (E. B. Lewis),
new order: 1A - 1D3|2A - 20;
61 - 89B2l|(lEl - 2A)J89C4 - 100.
origin: X ray induced.
discoverer: Oliver, 32122.
references: 1935, DIS 4: 15.
genetics: Mutant for *sta* and *as*.* Male viable and fertile; homozygous female lethal. The segregant *Dp(l;3)sta = Dp(l;3)lD3-El;2A;89B21-C4* is viable. The complementary *Df(I)ata = Df(l)lD3-El;2A* is viable in heterozygous female either as *Di(l)sta/+; +/+* or *Df(l)sta/Df(l)sta; Dp(l;3)sta/+* but the second type is sterile.

T(l;3)Thl: Translocation(l;3) from Thy mi dine
cytology. *T(1;3)12C;65B.*
origin: From male treated with H^3-thymidine as larva.
discoverer: Kaplan,
genetics: Male lethal.

T(l;3)v: Translocation(l;3) vermilion
cytology: *T(l;3)10;93B* (Lewis, 1951, DIS 25: 108-9).
origin: X ray induced in a chromosome carrying v.
discoverer. E. G. Anderson, 1924.
references: 1925, Papers Mich. Acad. ScL 5: 355-66.
1926, Papers Mich. Acad. Sci. 7: 273-78.
1929, Z. Induktive Abstammungs- Vererbungslehre 51: 397-411.
genetics: Inseparable from *v.* Male viable but sterile. Primary nondisjunction occurs with a frequency of about 2 percent in heterozygous females, secondary nondisjunction is 23 percent. Crossing over is reduced near v but approaches normal on both ends of the *X.*

****T(1;3)Vel: Translocation(J;3) Velvet***
origin: X ray induced in *In(l)sc^{8}.*
discoverer: Patterson,
references: 1934, DIS 2: 10.
genetics: Associated with *Vel.* Homozygous viable and fertile.

T(l;3)w^{+}S4a4: see *T(l;3)54a*
T(l;3)w+S4cxo: see *T(l;3)54c*

****T(l;3)w»h Translocation(l;3) white-mottled***
origin: X ray induced,
discoverer: Muller, 1927.
references: 1930, J. Genet. 22: 299-334.
genetics: Variegated for *w* and *N. X/Y* lethal, *X/Y/Y* viable and sterile,
other information: First recorded case of variegated position effect.

****T(l;3)w>»2***
origin: X ray induced.
discoverer: Patterson.
references: Muller, 1930, J. Genet. 22: 299—334.
genetics: Variegated for *w.* Male sterile.

T(1;3)w^{m49a}
cytology: *T(l;3)3A10-Bl;3E2-3;80.*
new order: 1 - 3A1QJ3E3 - 20;
61 - 80|(3Bl - 3E2)|80 - 100.
origin: X ray induced.
discoverer: Lefevre, 49a7.
synonym: *T(l;3)w^{mS}P: Translocation(l;3) white-mottled Spotted,*
references: 1949, DIS 23: 59.
1951, DIS 25: 71.
Ratty, 1954, Genetics 39: 513-28.
genetics: Variegated for *w, rst,* and *spl.* The two elements of the translocation can be separated; *Dt(l)w**4»* = Df(lpA10-Bl;3E2-3* survives in heterozygous female and is *N; Dp(l;3)w^{m49a} *= Dp(l;3)3AlQ-Bl;3E2-3;80* survives in both male and female and carries the loci of *w, rst, N,* and (from the cytology) presumably *dm.*

****T(1;3)w$^{m258-32}$***
cytology: *T(1;3)3C3*5;81* (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 371.
genetics: Variegated for w but not *mt, fa,* or din. Male viable.

****T(1;3)w$^{m258-44}$***
cytology: *T(l;3)3C3-4;4D2-El;80D;* deficient for 3C4-4D2.
origin: Aneuploid segregant from *T(1;2;3)w$^{m258-44}$/+.*

****T(1;3)w$^{m258-54}$***
cytology: *T(l;3)3B2-Cl;19F2-20A1;2®E;63C7-8.*

new order: 1 - 3B2|63C8 - 100;
20F|l9F2 - 3C1J20A1 - 2OE|63C7 - 61,
origin: X ray induced.
discoverer: Sutton, 40e.
genetics: Variegated for *w* and *rst,* but not *pn* or *spl.* Male lethal.

T(l;3)wm264-sa: see *T(1;3)N264-58*

***T(1;3)wm609e**

cytology: ***T(l;3)3C2-3;100C3-4.***
origin: X ray induced.
discoverer: Patterson.
synonym: ***T(l;3)Awr>609e,***
references: Griffen and Stone, 1938, Genetics 23: 149.
genetics: Variegated for *w.* Seems likely that the rearrangement is more complicated, since a euchromatic-euchromatic translocation would not be expected to produce variegation.

T(l;3)w™sP: see *T(l;3)w^49a*

T(l;3)wyco: Translocationfl;3) white-variegated cobbled

cytology: ***T(l;3)2B17-Cl;3C4-5;77D3-5;81*** **(Schultz).**
new order. 1A - 2B17J3C5 - 20;
61 - 77D3|2C1 - 3C4|81 - 77D5J81 - 100.
discoverer: Clausen.
genetics: Variegated for *w* and *rst* and apparently mutant for *in,* but *eg, Did, Dfdr, pb,* and p not affected, *in* effect probably associated with 77D3-5 break. Each element of the translocation survives **as an aneuploid.** ***Df(l)wvco° = Df(l)2B17-Cl;3C4-5*** is deficient for recessives from *kz* through the dwarf character of *rst*[2] (i.e., *rst* but not vr)- ***Df(l)w™°/T(l;3)wvco*** ^ *wf* **extreme *rst,* and highly infertile.** ***Dp(l;3)wvc0 = Dp(l;3)2B17-C1;3C4~5;77D3-5;81*** **covers *w* and *tst.***

**T(l;3)y260-n: Translocation(l;3) yellow*

cytology: ***T(l;3)lB2-3;8SFl-5.***
origin: X ray induced.
discoverer: Sutton, 39a.
references: 1943, Genetics 28: 210—17.
genetics: Mutant for *y* but not *BC, SC,* or *svr.* Male viable but sterile.

***T(1;3)y260-21**

cytology: ***T(l;3)6C;70E-F + In(l)lA6-7;SD8-El.***
new order: 1A1 - 1A6|5D8 - 1A7|5E1 - 6C|70F - 100;
20 - 6CJ70E - 61.
origin: X ray induced,
discoverer: Sutton, 1939.
references: 1943, Genetics 28: 210-17.
genetics: Mutant for *y* but not sc. Male lethal.

**T(1£;4)A: Translocation(l;3;4) from Austin*

origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
synonym: ***T(l;4)3A.***
references: Painter and Stone, 1935, Genetics 20: 327-41.

***T(l;3;4)A96b**

cytology: *T(1;3;4)3C3-7;IQIF;* break in chromosome *3* not determined (Mackensoo, 1935).

new order: 1 - 3C3|3P;
20 - 3C7|1O1F - 102F;
3D|l01F - 101A.
origin: X ray induced.
discoverer: Mackensen.
references: 1935, J. Heredity 26: 163-74 (fig.).
genetics: Variegated for *w.*

T(l;4)2: see *T(1;4)A1*
T(l;4)t: see *T(l;4)Bs*
T(1;4)3A: see *T(1;3;4)A*
T(l;4)4: see *T(1;4)B**

***T(l;4)231b**

origin: X ray induced.
discoverer: Patterson.
references: Patterson and Painter, 1931, Science 73: 530-31.
Patterson, 1932, Am. Naturalist 66: 193—206.
1932, Genetics 17: 38-59.
genetics: Variegated for *N* and *w.* Left end of *X* from sc to ec attached to chromosome *4.*

***T(1;4)A7:** *Translocation(l;4) from Austin*

cytology: ***T(l;4)9B;20;101-102.***
new order: 1 — 9B|20;
10l|9B -20J102.
origin: X ray induced.
discoverer. Muller, 1928.
synonym: ***CRB; W13; T(l;4)wl3; T(l;4)l.***
references: Muller and Stone, 1930, Anat. Record 47: 393-94.
Muller and Painter, 1932, Z. Induktive Abstammungs- Vererbungslehre 62: 316—65.
Painter, 1934, Genetics 19: 448-69.
genetics: *X* chromosome broken between *Iz* and *ras* and between *bb* and the centromere. The segregant, ***Dp(l;4)Al = Dp(l;4)9B;20;101-102,*** **is lethal when** added to a normal male genotype, causing failure of separation of the germ layers (Poulson, 1940, J. Exptl. Zool. 83; 271-325). Segregant added to a normal female or triploid intersex genotype produces females with low fertility (Pipkin, 1940, Texas Univ. Publ. 4032: 126—56). The reciprocal, *Df(l)Al =DfCl)9B;20,* causes death associated with incomplete blastoderm formation when added to male genotype (Poulson, 1940); it results in poorly fertile females when added to normal female or triploid intersex genotypes (Pipkin, 1940).

***TO;4)A2**

cytology: Chromosome *4* appended to *X* as second arm.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: Painter and Stone, 1935, Genetics 20: 327-41 (fig.).
genetics: Translocation involves short arm of one and base of long arm of the other. Unlike most *X~4* pseudofusions, crossing over between *t* and the centromere is virtually eliminated.

***T(1;4)A3**

cytology: About 10 percent of metaphase length of *X* chromosome transferred to chromosome *4.*

origin: X ray induced.
discoverer: Patterson, 301.
synonym: *T(l;4)w^m^*.
references: Patterson and Painter, 1931, Science 73: 530-31.
Patterson, 1932, Genetics 17: 38—59.
Muller and Painter, 1932, Z. Induktive Abstammungs- Vererbungslehre 62: 316—65.
genetics: Variegated for *w* and *N*. *X* broken between *w* and ec.

***T(1;4)A4**

cytology: *T(1;4)13F6-14A1;1O2F* Inferred from fig. 17D, E, and F of Mackensen (1935), also frontispiece of Texas Univ. Publ. 4032.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: 1934, Am. Naturalist 68: 359-69.
Stone, 1934, Genetica 16: 506-20.
Mackensen, 1935, J. Heredity 26: 163-74 (fig.).
Patterson, Stone, and Bedichek, 1935, Genetics 20: 259-79 (fig.).
1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126-56.
genetics: *X* chromosome broken between *sd* and f. Homozygous viable and fertile. Both the 4^DX^P and the reciprocal X^D4^P elements survive when added to diploid female or intersex genotypes. $X/X/4^DX^P$ females, but not the other genotypes, are fertile.

T(1;4)A4: see *T(l;4)Bs*

***T(1;4)A5**

cytology: Chromosome *4* appended to *X* as second arm.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: Stone, 1934, Genetica 16: 506—20.
Painter and Stone, 1935, Genetics 20: 327-41 (fig-)-
genetics: Translocation involves short arm of one chromosome and base of long arm of the other. Crossing over at base of *X* normal.

T(1;4)A5: see *T(l;4)wms*

***T(1;4)A6**

cytology: Chromosome *4* appended to *X* as second arm.
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche, 1933.
references: Stone, 1934, Genetica 16: 506—20.
Painter and Stone, 1935, Genetics 20: 327—41 (fig-)-
genetics: Same as *T(1;4)A5.*

***T(1;4)A7**

cytology: Chromosome *4* appended to *X* as second arm.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: Stone, 1934, Genetica 16: 506—20.
Painter and Stone, 1935, Genetics 20: 327—41 (fig.)-
genetics: Same as *T(1;4)A5.*

***T(1;4)A8**

cytology: *T(l;4)llA6-7* (1940, Texas Univ. Publ. 4032, frontispiece); breakpoint in chromosome *4* unknown.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: 1934, Am. Naturalist 68: 359—69.
Stone, 1934, Genetica 16: 506-20.
Patterson, Stone, and Bedichek, 1935, Genetics 20: 259-79 (fig.).
1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126-56.
genetics: *X* chromosome broken between *tw* and *wy* and chromosome *4* to the left of *bt.* Homozygous viable and fertile. Both the $X\&4^P$ and the 4^DX^P elements added to a normal diploid female genotype produce weakly fertile hyperploid females and when added to a triploid intersex genotype produce sterile hypoploid triploid females.

***T(1;4)A9**

cytology: *T(l;4)5Al-4* (1940, Texas Univ. Publ. 4032, frontispiece).
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche; 1933.
references: 1934, Am. Naturalist 68: 359—69.
Stone, 1934, Genetica 16: 506-20.
Patterson, Stone, and Bedichek, 1935, Genetics 20: 259-79.
1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126-56.
genetics: *X* chromosome broken between *rg* and *cv* and *4* broken to the left of *bt.* Homozygous viable and fertile. The X^D4^P element added to a normal diploid female genotype produces partially fertile hyperploid females; it survives when added to a triploid intersex genotype. Its complement, 4^DX^P, is virtually lethal when added to a diploid female but produces a partially fertile hypotriploid when added to triploid intersex genotype.

***T(1;4)AJ0**

cytology: *T(I;4)1A5-6;1O2A2~4.*
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche, 1933.
references: 1934, Am. Naturalist 68; 359—69.
Stone, 1934, Genetica 16: 506—20.
Stone and Griffen, 1940, Texas Univ. Publ. 4032: 208-17 (fig.),
genetics: Homozygous viable and fertile.

***T(1;4)A71**

cytology: Chromosome *4* appended to *X* as second arm.
origin; X ray induced,
discoverer Patterson,, Stone, Bedichek, *&ad* Suche, 1933.

references: Stone, 1934, Genetica 16: 506—20.
Painter and Stone, 1935, Genetics 20: 327—41 (fig-).
Brown, 1940, Texas Univ. Publ. 4032: 65-72.
genetics: Same as *T(1;4)A5.*

T(1;4)A13

cytology: *T(l;4)18C5-Dl* (1940, Texas Univ. Publ. 4032: frontispiece).
origin: X ray induced,
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: 1934, Am. Naturalist 68: 359-69.
Stone, 1934, Genetica 16: 506-20.
Patterson, Stone, and Bedichek, 1935, Genetics 20: 259-79.
1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126-56.
genetics: *X* chromosome broken between *(u* and *car* and in chromosome *4* to the right of *ey.* Homozygous viable and fertile. No *ci* position effect. The $4^{D}X^{P}$ element sterile in male and fertile in female. Complementary $X^{D}4^{P}$ produces fertile hypotriploid females when added to triploid intersex phenotype; it produces a virtually lethal superfemale when added to normal diploid female genotype.

****T(1;4)A14***

cytology: Chromosome *4* appended to *X* as second arm.
origin: X ray induced,
discoverer: Patterson, Stone, Bedichek, and Suche, 1933.
references: Stone, 1934, Genetica 16: 506—20.
Painter and Stone, 1935, Genetics 20: 327-41 (fig-)-
Brown, 1940, Texas Univ. Publ. 4032: 65-72.
genetics: Translocation involves short arm of one chromosome and base of long arm of the other. Stone (1934), but not Brown (1940), reports strong reduction in crossing over at base of *X* chromosome.

T(h4)A17

cytology: *T(1',4)7F5-8B1* (1940, Texas Univ. Publ. 4032: frontispiece).
origin: X ray induced.
discoverer: Mickey.
references: Patterson, Stone, and Bedichek, 1937, Genetics 22: 407-26.
Pipkin, 1940, Texas Univ. Publ. 4032: 126—56.
genetics: *X* chromosome broken between *t* and *lz,* although the reported cytological breakpoint is to the left of this interval. The $X^{D}4^{P}$ element survives when added to either a normal diploid female or a triploid intersex genotype; in the latter at least, the product is a fertile female. The complementary $4^{D}X^{P}$ is virtually lethal when added to a diploid female genotype but produces partially fertile females when added to a triploid intersex genotype.

T(1;4)BS; Trmslocation(l;4) Bar of Stone

cytology: *T(l;4)15F9-16Al;l6A7-Bl;102F* (Griffen, 1941, Genetics 26: 154-55).
new order: 1 - 16A7|l02F - 100;
20 - 16A1J102F.
origin: X ray induced in *Dp(l;l)B = Dp(l;l)15F9-16A1:16A7-16B1.*
discoverer. Stone, 1931.
synonym: *T(l;4)l; T(l;4)4; T(1;4)A4.*
references: 1934, Genetica 16: 506-20.
genetics: Position effect at *B* more extreme than in treated chromosome. Male and homozygous female viable and fertile. The $4^{D}X^{P}$ segregant carries no known markers from chromosome *4* and B^{s} through bb^{+} from *X.* Female hyperploid for this element viable and fertile. Hyperploid male poorly viable and sterile.
other information: Used by Stern in cytological demonstration of crossing over (1931, Biol. Zentr. 51: 547_87). $4^{D}X^{p}$ from $T(1;4)B^{S}$ used by Lindsley and Sandier (1963, In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc. pp. 390—403) in construction of compound-generating B^{s} duplications. Reciprocal products of meiosis in male not always recovered with equal frequency (Novitski and Sandier, 1957, Proc. Natl. Acad. Sci. U.S. 43: 318-24; Zimmering, 1960, Genetics 45: 1253—68; Zimmering and Barbour, 1961, Genetics 46: 1253—60; Zimmering and Perlman, 1962, Can. J. Genet. Cytol. 4: 333-36).

****T(1;4)ct[13b]1: Translocation(1;4) cut***

cytology: *T(1;4)7B2-3;20;101A-D* superimposed on *R(1)1A3-4;19F-2OA1.*
new order: |lA4 - 7B2|20-20F - 20A11;
101A|7B3 - 20J101D - 102.
Tentative.
origin: X ray induced in *R(l)2.*
discoverer: Hannah, 1947.
genetics: Mutant for *ct* but not *y, ac, sc, cm, sn,* or oc. Male lethal.

T(7;4)/-v77: *Translocation(T;4) lethal-variegated*

cytology: *T(1;4)15;1Q1.*
origin: X ray induced.
discoverer Lindsley, Edington, and Von Halle,
references: 1960, Genetics 45: 1649-70.
genetics: Variegated for a lethal. Male fertile.

T(l;4)m*:* see *T(l;4)wm5

****T(J;4)M-pro: Translocathn(l;4)* M/nufe-proc/ocer**

discoverer: Bridges, 33d26.
synonym: *M-pro; Minute-producer.*
genetics; Minutes produced are haplo-4's. The translocation causes nondisjunction of chromosome *4* centromeres (L. V. Morgan, 1940, DIS 13: 51).

TO;4)N264.U: Translocation(l;4) Notch

cytology: *T(l;4)3C6-7;101F* (Sutton).
origin: X ray induced,
discoverer: Demerec, 34a.
synonym: *T(1;4)N«[8].*
references: 1941, Proc. Intern. Congr. Genet., 7th. pp, 99-103.
Jodd, 1955, DIS 29: 126-27.
genetics: Carries mutant allele of *N.* Variegates *tor w* and *rmt* but not *pn, kz,* or <±n. The d^{+} allele shows weakened dominance (Stem).

***T(l;4)N264-20**

cytology: *T(l;4)3C4-5;3C7-8;101F;* 3C5-7 missing (Sutton).
new order 1 — 3C4|l01F;
20 - 3C8|l01F - 102.
origin: X ray induced.
discoverer: Demerec, 34g.
genetics: Deficient for *N;* variegates for *w* and *rst* but not *pn, kz,* or *dm. ci*$^{+}$ shows weakened dominance (Stern).

**T(l;4)N264-86*

cytology: *T(l;4)3C6-7;3C7-8;3E5-6;101F.*
new order: 1 - 3C7|3E6 - 20;
101A - 101F|3C7 - 3E5|l01F - 102;
band 3C7 present twice and considered to have been from each of two chromatids in the sperm (Demerec and Sutton, 1940, Proc. Natl. Acad. Sci. U.S. 26: 532-36).
origin: X ray induced.
discoverer: Demerec, 39i.
references: 1940, Genetics 25: 618-27.
Sutton, 1940, Genetics 25: 534-40 (fig.).
genetics: Carries two AT loci, one mutant and one variegated. Also carries a mutant allele of *rst* (*rst*^{264}~^{s6}) and variegates for *dm* but not *w* or ec. Carries normal allele of ci^{+} (Stern).
Dp(l;4)N^{264}-^{s6} = *Dp(l;4)3C6-7;3E5-6;101F-102* viable and fertile in both sexes; *D((1^264-86 = Dt(l)3C7-8;3ES-6* viable in heterozygote.

***T(1;4)N 264-113**

cytology: *T(l;4)3C10-Dl;101;* section 102 missing.
new order: 1 — 3ClQ|l01;
20 - 3Dl|?.
Proximal portion of *X* chromosome considered to be terminally deficient although it occasionally appears to be capped by a small nucleolus-like structure [Sutton, 1940, Genetics 25: 628—35 (fig.)]. Not clear that a reciprocal translocation between *X* and short arm of *4* was adequately ruled out.
origin: X ray induced.
discoverer. Demerec, 40c.
genetics: Variegates for w and *N* but not *ac, sc, dm,* or ec. Carries normal allele of *ci* (Stern).

T(1;4)N«:* see *T(1;4)N264-12*

***70-,4)sc^{10}2: *Translocation(l;4)* scute**

cytology: *T(1;4)1D;1O1E-F [+ T(1;4)1A;1O2F* according to Schultz].
new order. lA|l02F - 10lF|lD - 20;
101A - 101F|lD - 1A|1O2F;
Tentative.
origin: X ray induced in *ac*^{3}.
discoverer: Sturtevant, 1930.
references: 1934, Proc. Natl. Acad. Sci., U.S. 20: 515-18.
1936, Genetics 21: 444-66.
genetics: Mutant for sc. Virtually male lethal. *X* chromosome broken between *M(l)Bld* and &y chromosome *4* broken proximal to *ci.* According to Schultz, both *X* and *4* also have breaks distal to all known loci and their termini are interchanged. *X*^{D}*4*^{P} carries X-chxocnosotoe loci from y through *M(l)Bld* and was used extensively by Sturtevant (1934, 1936) in his studies on preferential segregation. The *4*^{D}*X*^{P} element survives in the heterozygous female but is an extreme Minute and rarely fertile.

T(1;4)sc^{H}: *Translocation(l;4) scute of Hackeft

cytology: *T(1;4)1B4-C3;1O1-1O2;* inferred from genetic results.
origin: Gamma ray induced.
discoverer: Hackett, 46a.
references: Muller and Valencia, 1947, DIS 21: 70.
genetics: Two halves of the translocation may be recovered separately. *4*^{D}*X*^{P} is deficient for *y* and *sc* but not *M(l)Bld* and carries ey^{+}. *X*^{D}*4*^{P} covers *Df(l)sc*^{19} and therefore carries a normal allele of *l(l)sc. T(1;4)sc*^{li}*/ci* is *ci+.*

*T(l;4)w**:* see *T(1;4)A1*

***T(l;4)w2S8-43**

cytology: *T(1;4)3C3-5;102F4-5* (Demerec).
origin: X ray induced.
discoverer. Demerec, 38k.
genetics: Mutant for *w* but not *kz, pn, rst,* or *(a.* Male lethal.

T(1;4)w^{m3}: see *T(1;4)A3*

T(1;4)w">*: T(l;4) white-mottled

cytology: *T(1;4)3C3-4;101Fl-2* (Griffen and Stone, 1938, Genetics 23: 149).
origin: X ray induced.
discoverer: Muller, 1929.
synonym: *T(1;4)m*^{5}*: Translocation(l;4) mottled-5; T(1;4)A5.*
references: 1930, J. Genet. 22: 299-334.
Bolen, 1931, Am. Naturalist 65: 417-22.
genetics: Variegates for *w* and ci. [Dubinin, Sokolov, and Tiniakov, 1935, Biol. Zh. (Moscow) 4: 716—20]. *X* chromosome broken between *1(1)3C3* and *rst,* and chromosome *4* broken to the left of ey. *X*^{D}*4*^{P} added to a normal male genome produces males with 20 percent normal viability that are weakly fertile; added to a diploid female genome, it produces fertile hyperploid genome; but added to a triploid intersex genome is virtually lethal. *4*^{D}*X*^{P} is inviable when added to a male genome, is virtually lethal when added to a female genome; it produces rather fertile hypotriploid females when added to a triploid intersex genome (Pipkin, 1940, Texas Univ. Publ. 4032: 126-56). Griffen and Stone (1940, Texas Univ. Publ. 4032: 190-200) produced and studied a number of X-ray-induced derivatives of *T(1;4)w^{m5}*.

***T(1;4)w^{m11}**

cytology: *T(l;4y3C3-4;i01A-D,*
origin: X ray induced.
discoverer: Panshin.
references: Pmnshin and Khvostov®, 1938, Biol. *Zh.* (Moscow) 7: 359-80.
Pan*liin, 1938, Nature 142: 837.
1941, DIS 15: 33-34.
genetics: Variegated for *w* but not ci. First rear-mftgemeat to involve, *mad* therefor© to demonstrate, existence of *4L.* Panshin and Khvostova [l938;

Panshin, 1938, Biol. Zh. (Moscow) 7: 837-65] produced and studied a number of X-ray-induced derivatives of *T(l;4)w^{m11}*.

T(1;4)w^{m51c}

cytology: *T(l;4)3Cl-2;3C4-7;20A;101.*
new order: 1 - 3Cl|20A - 3C7|20A - 20F; 10l|(3C2 -3C4)|l01 - 102.
origin: X ray induced in *In(l)w^{TM4} = In(l)3Cl-2;20A.*
discoverer: Lefevre, 51c2O.
references: 1951, DIS 25: 71.
1952, DIS 26: 66.
Ratty, 1954, Genetics 39: 513-28.
genetics: Variegated for *w* and *rst.* Male lethal. *Dp(l;4)w^{mSlc} =Dp(l;4)3C2-3;3C4-7;101* viable and fertile; carries loci of *w* and *rst* but not *spl.*

**T(l;4)w»>52bU*

cytology: *T(l;4)2A2-3;3C3-4;20B;101.*
new order: 1 - 2A2|20B - 3C4|20B - 2OF; 10l|(2A3 -3C3)|l01 - 102.
origin: X ray induced *inln(l)rst^3 =In(l)3C3-4;20B.*
discoverer: Ratty, 52bl3.
references: Lefevre, 1953, DIS 27: 57.
genetics: Variegated for *w.*

T(l;4)w»258-18

cytology: *T(l;4)3C4-5;101.*
origin: X ray induced.
discoverer: Demerec, 33k.
references: Demerec and Slizynska, 1937, Genetics 22: 641-49.
genetics: Variegated for *w* and *rst* but not pn, *fa, dm,* or ec. Also variegated for ci (Stern). Male and homozygous female viable and fertile. *X* chromosome broken between *rst* and *vt* (Gersh, 1965, Genetics 51: 477-80). The *X®4^P* element survives as a duplication.

T(1;4)w$^{m258-21}$

cytology: *T(l;4)3B5-6;101F* (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 1934.
synonym: *T(l;4)w^{v}D3. Tranalocation(l;4) white-variegated of Demerec.*
genetics: Variegates for *w, fa, spl, N, dm,* and *M(1)3E* but not ec or W. Also variegates for *ci* (Gersh). Males usually lethal; survivors probably *X/Y/Y.* Cell lethal in *X/0* tissue in gynandromorphs (Judd, 1953, DIS 27: 95).

**T(7;4)w» 258-31*

cytology: *T(l;4)3C3-5;102F4-17* (Demerec and Hoover).
origin: X ray induced.
discoverer: Demerec, 371.
genetics: Variegated for *w* but not *rst.* Male viable.

***T(1;4)w$^{m258-53}$**

cytology: *T(1;4)3C1-2;1O1E-F;* distal part of chromosome *4* lost. Sutton thought it a terminal deficiency of *X.* Evidence that chromosome *4* is involved seems equivocal, especially since, according to events postulated, the original mottled fly should have been haplo-4. Alternative interpretation is translocation between *X* and *Y* in *X/Y* sperm.
new order: 1A - 3Cl|l01E - 101A; 20 - 3C2|?.
origin: X ray induced.
discoverer: Demerec, 391.
references: Sutton, 1940, Genetics 25: 628—35.
genetics: Variegated for *w* but not *pn, rst,* or *spl.* Male viable. Translocation-bearing fly carries two normal fourth chromosomes.

lC\;4)vt^{mA}t Translocation(l;4) white-mottled from Austin

cytology: *T(1;4)3C2-3;101A2-3.*
origin: X ray induced.
discoverer: Stone.
references: Griffen and Stone, 1939, Genetics 24: 73.
1940, Texas Univ. Publ. 4032: 201-7 (fig.).
genetics: Variegated for *w.* Male viable and fertile. Second demonstration of the existence of a left arm on chromosome *4.*

T(l;4)w^{mD3}: Translocation(T;4) white-mottled of Dubinin

cytology: *T(l;4)3C;101.*
discoverer: Dubinin.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: 293-302.
genetics: Variegated for *w.*

**T(1;4)w">^{D}V4: Translocation(l;4) white-mottled of Dubinin and Volotov*

cytology: *T(l;4)3C3-7;3D;101A-D;* 3C-3D missing; inferred from genetic data and from fig. 5, 6, and 7 of Sacharov (1936), which indicate that the break in chromosome *4* is in the left arm.
new order: 1 - 3C3|l01D - 102F; 20 - 3D|l01A.
discoverer: Dubinin and Volotov.
references: Sacharov, 1936, Biol. Zh. (Moscow) 5: 293-302 (fig.).
genetics: Deficient for *N;* variegated for *w.* Male lethal. Since the *X^{D}4^P* element of *T(l;4)w^{aiD}V4* survives as a duplication and carries *w^{mDV4},* the left break in *X* chromosome is between w and *N.*

T(l;4)w>"^{J}: Translocation();4) white-mottled of Jonsson

cytology: *T(l;4)3C2-3;20;102C.*
new order 1 - 3C2|20 - 3C3|lO2C - 101A; 2OjlO2C - 102F.
origin: X ray induced,
discoverer Jonsson, 61i28.
references: Lefevre, 1963, DIS 37: 49.
Lefevre and Wilkins, 1966, Genetics 53: 175-87.
genetics: Variegated for *w.* The *4^{D}X^P* element of the translocation has become separated from the *X^{D}4^P* element and lost. The *XD4P* element is viable as an *X/Y* male but lethal as an *X/0* male, probably owing to deficiency for 06. Additional evidence for appreciable deficiency for proximal *X* heterochromatin is virtually random disjunction of *X* and y chromosomes. *X^{D}4^P* carries ci$^+$ but not *ey$^+$.* The variegation of white is unorthodox because heterochroraatin has been moved to the white locus rather than white moved into proximal heterochromatin.

T(l;4)w"Med: Translocation(l;4) white-mottled of Medvedev

discoverer: Medvedev, 1934.

genetics: Variegated for *w* and probably *rst.* Arose in w^a and therefore has light eye color.

T(1;4)w^{vD3}: see T(1;4)w$^{m258-21}$

T(1;4)z^{20G1}; Translocction(l;4) zeste

cytology: *T(l;4)3Cl-2;102F2-4;* genetic data more in accord with breakpoint in 3C2-3 than 3C1-2.

origin: X ray induced in a chromosome carrying z.

discoverer: Gans.

references: 1953, Bull. Biol. France Belg. Suppl. 38: 1-90 (fig.).
Gersh, 1963, DIS 37: 80.

genetics: Suppresses *z.* The *X&4*^{*3} element is poorly viable when added to male genome but viable and fertile in female; duplicated for *w* but does not cover lethality of *Df(l)*$w^{m4L}rst^{3R}$ = *Df(l)3Cl-2;3C3-4* (Gersh, 1963).

T(l;A)pn-ec: Translocationfl; Autosome) prune-echinus

cytology: *T(1;A)2D1-2;3F7-4A1;4O-41* or 50-52; position of autosomal breakpoint not determined.

new order: 1 - 2D1 |4A1 - 20;
21 _ 4O|(2D2 - 3F7)|41 - 60;
(for example).

origin: X ray induced.

discoverer: Robins, 62g26.

references: Lefevre, 1963, DIS 37: 50.

genetics: *w* not affected. Male lethal. Female heterozygous for the segregant *Df(l)pn-ec = Df(l)2Dl-2;3F7~4A1* survives though poorly viable and fertile. Male heterozygous for complementary *Dp(l;A)pn-ec = Dp(l;A)2Dl-2;3F7-4Al;40-41* or *80-81* viable but sterile.

T(X-2)In end 3: see T(l;2)wtn53e*

T(X^{c2};2)26: see T(l;2)26

T(Y;2)21E

cytology: *T(Y;2)21D4-E1.*

discoverer: Schultz.

references: Lewis, 1945, Genetics 30: 137—66.

genetics: Not mutant for S or *ast.* Chromosome *2* broken between *ds* and S. Both $2L^DY^P$ and Y^D2^P recoverable in aneuploid progeny.

T(Y;2)54a

cytology: *T(Y;2)*Y^L*;59C4-6.*

discoverer: Mickey, 54a.

references: 1959, Texas Univ. Publ. 5914: 99-105-1963, DIS 38: 30.

genetics: Variegated for *bw.* Male fertile. Male hyperploid for Y^F2R^D survives, is not variegated, and is sterile.

T(Y;2)A

cytology: *T(Y;2)4OF-41A1;* placed in *2R* by Whittinghill (1937, DIS 8: 82-84).

origin: X ray induced,

discoverer: Dobzhansky, 1929.

references: 1930, Biol. Zentr, 50: 671-85.
1932, Z. Induktive AbstaBunung*- Vererbungslehre 60: 235-86.

genetics: Break between pr and *tk. rl, M(2)S2, stw, ap, msf, tk,* and *ltd* not affected.

T(Y;2)A3: Translocation(Y;2) from Austin

origin: X ray induced.

discoverer: Stone,

genetics: Variegated for *bw.*

T(Y;2)B

cytology: *T(Y;2)4OF-41A1,* placed in *2R* by Whittinghill (1937, DIS 8: 82).

origin: X ray induced.

discoverer: Dobzhansky, 1929.

references: 1930, Biol. Zentr. 50: 671—85.
1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.

genetics: Lethal in combination with *M(2)*$S2^{10}$ and shows an extreme *rl* phenotype with *rl. stw, ap, msf, tk,* and *ltd not* affected.

T(Y;2)bw$^+$ Y: Translocation(Y;2) brown-wild typeY

cytology: *T(Y;2)Y^;58F1-59A2;6OE3-F1* (Gersh, 1956, DIS 30: 115; Nicoletti).

new order: Y^{LD}|(59A2 - 6OE3)|yLP _ Y^s;
21 - 58Fl|60Fl - 60F5.

origin: X ray induced.

discoverer: Dempster.

references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339—46.

genetics: *Dp(2;Y)bw*$^+$ carries loci from *bw* through *ba* but not *hv* or *M(2)c;* it is used as a marked *Y* and referred to as *bw*$^+$*Y.*

T(Y;2)bwR27: Translocation(Y;2) brown-Rearranged

cytology: *T(Y;2)59D11-E1.*

origin: X-ray-induced derivative of *bw.*

discoverer: Slatis.

references: 1955, Genetics 40: 5—23.

genetics: Associated with bw**27.

T(Y;2)bw**7

cytology: *T(Y;2)59D5-6.*

origin: X ray induced.

discoverer: Slatis.

references: 1955, Genetics 40: 5—23.

genetics: Associated with *bwR57.*

T(Y;2)C

cytology. *T(Y;2)4OF-41A1;* placed in *2R* by Whittinghill (1937, DIS 8: 82-84).

origin: X ray induced.

discoverer: Dobzhansky, 1929.

references: 1930, Biol. Zentr. 50: 671-85.
1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.

genetics: Does not affect *d, M(2)S2, stw, ap, msf, tk,* or *ltd.*

T(Y;2)D: see T(Y;2;3)D

T(Y;2)dp *' *; Tronslocation(Y;2) dumpy

origin: X ray induced.

discoverer: Thompson, 61d.

genetics: Mutant for *dp.*

T(Y;2)o|p^{w2}: Tr<mslocathn(Y;2) dumpy-warped

origin: X ray induced.

discoverer: Schalet, 55k.

references: Carlson and Schalet, 1956, DIS 30: 71. Carlson, 1958, DIS 32: 117-18.
genetics: Variegated for dp.

T(Y;2)E
cytology: *T(Y;2)36D2-3* (Whittinghill, 1937, DIS 8: 82-84).
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671-85. 1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.
genetics: Male fertile, but *Df(l)sc^{4L}sc8R/T(Y;2)E* male is sterile.

T(Y;2)F: see *T(Y;2;3)F*

T(Y;2)G
cytology: *T(Y;2)36B5-C1;4OF;* metaphase chromosomes appear normal (Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 287).
new order. YD|(36C1 - 40F)|yP;
21 - 36B5|40F - 60.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671-85. Rhoades, 1931, Genetics 16: 490-504.
genetics: *Dp(2;Y)G* has normal phenotype and is fertile when hyperploid in either sex; duplicated for the loci of *M(2)m, M(2)H, hk, pr, Bl, It,* and the lethal of *bw^{V32}6* but not *rd.*

****T(Y;2)H***
cytology: *T(Y;2)37Bl-2;4QB2-3;* also an inversion in *2R* from near centromere to left of *px* (Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 287).
new order. Y^{D}|(37B2 - 40B2)|YP;
21 - 37B1J40B3 - | - | - 60.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671—85. Schultz and Bridges, 1932, Am. Naturalist 66: 323-34.
genetics: Male fertile. Homozygote viable but male sterile. *D£(2L)H* survives and is deficient for *M(2yfi, hk,* and *pr* but not *M(2)m* or *It;* somewhat sterile. *Dp(2;Y)H* appears normal; duplicated for the loci for which *Di(2L)H* is deficient.

T(Y;2)J
cytology: *T(Y;2)40F-41Al;57Fl-2* (Whittinghill, 1937, DIS 8: 82-84).
new order. Y^{D}|40F - 21;
YP|57F1 - 41A1J57F2 - 60.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671—85. 1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.
genetics: Does not affect *rl, M(2)S2, ntw, ap, mat, tk,* or ltd.

****T(Y;2)R24***
cytology: *T(Y;2)4SA;51E.*
new order: Y^{D}|(45A - 51E)|yP;
21 - 45AJ51E - 60.
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 8.
genetics: Induced simultaneously with (but independently of) *bw^{24},* an isoallele of *bw.* Associated with a rough-eye phenotype. Male hyperploid for *Dp(2;Y)R24* is viable but sterile.

T(Y;2)w+Y
Described as *w^{+}Y* in subsection on *Y* derivatives.

****T(Y;2;3)D***
cytology: *T(Y;2;3)29F-3OA1 + T(2;3)34C;78F + Df(2R)41A;41C + Df(3L)61E2-Fl;62A4-6.* May also carry small inverted segment in region 41 (Whittinghill, 1937, DIS 8: 82-84).
new order: Y^{D}|30Al - 34C|78F - 100;
Y^{p}|29F -21;
60 - 41C|41A - 34C|78F - 62A6|61E2 - 61A.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
synonym: *T(Y;2)D.*
references: 1930, Biol. Zentr. 50: 671-85. 1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.
genetics: Deficient for *M(2)S2* and *stw,* but not *rl, ap, msf, tk,* or *ltd* in chromosome 2 and for *ru, aa,* and ve but not *su(ve)* or *R* in chromosome *3.* The *2L^{D}Y^{P}* element survives in hyperploids.

T(Y;2;3)F
origin: X ray induced.
discoverer: Dobzhansky, 1929.
synonym: *T(Y;2)F.*
references: 1930, Biol. Zentr. 50: 671—85. 1932, Z. Induktive Abstammungs- Vererbungslehre 235-86.
genetics: Break in *2R* to right of *sp.*

****T(Y;2;3)I***
cytology: *T(Y;2)47A2-3 + T(Y;3)91E2-4 + In(3LR)69C2-3;84E2-3+In(3LR)74A-Bl;99C* (Whittinghill, 1938, DIS 8: 82-84).
new order. Y^{D}J47A2 - 21;
YD|91E4 - 99CJ74B1 - 84E2|69C2 - 61;
60 - 47A3|YP|91E2 - 84E3|69C3 - 74A|99C - 100.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671-85. 1932, Z. Induktive Abstammungs- Vererbungslehre 60: 235-86.

****T(Y;3)42i***
cytology: Break in middle of one arm of chromosome *3.*
origin: X ray induced.
discoverer Poulson.
references: 1943, DIS 17: 51.

****T(Y;3)HS8b.*** ***Tronslocathn(Y;3) Hairless***
origin: Gemma ray induced.
discoverer: Ives, 58b25.
references: 1959, DIS 33: 95.
genetics: Mutant for *H.*

T(Y;3)I
cytology: *T(Y;3)Y^S;63C;72E.*
new order: Y^L - Y^SPJ63C - 72E|63C - 61; Y^{SD}|72E - 100.
origin: X ray induced,
discoverer: Muller.
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller, 1930, J. Genet. 22: 299-334.
Mohr and Mossige, 1940, Hereditas 26: 202—8 (fig-).
genetics: Right break in *3L* between ffi and s£. The $3L^DY^P$ element recoverable in hyperploid and duplicated for loci from *ni* through *th.*

T(Y;3)K4: Translocation(Y;3) of Krivshenko
cytology: *T(Y;3)Y^s;8l;* inferred from metaphase cytology. Ganglion metaphases show break in Y^s distal to 66 and break in *3R* near centromere.
origin: X ray induced.
discoverer: Krivshenko, 59b7.
references: 1959, DIS 33: 96.
genetics: Homozygous viable but apparently sterile.

T(Y;3)P8Q: Translocation(Y;3) from Pasadena
cytology: *T(Y;3)88C-F.*
discoverer: E. B. Lewis.

T(Y;3)P102
cytology: *T(Y;3)87B2-3.*
discoverer: E. B. Lewis.

T(Y;3)srl00.23. Translocation(Y;3) stripe
cytology: *T(Y;3)90E2-3.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *sr.*

T(Y;3)sf*00.i26. Translocation(Y;3) scarlet
cytology: *T(Y;3)73A2-3.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *st.*

T(Y;4)
Described as *4Y* in subsection on *Y* derivatives.

T(2;3)63-1
cytology: *T(2;3)49D-E;79B-C.*
origin: Gamma ray induced.
discoverer. C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous viable and fertile. Eyes slightly rough.

T(2;3)63-2
cytology: *T(2;3)27B-C;75C.*
origin: Gamma ray induced,
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Hcmozygous lethal.

TX2;3)63-3
cytology: *T(2;3)40-41;8Q-81;* inferred from genetic results since salivary chromosomes appear normal.
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

1(2:3)63-5
cytology: *T(2;3)40C;89E-F + In(3L)69-70;79-80.*
new order: 21 - 40C|89E - 80|70 - 79J69 - 61; 60 - 40C[89F - 100.
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1965, Genetics 51: 971—82.

T(2;3)63-6
cytology: *T(2;3)59E-F;89E-F.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous viable and fertile. Short bristles; wings obliquely creased, ovate, and often asymmetrical.

1(2;3)63-7
cytology: *T(2;3)41C;92D-E.*
origin: Gamma ray induced,
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971—82.
genetics: Homozygous lethal.

T(2;3)63-8
cytology: *T(2;3)36E;86B.*
origin: Gamma ray induced.
discoverer. C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

T(2;3)63-9
cytology: *T(2;3)34A-B;75C.*
origin: Gamma ray induced,
discoverer. C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971—82.
genetics: Homozygous lethal.

*** 1(2:3)63-10***
cytology: *T(2;3)33'34;76D-E.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous viable but sterile. Abdominal tergite pigmentation more intensive and extensive than wild type.

1(2:3)63-13
cytology: *T(2;3y24-2S;94D-E.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references; 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygoos viable and fertile. Eye color variegated.

1(2:3)63-14
cytology: *T(2;3)38A-B;69A-B,*
origin: Gamma ray induced.

discoverer: C. Hinton, 63b.
references: 1964, OIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

7(2;3)63-15
cytology: *T(2;3)41D;64A.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references'. 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal. Eye color variegated in heterozygote.

T(2;3)63-16
cytology: *T(2;3)41C~D;93A-B.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous viable and fertile. Eyes slightly rough.

T(2;3)63-17
cytology: *T(2;3)40C;96A-B.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal. Eye color in heterozygote variegated over *SM5* but normal over *bw* and +. Possibly contains light-mottled.

7(2;3)63-18
cytology: *T(2;3)39B-C;80C.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous viable and fertile. Ninety percent have troughlike wing posture.

7(2:3)63-19
cytology: *T(2;3)24D-E;80C.*
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

7(2;3)63-21
cytology: *T(2;3)32E;89C-E + ht(3LR)65B;84B.*
new order: 21 - 32E|89C - 84B|65B - 84B|65B - 61;
60-32E|89E - 100.
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1965, Genetics 51: 971-82.

7(2;3)63-22
cytology: *T(2;3)40B;84D.*
origin: Gamma ray induced,
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

7(2,-3)63-23
cytology: *T(2;3)40~41;80-81;* inferred from genetic data since salivary chromosomes appear normal.
origin: Gamma ray induced.
discoverer: C. Hinton, 63b.
references: 1964, DIS 39: 61.
1965, Genetics 51: 971-82.
genetics: Homozygous lethal.

T(2;3)64-31
cytology: *T(2;3)36D-E;96B-C + In(2R)41E-F;55F.*
new order: 21 - 36D|96B - 61;
60 - 55F|41F - 55F|41E - 36E|96C - 100.
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971-82.

1(2;3)64-32
cytology: *T(2;3)35D-E;70C-D.*
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971-82.

7(2;3)64-33
cytology: *T(2;3)40-41;80-81;* inferred from genetic data since salivary chromosomes appear normal.
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971—82.

T(2;3)64-34
cytology: *T(2;3)25D;86C.*
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971-82.

T(2;3)64-35
cytology: *T(2;3)40B;92C.*
origin: X ray induced.
discoverer C. Hinton, 1964.
references: 1965, Genetics 51: 971-82.

7(2:3)64-36
cytology: *T(2;3)40D;85E.*
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971—82.

7(2;3)64-37
cytology: *T(2;3)60E;82F.*
origin: X ray induced.
discoverer: C. Hinton, 1964.
references: 1965, Genetics 51: 971-82.

**7(2;3)100r20*
cytology: *T(2;3)35B2;3;40;80* superimposed on *Dp(l;3)3B4-Cl;4B4-5;80.*
new order 21 - 35B2|4B4 - 3Cl|80 - 100;
60 - 40J35B3 - 40|80 - 61.
origin: X ray induced in $Dp(l;3)N^{2}64\text{-}100$,
discoverer: Gersh, 1959.
references: 1959, Genetics 44: 163-72.
genetics: Selected as a partial reversion from white-mottled.

7(2;3)101
cytology: *T(2;3)44B;83E-F* (Lewis, 1956, DIS 30: 130).
discoverer: Sturtevant.
genetics: Homozygous viable; male fertile but female sterile. Crossing over about normal in chromosome 2 of heterozygous female.

T(2;3)103

discoverer: Sturtevant.

genetics: Homozygous lethal. Reciprocal translocation with breaks in *2L* and *3L*. Crossing over in heterozygous female low in *2L*, normal in *2R*.

T(2;3)108

cytology: ***T(2;3)37-40;42A2-3;52D-F;58A4-B1;80;81;*** inferred from a combination of cytological (52D-F by Lewis, 1951, DIS 25: 108-9) and genetic observations.

new order: 21 - 37|(80 - 81)|52D - 42A3|58B1 - 60;
61 - 801(40 - 42A2|58A4 - 52F)|81 - 100.

origin: Arose in *In(2R)Cy = Jn(2R)42A2-3;58A4-Bl.*

discoverer: Sturtevant.

genetics: Mutant for *Rev*. Homozygous semilethal. The segregant that receives a normal chromosome *2* and the translocated element that might be designated $3L^{D}2^{P}3R^{D}$ survives and is fertile. It is duplicated for the loci of *pr, It, rl, tk,* and according to E. B. Lewis, for *M(2)S7, sm,* and *hy;* not deficient for chromosome *3* genes.

T(2;3)109

cytology: ***T(2;3)22F-23B;55F-56A;80*** **(Lewis, 1951,** DIS 25: 108-9).

new order: 21 - 22F|55F - 23B|80 - 61;
60 - 56A|80 - 100.

discoverer: Sturtevant.

genetics: Homozygous viable and wild type. Originated in *In(3R)P* but separable from it.

****T(2;3)110***

origin: X ray induced.

discoverer: Sturtevant.

genetics: Homozygous lethal. Wings short, extended, coiled downward in spiral. L4 and marginal veins thickened, L4 sometimes not reaching margin; posterior wing cell reduced. Posterior crossvein absent; L5 reduced and irregularly plexate. Break in *2R* near *vg* and one in *3R,* which carries ***In(3R)P.*** **New order is *2L + 3L* and *2R + 3R.***

****T(2;3)13S***

cytology: ***T(2;3)37;85A.***

origin: X ray induced simultaneously with *T(l;2)l-vl35.*

discoverer: Lindsley, Edington, and Von Halle,

references: I960, Genetics 45: 1663.

T(2;3)A

cytology: *T(2;3)39B-C;83B* (Lewis, 1951, DIS 25: 108-9).

origin: X ray induced in *Bl.*

discoverer: Dobzhansky, 28h.

references: 1929, Biol. Zentr. 49: 408—19.
1933, Z, Induktive Abstammungs- Vererbunigslehre 64: 269-309.
Dobzhansky and Sturtevant, 1931, Carnegie last. Wash. Publ. No. 421: 29-59.

genetics: Homozygous lethal.

****T(2;3)A1: 7"ranslocalhn(2;3) from Austin***

origin: X my induced.

references: Patterson, Stone, Bedichek, and Suche, 1934, Am. Naturalist 68: 359-69.
Pipkin, 1940, Texas Univ. Publ. 4032: 73-125.

genetics: Homozygous viable and fertile. Chromosomes *2* and *3* broken at chromocenter. *2L* attached to *3R* and *3L* to *2R*.

****T(2;3)A26***

origin: X ray induced.

discoverer: Muller.

references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller, 1930, J. Genet. 22: 299-334.

genetics: Break in *3R* between sr and e.

T(2;3)Antp^{Yt}>: Translocation(2;3) Antennapedła ofYu

cytology: ***T(2;3)22B;83E-F + T(2;3)38B;98A.***

new order: 21 - 22B|83F - 98A|38E - 22B|83E - 61;
60 - 38E|98A - 100.

origin: X ray induced,

discoverer: Yu, 1948.

references: 1949, Ph.D. Thesis, Calif. Inst. Technol.
Lewis, 1956, DIS 30: 76.

genetics: Mutant for *Antp;* associated with 83E-F breakpoint. Homozygous lethal.

T(2;3)apX°: Translocafion(2;3) apterous-Xasta

cytology: *T(2;3)41F;89E8-F1* superimposed on ***In(2R)42A2-3;58A4-Bl + In(3R)89C2-3;96A18-l 9*** (Bridges in Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 294, with correction by Lewis, 1951, DIS 25: 108-9).

new order: 21 - 41F|89E8 - 89C3|96A19 - 100;
60 - 58Bl|42A3 - 58A4|42A2 - 41F|89F1 - 96A18|89C2 - 61.

origin: X ray induced in *In(2R)Cy; In(3R)P.*

discoverer: Serebrovsky, 28a.

synonym: ***T(2;3)Xa: Translocation(2;3) Xasta.***

references: Serebrovsky and Dubinin, 1930, J. Heredity 21: 259-65.
Sturtevant, 1934, DIS 2: 19.

genetics: Dominant mutant for *ap.* Homozygote virtually lethal.

other information: The first X-ray-induced mutation recovered in the USSR. Useful as a balancer of *2R* and *3R.*

****T(2;3)as1 r*1; Translocation(2;3) asteroid-reverted***

cytology. ***T(2;3)21E2-3;68C2-3;8SD8-9.***

new order. 21A - 21E2|88D8 - 68C3J88D9 - 100;
61 - 68C2|21E3 - 60.

origin: X ray induced in *al ast ho.*

discoverer: E. B. Lewis, 1942.

references: 1945, Genetics 30: 158.

genetics: Associated with a reversion of *ami.* Homozygous lethal.

****T(2;3)astrv3***

cytology: ***T(2;3)21E2-3;61C2-3,***

origin: X my induced *in net ast dp cl.*

discoverer: E. B. Lewis, 1942.

references: 1945, Genetics 30: 158.

genetics: Associated with reversion of *ast.* Lethal homozygous and heterozygous with *Df(2L)S4 = Df(2L)21C3-4;22B2-3.*

T(2;3)Ata: Translocation(2;3) Arista

cytology: *T(2;3)40;66F-67A + T(2;3)47;81.*
new order: 21 - 40|67A - 81J47 - 60;
61 - 66F|40-47|81 - 100.
origin: X ray induced.
discoverer: Krivshenko, 1949.
synonym: *T(2;3)At* (symbol preoccupied).
references: 1954, DIS 28: 74-75.
1955, DIS 29: 73.
genetics: Associated with *Ata.* Homozygous lethal.

T(2;3)B

cytology: *T(2;3)33;S1F* (Lewis, 1951, DIS 25: 108-9; 1954, Am. Naturalist 88: 225-38).
origin: X ray induced.
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408-19.
Dobzhansky and Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 29-59.
genetics: Homozygous lethal. Crossing over reduced in *2L.*

T(2;3)bw^{R4}: Translocation(2;3) brown-Rearranged

cytology: *T(2;3)59E2-3;80-81.*
origin: X-ray-induced derivative of few.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with *bw^{R4}.*

T(2;3)bw*i2

cytology: *T(2;3)59D;80C.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{R12}.*

T(2;3)bw*u

cytology: *T(2;3)59E2-3;80.*
origin: X ray induced.
discoverer: Slatis.
references: 1955, Genetics 40: 5-23.
genetics: Associated with *bw^{R14}.*

T(2;3)bw^{R15}

cytology: *T(2;3)59D;80C.*
origin: X ray induced.
discoverer: ShiUs.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw^{Rls},*

T(2,3JfcwV*: Translocation(2;3) brown-Variegated

origin: X ray induced.
discoverer: Muller.
references; Glass, 1933, J. Genet. 28: 69-112.
1934, Am. Naturalist 68: 107-14.
genetics: Variegated for *bw.* Break near *bw* in *2R* and in *3L* just left of centromere,
oftwf information: Similar to *T(2;3)bwV** and *T(2?3)hw^{vs};* translocatioo parts interchangeable among these rearrangements without altering pbenotype.

T(2;3)bw^{V4}

origin: X ray induced,
discoverer: Patterson.
references: Glass, 1933, J. Genet. 28: 69—112.
1934, Am. Naturalist 68: 107-14.
genetics: Variegated for *bw.* Break in *2R* near *bw* and in *3L* near centromere.

T(2;3)bw^{V5}

origin: X ray induced.
discoverer: Patterson,
references: Glass, 1933, J. Genet. 28: 69-112.
1934, Am. Naturalist 68: 107-14.
genetics: Variegated for *bw.* Break in *2R* near *bw* and in *3L* near centromere.

T(2;3)bwY

origin: X ray induced in *bw.*
discoverer: Moore, 1929.
references: Glass, 1933, J. Genet. 28: 69-112.
1934, Am. Naturalist 68: 107-14.
genetics: Crossing over reduced in *2L, 2R,* and base of *3R.* Probably breaks in all three arms.
other information: Eye color reverted to wild type, but translocation remained.

T(2;3)bwV8

origin: X ray induced.
discoverer: Levy, 1932.
genetics: Variegated for *bw.* Break in *2R* at bw and *3R* near p.

T(2;3)bwV30ki2

origin: X ray induced.
discoverer: Van Atta, 30kl2.
references: 1932, Genetics 17: 637—59.
genetics: Variegated for few. Complex rearrangement with break in *2R* near few, near centromere of 2, in *2L,* and *3L* near centromere; also appears to carry an inversion in *3R.*

T(2;3)bwV30ki3

origin: X ray induced.
discoverer: Van Atta, 30kl3.
references: 1932, Genetics 17: 637—59.
genetics: Variegated for few. Breaks in *2R* near c and *bw* and in *3R* near cu.

T(2;3)bwV^{D}: Translocation(2;3) brown-Variegated Dichaete linked

origin: X ray induced,
discoverer: Oliver, 29k24.
references: 1932, Z. Induktive Abstammungs-Vererbungalehre 61: 447—88.
genetics: Variegated for few. Homozygous lethal.

7T2;3)4wVD.3; *Translocation(2;3) brown-Variegated* of *Demerec*

cytology: *T(2;3)59D;81F.* Also an inversion in *2R.*
origin: X ray induced,
discoverer Demerec, 33jl4.
genetics: Variegates for few and *mi* but not *abb.* Mutant for *Dfd.* Homozygous lethal. Gives transvection effects with certain pairs of bithorax pseudoalleles (Lewis, 1955, Am. Naturalist 89: 73-89).

T(2;3)bw$^{VD•4}$

cytology. *T(2;3)59D2-4;80* (Schultz).
origin: X ray induced,
discoverer: Demerec, 33k22.
genetics: Variegates for *bw* and *mi.* Homozygous lethal.

T(2;3)C
origin: X ray induced.
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408-19.
Dobzhansky and Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 29-59.
genetics: Break near centromere in chromosomes 2 and 3. New order is *2L + 3L; 2R + 3R.* Homozygous lethal.

T(2;3)C4: Translocatipn(2;3) Crossover *suppressor*
cytology: *T(2;3)40-41;94A;* position of breakpoint in chromosome 2 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination reduced in *3R.*

T(2;3)C11
cytology: *T(2;3)40-41;64D;77A;* position of breakpoint in chromosome 2 with respect to centromere not determined.
new order: 21 - 40|77A - 64D|77A - 100;
60 - 40|64D - 61.
Tentative.
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Homozygous viable. Recombination reduced in *3L.*

T(2;3)C16
cytology: *T(2;3)50E;66C;70C.*
new order: 21 - 50E|70C - 66C|50E - 60;
61 - 66C|70C - 100.
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination reduced in *3L* and *2R.*

T(2;3)C17
cytology: *T(2;3)56F;67E.*
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination reduced in *3L* and *2R.*

T(2;3)C18
cytology: *T(2;3)25B;40;84B.*
new order: 21 — 25B|40 — 60;
61 - 84B|25B - 40|84B - 100.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination reduced in *2L.*

T(2;3)C24
cytology: *T(2;3)S3B;80-81;* position of breakpoint in chromosome 3 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous viable. Recombination reduced in *2R.*

T(2;3)C29
cytology: *T(2;3)43F;92D.*
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous viable. Recombination reduced in *3R.*

T(2;3)C49
cytology: *T(2;3)22C-D;86E.*
origin: X ray induced,
discoverer: Roberts, 1964.
genetics: Homozygous viable. Recombination reduced in *2L.*

T(2;3)CS8
cytology: *T(2;3)40-41;96F;* position of breakpoint in chromosome 2 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1964.
genetics: Homozygous lethal. Recombination reduced in *3R.*

T(2;3)C6S
cytology: *T(2;3)40-41;75A;80-8l + In(3L)64C;77A;* involvement of chromosome 2 inferred from genetic data; positions of heterochromatic breakpoints with respect to centromeres not determined,
new order: 21 - 4Q|80 - 100;
60 - 40|75A - 64C|77A - 80|75A - 77A|64C - 61.
Tentative.
origin: X ray induced.
discoverer: Roberts and D. Stewart, 1964.
genetics: Homozygous lethal. Recombination reduced in *3L.*.

T(2;3)Ct01
cytology: *T(2;3)29B;80-81;* position of breakpoint in chromosome 3 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygote survives infrequently. Recombination reduced in *2L.*

T(2;3)CU1
cytology: *T(2;3)40-41;70F + In(3L)62B;79D-E;* position of breakpoint in chromosome 2 with respect to centromere not determined; new order therefore ambiguous.
new order: 21 - 40|70F - 62B|79E - 100;
60 - 4Q|70F - 79D|62B - 61.
Tentative.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *3L.*

T(2;3)CJ22
cytology: *T(2;3)60B;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *2R.*

T(2;3)CU4
cytology: *T(2;3)34D;75F.*
origin: X ray induced.
discoverer: Roberts, 1965.

genetics: Homozygous lethal. Recombination reduced **in *2L.***

T(2;3)C132

cytology: *T(2;3)55E;80-81;* position of breakpoint in chromosome 3 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *2R.***

T(2;3)CJ49

cytology: *T(2;3)52A;93B.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2R* and *3R.*

T(2;3)C157

cyto logy: *T(2;3)41;96D-E + In(2LR)24F; 54F.*
new order: 21 - 24F|54F - 4l|96D - 61;
60 - 54F|24F - 41 |96E - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *2L* and *3R.*

T(2;3)C164

cytology: *T(2;3)32F;64B.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2L* and *3L.*

T(2;3)C177

cytology: *T(2;3)40-41;62F + T(2;3)56F;79B;* position of left breakpoint in chromosome 2 with respect to centromere not determined.
new order: 21 - 40|62F - 79B|56F - 4l|62F - 61;
6 0 - 56F|79B - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *3L* and *2R.*

T(2;3)C199

cytology: *T(2;3)41;93E.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3R.***

T(2;3)C2O2

cytology: *T(2;3)S6D;89D.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced **in *2R.***

T(2;3)C2ll

cytology: *T(2;3)40-41;70C;* position of breakpoint in chromosome *2* with respect to cenfaromere not determined.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3L.***

T(2;3)C218

cytology: *T(2;3)40-41;70F;* position of breakpoint in chromosome 2 with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced **in *3L.***

T(2;3)C230

cytology: *T(2;3)35D;61A.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3L.***

T(2;3)C231

cytology: *T(2;3)50D;62B + In(2LR)35C-D;52A-B.*
new order: 21 - 35C|52B - 50D|62B - 100;
60 - 52A|35D - 50D|62B - 61.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2R* and *3L.*

T(2;3)C248

cytology: *T(2;3)S2C;94D;96B.*
new order 60 - 52C|94D - 61;
21 - 52CJ96B - 94D|96B - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2R* and *3R.*

T(2;3)C257

cytology: *T(2;3)50F;80;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *2R.***

T(2;3)C259

cytology: *T(2;3)40-41;61E;73A;* position of breakpoint in chromosome 2 with respect to centromere not determined.
new order 21 - 40|61E - 73A|41 - 60;
61A - 61E|73A - 100.
Tentative.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3L.***

T(2;3)C267

cytology: *T(2;3)21D;63F;64E + In(3LR)74F;8&D.*
new order 21A - 21D|64E - 74FJ8SD - 74F[88D - 100;
60 - 21DJ63F - 64E|63F - 61.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3L.***

T(2;3)C287

cytology: *T(2;3)54F;89F.*
origin: X ray induced,
discoverer Roberts, 1965.

genetics: Homozygous lethal. Recombination reduced **in *2R.***

T(2;3)C293

cytology: *T(2;3)43A;67A;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
new order: 21 - 43A|67A - 61;
60 - 43A|80 - 67A|81 - 100.
origin: X ray induced.
discoverer Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3L.***

T(2;3)C304

cytology: *T(2;3)48A;83C;100B.*
new order: 21 - 48A|l00B - 100F;
60 - 48A|83C - 100B|83C - 61.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3R.***

T(2;3)C308

cytology: *T(2;3)40-41;84B;94D;99B.*
new order: 21 - 40|94D - 84B|94D - 99B|84B - 61;
60 - 40|99B - 100.
Tentative.
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *3R.***

T(2;3)C309

cytology: *T(2;3)58D;68F.*
origin: X ray induced,
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2R* and *3L.*

T(2;3)C3T1

cytology: *T(2;3)54C;64C.*
origin: X ray induced,
discoverer. Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2R* and *3L.*

T(2;3)C313

cytology: *T(2;3)27B;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *2L.***

T(2;3)C316

cytology: *T(2;3)25F;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer. Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced **in *2L.***

T(2;3)C3U

cytology: *T(2;3)24D;97D.*
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous lethal. Recombination reduced in *2L* and *3R.*

T(2;3)C328

cytology: *T(2;3)55C;58B;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
new order: 21 - 55C|58B - 60;
61 - 80|(55C - 58B)[81 - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *2R.* The segregant *Dp(2;3)C328 = Dp(2;3)55C;58B;80-81* survives but not the complementary deficiency.

T(2;3)C356

cytology: *T(2;3)29F;80-81;* position of breakpoint in chromosome *3* with respect to centromere not determined.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced **in *2L.***

T(2;3)C591

cytology: *T(2;3)28D;69D.*
origin: X ray induced in oocyte.
discoverer: Roberts and Thomas, 1965.
references: Thomas and Roberts, 1966, Genetics 53: 855-62.
genetics: Homozygous lethal. Recombination reduced **in *2L.***

****T(2;3)C-K: Translocation(2;3) Curved of Krivshenko***

cytology: *T(2;3)52;76;81;86.*
new order: 21 - 52186 - 100;
60 - **52)81** - 76J81 - 86|?6 - 61.
origin: X ray induced.
discoverer: Krivshenko, 5513.
references: 1956, DIS 30: 74.
genetics: Associated with *C-K.* Homozygous lethal.

****T(2;3)D***

origin: X ray induced,
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408—19.
Dobzhansky and Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 29-59-
genetics: Heterozygote short lived and frequently sterile, especially in female. Wings mis-shapen and legs short.

T(2;3)dp: Translocation(2;3) dumpy

cytology.* ***T(2;3)34D;41A;47E;48A;80;81 + In(2)27Dl-2;32D;44C5-6;44F3-12*** **(Bridges); existence** of break or breaks in chromosome *3* inferred from genetic data (Muller, 1942; Cooper, Zitnsaering, and Krivshenko, 1955, Proc. Natl. Acad. ScL U.S. 41: 911-14),
new order. 21 - 27D1J32D - 34D|41A - 44C5J44F3 - 44C6|27D2 - 32D|44F12 - **47E|(80** - 81)|48A - 60;
61 - 8Q|(34D - 41A)|81 - 100.
Extremely tentative; 47E — 48A unaccounted for.
origin: Reportedly spontaneous.

discoverer. Nichols-Skoog, 36el6.
synonym: *In(2LR)dp.*
references: Morgan, Bridges, and Schultz, 1937, Carnegie Inst. Wash. Year Book 36: 301.
Curry, 1939, DIS 12: 46.
Muller, 1942, DIS 16: 64.
genetics: Mutant for *dp* (dp^{36}°), fcOb^{3*5}'). *rl[T(2;3)dp/Dt(2RjM-S2^{r}*^{11}* is *rl], tuf[T(2;3)dp/tuf* is extreme *tuf],* and a lethal that is uncovered by *Df(2R)Np.* Associated .with a dominant rough eye mutant. Homozygous lethal. The chromosome *3* segregant *Dp(2;3)dp = Dp(2;3)34D;41A;80;81* (tentative) survives in poorly fertile male and sterile female, both of which have arched wings and low viability; duplicated for *pr.* The complementary *Df(2LR)dp —Df(2LR)34D;41A* is lethal.

T(2;3)dp^{D}: Translocation(2;3) dumpy-Dominant
cytology: *T(2;3)25A;95B-D* (E. B. Lewis).
origin: X ray induced.
discoverer: £. B. Lewis, 1962.
references: Del Campo, 1963, DIS 38: 32.
genetics: Mutant for *dp.* Homozygous lethal.

T(2;3)dp»i; Translocation(2;3) dumpy-warped
origin: X ray induced.
discoverer: Schalet, 1955.
references: Carlson and Schalet, 1955, DIS 29: 71—72.
Carlson, 1958, DIS 32: 117-18.
genetics: Apparently variegated for *dp.* Homozygous lethal.

T(2;3)Dp-S: Translocation(2;3) with Duplication Star
cytology: *T(2;3)21D4-E1;81F* superimposed on *Dp(2;2)21D2-3;21E2-3.*
new order: 21A - 21E2J21D3 - 21D4|81F - 61;
60-21El|81F - 100.
origin: X ray induced in *Dp(2;2)S, ast ást.*
discoverer: E. B. Lewis.
references: 1945, Genetics 30: 137—66.
genetics*. Y-suppressible expression of *ast.*

T(2;3)Dr^{L}: Translocation(2;3) Drop of Lewis
cytology: *T(2;3)44;89F-90A + Itt(3R)89C}95D-96Bl.*
new order 21 - 44|89F - 89CJ96B1 - 100;
60 - 44|90A - 95DJ89C - 61.
origin: X ray induced,
discoverer: E. B. Lewis.
genetics: Mutant for *Dr,* which is probably independent of rearrangement.

T(2;3)E
cytology: *T(2;3)30B;67E* (Schultz).
origin: Spontaneous.
discoverer: Sturtevant, 1929.
references: Dobzhansky and Sturtevant, 1931, Carnegie Inst. Wash. Publ. No. 421: 29-59.
genetics: Homozygous lethal.

TTZ'W"^{rf}- ***Translocation(2;3) glass***
origin: Gamma ray induced.
discoverer: Ives, 63d29.
references: 1965, DIS 40: 35.
genetics: Mutant for *0.*

T(2;3)Gt: see ***T(2;3)Puor***

T(2;3)hlO0.27l: Translocation(2;3) hairy
cytology: *T(2;3)41;66D14-E1.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *h.*

T(2;3)HK: Translocation(2;3) Half of Krivshenko
cytology: *T(2;3)22A;61A.*
origin: X ray induced in female.
discoverer: Krivshenko, 56114.
references: 1959, DIS 33: 95.
genetics: Only the *2L^{D}3^{P}* element recovered from the treated oocyte.

T(2;3)Hm: Translocation(2;3) Haltere mimic
cytology: Breakpoints unknown.
origin: X ray induced.
discoverer: Slatis, 49b5.
genetics: Associated with *Hm.*

T(2;3)Hn: Translocation(2;3) Henna
cytology: *T(2;3)53E-54A;77A;94F;96A* (E. B. Lewis),
new order. 21 - 53E|77A - 61;
60 - 54A|94F - 96A|77A - 94F|96A - 100.
Tentative.
origin: X ray induced,
discoverer: Van Atta, 30k.
references: 1932, Am. Naturalist 66: 93—95.
1932, Genetics 17: 637-59.
genetics: Separable from Hn, which is associated with *Df(3L)Hn =Df(3L)66A;66B.*

T(2;3)lf"h Translocation(2;3) light-mottled
cytology: *T(2;3)40B-F;63E-F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lt=4
cytology: *T(2;3)40B-F;67E.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)lt'nS
cytology: *T(2;3)40B-F;98C.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lt>n6
cytology: *T(2;3)26E-F;40B-F;96E.*
new order: 21 - 26E|40B - 26F|96E - 61;
60 -40F|96E - 100.
origin: X ray induced,
discoverer Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2:3)lt=7
cytology: *T(2;3)40B-F;100F.*
origin: X ray induced.
discoverer: Hessler, 1957.

references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lf»8
cytology: *T(2;3)40B-F;92B.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lt>nio
cytology: *T(2;3)40B-F;64E.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

*T(2;3)ltn>"
cytology: *T(2;3)40B-F;96F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)ltm13
cytology: *T(2;3)40B-F;64F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)ltm14
cytology: *T(2;3)40B-F;95F.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)ltm15
cytology: *T(2;3)40B-F;92E.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)ltm17
cytology: *T(2;3)40B'F;95C-D.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lt'°1
cytology: *T(2;3)40B-F;98A.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)ltm19
cytology: *T(2;3)40B~F;94B.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
feneties: Variegated for *U.*

T(2;3)ltm21
cytology: *T(2;3)4QB-F;93D.*
origin: X ray induced.
discoverer: Hessler, 1957.
iwfwomeo*: 1958* Geoetic* 43: 395—403.
§an©tics: Variegated for *It.*

T(2;3)lt*>23
cytology: *T(2;3)40B-F;62F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)lt<»24
cytology: *T(2;3)40B-F;59F;75C.*
new order. 21 - 40B|75C - 100;
60 - 59F|40F - 59F|75C - 61.
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)lf»27
cytology: *T(2;3)40B-F;88E-F.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)lt>»28
cytology: *T(2;3)40B-F;97E.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

7(2:3)1^29
cytology: *T(2;3)40B-F;99F.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)lt>»30
cytology: *T(2;3)40B-F;99C.*
origin: X ray induced.
discoverer Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lf»32
cytology: *T(2;3)40B-F;97A.*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395-403.
genetics: Variegated for *It.*

T(2;3)ltm34
cytology: *T(2;3)*0B-F;6tB.*
origin: X ray induced.
discoverer. Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *It.*

T(2;3)lt>»3S
cytology: *TX2;3)40B-F;64C-*
origin: X ray induced.
discoverer: Hessler, 1957.
references: 1958, Genetics 43: 395—403.
genetics: Variegated for *tt.*

T(2;3)lt>»ioo
cytology: *T(2;3)40;97F.*
origin: X ray induced.
references: Baker and Rein, 1962, Genetics 47: 1399-1407.
genetics: Variegated for *It.* Homozygous lethal.

T(2;3)M$^{vTM^d}$: see T(2;3)MV

T(2;3)Me: Translocation(2;3) Moir6

cytology: *T(2;3)48Cl-2;59D2-3;60F;80-81* (tentative) + *In(3LR)69E;9lC* + *In(3R)89B;97D* superimposed on *In(3L)63C;72El-2* (Whittinghill, 1937, DIS 8: 83); breakpoint in chromosome *3* with respect to centromere not determined; new order therefore ambiguous.

new order: 21 -48Cl|S9D2 - 48C2|60F; 61 - 63C|72E1 - 69E|91C - 97D|89B - 8l|59D3 - 60F|80 - 72E2|63C - 69E|91C - 89B|97D - 100. Tentative.

origin: X ray induced in *In(3L)P, Me.*

discoverer: Muller, 1930.

references: Glass, 1933, J. Genet. 28: 104.

genetics: Mutant for *sbd (sbd^1), Dp(2;3)Me = Dp(2;3)59D2-3;60F;80-81* survives.

****T(2;3)Me2***

origin: X ray induced.

discoverer Moore, 1929.

references: Glass, 1933, J. Genet. 28: 69-112.

genetics: Break in *2L* near centromere. Mutant for ***Me.***

****T(2;3)MeS°: Translocation(2;3) Moire´of Sytko***

discoverer: Sytko.

references: Agol, 1936, DIS 5: 7.

genetics: Breaks reportedly in *2R* and *3R,* yet mutant for *Me* in *3L.*

T(2;3)Met: Translocation(2;3) Metatarsi irregular

origin: X ray induced.

discoverer: Jonsson, 56al0.

references: 1956, DIS 30: 73.

genetics: Associated with *Met,*

****T(2;3)M0***

origin: Spontaneous.

discoverer. Imaizumi, 59a.

references: 1962, Cytologia 27: 212—28.

genetics: Breaks between *en* and *vg* in *2R* and between *st* and ss in *3R.*

T(2;3)Mot-K: Translocation(2;3) Mottled of Krivshenko

cytology: *T(2;3)41;6QD;80-8t;* breakpoint in chromosome *3* with respect to centromere not determined; association of arms therefore ambiguous.

new order 21 - 4l|80 - 61; 60F - 60D|41 - 60D|80 - 100. Tentative.

origin: X ray induced.

discoverer Krivshenko, 54c25.

references: 1954, DIS 28: 75.
1955, DIS 29: 76.

genetics: Associated with *Mot-K.* Homozygous lethal.

****T(2;3}MV: Translocation(2;3) Variegated of Mickey***

cytology: *T(2;3)43E;75C.*

origin: Gamma ray induced.

discoverer: Mickey, 54d.

synonym: *T(2;3W^{VS4d}.*

references: 1963, DIS 38: 30.

genetics: Eye color variegated; more prominent in **male.**

****T(2;3)Hu: Translocation(2;3) Nude***

cytology: *T(2;3)24;36-37;39-40;73-74;75-76;77-78;81-82;85-86;89-90.*

origin: X ray induced.

discoverer Sutton, 41a27.

genetics: Associated with *Nu.* Homozygous lethal.

T(2;3)pGr: see T(2;3)PuOr

T(2;3)P: Translocation(2;3) Pale

cytology: *T(2;3)58E3-F2;60D14-E2;96B5-Cl* (Morgan, Bridges, and Schultz, 1935, Carnegie Inst. Wash. Year Book 34: 286).

new order: 21 - 58E3|60E2 - 60F; 61 - 96B5|60D14 - 58F2|96CI - 100.

origin: Spontaneous.

discoverer: Bridges, 17J16.

references: 1919, Anat. Record 15: 357-58.
1923, Anat. Record 24: 426-27.
Bridges and Morgan, 1923, Carnegie Inst. Wash. Publ. No. 327: 184-87.
Li, 1927, Genetics 12: 1-58.
Kossikov and Muller, 1935, J. Heredity 26: 305-17.
Bridges, 1937, Cytologia (Tokyo), Fujii Jub. Vol. 2: 745-55.

genetics: Associated with P. Homozygote ordinarily lethal but survives in presence of *bw$^+$Y = Dp(2;Y)Y^L;58Fl-59A2;60E3-Fl;* lethality therefore associated with 60D14-E2 breakpoint (Muller, 1942, DIS 16: 64). *Dp(2;3)P = Dp(2;3)58E3-F2;60D14-E2;96B5-C1* is viable and fertile; duplicated for loci of *px, M(2)t, crs, bw, mi, abb, pd, 11, 1(2)NS, sp, bs,* and *ba* but not a or *M(2)c.* Homozygous *Dp(2;3)P* is lethal unless one chromosome *2* is *Df(2R)P = Df(2R)58E3-4;60D14-E2. Df(2R)P* with two normal third chromosomes is lethal.

other information: First translocation recorded in *Drosophila melanogaster.*

T(2;3)P23: Translocation(2;3) from Pasadena

cytology: *T(2;3)81F;56F.*

origin: X ray induced in *Ubx e^4.*

discoverer: E. B. Lewis, 49k.

references: 1963, Am. Zoologist 3: 33—56.

genetics: Gives transvection effect in *T(2;3)P23, Ubx/bx34** heterozygote.

T(2;3)P32

cytology: *T(2;3)42D-E,89D7-E1 + D((2)41A;44C-D.*

new order: 21 - 41A|44D - 60; 61 - 89D7|42D - 41Ai44C - 42E|89E1 - 100.

origin: X ray induced in *bx$^{\wedge 4e}$.*

discoverer: E. B. Lewis, 50L

genetics: Gives transvection effect in *T(2;3)P32, bx^{34e}/ZJbx* heterozygote. The segregant *Dp(2;3)P32 = Dp(2;3)41A;42D-E;44C-D;89D7-El* survives and is fertile and virtually wild type; duplicated for *stw, ap, tuf,* and *en* but not *pr* or *ltd.*

****T(2;3)Pu: Translocation(2;3) Punch***

cytology: *T(2;3)40F-41Al;70D~E + T(2;3)57B5~C1;79F.*

new order: 21 - 40F|70E - 79F|57C1 - 60;
61 - 7OD|41A1 - 57B5|79F - 100.
Tentative.
origin: X ray induced,
discoverer: Oliver, 28k4.
references: Muller, 1930, J. Genet. 22: 326.
Oliver, 1932, Z. Induktive Abstammungs-Vererbungslehre 61: 484.
genetics: Associated with *Pu.* Homozygous lethal.

T(2;3)Pu^{Gr}: Translocation(2;3) Punch-Grape
cytology: *T(2;3)57C;81F* (Lewis, 1956, DIS 30: 130).
origin: X ray induced,
discoverer Muller, 291.
synonym: *T(2;3)Gr; Translocation(2;3) Grape; T(2;3)p^{Or}:* Translocation(2;3) pink-Grape,
references: Glass, 1933, J. Genet. 28: 69—112.
1934, Am. Naturalist 68: 107-114.
genetics: Mutant for *Pu.* Homozygous lethal.

****T(2;3)Pu^{r}*: Translocation(2;3) Punch-reversed***
cytology: *T(2;3)40F-41A;70D-E + T(2;3)57B5-C1;79F.*
new order 21 - 40F|70E - 79F|57B5 - 41Al|70D - 61;
60 - 57Cl|79F - 100.
Tentative,
origin: X-ray-induced derivative of *T(2;3)Pu = T(2;3)40F-41A;70D-E + T(2;3)57B5-C1;79F.*
discoverer: Oliver, 32127.
references: 1939, Genetics 24: 82.
1941, Proc. Intern. Congr. Genet., 7th. p. 228.
genetics: Partial reversal of *Pu.* Homozygous lethal.

T(2;3)Pu*f: Translocation(2;3) Punch-Wine
cytology: *T(2;3)57B-C;80.*
origin: X ray induced,
discoverer: E. B. Lewis, 55h.
genetics: Mutant for *Pu.*

T(2;3)rn: Translocation(2;3) rotund
origin: Probably X ray induced.
discoverer: Glass, 1929.
references: 1934, DIS 2: 8.
Muller, 1953, DIS 27: 106-7.
Carlson, 1956, DIS 30: 109.
genetics: Mutant for rn. Homozygous viable but sterile in both sexes. Breakpoints near the centromeres and probably in right arms of chromosomes 2 and *3* (Carlson, 1956). About 10 percent of the progeny of parents heterozygous for *T(2;3)tn* and chromosome 2 inversions are nondisjunctional for chromosome *2* (Muller, 1953).

****T(2;3)SL: Translocation(2;3) Star of Lewis***
cytology. *T(2;3)2tE2-3;81 F;88D6-8.*
new order: 21 - 21E2J81F - 88D6J81F - 61;
60 - 21E3|88D8 - 100.
Tentative.
origin: X ray induced,
discoverer E. B. Lewis, 1940.
references: 1945, Genetics 30: 137-66.
genetics: Mutant for S.

7(2;3)$*: Translocation(2;3) Star of Muller
cytology: *T(2;3)21E2-3;79D2-E1* superimposed on *In(2L)22Dl-2;33F5-34Al + In(2R)42A2-3;58A4-Bl.*
new order: 21A - 21E2J79E1 - 100F;
60F - 58B1 |42A3 - 58A4|42A2 - 34Al|22D2 - 33F5|22D1 - 21E3|79D2 - 61A-
origin: X ray induced in *In(2L)Cy +In(2R)Cy.*
discoverer Muller, 1928.
references: Painter and Muller, 1929, J. Heredity 20: 287-98.
Muller, 1930, J. Genet. 22: 335-57.
Morgan, Bridges, and Schultz, 1936, Carnegie Inst. Wash. Year Book 35: 293.
genetics: Mutant for *S;* also carries *Cy.*

****T(2;3)Sa: Translocation(2;3) Salmon***
origin: X ray induced.
discoverer: Van Atta, 30kl.
references: 1932, Am. Naturalist 66: 93—95.
1932, Genetics 17: 637-59.
genetics: Associated with *Sa.* Homozygous lethal. Break in *2L* between *pr* and centromere and in *3L* near centromere.

T(2;3)SbV: Translocation(2;3) Stubble-Variegated
cytology. *T(2;3)41A-C;88;89B* superimposed on *In(3R)93D7-El;98F2-6. In(3LR)65;83* induced simultaneously but was separated from it by recombination.
new order. 21 - 41A|89B - 93D7|98F2 - 93El|98F6- 100;
61A - 88|89B - 88|41C - 60.
origin: X ray induced in *In(3R)Mo, Sb sr.*
discoverer E. B. Lewis, 1948.
references: 1956, DIS 30: 76-77.
genetics: Variegates for phenotype of deficiency for *Sb,* which is normal.

T(2;3)sbdlO6. Translocation(2;3) stubbloid
cytology: *T(2;3)22E;89B.*
origin: X ray induced.
discoverer: E. B. Lewis.

****T(2;3)$car: Translocation(2;3) Scarred***
cytology: *T(2;3)27E;95A + In(3)91F;96A,*
new order 21 - 27EJ95A - 96A|91F - 61;
60 - 27EJ9SA - 91FJ96A - 100.
origin: X ray induced,
discoverer Yu, 48h.
references: 1949, DIS 23: 65.
genetics: Associated with Scar.

****T(2;3)SM2: TranslocotioM2;3) Second Multiple***
cytology- *T(2;3)21A;40F;80-81* superimposed on *In(2L)22Dl-2;33F5-34AI + ln(2LR)22A3-Bl?6QB-C + In(2R)42A2'3;58A4-Bl;* position of breaks in proximal heterochroMitin with respect to centromeres not determined.
origin: X ray induced in *In(2LR)SMl,*
discoverer R. F. Grell, 1953.
references: Lewis and liislove, 19S3, DIS 27: 58.
Mislove and Lewis, 1954, DIS 28: 77.
genetics: Variegated for *It.*

other information: Discarded because the *T(2;3)* impairs its general usefulness as a chromosome 2 balancer, described as *SM2* in the section on balancers.

T(2;3)sr4-2: Translocation(2;3) stripe

cytology: *T(2;3)30C;90C-96.*
origin: X ray induced.
discoverer: Alexander.
references: I960, Genetics 45: 1019-22.
genetics: Mutant for sr. Homozygous lethal.

T(2;3)sri00.3i2

cytology: *T(2;3)40-41;90D2-El.*
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for sr. Homozygous lethal.

T(2;3)sfl00.359. Translacation(2;3) scarlet

cytology: *T(2;3)21C3-5;73A2-3;98F2-4.*
new order: 21A - 21C3|73A3 - 98F2|73A2 - 61;
60 - 21C5|98F4 - 100.
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for *st.* Homozygous lethal.

T(2;3)Xd: see ***T(2;3)apXa***

T(Z-3;4)+3

cytology: *T(2;3)2W;74F + T(3;4)67C;101B + T(3;4)95D-E;97C;101E.*
new order: 21A - 21D|74F - 95D|97C - 100;
60 - 21D|74F - 67CJ101E - 102F;
61 - 67C|l01E - 101A;
101A - 101E|95E - 97C|l01E - 102F.
This new order postulates involvement of two fourth chromosomes, but the true origin of the centromere to which 95E-97C is attached is unknown. In larval ganglia 1 metaphases, this element is not visible.
origin: X ray induced.
discoverer: Stern, Schaffer, and Heidenthal.
synonym: $JR^3(+)$.
references: 1946, Proc. Natl. Acad. Sci. U*S. 32: 26-33.
Stern, MacKnight, and Kodani, 1946, Genetics 31: 598-619.
Kodani and Stern, 1946, Science 104: 620-21 («g.).
genetics: Variegates for *ci.* Homozygous lethal. *T(2;3;4)+3/ci* has greater interruption of wing veins than *ci/ci. T(2;3;4)+3/M(4)* is normal, supporting the postulated involvement of two fourth chromosome's.

T(2;3;4)hw*S8; Tmnslocaiion(2;3;4) brown-Rearranged

cytology: *T(2;3;4)59D;6S;1QIC.*
new order: 21 - 59O|65 - 61;
60 - 59DJ101C - 102;
?|65 - 100.
101A to C lost.
origin: X ray Induced..
discoverer: Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with $bw^R5«_t$

T(2;3;4)bwV30ki8; Translocation(2;3;4) brown-Variegated

origin: X ray induced.
discoverer: Van Atta, 3Okl3.
references: 1932, Genetics 17: 637-59.
genetics: Variegated for *bw.* Produces aneuploids that have Minute bristles.

T(2;4)a

cytology: *T(2;4)50B2-3;102E* (E. B. Lewis).
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671-85.
1931, Genetics 16: 629-58.
genetics: Homozygous lethal. Fly hyperploid for $2R^D4^P$ element survives rarely and is sterile.

**T(2;4)A6: Translocation(2;4) from Austin*

cytology: *T(2;4)57F2-3;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable but sterile. Fly hyperploid for the 4^P2R^D element viable and fertile.

T(2;4)A8

cytology: *T(2;4)26F4-27A1;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Patterson, Brown, and Stone, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable and fertile. Fly hyperploid for the $2L^D4^P$ element viable and fertile.

T(2;4)A23

cytology: *T(2;4)58F;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
genetics: Homozygous viable but sterile.

T(2;4)A27

cytology: *T(2;4)4OD1-F1;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Burdette, 1940, Texas Univ. Publ. 4032: 157-63.
Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 157-63.
genetics: Homozygous lethal.

T(2;4)A29

cytology: *T(2;4)47A4-5;* breakpoint in chromosome *4* not determined.
origin: X ray induced,
discoverer. Patterson, Stone, Bedichek, and Such®.

references: 1934, Am. Naturalist 68: 359—69. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous lethal.

T(2;4)A30
cytology: *T(2;4)53B2-C1;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69. Burdette, 1940, Texas Univ. Publ. 4032: 157-63. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable and fertile.

T(2;4)A34
cytology: *T(2;4)56F6-7;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69. Burdette, 1940, Texas Univ. Publ. 4032: 157-63. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable. Either acts as or carries a dominant suppressor of *Pu* (Oliver, 1943, Anat. Record 87: 461).

T(2;4)A35
cytology: *T(2;4)26E;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
genetics: Homozygous viable.

T(2;4)A40
cytology: *T(2;4)49F3-50Al;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69. Burdette, 1940, Texas Univ. Publ. 4032: 157-63. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable and fertile.

T(2;4)A43
cytology: *T(2;4)22C;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable and fertile. $2L^{D}4^{P}$ element not recoverable in hyperploid; therefore translocation probably more complex than given.

T(2;4)A45
cytology: *T(2;4)36D;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
genetics: Homozygous lethal according to Patterson, Stone, Bedichek, and Suche (1934); viable and fertile according to Bridges and Brehtne (1944, The Mutants of *Drosophila melano&aster,* Carnegie Inst. Wash. Publ. No. 552: 202).

T(2;4)AS2
cytology: *T(2;4)36B;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
genetics: Homozygous viable and fertile.

T(2;4)A53
cytology: *T(2;4)36El-3;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69. Burdette, 1940, Texas Univ. Publ. 4032: 157-63. Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
genetics: Homozygous viable and fertile.

T(2;4)ast^{v}: Translocation(2;4) asteroid-variegated
cytology: *T(2;4)21E2-3;101.*
origin: X ray induced.
discoverer. E. B. Lewis, 1940.
references: 1945, Genetics 30: 137—166.
genetics: Variegates for *S, ast,* and ci. Homozygous lethal. Fly with $4^{D}2^{P}$ element in place of one chromosome *2* survives and has extremely rough eyes. $4^{D}2^{P}$ is deficient for *l(2)gl* and *net* and presumably for *al,* ex, and *ds.* Fly hyperploid for complementary $2L^{D}4^{P}$ also survives.

T(2;4)b
cytology: *T(2;4)25E;102C15-Dl* (Schultz and E. B. Lewis). Metaphase chromosome *4* twice normal size.
origin: X ray induced.
discoverer. Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671—85. 1931, Genetics 16: 629-58.
genetics: *ci* not affected. Homozygous viable and fertile. Fly hyperploid for $2L^{D}4^{P}$ element survives; short and thick with flattened abdomen, bulging eyes, and curved wings; both sexes sterile. Duplicated for *M(2)z* and *dp* but not *cl, ey,* or *av* (Morgan, 1946, DIS 20: 88).

T(2;4)bwK2S; Translocation(2;4) brown-Rearranged
cytology: *T(2;4)59D;101E.*
origin: X-ray-induced derivative of *bw.*
discoverer Slatis.
references: 1955, Genetics 40: 5—23.
genetics: Associated with *bw&*^{2S}.

T(2;4)c
cytology: Metaphase chromosome *4* about twice normal size.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671—85. 1961, Genetics 16: 629-58.
genetics: Hotnozygote nearly lethal; wings do not expand, and fly dies early. Break in *2L* between *dp* and *b,* but close to *dp.* Male hyperploid for

$2L^D4^P$ element poorly viable and sterile. No variegation for ci^+ (Stern).

T(2;4)d

cytology: *T(2;4)55E-F* (Lewis, 1956, DIS 30: 130); breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Dobzhansky, 1929.
references: 1930, Biol. Zentr. 50: 671-85.
1931, Genetics 16: 629-58.
genetics: Homozygote nearly lethal; fly is short lived and has inflated wings. No viable aneuploid product.

T(3;4)85C

cytology: *T(3;4)85C;* breakpoint in chromosome *4* not determined.
discoverer: E. B. Lewis.
references: Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.

T(3;4)86D

cytology: *T(3;4)86D2-3;1Q1F.*
origin: Neutron induced in bx^{34e} e^4.
discoverer: E. B. Lewis.
references: Grell, 1959, Genetics 44: 421—35.
1959, Genetics 44: 911-22.
genetics: Homozygous viable and fertile. *T(3;4)86D/ci* has *ci* effect; enhanced by low temperature; tends to be suppressed by extra *Y* chromosome. Venation of homozygote and haplo-4 is ci+.

T(3;4)88B

cytology: *T(3;4)88B;* breakpoint in *4* not determined,
origin: X ray induced in *Ubx.*
discoverer E. B. Lewis.
references: Grell, 1959, Genetics 44: 421—35.
genetics: Homozygous lethal. Has no position effect on *d.*

T(3;4)89E

cytology: *T(3;4)89E2-3;101F.*
origin: X ray induced in ss *bx* $Su(as)^2$.
discoverer: E. **B.** Lewis.
references: Grell, 1959, Genetics 44: 911—22.
genetics: Associated with bxd^{101}. Homozygous lethal. *T(3;4)89E/ci* has a ci effect; enhanced by low temperature; tends to be suppressed by extra *Y* chromosome.

T(3;4)104:* see *T(3;4)f

****T(3;4)684***

cytology: *T(3;4)67;101;* breakpoints roughly estimated from fig. of Dubinin and Sidorov (1935).
origin: X ray induced.
discoverer: Dubinin and Sidorov.
references: 1934, Biol. Zh. (Moscow) 3: 307—31.
1935, Biol. Zh. (Moscow) 4: 555-68 (fig.).
genetics: Position effects on both *h* and ci.

T(3;4)o

cytology: Metaphase chromosome *4* about one-half length of *3L.*
origin: X my induced.
discoverer: Dobzhansky, 29h.
references: 1929, Biol. Zentr. 49: 408-19.
1929, Proc. Natl. Acad. Sci. U.S. 15: 633-38.
1930, Genetics 15: 347-99.
genetics: Homozygous lethal. Break in *3L* between ***D*** and ***th.***

****T(3;4)A1: Translocation(3;4) from Austin***

cytology: *T(3;4)89A6-Bl;102B;* breakpoint in chromosome *4* inferred from Painter's fig. 40 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous viable and fertile according to Patterson, Stone, Bedichek, and Suche (1934); homozygous lethal according to Bridges and Brehme (1944, The Mutants of *Drosophila melanogaster,* Carnegie Inst. Wash. Publ. No. 552: 203).

T(3;4)A2

cytology: *T(3;4)94A3-4;101F* (Brown).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
genetics: Homozygous viable and fertile. Fly hyperploid for $3R^D4^P$ element survives.

****T(3;4)A3***

origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
synonym: *T(3;4)A60.*
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous lethal. *3R* broken between e and ca.

****T(3;4)A4***

cytology: *T(3;4)80-81;101.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous lethal.

****T(3;4)A5***

cytology: *T(3;4)92A5-6;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Burdette, 1940, Texas Univ. Publ. 4032: 157-63.
genetics: Homozygous lethal.

****T(3;4)A8***

cytology: *T(3;4)75B4-5;102Dl-3* (Brown).
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
Burdette, 1940, Texas Univ. Publ. 4032: 157—63.
genetics; Homozygous viable and fertile.

****T(3;4)A9***

cytology: *T(3;4)87E3-Fl;102F.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.

references: 1934, Am. Naturalist 68: 359-69.
Painter, 1935, Genetics 20: 301-26 (fig.)-
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
genetics: Homozygous viable and fertile.

T(3;4)A12

cytology: *T(3;4)73Cl-2;102C;* breakpoint in chromosome *4* roughly estimated from Painter's fig. 15 (1935).
origin: X ray induced.
discoverer: Patterson, "Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Burdette, 1940, Texas Univ. Publ. 4032: 157-63.
Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.
genetics: Homozygote poorly viable and fertile. Fly hyperploid for $3L^{D}4^{P}$ element survives.

T(3;4)A13

cytology: *T(3;4)67E3-4;102D-E;* breakpoint in chromosome *4* roughly estimated from Painter's fig. 14 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Patterson, Brown, and Stone, 1940, Texas Univ. Publ. 4032: 167-89.
Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.
genetics: Homozygous lethal. Fly hyperploid for $3L^{D}4^{P}$ element survives.

****T(3;4)A14***

cytology: *T(3;4)80;101.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).

****T(3;4)A20***

cytology: *T(3;4)89A;101F;* breakpoint in chromosome *4* roughly estimated from Painter's fig. 41 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous lethal.

****T(3;4)A22***

cytology: *T(3;4)61E-F;102B-C;* estimated from Painter's fig. 11 (1935).
origin: X ray induced.
discoverer Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
1935, Painter, Genetics 20: 301-26 (fig.),
genetics: Homozygous lethal. *3L* broken to the left of *tu.*

****T(3;4)A23***

cytology: *T(3;4)66D5-E1;1O1F.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Hcsaoxygous lethal in male, viable in female.

****T(3;4)A24***

cytology: *T(3;4)99;102B-C;* inferred from Painter's fig. 48 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301—26 (figO-
genetics: Homozygous viable and fertile.

****T(3;4)A27***

cytology: *T(3;4)82B3-Cl;101A-D.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
Burdette, 1940, Texas Univ. Publ. 4032: 157—63.
genetics: Homozygous viable and fertile.

T(3;4)A28

cytology: *T(3;4)94D3-4;102* (E. B. Lewis); breakpoint in chromosome *4* estimated from Painter's fig. 44 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.
genetics: Homozygous viable and fertile.

****T(3;4)A3Q***

cytology: *T(3;4)96E5-Fl;102B-C;* breakpoint in chromosome *4* roughly estimated from Painter's fig. 47 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Pipkin, 1959, Texas Univ. Publ. 5914: 69-88.
genetics: Homozygous lethal. Fly hyperploid for $3R^{D}4^{P}$ survives.

****T(3;4)A31***

cytology: *T(3;4)80;101.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
Burdette, 1940, Texas Univ. Publ. 4032: 157—63.
genetics: Homozygous viable and fertile.

****T(3;4)A34***

cytology: *T(3;4)61F;101F;* estimated from Painter's fig. 10 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.),
genetics: Homozygous lethal. *3L* broken to left of ***tu.***

****T(3;4)A36***

cytology: *T(3;4)8OB3-C1;1Q2E* (Brown). *3L* broken about one-sixth the distance from centromere to tip in roetaphase chromosome.
origin: X ray induced.
discoverer. Patterson, Stone, Bedichek, and Suche.

references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
Brown, 1940, Texas Univ. Publ. 4032: 11-64.
Burdette, 1940, Texas Univ. Publ. 4032: 157-63.
genetics: Homozygous viable and fertile.

***T(3;4)A37**
cytology: *T(3;4)86E5-6;101F;* breakpoint in chromosome *4* roughly estimated from Painter's fig. 38 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous lethal.

***T(3;4)A39**
cytology: *T(3;4)94B4-C1;IO1F;* breakpoint in chromosome *4* estimated from Painter's fig. 46 (1935).
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-69.
Painter, 1935, Genetics, 20: 301-26 (fig.).
Burdette, 1940, Texas Univ. Publ. 4032: 157-63.
genetics: Homozygous lethal.

***T(3;4)A43**
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Homozygous lethal. *3R* broken near *sr*.

***T(3;4)A44**
cytology: *T(3;4)76;99;102D-F;* estimated from Painter's figs. 49 and 51 (1935).
new order 61 - 76|lO2D - 101;
100- 99|76 - 99|1O2F.
references: 1934, Am. Naturalist 68: 359—69.
origin: X ray induced,
discoverer: Patterson, Stone, Bedichek, and Suche.
Painter, 1935, Genetics 20: 301-26 (fig.),
genetics: Homozygous lethal.

***T(3;4)A45**
cytology: *T(3;4)80;101.*
origin: X ray induced.
discoverer: Patterson, Stone, Bedichek, and Suche.
references: 1934, Am. Naturalist 68: 359-*69.
Painter, 1935, Genetics 20: 301-26 (fig.)-
phenotype: Homozygous viable but sterile.

***T(3;4)A52**
cytology: *T(3;4)65D3-F2;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer. Patterson, Stone, Bedichek, and Sucbe.
references: 1934, Am. Naturalist 68: 359—69.
Painter, 1935, Genetics 20: 301-26 (fig.).
ph©notype: Hcnsozygous viable and fertile.

***T(3;4)A56**
cytology: *T(3;4)76E2"F3;101F;* breakpoint in chromosome *4* estimated from Painter's fig. 17 (1935).
origin: X ray induced.
discoverer. Patterson, Stone, Bedlchek, and Suche.
references: 1934, Am. Naturalist 68: 356~§[Q].
Painter, 1935, Genetics 20: 301-26 (fig.).
genetics: Hornozygous lethal.

T(3;4)A60: see *T(.3;4)A3*

***T(3;4)b**
cytology: Chromosome *4* increased to one-half the length of *3L* in metaphase figures.
origin: X ray induced.
discoverer. Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408-19.
1929, Proc. Natl. Acad. Sci. U.S. 15: 633-38.
1930, Genetics 15: 347-99.
genetics: Breakpoint in *3L.* near *th.* Crossing over markedly lowered near *th* and somewhat so at *3L* tip.

T(3;4)c
cytology: *T(3,-4)86B-C;l01F* (Lewis, 1951, DIS 25: 108-9).
origin: X ray induced.
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408-19.
1929, Proc. Natl. Acad. Sci. U.S. 15: 633-38.
1930, Genetics 15: 347-99.
genetics: Homozygous viable and fertile, *ci* not affected. Crossing over much reduced near breakpoint in heterozygote and even more reduced in homozygote in some regions (Beadle, 1932, Proc. Natl. Acad. Sci. U.S. 18: 160-65).

***T(3;4)d**
cytology: Metaphase figures show barely detectable increase in size of chromosome *4.*
origin: X ray induced.
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408—19.
1929, Proc. Natl. Acad. Sci. U.S. 15: 633-38.
1930, Genetics 15: 347-99.
genetics: Homozygous lethal, ci not affected (Stern). Breakpoint in *3R* between *ca* and *M(3)g* and in *4* to the left of *M(4)* and ey. Apparently, 4^D3^P element can substitute for a normal *3* producing Minute flies. Hyperploids for $3R^D4^P$ element probably also survive.

T(3;4)DI7P*: *Translocation(3;4)* De/fo-7 *of Panshin
origin: X ray induced.
discoverer: Panshin.
references: 1935, Dolk. Akad. Nauk SSSR 4: 85-88.
genetics: Chromosome *3* broken to the right of cu. Mutant for *Dl;* position effect that weakens dominance of ca^+.

T(3;4h
cytology: *T(3;4)79E;102F* (Lewis, 1956, DIS 30: 130),
origin: X ray induced.
discoverer: Dobzhansky, 28h.
references: 1929, Biol. Zentr. 49: 408-19.
1929, Proc. Natl. Ac®d. Sci. U.S. 15: 633-38.
1930, Genetics 15: 347-99.
genetics: Homozygous semi lethal and female sterile. *ci* not affected (Stern). Crossing over normal in betarocygote except oear p.

T(3;4)f
cytology: *T(3;4)6SD;* at least seven bands of chroraomoaa© *4* Inserted into *3L* (Lewis, 1956, DIS 30: 130).

origin: X ray induced.
discoverer: Sturtevant, 1930.
synonym: *T(3;4)104.*
references: Beadle, 1933, Z. Induktive Abstammungs- Vererbungslehre 65: 111—28.
genetics: Homozygous lethal. No *ci* variegation **(Stern).**

T(3;4)H1: Translocation(3;4) from Howard University
cytology: *T(3;4)80-81;* breakpoint in chromosome *4* not determined.
origin: X ray induced,
discoverer: Pipkin.
references: 1959, Texas Univ. Publ. 5914: 69—88.

T(3;4)H3
cytology: *T(3;4)80-81;* breakpoint in chromosome *4* not determined,
origin: X ray induced.
discoverer: Pipkin.
references: 1959, Texas Univ. Publ. 5914: 69-88.

T(3;4)H5
cytology: *T(3;4)96E;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Pipkin.
references: 1959, Texas Univ. Publ. 5914: 69-88.
genetics: Fly hyperploid for $3R^D4^P$ survives.

T(3;4)H6
cytology: *T(3;4)98A;* breakpoint in chromosome *4* not determined.
origin: X ray induced.
discoverer: Pipkin.
references: 1959, Texas Univ. Publ. 5914: 69—88.
genetics: Fly hyperploid for $3R^D4^P$ survives.

T(3;4)H7
cytology: *T(3;4)66C;* breakpoint in chromosome *4* not determined,
origin: X ray induced,
discoverer Pipkin.
references: 1959, Texas Univ. Publ. 5914: 69-88.

T(3;4)K: Translocation(3;4) of Kirssanov
origin: X ray induced.
discoverer: Kirssanov.
references: 1933, Biol. Zh. (Moscow) 2: 447-50.

T(3;4)l-18: Translocation(3;4) lethal
origin: X ray induced,
discoverer: Gloor and Green, 1957.
genetics: Variegates for *ci;* mutant for *1(4)18.*

T(3;4)P86: Translocation(3;4) from Pasadena
cytology: *T(3;4)88B-C;101* (E. B. Lewis),
origin: X ray induced.
discoverer: E. B. Lewis.

TRANSPOSITIONS

Tp(l)303-l: see *In(l)303-l*

Tp(l)At: see *ln(!)At*

Tp(l)B$^{363-24}$. see/nfl>i?2<sj-2 4

**Tp(l)B263~48: Trcnsposition(l) Bar*
cytology: *Tp(l)3E2-3;15F9-16Al;20A2-3.*
new order. 1 - 3E2J16A1 - 2QA2J3E3 - 15F9J20A3 - 20F.
origin: X ray induced.
discoverer: Bishop, 1939.
references: Sutton, 1943, Genetics 28: 99.
genetics: Male and homozygous female viable. Crossing over in region 3E3-15F9 in *Tp(l)B2^{63}-*8/+* heterozygote yields *Dp(l;l)B263-48 = Dp(l;l)3E2-3;15F9-16Al;20A2-3,* which is heterozygous viable and produces the Bar effect. The complementary deficiency is heterozygous lethal.

**Tp(l)ct6ai: Transposition(l) cut*
cytology: *Tp(l)7B2-CI;19;20.*
new order: 1 - 7B2|(19 - 2O)|7C1 - 19|20.
Nucleolus organizer included in transposed piece,
origin: X ray induced.
discoverer: Hannah, 1947.
references: 1949, Proc. Intern. Congr. Genet., 8th. pp. 588-89.
genetics: Variegated for *ct.* Male lethal.

Tp(l)hill:* see *ln(l)hill

Tp(l)l-272-13:* see *In(l)l-272~13

**TpO)N264-63: Transposition) Notch*
cytology: *Tp(l)3C7-9;13C7-8;19F* (Hoover),
new order: 1 - 3C7|(13C8 - 19F)|(3C9 - 13C7)|l9F - 20.
origin: X ray induced,
discoverer: Demerec, 38e.
genetics: Mutant for *N* but not for *w, rst,* or *dm.*

Tp(1)sc$^{260-2}$s:* see *In(1LR)sc$^{260-25}$

Tp(3)bxd^{100}: Transpasition(3) bithoraxoid
cytology: *Tp(3)66C;89B5-6;89E2-3.*
new order: 61 - 66C|(89B6 - 89E2)|66C - 89B5|89E3 - 100.
origin: X ray induced.
discoverer: E. B. Lewis.
references: 1951, Cold Spring Harbor Symp. Quant. Biol. 16: 159-74.
genetics: Mutant for *bxd* but not *bx, Dp(3;3)bxdl00* » *Dp(3;3)66C;89B5-6;89E2-3* derived by crossing over in region 66C-89B of *Tp(3)bxd^{10}0/+* survives and is duplicated for *bx* and the lethal effect of *Ubx* but not for *bxd.* The complementary *Df(3R)bxdl 00* « *Dt(3R)89B5-6;89E2-3* survives in heterozygote and has *Ubx* phenotype.

Tp(3)bxd^{110}
cytology: *Tp(3)89E2-3;91C7-Dl;92A2-3.*
new order. 61 - 89E2|(91D1 - 92A2)|89E3 - 91C7|92A3 - 100.
origin: X ray induced.
discoverer. E. B. Lewis.
genetics: Mutant for *bxd* but not *bx* or *Dl.* *Dt(3R)bxdllO ^ Di(3R)91C7-DJ;92A2-3,* derived from crossing over in region 89E-91C in *Tp(3)bxd*^{1} °/+* female, survives in h«terozygote and has *Dl* phenotype. The complementary *Dpf3;3)hxd*10 = Dp{3;3)B9E2~3;9lC7~Dl;92A2-3* is duplicated far *Dl* and acts as a suppressor of *Dl* in *Dp(3;3)hxdUG/Dl^{7}* hetero*ygot« (E. B. Lewis).

Tp(3)C285: Transposition^) Crossover suppressor
cytology: *Tp(3)88F;98B;99B.*
new order: 61 - 88F|98B - 99B|88F - 98B|99B - 100.
origin: X ray induced.
discoverer. Roberts, 1965.
genetics: Homozygous lethal. Recombination between *st* and *ca* sharply reduced.

Tp(3)C341
cytology: *Tp(3)63C;71B;80-81* position of right breakpoint in chromosome *3* with respect to centromere not determined.
new order: 61 - 63C|71E - 80|{63C - 71E)|81 - 100.
origin: X ray induced.
discoverer: Roberts, 1965.
genetics: Homozygous viable. Recombination reduced in *3L.*

Tp(3)sr300.240: Transposition^) stripe
cytology: *Tp(3)75C;89E;92A.*
new order: 61 - 75C|(89E - 92A)|75C - 89E|92A - 100. Inserted piece said to be in inverted order but not specified whether with respect to numerical sequence or centromere.
origin: X ray induced.
discoverer: Alexander.
references: Ward and Alexander, 1957, Genetics 42: 42-54.
genetics: Mutant for sr. Homozygous lethal.

Tp(3)th100.293: see *In(3)th100.293*

Tp(3)Vno: Transposition^) Vein off
cytology: *Tp(3)89E;93F;97A* (Nicoletti and Lewis, 1960, DIS 34: 53).
new order: 61 - 89E|93F - 97A|89E - 93F|97A - 100.
origin: X ray induced.
discoverer: E. H. Grell, 56c.
synonym: *In(3R)Vno.*
references: 1959, DIS 33: 94.
genetics: Associated with *Vno.* Homozygous lethal.

X0: seeR(l)l

Xc: seeR(l)l

Xc2: see ***R(l)2***

SPECIAL CHROMOSOMES

Balancers

Compound Chromosomes

Multiply Marked Chromosomes

X—Y Combinations

Y Derivatives

BALANCERS

asc

constitution: ***In(l)sc$^{sl\ L}$sc^{8R}+S, sc^{si} sc^{8} w°.***

properties: Like Base except that *B* reverted.

Base

constitution: ***In(l)sc^{slL}sc^{8R}+S, sc^{si} sc^{8} w^{a} B.***

synthesis: Muller.

synonym: ***M-5: Muller-5.***

references: Spencer and Stern, 1948, Genetics 33: 43-74.

properties: Male and homozygous female viable and fertile; *X/0* male poorly viable, variegated for *y*, ac, and probably *1(1)J1*. Suppresses crossing over in *X*, but less so than *Binsc* because *Jn(l)S —* ***In(l)6Al-3;10F10-llAl*** **less effective than** ***In(l)dl-49 =ln(l)4D7-El;llF2-4.*** **Routinely used in** detection of sex-linked recessive lethals.

Binsc

constitution: *In(l)scSlL$_{sc}$8R+dl-49,* sc^ sc« B.

synthesis: Muller.

properties: Male and homozygous female viable and fertile. Suppresses crossing over in *X* chromosome.

Binscy

constitution: ***In(l)sc^{SiL}sc^{8R}+dl-49, y sc^{s}* sc^{8} v B.***

synthesis: Muller.

references: 1952, DIS 26: 113-14.

Muller and Oster, 1963. In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day, Inc. pp. 249-78.

properties: Male and Homozygous female viable and fertile. Suppresses crossing over in *X* chromosome.

Binsn

constitution: ***In(l)sc^{slL}sc^{aR}+dl-49, sc$l sc& sn^{2}$*** **B.**

synthesis: Muller.

properties: Male viable and fertile; homozygous female viable but sterile because of *sn^{X2}*. Suppresses crossing over in *X* chromosome.

Biny

constitution: ***In(l)4sc^{8L}scSl^{R}+dl-49, y^{31d} sc- v f B.***

synthesis: Lindsley.

references: Lindsley and Edington, 1957, DIS 31: 131-32.

Lindsley, Edington, and Von Halle, 1960, Genetics 45: 1649-70.

properties: Male lethal because of deficiency for sc. Suppresses crossing over in the *X* chromosome. Used in the recovery of F-suppressed sex-linked recessive lethals.

C(3)x

constitution: Probably *In(3L+3R)P.*

CIB

constitution: ***In(l)Cl, sc 1(1)C t^{2} si B.***

synthesis: Muller.

references: 1928, Genetics 13: 279-357.

properties: Male lethpl. Suppresses crossing over in *X* chromosome. Originally used in recovery of sex-linked recessive lethals; largely replaced by *Base* for this purpose.

complete: **see** ***FM1***

CyO: Curly derivative of Oster

constitution: *ln(2LR)O,* dp$^{/vJ}$ *Cy pr en^{2}.*

synthesis: Oster.

synonym: ***Cy,InsO5.***

references: 1956, DIS 30: 145.

properties: More effective suppressor of crossing over in chromosome *2* than *In(2L+2R)Cy;* should be superior to *SMI* as balancer for chromosome 2.

FMJ: First Multiple

constitution: ***In(l)sc^{8}+dl-49, y^{31d} sc^{8} w^{a} lz^{s} B.***

synthesis: Schultz and Curry.

synonym: ***complete.***

references: Lewis and Mislove, 1963, DIS 27: 57—58.

properties: Male viable and fertile; homozygous female viable but sterile because of *lz^{s}*. Reduces crossing over in *X* chromosome. Useful for balancing sex-linked recessive sterile or lethal mutations.

FM3

constitution: ***In(l)FM3, y^{31d} sc^{8} dm B.***

synthesis: R. F. Grell, 1954.

references: Mislove and Lewis, 1954, DIS 28: 77.

properties: Male lethal owing to presence of two recessive lethals in *In(l)FM3,* which may be covered by *B^{s}Yy^{+}* or by *y^{+}Y* and *B^{S}Y.* Effectively suppresses crossing over in the *X* chromosome. Useful for balancing sex-linked recessive female-sterile mutants, and in combination with *B^{s}Yy^{+}* for balancing sex-linked recessive lethal and male-sterile mutants.

FM4

constitution: ***In(l)FM4, y^{31d} sc^{8} dm B.***

synthesis: R. F. Grell, 1954.

references: Mislove and Lewis, 1954, DIS 28: 77.

properties: Male viable and fertile; homozygous female viable but sterile because of *dm. In(l)FM4* is the consequence of the approximate reinversion of *ln(l)dl-49* in *In(l)sc^{a}+dl-49* and is similar in sequence to *ln(l)sc^{s}* but with the insertion of 3C-4F into 11F. Unless this small transposition has an abnormally large effect on crossing over e.g., see *Dp(2;2)C619,* recombination might be expected to be frequent in *FM4/+* heterozygotes and practically normal in *FM4/ln(l)sc^{8}* heterozygotes. In *FM4/+* heterozygotes, double crossovers with points of exchange inside or outside the 3C to 11F region should produce euploid *X* chromosomes, and those with one point of exchange inside and one outside produce complementary duplications and deficiencies for 3C to 4F. The duplication survives in either sex and exhibits a Confluens phenotype (E. H. Grell); the deficiency might survive in the heterozygote as a Notch Minute female judging from the survival of the slightly smaller ***Df(l)W*>25^{8}-*4 = Df(l)3C3~4;4D2-El.*** **Balancing** properties not well determined. Some lines carry *$_{w}$S5t $_{an}$*d in some *y31d* replaced with y^{+} or *B* with / or +.

FM6

constitution: ***In(l)FM6, y^{31d} sc* dm B.***
synthesis: R. F- Grell, 55i.
references: Grell and Lewis, 1956, DIS 30: 71.
properties: Male viable and fertile, homozygous female viable but sterile because of *dm.* Like *FM4* except for the presence of the additional *In(l)15D-E;20A-B.* Reservations similar to those about the balancing ability of *FM4* apply in *FM6* to the salivary chromosome region from IB to 15D. In genotypes with a normal recombination rate, *FM6* effectively eliminates recombination in *FM6/+* heterozygotes but yields viable recombinants when heterogous for such inversions as *In(l)sc^8.* Used for balancing sex-linked recessive lethal and sterile mutations. Does not effectively balance cv or *v* in stocks that are also heterozygous for *In(2LR)SMl* **and** ***In(3LR)Ubx^{13}°.***

In(1)dl-49+B^{M1}

constitution: ***ln(l)dl-49+B^{M1}, sc vB^{M1}.***
properties: Male and homozygous female viable and fertile. Effective suppressor of crossing over in *X* chromosome.

In(l)sc7+AM

constitution: ***In(l)sc^7+AM, sc^7.***
properties: Male viable and fertile; homozygous female viable but sterile because of homozygous *In(l)AM.* Reduces *X* chromosome crossing over. May be used to balance sex-linked recessive lethal or sterile mutations.

In(1)sc^{s1}+dl-49

constitution: ***In(l)sc^{sl}+dl-49, sc^{sl} v f car.***
properties: Male viable and fertile; homozygous female viable but sterile because of homozygous *In(l)sc^s*.* Reduces crossing over in *X* chromosome. May be used to balance sex-linked recessive lethal or sterile mutations.

Insc

constitution: ***In(l)$sc^{si\ L}sc^{8R}$+dl-49, ac^{sl} sc^8.***
synthesis: Muller.
properties: Male and homozygous female viable and fertile. Suppresses crossing over in the *X* chromosome.

Inscy

constitution: ***In(l)$sc^{slL}sc^{8R}$+dl-49, y sc^{si} sc^8.***
synthesis: Muller.
properties: Male and homozygous female viable and fertile. Crossing over suppressed in *X* chromosome.

LVM: *Balancer of L.* V. *Morgan*

constitution: *In(3L)P* with a lethal in each arm of chromosome *3.*

M-5: see Base

Muller-5: see *Base*

S-5

constitution: ***In(l)$sc^{4L}sc^{8R}$+S, y sc^4 sc^8 w* B.***
synthesis: Lindsley.
references: Lindsley and Edington, 1957, DIS 31: 131-32.
Lindsley, Edington, and Von Halle, 1960, Genetics 45: 1649-70.
properties: Male viable and fertile; homozygous female and *X/0* male inviable because of deficiency for *bb.* Suppresses crossing over in *X* chromosome. Used in the recovery of F-suppressed sex-linked recessive lethals.

SMI: Second Multiple

constitution: ***In(2LR)SMl) al^2 Cy en^2 sp^2.***
synthesis: R. F. Grell, 1953.
references: Lewis and Mislove, 1953, DIS 27: 58.
properties: Viability and fertility of heterozygote excellent. Reliable balancer for all of chromosome 2, although there is an occasional double crossover in *2R* if *X* and *3* are heterozygous for inversions. Mclntyre and Wright (1966, DIS 41: 141-42) found no recombination between *In(2LR)SMl* and *al dp b pr en* c *px sp* in females also heterozygous **for what behaves like *In(l)sc^8* and *In(3LR)Ubx^{13}°.***

**SM2*

constitution: ***T(2;3)SM2, al^2 Cy It? en^2 sp^2.***
synthesis: R. F. Grell, 1953.
references: Lewis and Mislove, 1953, DIS 27: 58.
1954, DIS 28: 77.
properties: Not useful as a balancer.

SMS

constitution: ***In(2LR)SM5, al^2 Cy lt^v en^2 sp^2.***
synthesis: R. F. Grell, 1953.
references: Mislove and Lewis, 1955» DIS 29: 75.
properties: Heterozygote usually has good viability and fertility, although may not be so good as *SMI.* Most complete balancer for chromosome 2.

TMh Third Multiple

constitution: ***In(3LR)TMl, Me ri sbd^2.***
synthesis: E. B. Lewis,
references: 1949, DIS 23: 92.
Lewis and Mislove, 1953, DIS 27: 58.
properties: Homozygous lethal. Suppresses crossing over in chromosome *3.*

TM2

constitution: ***In(3LRyUbxl30> rjhx^O e«.***
synthesis: E. B. Lewis.
references: 1952, Proc. Natl, Acad. Sci. U.S. 38: 953-61.
1952, DIS 26: 66.
properties: Homozygous lethal. Eliminates crossing over in chromosome *3* except at the end of the right arm. Does not reliably balance mutations in the vicinity of ca. Maclntyre and Wright (1966, DIS 41: 141—42) observed about 9 percent double crossing over in the unbroken segment of the left arm from 61C to 74 on the salivary gland chromosome map and 15 percent recombination between the breakpoint **at 96A and ca in *In(3LR)Ubx*3^Q,***
Ubx^{130} e/ru h* tfi *at cu sr e^s Pr ca **females that** were also heterozygous for an X-chromosome inversion behaving like *In(l*>sc* and *In(2LR)SMl;* no recombination observed in other regions.

TM3

constitution: *In(3LR)TM3, y^+ ri pP* sep bx-»*^{e} e».
synthesis: E. B. Lewis, 55g.
references: Mitchell, 1958, Cold Spring Harbor Symp. Quant. Biol. 23: 279-90.

Lewis, 1960, DIS 34: 51.
Tinderholt, 1960, DIS 34: 53-54.
properties: Stocks exist in which *Ser* or *Sb* and Ser are present. With normal *X* and *2,* all of chromosome *3* is effectively balanced; in the presence of *FM6* and *SMS,* however, crossing over between y^+ and *ri,* i.e., in 61A2-65E, is appreciable. Double crossovers that separate Sb or *Ser* from inversion complex rare, even in presence of *FM6* and *SM5.*

TM6
constitution: *In(3LR)TM6, ss~ bx^{34e}* e; also exists with *UbxtTb.*
synthesis: E. B. Lewis and F. Bacher, 66i.
properties: Should effectively balance entire third chromosome, but has not been tested. Has unbroken regions with genetic lengths of approximately 10, 15, 20, and 30 units.

winscy
constitution: *Jn(l)$sc^{SiL}sc^{8R}$+dl-49, y sc^{sl} sc^8 w.*
synthesis: Muller.
properties: Male and homozygous female viable and fertile. Suppresses crossing over in *X* chromosome.

COMPOUND CHROMOSOMES

Compound chromosomes are monocentric elements in which the material from one chromosome arm is represented twice; they contain the entire diploid complement for the arm involved. They are designated by the symbol *C* followed parenthetically by the designation of the involved arm. Gametes of compound-bearing flies generally carry two or no doses of the chromosome arm. Compound-Jf chromosomes, *C(l)'s,* exist only in females, which unless special steps are taken, carry a *Y* chromosome. Such *C(l)/Y* females produce patroclinous sons, which inherit their *X* from their father and their *Y* from their mother, and matroclinous daughters, which inherit both their *X'%* from their mother and a *Y* from their father (so-called noncrisscross inheritance). Compound-autosome-bearing flies usually produce no viable progeny unless crossed to flies carrying compounds for the same arm or arms.

Some compounds have arisen repeatedly from certain genotypes; they were studied collectively but not as individual occurrences. In other cases, similar compounds of independent origin were studied individually. Both general classes of compounds and compounds of unique origin are listed.

The two chromosome arms comprising a compound may join (1) by attachment of the base of one to the terminus of the other to form an acrocentric chromosome or (2) by attachment of both proximally to a single centromere to form a metacentric; the ends of either an acrocentric or a metacentric may join to form a compound ring. In addition, the component arms may be in the same sequence or one may be entirely inverted with respect to the other. Thus the elements of a compound may pair as a spiral — the tandem configuration or as a hairpin — the reversed configuration. Simple compounds may therefore be classified according to the conventions of Novitski (1954, Genetics 39: 127-40) as reversed acrocentrics, reversed metacentrics, reversed rings, tandem acrocentrics, tandem metacentrics, and tandem rings; where applicable this classification was retained and is used in the designation of compounds.

When the component arms differ in sequence by something other than whole-arm inversion, the classification tandem or reversed becomes ambiguous. Furthermore, when the component arms are separable from each other by a single break, the terms acrocentric and metacentric are descriptive; but when elements of the two arms become interspersed, as for example by interarm rearrangements, these terms lose meaning. Consequently, the more-complex compounds are given arbitrary symbols.

The chromosomal constitution of compounds in which the chromosome arms remain intact is designated: metacentrics, by the sequences of the component arms separated by a centerpoint (which represents the centromere); acrocentrics, by the sequence of the distal arm separated by an em dash from the sequence of the proximal arm followed by a centerpoint; rings (which are derived from acrocentrics or metacentrics) by origin. In heterozygotes, the gene content of the component arms is listed according to the same conventions, with the genes on the first arm listed in the chromosomal designation followed by those on the second arm. In homozygotes, the genes are listed in chromosome map order. Complete designation of a compound includes its symbol, its chromosomal constitution, and the gene content of its component arms; e.g., *C(1)TM2, +-In(l)$sc^{4L}EN^R$, y cv v sd'y sn g.* It should be emphasized that the heterozygous gene content of compounds is often highly unstable owing to homozygosis and changes in coupling relations resulting from exchange.

In compounds in which elements of the component arms have become interspersed, it is usually not feasible to designate the chromosomal constitution in terms of the component arms; rather, it is described in terms of the order of chromosome segments as seen in salivary-gland chromosomes. In heterozygotes, the gene content is listed in such a way as to indicate which genes were originally in the different component arms.

•=: see *C(1)RM*
:=: see *C(1)DX*
2L: see *C(2L)RM*
2R• see *C(2R)RM*
3L: seeC(3L)RM
3R: see *C(3R)RM*
Attached 2L: see *C(2L)RM*
Attached 2R: see *C(2R)RM*
Attached 3D: see *C(3L)RM*
Attached 3R: see *C(3R)RM*
Attached-X: see *C(1)RM*

C(1)94-2A
constitution: Homozygous for *y;* originally heterozygous for cv, sn, *v, g,* and *sd.* Ring shaped in mitotic metaphase. Salivary chromosome analysis

shows order to be |lA - 5E|lF - 1A-20 - 5E|lF - 20|.
origin: Spontaneous (although possibly X ray induced premeiotically) derivative of *C(l)TR94-2.* Apparently arose through an asymmetrical or reversed exchange between the IF region near the centromere and the 5E region near the interstitial heterochromatin of *C(l)TR94-2.*
synthesis: Rosenfeld, 1964.
properties: Crossing over in region 1F-6A produces **a single ring carrying *In(l)94-2A = ln(l)lF-2A;5E-6A.*** Reversibly convertible to other double-ring configurations by other types of exchange (e.g., Novitski and Braver, 1954, Genetics 39: 197—209).

C(1)A: Compound(l) of Armentrout

constitution: Homozygous for *y* and probably originally heterozygous for cv, *sn, v, g,* and *sd.* Ring shaped in mitotic metaphse. Salivary chromosome analysis shows order to be 11A — 6F2|6F2 — 1AJ20 - 7Al|7Al - 20-|.
origin: Spontaneous stable derivative of *C(1)TR94,* which was originally *y cv v sd>y sn* g. Apparently arose by a process describable as reversed crossing over in region 6F2-7A1.
synthesis: Armentrout, 1964.
properties: An apparently completely stable compound-ring-^ chromosome; cannot produce single-X-chromosome derivatives by heterochromatic exchange. Should be the best of all compound-X chromosomes for stock purposes.

CO)DX: Compound(l) Double X

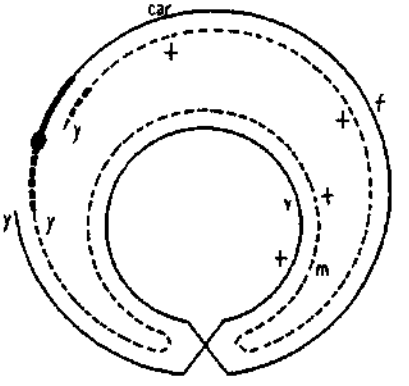
constitution: ***C(1)DX, In(l)dl-49 - In(l)sc^{8}-, y f — y~ sc^{8} I'.***
origin: X ray induced in *In(l)dl-49, y w f/In(l)sc^{8},* *sc^{8} B* female [stated by Muller to have been ***In(l)dl-49/In(l)ac^{8L}y^{3PI}*, but the derivative does*** not carry y^{3JP}]. Was originally *y w I — y— sc^{8} B',* but by double exchange / became homozygous and *B* was lost.
synthesis: Muller.
synonym: The symbol ;=.
references: 1943, DIS 17: 61-62.
Valencia, Muller, and Valencia, 1949, DIS 23: 99-102.
properties: A reversed acrocentric heterozygous for *ln(l)dl-49;* since it is very stable, probably because there is little interstitial heterochromatin, it is useful in balancing, *y w f* detachments produced very rarely. Also produces a low incidence of homozygosis for *w. C(l)DX/0* lethal; probably deficient for *bb.*

**C(m2: Compound^) Multiple*

constitution: ***C(1)M2, In(l)sc^{7}+AM -In(l)FM4-, sc^{7} — y~ sc^{8} dm B'.***
origin: X-ray-induced exchange between the proximal heterochromatin *of In(l)sc^{7}+AM* and the distal heterochromatin of *ln(l)FM4.*
synthesis: Lewis, 54h.
synonym: *FMA2: First Multiple Attached.*
references: 1958, DIS 32: 81.

com

constitution: ***C(iyM3, In(l)AM -ln(l)FM4', y^{2} — y~ sc^{8} dm £?•.***
origin: Recombinant between *In(l)sc^{7}+AM* element of *C(1)M2* and *In(l)AM, y^{2}* in triploid.
synthesis: E. B. Lewis, 55b.
synonym: *FMA3.*
references: 1958, DIS 32: 81-82.
properties: Detachment rare; useful in balancing.

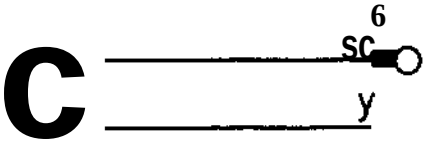


C(1)NB: Compound(l) of Novitski and Braver

From Novitski and Braver, 1954, Genetics 39: 197-209.

C(1)NB: Compound(l) of Novitski and Braver

constitution: ***C(1?JB, In(l)dl-49'In(l)sc^^{L}EN^{R};* originally *y v f car-y m; In(l)dl-49* and *In(l)EN*** attached proximally to a single centromere.
origin: Crossover between the heterochromatic short arm of *In(l)EN* and the proxima 1 heterochromatin of ***In(l)dl-49.***
synthesis: Novitski and Braver.
references: 1954, Genetics 39: 197—209 (fig.).
properties: Essentially a tandem metacentric heterozygous for *In(l)dl-49.* Can exist in a number of different configurations interconvertible by crossing over. Generates single rings at different frequencies, depending on configuration of the compound.



C(1)RA: Compound(l) Reversed Acrocentric

Redrawn from Sandier, 1954, Genetics 39: 923-42.

C(1)RA: Compound(l) Reversed Acrocentric

constitution: ***C(1)RA, + — In(l)sc^{8}".***
origin: Spontaneous from *X>Y^{L}/In(l)sc^{s}* either by exchange between the proximal heterochromatin of *X'Y^{L}* and the distal heterochromatin of *In(l)sc^{s}* or, more likely, by sister-strand union in one of the heterochromatic segments followed by a normal euchromatic exchange. A frequently recurring event that seems to require the presence of *Y^.*

synthesis: Novitski.

synonym: *RA.*

references: Novitski, 1954, Genetics 39: 127—40.
Sandier, 1954, Genetics 39: 923-42.
1958, Cold Spring Harbor Symp. Quant. Biol. 23: 211-23.

properties: Yields frequent detachments resulting from exchange between the *Y* chromosome and the interstitial heterochromatin of the reversed acrocentric. Tetrad distribution usually quite abnormal; one-exchange tetrads infrequent and no- and two-exchange tetrads frequent. Exchange frequency increased by addition of *Y* or y^+Y^L, but tetrad distribution remains abnormal (Sandier, 1954). Y^L appended as a second arm to *C(1)RA* normalizes tetrad distribution (Sandier, 1958).

C(l)RA60g

constitution: *C(l)RA60g, + -In(l)sc8.*

origin: A spontaneous exchange between distally located heterochromatin of $In(l)sc^8$ and proximal heterochromatin of a normal *X*. Occurred in a triploid female.

synthesis: Mohler, 60g.

references: 1960, DIS 34: 52.

other information: The reciprocal exchange product, *Dp(l;f)60£,* recovered from same fly.

C(1)RM: Compound(T) Reversed Meiacenfric

constitution: *C(1)RM,* +•+; two *X* chromosomes in normal sequence attached proximally to the same centromere; exists with many combinations of markers.

origin: Spontaneous. Recurs regularly by exchange between heterochromatin of the short arm of one *X*, $X'Y^S$, or $X\text{-}Y^L$ and that of the base of the long arm of a sister or homolog.

discoverer: L. V. Morgan, 21bl2.

synonym: *Attached-X;* also the symbol •=.

references: 1922, Biol. Bull. 42: 267-74.
1938, Am. Naturalist 72: 434-46.

properties: Recombination with the *Y* chromosome leads to detachments with a frequency of about 10-3 ^ *C(1)RM/Y* females. Has been extensively used in studies of crossing over (e.g., Anderson, 1925, Genetics 10: 403-17; Beadle and Emerson, 1935, Genetics 20: 192-206; Welshons, 1955, Genetics 40: 918-36).

**C(1)RRJ: Compound(l) Reversed Ring*

constitution: *C(1)RR1, + - In(l)EN, y— sc— — y;* two *X* chromosomes attached by their normally distal ends to a common centromere and by their normally proximal ends to each other. Marked with *y.*

origin: Spontaneous derivative of *C(1)TR1.*

synthesis: Zimmering.

synonym: *RR.*

references: Novitski, 1954, Genetics 39: 127-40.

**C(1)RR2*

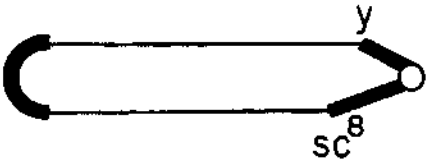
constitution: $C(l)RR2_f$ *In(l)scS.In(l)acSlLEN^R;* originally *y~ cv v f-y m car, In(l)&c** and $In(l)sc^{slL}ElV^R$ attached proximally to a single centromere and distally at their distal heterochromatic segments.

origin: X ray induced in an attached-X with *In(l)sc8* and $In(l)sc^{slL}EN^R$ attached proximally to a single centromere. Recovered as simultaneous loss of y'Ψ' from the tip of both arms.

synthesis: Sandier.

references: 1957, Genetics 42: 764-82 (fig.).
1958, Cold Spring Harbor Symp. Quant. Biol. 23: 211-23.

properties: Tetrad distribution abnormal, with one-exchange tetrads being infrequent but no- and two-exchange tetrads being frequent. Exchange frequency increased by addition of *Y* or y^*Y^L but tetrad distribution remains abnormal.



C(1)RR2: Compoundfl) Reversed Ring 2

From Sandier, 1957, Genetics 42: 764-82.

C(J)RR94-2F

constitution: *C(1)RR94-2F,* +•+; two *X* chromosomes of normal sequence attached proximally to a single centromere and joined distally by a segment of heterochromatin.

origin: X-ray-induced derivative of *C(1)TR94.*

synthesis: Rosenfeld, 1964.

references: Sandier, 1965, Natl. Cancer Inst. Monograph No. 18: 243-72.

properties: Tetrad distribution more nearly normal **than in *C(1)RR2.***

C(1)SB: Compound(l) of Sturtevant and Beadle

constitution: *C(1)SB, +'In(l)y^4; In(l)y^4* and a normal sequence attached proximally to a single centromere.

origin: Recombinant between the uninverted portion of $In(l)y^4$ and *C(1)RM* in a triploid.

synthesis: Sturtevant and Beadle.

references: 1936, Genetics 21: 554—604.
Novitski and Sandier, 1956, Genetics 41: 194-206.

properties: A reversed metacentric heterozygous for $In(J)y^4$. Meiotic behavior similar to that of a tandem metacentric. Crossing over within inversion generates single ring, $R(l)y^4$.

**C(1)TA1: Compound(l) Tandem Acrocentric*

constitution: *C(1)TA1,* $In(l)sc^4$ - $In(l)EN\text{-}Y^L$, *y* sc* — y .

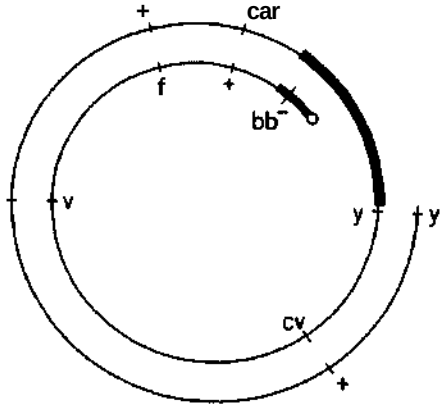
origin: X-ray-induced exchange between the proximal heterochromatin of $ln(l)sc^4$ and Y^s of Y^SXY^L.

synthesis: Novitski.

synonym: *TA.*

references: 1954, Genetics 39: 127-40.

properties: Produces a single centric rod-X chromosome and either an acentric ring or a tandem-triple-*X* chromosome by recombination between the proximal and distal *X* chromosomes.

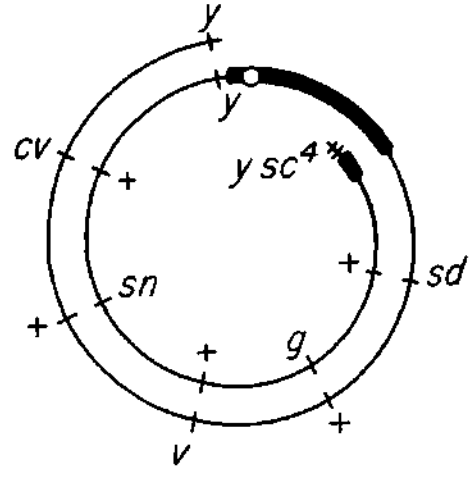


C(1)TA2: Compound(l) Tandem Aerocentric 2
From Sandier and Lindsley, 1963, Genetics 48: 1533-43.

C(1)TA2
constitution: *C(1)TA2,* H—+•; originally *y cv f — y f:*
origin: X-ray-induced recombinant in $Y^{S}X$-, $y + K^{s}$ *y cv v f/X'*Y^{L}, *y car-*K^{L} female; origin required triple exchange.
synthesis: Sandier and Lindsley.
references: 1963, Genetics 48: 1533-43 (fig.).
properties: Generates single-X chromosomes like *C(1)TA1.* Tetrad distribution about normal. *C(l)TA2/0* lethal; probably deficient for *bb.*

C(1)TM1: Compound(l) Tandem Metacentric
constitution: *C(1)TM1, +'In(l)scS^*EN^{R}, *y Hw f-*y^{+} *y i;* a normal sequence and *In(l)EN* attached proximally to a single centromere derived from *R(l)2.*
origin: Product of one crossover between + and *R(l)2* and one between *In(l)EN* and *R(l)2* in a *+/R(l)2/In(l)EN* triploid.
synthesis: Novitski, 1950.
references: Novitski and Lindsley, 1950, DIS 24: 90-91.
properties: Single crossover between the arms produces single-ring-X chromosome with the same structure as *R(l)2* and an acentric rod-X chromosome. Tetrad distribution about normal (Novitski, 1951, Genetics 36: 267-80; Novitski and Sandier, 1956, Genetics 41: 194-206).

C(1)TM2
constitution: *C(1)TM2, +-In(l)sCf^*EN^{R}*;* originally *y cv v sd-y sn g. In* mitotic prophase the sequence is: the normal *X* euchromatin, two large heterochromatic segments, a small segment, the centromere, a small segment, the inverted *X* euchromatin.
origin: X-ray-induced exchange between the proximal heterochromatin of a normal *X* and Y^{L} of *X-*Y^{L}, *In(l)ac*^*EN^{R}.
synthesis: Lindsley and Sandier, 1963.
synonym: *TMX y.*
references: 1965, Genetics 51: 223-45 (fig.).
properties: Recombination between the arms produces a single-ring-.X chromosome and an acentric rod *X.* Meiotic behavior similar to that of *C(1)TM1;* tetrad distribution about normal.

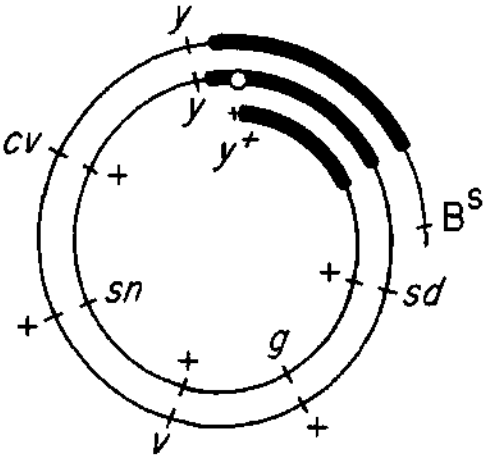


C(1)TM2: Compound(l) Tandem Mefocen/r/c 2
From Lindsley and Sandier, 1965, Genetics 51: 223-45.

C(l)TMB^{S}9-h Compound(i) Tandem Mefocenfr/c ***with Bar-Stone***
constitution: *C(1)TMB*^{S}*9-1, Dp(l;l)B*^{s}*TAG'In(l)sc«*$^{L}EN^{R}$*;* originally B^{s} *y cv v sdy* sn g. In mitotic prophase the sequence is: the normal *X* euchromatin, two large heterochromatic segments, a small segment, the centromere, a small segment, the inverted *X* euchromatin.
origin: X-ray-induced exchange between the proximal heterochromatin *of Dp(l;l)B*^{s}*TAG* and Y^{L} of *X-*Y^{L}, *In(l)sc8LEN*^{R}.
synthesis: Lindsley and Sandier, 1963.
synonym: *TMXB*^{S} *9-1;* also designated as *Dp(l;l)B*^{s}*TRG.*
references: 1965, Genetics 51: 223—45.
properties: Recombination between the arms produces a single-ring-X chromosome, *R(l)9-1,* and an acentric rod *X.* Recombination between the B^{s} duplication and the homologous region of the inverted arm generates a nontransmissible tandem-ring chromosome. Meiotic behavior similar to that of *C(1)TM2.*

C(l)TMBS9-4
constitution: *C(l)TMBS9-4, Dp(l;l)B*^{s}*TAG'ln(l)sc«*^{l}*'*EN^{R}*;* originally B^{s} *y cv v sd'y sn g.* In mitotic prophase the sequence is: the normal *X* euchromatin, a large heterochromatic segment, a small segment, the centromere, a small segment, the inverted *X* euchromatin.
origin: X-ray-induced exchange between the proximal heterochromatin of *Dp(1;1)B*^{S}*TAG* and Y^{L} of *X·*Y^{L}, *In(1)sc*^{8L}EN^{R}.
synthesis: Lindsley and Sandier, 1963.
synonym: *TMXB*^{s}*9-4;* also designated as *Dp(l;l)B*^{s}*TRG.*
references: 1965, Genetics 51: 223-45 (fig.).
properties: Recombination between arms produces single-ring-J? chromosome, *R(l)9-4,* and an acentric

rod *X*. Recombination between the B^s duplication and the homologous region of the inverted arm produces a tandem-ring chromosome that may be transmissible.



C(l)TMB^S: Compound(l) Tandem Me/ocentr/c with Bar-Stone

From Lindsley and Sandier, 1965, Genetics 51: 223-45.

****C(1)TR1: Compound(l) Tandem Ring***

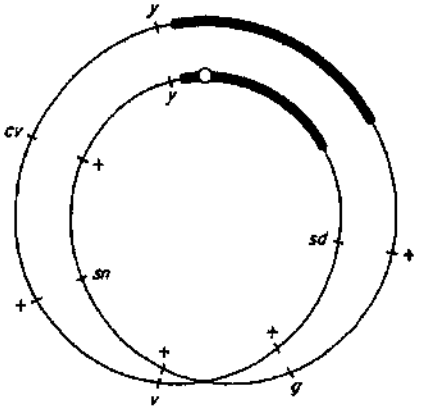
constitution: *C(1)TR1, In(l)sc* _ ln(l)EN% y— sc— —y.*

origin: Spontaneous derivative of *C(1)TA1* in which the Y^L second arm had been replaced by the $4^D X^P$ element of *T(1;4)B$ = T(1;4)15F9-16A1;16A7-Bl;102F*. A product of recombination between the duplicated B^s second arm and the homologous region of the distal element of the tandem acrocentric.

synthesis: Novitski.

references: 1954, Genetics 39: 127-40.

properties: Seems to be poorly transmissible (Novitski, 1954). Produces a centric single-ring-X and either an acentric single-ring-X or a tandem triple-ring-JT chromosome by recombination between the two elements of the compound.



C(1)TR94: Compound(l) Tandem Ring 94

From Sandier and Lindsley, 1967, Genetics 55: 645--71.

C(1)TR94

constitution: *C(1)TR94, +-In(l)sc*^{L}EN^R-;* originally *y cv v sd-y sn g.*

origin: Regular but infrequent product of *C(l)TMB^{s}9-4*. Formed by exchange between the duplicated B^s section and the homologous region of the inverted arm.

synthesis: Sandier and Lindsley.

references: 1967, Genetics 55: 645—71.

properties: Produces a centric single-ring-X and either an acentric single-ring-X or a tandem triple-ring-X chromosome by crossing over between the two arms of the compound. Transmission higher than that of *C(1)TR1*. Tetrad distribution about normal.

****C(1)VM:** Compound(l) **of** Valencias and Muller*

constitution: *C(1)VM, + — In(l)sc^{sl}+dl-49';* originally *y* ac *sc pn w rb cm ct& sn^3 oc ras^2 v dy g t car — y ac^{Si} lz^a* JEK

origin: X ray induced in *+/In(l)sc^{sl}+dl-49/Y^L* female, either by exchange between the proximal heterochromatin of the normal sequence and the distal heterochromatin of *In(l)sc^{si}* or by sister-strand union in one of the heterochromatic elements accompanied by normal euchromatic exchange. A regularly induced product in such females.

synthesis: Valencia, Muller, and Valencia.

references: 1949, DIS 23: 99-102.

properties: Essentially a reversed acrocentric in which the proximal element contains *In(l)dl-49*. Detachment by crossing over with a *Y* chromosome relatively frequent.

***C(2L)RtA: Compound(2L) Reversed Mef**acentric*

constitution: *2L'2L;* exists with various marker combinations. Two left arms of chromosome 2 attached proximally to a single centromere.

origin: X ray induced.

synthesis: Rasmussen, 60c.

synonym: 2L: Attached *2L.*

references: 1960, DIS 34: 53.

properties: Produces viable progeny only in crosses in which both parents carry *C(2L)RM*. Usually carried in stock of constitution *C(2L)RM; C(2R)RM*. Such males may produce viable progeny in crosses to triploid females and to irradiated females in which new attachments are produced.

C(2R)RM

constitution: *2R'2R;* exists with various marker combinations. Two right arms of chromosome 2 attached proximally to a single centromere.

origin: X ray induced.

synthesis: Rasmussen, 59k.

synonym: *2JR_: Attached 2R.*

references: I960, DIS 34: 53.

properties: Similar to *C(2L)RM.*

C(3L)RM

constitution: *3L-3L;* exists with various marker combinations. Two left arms of chromosome *3* attached proximally to a single centromere.

origin: X ray induced.

synthesis: Rasmussen, 59f.

synonym: JZ-: Attached *3L.*

references: 1960, DIS 34: 53.
properties: Produces viable progeny only in crosses in which both parents carry *C(3L)RM*. Usually carried as *C(3L)RM; C(3R)RM*. Such males may produce viable progeny in crosses to triploid females and to irradiated females in which new attachments are produced.

C(3R)RM
constitution: *3R-3R;* exists with various marker combinations. Two right arms of chromosome *3* attached proximally to a single centromere.
origin: X ray induced.
synthesis: Orias and Deal, 581.
synonym: *3R: Attached 3R.*
references: Rasmussen, 1960, DIS 34: 53.
properties: Similar to *C(3L)RM.*

C(4)RM
constitution: *4.4;* exists with various marker combinations. Two right arms of chromosome *4* attached proximally to a single centromere.
origin: X-ray induced,
synthesis: E. B. Lewis,
properties: Produces haplo-4 and triplo-4 progeny in crosses to normal diplo-4 flies.

First Multiple Attached: see *C(1)M*
FMA: see *C(1)M*
RA: see *C(1)RA*
RR: see *C(1)RR*
TA: see *C(1)TA*
TMXB^S: see *C(l)TMBs*

MULTIPLY MARKED CHROMOSOMES

Z-ple
constitution: *dp b pr c px sp.*
synthesis: Muller.
references: 1925, Genetics 10: 470—507.

3-ple
constitution: *ru h st pP ss e^s.*
synthesis: Bridges, 1920.
references: 1927, J. Gen. Physiol. 8: 689—700.

S-ple
constitution: *b pr vg a sp,*
synthesis: Muller, 1914.

72-p/e
constitution: *at dp b pr* en *vg c a* px *bwmi sp.*
synthesis: Muller.
synonym: *twelve-pl.*

albasp
constitution: a/ *bpr en vg a sp^2.*
synthesis: Bridges, 1926.

all
constitution: *el dp b pr c px sp.*
synthesis: Bridges, 1926.
synonym: *apt.*

oll-Bl
constitution: *at dp b pr Bl c px sp.*

apl: see *all*

bleached
constitution: *pn w rb cm ct^6 mi^3 ra&^{2} v dy g^2 f car.*
synthesis: Muller.

Brfspl
constitution: *al dp b Bl c px sp.*
synthesis: Muller.

hes
constitution: *h th st pP cu sr e^B.*
synthesis: Bridges, 1923.

maple
constitution: *y ac sc pn w rb cm ct^6 ras^2 v g^2 f car.*
synthesis: Muller.

peple
constitution: *pP ss k e^a ro.*
synthesis: Muller, 1914.

p/oc
constitution: *y ac sc pn w rb cm ct^6 sn^3 oc ras^2 v dy g f car.*
synthesis: Muller.
references: Valencia, Muller, and Valencia, 1949, DIS 23: 99-102.
properties: Used for specific-locus mutation studies.

res
constitution: *ru h th st pP* cu *sr e^a.*
synthesis: Bridges, 1925.
synonym: *rupes.*

rucuco
constitution: *ru h th st cu sr e^a ca.*
synthesis: Bridges, 1926.

rupes: see *res*

ruPrica
constitution: *ru h th st cu sr* e^a *Pr ca.*

sc-tester
constitution: sc ec *ct^6 t^2 v g^3 si.*
synthesis: L. V. Morgan.

seple
constitution: *se ss k e^a ro.*
synthesis: Muller, 1914.

tester 1
constitution: *y ac pn w rb wy^2 g^2.*
synthesis: Muller.

tester 2
constitution: *y^2* w* cm *wy^2 g^2 car.*
synthesis: Muller.

tester 3
constitution: *y rb cm ras^2 g^2.*
synthesis: Muller.

theca
constitution: *th cu sr e^s ro* ca.
synthesis: Bridges, 1925.

thes
constitution: *th st pP cu sr* e^s.
synthesis: Bridges, 1924.

thrike
constitution: *th at cp in ri pP* ss *bxd k* e^s.

twelve-pl: see *12-ple*

X-6
constitution: *sc ec ct^6 g^2 Bx^2 bb.*
synthesis: L. V. Morgan, 1928.

X-7
constitution: *y oc cv ct^6 v g^2 f.*
synthesis: L. V. Morgan, 1928.

X-8

constitution: *y* ec cv *cfi v g? f bb.*

synthesis: Bridges, 1931.

X-9

constitution: *sc* ec cv *erf* v s ^ f car *bb*^{1}.

synthesis: Bridges, 1931.

X-p/e

constitution: *sc ev cv ct*^{6} *v g*^{2} *t*

synthesis: Bridges, 1920.

references: Bridges and Albright, 1926, Genetics 11: 41-56.

X-Y COMBINATIONS

The *X* and one or both arms of the *Y* chromosome may be linked by recombinational events occurring in the heterochromatin. Such *X-Y* combinations are composed of the *X,* a centromere (derived from either *X* or F), and either Y^L or Y^s or both. In the designation of such chromosomes, the component elements are listed in order such that *X* precedes the centromere (symbolized by a centerpoint), e.g., $Y^SX'Y^L$. Events that give rise to *X-Y* attachments are usually recurring so that the same combinations arise repeatedly; however, since the exact points of exchange differ, independent occurrence of similar combinations certainly differ from one another in heterochromatic content. Since similar *X-Y* combinations of independent origin are not ordinarily designated, studied, or maintained as different chromosomes and since, for most purposes, it is not important that they be distinguished, general categories of *X-Y* combinations are largely described in the ensuing section. Where a specific combination has been studied, it is listed with the designation of its component elements followed immediately by its specific designation, e.g., $X'Y^LC2$.

The complete designation of an *X-Y* combination consists of the following items in the order given: chromosomal elements, sequence of the *X* chromosome (if other than normal), gene content. *X-Y* combinations that differ from one another only with respect to mutant genes or euchromatic inversions are not described separately because it is considered that such mutants and inversions can be removed from or inserted into the component *X* by euchromatic exchange. When *X's* differ by an inversion with at least one heterochromatic breakpoint, the chromosomes are described separately since they must differ in their heterochromatic constitution.

FR1: see *Y*X-*
Fragment t: see Y^SX-
sc* co. *X:* see *Y*X-,* /nfijsc*
*sc*EN co. X:* see *Y*X', In(l)EN*
XY': **see *X.Y*^{L}**

X.Y^{L}

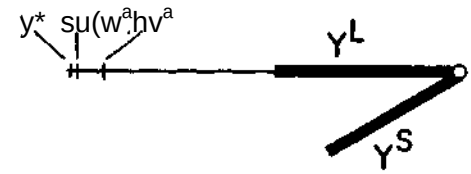
origin: A recurrent product of exchange between the proximal heterochromatin of *C(1)RM* and either arm of the *Y.* Also may result from exchange between Y^s and the proximal heterochromatin of a normal *X* or the interstitial heterochromatin of *C(l)RA.*

synthesis: Stern.

synonym: *XY'*.

references: 1926, Biol. Zentr. 46: 505-8.
1929, Z. biduktive Abstammungs- Vererbungslehre 51: 253-353.
Kaufmann, 1933, Proc. Natl. Acad. Sci. U.S. 19: 830-38 (fig.).

properties: An *X* chromosome in normal sequence with Y^L appended as a second arm. May carry varying amounts of the proximal part of Y^s between the *X* and the centromere. Males carrying $X>Y^L$ require *KS* in some form for fertility. Chromosome V shaped in metaphase.



***XY*^{L}*.Y*^{S}**

From Lindsiey and Novitski, 1959, Genetics 44: 187-96.

XY^{L}*.Y*^{S}

constitution: XY^L-Y^S; originally *y2 su(w^a) w^a (bb?)KL-KS.*

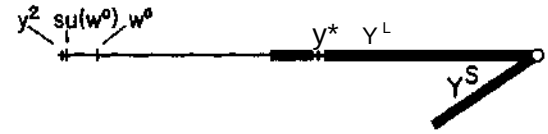
origin: X-ray-induced detachment in *C(1)RM,* y2 *su(w^a) w* bb/y+Y* female.

synthesis: Parker.

references: Parker and McCrone, 1958, Genetics 43: 172-86.
Lindsiey and Novitski, 1959, Genetics 44: 187-96 (fig-).

properties: Essentially an intact *Y* chromosome with all of the *X* euchromatin appended distal to *KL.* Carries all the sex-chromosome material required for male viability and fertility.

other information: Several detachments of this constitution recovered; numbered 2-10T13, 2-10T15, 108-9, 112-17, and 129-11.



XY*^{L}*.Y*^{S}*129-16

XY^{L}*.Y*^{S}*129-16*

constitution: XY^L-Y^S; originally *y2 su(w^a) w^a (bb?) y$^+$KL-KS.*

origin: X-ray-induced detachment in *C(1)RM, y2 su(w^a) w^a bb/y$^+$Y* female.

synthesis: Parker.

references: Parker and McCrone, 1958, Genetics 43: 172-86.

properties: Essentially an intact y^+Y chromosome with all of the *X* euchromatin attached to Y^L distal to y^+. Interstitial position of y^+ shown by recovery of y^+ reattachment; also interstitial y^+ allele shows strong variegation. Carries all the sex-chromosome material required for male viability and fertility.

XV-C2

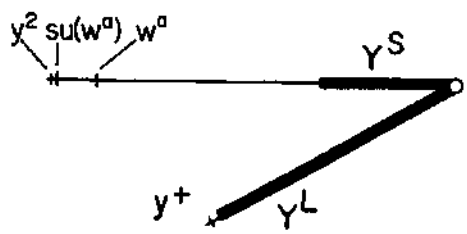
constitution: $X'Y^L$, *bb~-KL.*
origin: Recombination between Y^s proximal to bb^+ and *C(1)RM* distal to *bb+.*
synthesis: Lindsley.
properties: Like $X'Y^L$ but deficient for *bb;* $X'Y^LC2/0$ lethal. Shows unique behavior in double first-anaphase bridges (Novitski, 1952, Genetics 37: 270-87).

XY<-, *In(l)EN*

constitution: *X-Y^L, In(l)EN, yKL.*
origin: Recombinant from $Y^SX'Y^L$, *In(l)EN/In(l)EN* female.
genetics: An entirely inverted chromosome with *Y^* appended as a second arm.

X.Y^S

origin: Recurrent product of recombination between the proximal heterochromatin of *C(1)RM* and the *Y.*
synthesis: Kaufmann.
references: 1933, Proc. Natl. Acad. Sci. U.S. 19: 830-38.
properties: An *X* chromosome in normal sequence with Y^s appended as a second arm. May carry varying amounts of the proximal part of Y^L between *X* and the centromere. Males carrying $X'Y^S$ require *KL* in some form for fertility. Chromosome J shaped in metaphase.



XYS.YL

From Lindsley and Novitski, 1959, Genetics 44: 187–96.

XYS.YL

constitution: XY^S-Y^L; originally ***y2 su(w*) w* (bb?) KS-KL y^+.***
origin: X-ray-induced detachment in *C(1)RM,* ***y^2 8u(w*) w* bb/y^+Y* female,***
synthesis: Parker.
references: Parker and McCrone, 1958, Genetics 43: 172-86.
Lindsley and Novitski, 1959, Genetics 44: 187-96 (fig.).
properties: Essentially an intact *y*Y* chromosome with all of the *X* euchromatin appended distal to *KS.* Carries all the sex-chromosome material required for male viability and fertility.
other information: Two detachments of this constitution recovered; numbered 110-8 and 115-9.

YSX.

constitution: Y^SX'; originally *KS y cv v f* (Braver).
origin: Spontaneous from $Y^SX'Y^L$, *ln(l)EN,* ***KS yKL/sc cv v f* female.**
synthesis: Novitski.
synonym: *FR1: Fragment 1,*
references: 1952, Genetics 37: 270—87.
Lindsley and Novitski, 1959, Genetics 44: 187—96.
properties: An *X* in normal sequence with Y^s appended distal to *1(1)JI^+* and *y.* Lowers crossing over near *y.*

YSX$_V$ *In(1)EN*

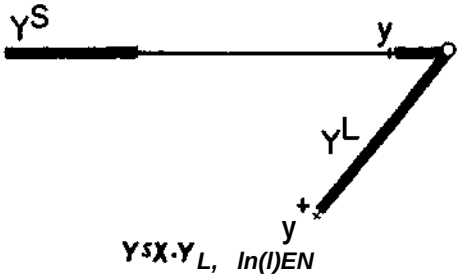
constitution: Y^SX; ln(l)EN, KS y.*
origin: Infrequent product of spermatogonial exchange between Y^s and the distal inverted heterochromatic segment of $In(l)sc^{8L}EN^R$. Also formed by recombination in Y^SX-, $Jn(l)sc^8/In(l)EN$ females. Specific occurrence described as *Df(l)sc^8P7,* deficiency subsection.
synthesis: Lindsley.
synonym: *sc^8ENco. X.*
references: 1955, Genetics 40: 24—44.
properties: A completely inverted *X* chromosome with Y^s appended distally. The distal heterochromatin resembles that of *In(l)sc^8* in mitotic prophase and carries bb^+.

YSX-, In(l)sc8

constitution: Y^SX', In(l)sc^8, KS 1(1)J1~ y- ac~ sc*.
origin: Infrequent product of spermatogonial exchange between Y^s and the distal inverted heterochromatic segment of *In(l)sc^8.* Also formed by recombination **in Y^SX>, In(l)EN/In(l)sc* females.** Specific occurrence described as *Di(l)$sc^8$89a,* deficiency subsection.
synthesis: Sidorov.
synonym: sc'c.o. *X.*
references: 1940, Bull. Biol. Me'd. exp. URSS 9: 10-12.
1941, Dolk. Acad. Nauk SSSR 30: 248-49.
Lindsley, 1955, Genetics 40: 24-44.
properties: *In(l)sc^8* with the distal uninverted euchromatic region carrying the normal alleles of *Hl)Jli Yt* and ac replaced by *KS,* Chromosome resembles *In(l)sc^8* in mitotic prophase.

YSX.YL

constitution: Y^SX-Y^L, KS y-KL.*
origin: Recombination between Y^SX' and $X'Y^L$.
synthesis: Lindsley and Novitski.
references: 1959, Genetics 44: 187-96.
properties: Contains all of the sex-chromosome material required for male viability and fertility. Commonly kept in stock as $Y^SX'Y^L/O$ males crossed to *C(l)/0* females.



Y^SX-Y_L, *In(l)EN*

From Lindsley and Novitski, 1959, Genetics 44: 187—90.

Y^X-YL, *In(1)EN*

constitution: Y^SX-Y^L, *In(l)EN, KS y-KL* y^+.

origin: Recovered as recombinant between the proximal heterochromatin of Y^SX% *In(l)EN* and ***y+Y.***

synthesis: Lindsley, 1949.

references: Lindsley and Novitski, 1960, DIS 24: 84-85.

1959, Genetics 44: 187-96 (fig.).

properties: Contains all of the sex-chromosome material required for male viability and fertility. Exists without the y^+ marker at the terminus of the Y^L arm; also exists with various combinations of sex-linked markers.

Y DERIVATIVES

The F chromosome consists of a long arm, Y^L, and a short arm, Y^s; the long arm is arbitrarily taken as the left arm. There are two general categories of special F chromosomes, F fragments and marked F chromosomes; in addition, there are marked F fragments. F fragments are symbolized either Y^L or Y^s plus necessary distinguishing notation, e.g., Y^S8. The F chromosome may be marked by mutating the genetically demonstrable elements of the F or by translocating normal or mutant alleles from other parts of the complement to the F chromosome. Marked F's are symbolized by combining, without intervening punctuation, the symbol for the normal or mutant gene of primary marker intent with the symbol F. If the marker is in the long arm, its symbol precedes *Y* (e.g., y^+Y) and if it is in the short arm, its symbol follows F (e.g., *Ybb).* Symbols for marked fragments combine the symbol for the appropriate F arm with that for the marker gene, listed in order. These notations are separated by a centerpoint when the centromere lies between them (e.g., $Y^{Lt}sc^{Si}$), otherwise they are not separated by punctuation (e.g., $y+Y^L$).

The long arm of the F carries a complex of male fertility factors, *KL,* and the short arm carries a normal allele of *bb* proximally and a complex of male fertility factors, *KS,* distally. The genetic constitution of the F chromosome may be designated by listing the above components and the centromere in order from left to right, *KL'bb+KS.* The constitution of a F fragment is described in a similar manner. The genetic constitution of a marker segment is designated by listing the symbols of the most widely separated loci known to be included in it separated by an em dash, e.g., bw^+ — ba^+. The constitution of a marked F or F fragment may be designated by listing its genetic elements in order, with any ambiguities in order enclosed within parentheses, e.g., $KL(bw^+ - ba^+)$-bb^+KS. When there is a hierarchy of ambiguities in order, a hierarchy of parentheses is **used, as in *((ci*** $^+$ ***_ spa*** $^+$***)KL)-bb*** $^+$***KS.***

4Y

constitution: $((ci^+ — spa^+)KL)'bb^+KS$; tentative.

origin: X ray induced.

synthesis: Edmondson, 1946.

synonym: *Tp4'Y: Transposition 4-Y.*

references: Muller and Edmondson, 1957, DIS 31: 140-41.

properties: Contains all known loci of chromosome *4* linked to the *Y* chromosome. Results from recombination between *4Y* and Y^SX-Y^L suggest that *4* is inserted into or appended to Y^L. Two doses of this chromosome in the absence of any other F- or 4-derived material produce viable and fertile flies of both sexes.

***B^w^y^Y**

constitution: B^s *pdf* $^+$ ***su(f)*** $^+$ ***kz*** $^+$ **—**
spl^+ y^+ ac^+ *KL'bb*$^+$ *KS;* inferred from origin.

origin: X-ray-induced deletion of majority of euchromatin (dm^+ through mal^+) from the recombinant composed of left end of Y^DX^P element of ***T(1;Y)148 = T(1;Y)2D;*** Y^L**, which involves** B^SY**,** and right end of XY^L-Y^S129-*16,* which carries y^+ from y^+Y between *X* and Y^L.

synthesis: Nicoletti.

references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

properties: Meiotic behavior and viability apparently normal. Produces *Co* effect; covers *N.* Has, in addition, combined marker characteristics of B^SY **and** y^+Y.

B^s_w^+Y

constitution: B^s *pdt* $^+$ ***su(f)*** $^+$ ***kz*** $^+$ ***- dm*** $^+$ ***KL-bb*** $^+$ ***KS;*** inferred from origin.

origin: X-ray-induced deletion of majority of euchromatin (rb^+ through mal^+) from a recombinant carrying left end of FW element of *T(1;Y)148 = T(1;Y)2D;* Y^L, which involves B^SY, and right end **of** XY^L-Y^S.

synthesis: Nicoletti.

references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

properties: Produces *Co* phenotype in X/B^sw^+Y male and $X/X/B^sw^+Y$ female. Covers many *N* deficiencies. *B* phenotype as in B^SY.

BSy+Y

constitution: B^s *pdf* $^+$ ***su(f)*** $^+$ ***y*** $^+$ **ac** $^+$ ***KL-bb*** $^+$ ***KS;*** inferred from origin.

origin: X-ray-induced deletion of the euchromatin (kz^+ through *mal*)* from the recombinant composed of left end of Y^DXP element of *T(1;Y)148* ≃ *T(1;Y)2D;* Y^L, which involves B^SY, and right end of XY^L-Y^S129-*16,* which carries y^+ from y+F between *X* and F^{*1}.

synthesis: Nicoletti.
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

B^SY

constitution: B^s pdf^+ $su(f)+$ $KL'bb*$ KS.
origin: X-ray-induced deletion of majority of euchromatin (including *mal+)* from a recombinant carrying **left end of 4^DX^P element of $T(1;4)B^S$ = $T(1;4)15F9-16Al;16A7-Bl;102F$ and right end of XY^L-Y^S.**
synthesis: Brosseau.
synonym: YB^S.
references: Brosseau and Lindsley, 1958, DIS 32: 116.
Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.
properties: Causes extreme *B* phenotype; presence readily scorable in +/+, *B/+*, and + but not *in B/B* or *B*. Shown to carry *pdi+* (Grell) and $su(f)^+$ (in B^sYy^+; Zimmering, 1959, DIS 33: 175-76). Does not cover $spaP^{o1}$. Viability and fertility of X/B^SY, $X/B^YY/BSY$, and $X/X/B^SY$ good. Three euchromatic bands visible in salivary chromosomes (Nicoletti and Lindsley, I960, Genetics 45: 1705-22).

$B^SY\ y^+$

constitution: B^s pdf^+ $su(f)^+$ KL-bb^+ KS ac^+ - $t(1)J1^+$.
origin: Recombination between B^SY and bw^+Yy+.
synthesis: Brosseau.
references: 1958, DIS 32: 115-116.
Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339—46.

$B^SY\ y^{31d}$

constitution: $J3^S$ pdf^+ $su(t)^+$ KL-bb^+ KS ac^+ y^id $1(1)J1^+$; inferred from origin,
origin: X-ray-induced recombinant between B^sYy^+ **and $In(l)sc^s$, $y31d$ sc^8 in a female.**
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

bw^+Y

constitution: KL $(bW^+$ - $ba^+)$-$bb+$ KS.
origin: Aneuploid segregant from $T(Y;2)bw^+Y$ = **$T(Y;2)Y^L;58F1-59A2;6OE3-F1$ (Gersh, 1956, DIS** 30: 115; Nicoletti).
synthesis: Dempster.
synonym: y": *bw+*.
references: Muller, 1942, DIS 16: 64.
1951, DIS 25: 119.
1955, DIS 29: 146.
properties: A section of *2R* carrying *bw+* inserted into Y^L proximal to *KL* (Baker, 1955, DIS 29: 101—3). Inserted segment known to carry normal alleles of *bw, mr, or, Fo, Pin, bs,* and 6a but not ***px, hv, crs, M(2)l,* or *M(2)c.* Male with two *bw+Y*** chromosomes lethal.

$bw^+Y\ y^+$

constitution: *KL (bw+* - fca^+>66 $^+$ *KS* ac^+ - $t(l)Jl^+$ (Baker, 1955, DIS 29: 101-2).
origin: Recombination between Y^s of *bw+Y* distal to **KS and Y^L of *y+Y* in *C(l)RM/y+Y/bw+Y* female,**
synthesis: Cooper.
synonym: sc^s-Y:bw+.
references: 1952, DIS 26: 97.

FR2: seey+F*-
Fragment 2: see $y + Y^L$

KDJ1+Y

constitution: $1(1)]1^+$ KL-bb^+ KS.
origin: Neutron-induced derivative of *y+Y.*
synthesis: Muller.
references: 1954, DIS 28: 140-43.
properties: Like *y+Y* except that y^+ and ac^+ but not $1(1)J1^+$ deleted.

R(Y)bw+

constitution: *KL* $(bw^+$ — $ba^+)$-bb^+ *KS;* closed to form a ring.
origin: X-ray-induced derivative of *bw+Yy+.*
synthesis: Oster and Iyengar.
synonym: Y^cbw^+; MYR: Marked Y Ring.
references: 1955, DIS 29: 159.
properties: Ring shaped in mitotic metaphase. Lacks y^+ present in the treated chromosome. Introduction of *Rfif)bw+* via male into certain strains results in death of nearly all male progeny during early embryogenesis. About 10 percent of strains are subject to such killing of male offspring. Introduction of *R(Y)bw+* via female does not result in death of the sons (Oster, 1964, Genetics 50: 274).

R(Y)L

constitution: KL^m; closed to form a ring.
origin: Spontaneous derivative of *y+Y.*
synthesis: Muller.
synonym: Y^{cl}; Y^{Lc}.
references: 1948, DIS 22: 73-74.
properties: Ring shaped in mitotic metaphase and about same length as the *X* chromosome (Hannah). Carries all *of KL. bb/R(Y)L* is bobbed and *bb*/R(Y)L* dies; therefore *R(Y)L* lacks *bb* locus.

*R(Y)L14

constitution: *KL",* closed to form a ring.
origin: X-ray-induced derivative of $bw+Yy^+$.
synthesis: W. K. Baker.
synonym: Y^c^-14.
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.),
properties: Ring shaped in mitotic metaphase. Lacks y^+, bw^+, bb^+, and *KS* present in treated chromosome.

R(Y)L15

constitution: *KL",* closed to form a ring.
origin: Spontaneous derivative of bw^+Yy+.
synthesis: W. K. Baker.
synonym: Y^{cL}-15.
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.),
properties: Ring shaped in mitotic metaphase. Lacks *y+*, bw^+, bb^+, and KS present In original chromosome.

R(Y)Lbb$^+$

constitution: $KL'bb^+$; closed to form a ring.
origin: X-ray-induced derivative of bw^+Yy^+.
synthesis: W. K. Baker,
synonym: Y^{cL}:bb^+.

references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.),
properties: A medium-sized ring in mitotic metaphase. Lacks *y+*, *bw+*, and *KS* present in treated chromosome.

R(Y)Sbw+
constitution: *(bw+ — ba+)-bb+ KS;* closed to form a ring. Order of elements inferred from origin.
origin: X-ray-induced derivative of $bw^{+}Yy^{+}$.
synthesis: W. K. Baker,
synonym: Y^{cS}**:**$bw^{+}bb^{+}$**.**
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.).
properties: Ring shaped in mitotic metaphase. Lacks *y +* and *KL* from treated chromosome. Shows some somatic and germinal instability.

SC'Y^{L}: seeY^{L}-sc^{sl}
scSENc.o. Y B-2: see *Y^-y +·B2*
scSENc.o. Y T-0: see *Y^-y + TO*
sc^{8}-Y: see *y+Y*
sc^{8}-Y:bw+: see *bw+Yy+*
sc^{8}V.Y: see yvssy
*sc^{51}*c.o. *Y EY80:* see *Y L:sc^{51}3*
sc^{V}1.Y5
constitution: *1(1)J1 + - scVl-bb+ KS;* tentative.
origin: Spontaneous recombinant from ***In(lLR)scVl/Y*** **male.**
synthesis: Muller.
references: 1948, DIS 22: 73-74.
properties: Small two-armed chromosome in mitotic metaphase. Survives in combination with *C(1)DX* and therefore probably carries *bb+* and the nucleolus organizer.

Tp4-Y: see *4Y*
Transposition 4-Y: see *4Y*
w+y+Y
constitution: ***kz+ - spl + y + ac + KL-bb+ KS;*** inferred from origin and supposed constitution of ***B^{s}w+y+Y.***
origin: X-ray-induced derivative of *B^{s}w+y+Y.*
synthesis: Nicoletti.
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.
properties: Like $B^{s}w^{+}y^{+}Y$ but with stiff,$^{+}$ and B^{s} missing.

w+Y
constitution: *kz+ — spl + KL-bb+ KS;* inferred from origin. Also associated with *T(Y;2)w+Y = T(Y;2)Y^{L};22D* (Schultz) in which the break in Y^{L} is distal to the *kz + — spl* insertion.
origin: Spontaneous in *C(l)RAY^{L}/w+y+Y* female. Seems likely that the *w+y+Y,* which was an X-ray-induced derivative of *B^{s}w+y+Y,* was different from the one described here and was already translocated with chromosome *2.*
synthesis: Nicoletti.
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.
properties: Produces *Co* effect; covers *N.*

y+msY
constitution: ***l(l)Jl + ~ ac + ms(Y)L'bb^{+} KS.***
origin: X-ray-induced derivative of *y+Y.*
synthesis: Brosseau.
references: I960, Genetics 45: 257-74.
properties: A series of *y+Y* chromosomes that carry a male-sterilizing mutant in *KL;* e.g., *y+mslY* carries *ms(Y)L,l.* Brosseau (1960) described a number of complementing male-sterilizing mutations **in** ***Y^{L}.***

y+Y
constitution: ***l(l)Jl^{+} - ac^{+} KL-bb^{+} KS.***
origin: X ray induced in spermatogonial cell of ***In(l)sc8/Y*** **male.**
synthesis* Muller.
synonym: *sc^'Y.*
references: 1948, DIS 22: 73-74.
properties: Tip of *In(l)sc^{s}* including *1(1)J1^{+}, y^{+},* and *ac^{+}* but not sc transferred to tip of Y^{L} distal to *KL.* Since in metaphase Y^{L} appears to be as long as *X* (Hannah), some heterochromatin derived from *In(l)sc^{8}* must be carried distally on Y^{L}. Detachment studies show that *bb^{+}* from *In(l)sc^{8}* has not been transferred to Y^{L} (Parker). Has dominant *Hw* effect that produces one or more humeral hairs in *X/y^{+}Y* male and *X/X/y^{+}Y* female and one or more hairs in second and third posterior cells of wing of *X/y+Y/y^{+}Y* male (Schultz).

y^{+}Yms
constitution: ***l(l)Jl^{+} ~ ac+ KL-bb^{+} ms(Y)S.***
origin: X-ray-induced derivative of *y+Y.*
synthesis: Brosseau.
references: 1960, Genetics 45: 257-74.
properties: A series of *y+Y* chromosomes that carry a male-sterilizing mutant in *KS;* e.g., *y+Yms2* carries *ms(Y)S2.* Complementing male-sterilizing mutations in Y^{s} have been described by Brosseau (1960).

y+YL
constitution: ***1(1)J1 + - ac^{+} KL-bb^{+}.***
origin: Spontaneous product from sc cv v *f/Y^{s}X'Y^{L},* ***In(l)EN, KS y-KL y^{+}*** **female.**
synthesis: Novitski.
synonym: ***FR2: Fragment 2.***
references: 1952, Genetics 37: 270—87.
properties: Has subterminal centromere and extremely short second arm in mitotic metaphase. Constitution confirmed by analysis of detachments with *C(1)RA$_{I}$* all of which appear to result from exchange between the intersitial heterochromatin of the compound and the fc6^{+}-bearing short arm of *y+Y^{1}** (Sandier, 1954, DIS 28: 153-54).

,S3!Y
con#itution: ***1(1)11+ y^{53i} ac+ KL-bb+ KS.***
origin: X-ray-induced derivative of *y+Y.*
synthesis: Luning, 53i.
references: 1953, DIS 27: 58.
properties: Like *y+Y* but with a mutant allele of *y.*

y^{P59}Y
constitution: ***1(1)J1+ y^{P59} ac+ KL-bb+ KS.***
origin: Spontaneous derivative of *y+Y.*
synthesis: Perkovic, 59h.
references: Meyer, 1959, DIS 33: 97.
properties: Like *y+Y* but with a y^{2}-like allele of y.

***yvS6Y**
constitution: *1(1)J1*$^{+}$ *y*^{vS6} *ac*$^{+}$ *KL'bb*$^{+}$ *KS.*
origin: X-ray-induced derivative of *y*$^{+}$*Y.*
synthesis: C. Hinton and Schmidt.
synonym: *sc*^{av}*-Y.*
references: 1956, DIS 30: 121.
properties: Like *y*$^{+}$*Y* but with strong variegation for y. May be associated with unanalyzed rearrangement.

YB9: see fisy

Ybb
constitution: *KL-bbKS.*
origin: Spontaneous.
synthesis: Bridges, 1926.
properties: General symbol for a *Y* chromosome carrying a mutant allele of 66, e.g., *bb*^{Y}. Such *Y* chromosomes occasionally encountered in crosses of 66^{+} lines to 66.

Ybb-
constitution: *KL'KS.*
synthesis: Schultz, 33k8.
properties: A *Y* chromosome deficient for a section of *Y*^{s} including 66+ but not *KS. X/Ybb~* male fertile. *Y*^{s} about one-third normal length in metaphase.

Y:bw+: see *bw*$^{+}$*Y*

**Ymal*$^{+}$
constitution: *KL*sw+ — su(f)*$^{+}$ *bb*$^{+}$ *KS;* inferred from origin.
origin: X-ray-induced deletion of majority of euchromatin *[l(l)Jl*$^{+}$ through *car*$^{+}$*]* from *Y*^{S}*X-Y*^{L}, *In(l)EN.*
synthesis: E. H. Grell.
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

Ymal+2
constitution: *KL'Sw*$^{+}$ — *su(f)*$^{+}$ *bb*$^{+}$ *KS;* inferred from origin.
origin: X-ray-induced deletion of majority of euchromatin *[l(l)Jl*$^{+}$ through *car*$^{+}$*]* from *Y*^{S}*X-Y*^{L}, *In(l)EN.*
synthesis: £. H. Grell.
references: Brosseau, Nicoletti, Grell, and Lindsley, 1961, Genetics 46: 339-46.

Ycbw+: see *R(Y)hw+*

Yd-, see *R(Y)L*

YcL:bb+. *seeR(Y)Lbb+*

Ycs:bw+bb+: see *R(Y)Sbw+*

YM3
constitution: *KL.*
origin: Spontaneous derivative of *bw*$^{+}$*Yy*$^{+}$.
synthesis: W. K. Baker.
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.).
properties: A large acrocentric chromosome in mitotic metaphase. Lacks *y*$^{+}$, *bw\ bb* and KS present in original chromosome.

YL.$_{SC}$**S?**
constitution: *KL'bb** sc^{s}* *-i(i)ji+;* presence of 66^{+} tentative,
origin: Recombinant between *Y*^{s} and distal heterochromatin of *Jn(l)scSl.*
synthesis: Crew and Lamy.
synonym: *SC'Y*^{L}.
references: 1940, J. Genet. 39: 273-83. Pontecorvo, 1940, DIS 13: 74.
properties: Described as an acrocentric rod the size of *Y*^{1}*-*^{1} in metaphase (Crew and Lamy, 1940). Later described as an asymmetrically V-shaped element with the shorter arm the size of *Y*^{L} (Pontecorvo, 1940).

YL.sc*^{S}*12
constitution: *KL-bb*$^{+}$ *sc^l _ 1(1)J1+;* presence of 66^{+} tentative,
origin: Recombinant between *Y*^{s} and distal heterochromatin of *In(l)sc*^{si} in *Base* male.
synthesis: Parker,
synonym: *sc*^{sl}*'Y*^{L}**2.*
references: Parker and McCrone, 1958, Genetics 43: 172-86.

YL.sc*^{S}*13
constitution: jRX'66^{+} *sc*^{si} - *I(1)J1*$^{+}$.
origin: Recombinant between *Y*^{s} and distal heterochromatin of *In(l)sc*^{Sl} in *Base* male.
synthesis: Lindsley.
synonym: *sc*^{si}*c.o. Y EY80.*
properties: Resembles a normal *Y* in mitotic prophase.

Yi-.*$_{Y}$*+B2
constitution: KL-ac+ - *1(1)]1*$^{+}$.
origin: Recombinant between *Y*^{s} and distal heterochromatin of *In(l)sc*^{8L}*EN*^{R}.
synthesis: Lindsley.
synonym: *sc*^{a}*ENc.o. Y B-2.*
references: 1955, Genetics 40: 24—44.
properties: Lethal in combination with *In(l)sc*L sc*^{aR} or *bb*^{1}*;* bobbed in combination with 66. Unique among such recombinants between *Y*^{s} and distal heterochromatin of *In(l)sc*^{8} or *In(l)sc*^{si} in lacking 66^{+}. Resembles normal *Y* in mitotic prophase.

YL.y+TO
constitution: *KL'bb*$^{+}$ *ac*$^{+}$ - *1(1)J1*$^{+}$.
origin: Recombinant between *Y*^{s} and distal heterochromatin of *In(l)sc*Z*EN*^{R}.
synthesis: Lindsley.
synonym: *sc*^{8}*ENco. Y T-0.*
references: 1955, Genetics 40: 24—44.
properties: Resembles a normal *Y* in mitotic prophase.
other information: One of a number of similar recombinant *Y* chromoeomes recovered from *In(l)sc*^{a} or *In(l)sc*^{8}*^EN*^{R} males.

YL.*$_{y}$*3M
constitution: K!JL-6&$^{+}$ *sc*^{si} - *y*^{3M} *1(1}J1*$^{+}$*;* inferred from supposed constitution of *Y^"sc*^{si}.
origin: Spontaneous mutation in *Y*^{Lt}*sc*^{S1}.
synthesis: Muller.
references: Muller and Valencia, 1947, DIS 21: 70.
properties: Like *Y*^{L}*'SC*^{S1} but with y^-like allele of *y.*

YLc: see *R(Y)L*

Ys8

constitution: -66^{+} *KS;* tentative.
origin: Spontaneous derivative of *bw*$^{+}$*Yy*$^{+}$ recovered from *R(l)l/bw+Yy*$^{+}$ male.
synthesis: W. K. Baker,
synonym: *Y*^{s}*:bb*$^{+}$*-8.*
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.).
properties: A small two-armed chromosome in mitotic metaphase. Lacks *y*$^{+}$, bw^{+}, and *KL* present in chromosome of origin.

Y9:bb+-8: see **Ys8**

YSy+5

constitution: *-bb*$^{+}$ *KS ac*$^{+}$*- l(l)Jl*$^{+}$; tentative.
origin: Spontaneous derivative of *bw*Yy*$^{+}$ recovered from *R(l)l/bw*$^{+}$*Yy+* male.
synthesis: W. K. Baker,
synonym: *Y$:y*bb*$^{+}$*-5.*
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.).
properties: Large acrocentric chromosome in mitotic metaphase. Lacks *bw*$^{+}$ and *KL* present in original chromosome.

YSy+6

constitution: *-bb*$^{+}$ *KS ac*$^{+}$ *- 1(1)J1*$^{+}$*-,* tentative.
origin: X-ray-induced derivative of *bw*$^{+}$*Yy*$^{+}$.
synthesis: W. K. Baker.
synonym: *Y*^{s}*:y*$^{+}$*bb*-6.*
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.).
properties: Two-armed chromosome in mitotic metaphase. Lacks *bw*$^{+}$ and *KL* present in treated chromosome.

YSy+7

constitution: *-bb*$^{+}$ *KS* ac^{+} *- 1(1)J1*$^{+}$*;* tentative.
origin: X-ray-induced derivative of *bw*$^{+}$*Yy*$^{+}$.
synthesis: W. K. Baker.
synonym: F^{s}:y^{+}fc6^{+}-7.
references: Baker and Spofford, 1959, Univ. Texas Publ. 5914: 135-54 (fig.),
properties: A rod-shaped chromosome about twice the length of chromosome *4* in mitotic metaphase. Lacks *bw*$^{+}$ *and KL* present in treated chromosome.

Ys:y+bb+: see **YsY+**

Ys.Ys

constitution: KS *bb*$^{+}$*-bb*$^{+}$ *KS;* tentative.
origin: Spontaneous.
synthesis: Stern.
synonym: F ".
references: 1929, Z. Induktive Abstammungs- Vererbungslehre 51: 253-353.
properties: V-shaped chromosome in mitotic metaphase with both arms the length of *Y*^{s}.

Ys.Ys2

constitution: *KS bb*$^{+}$*-bb*$^{+}$ *KS;* inferred from probable mode of origin.
origin: Spontaneous product from *X'Y*^{s}*/y*$^{+}$*Y* male.
synthesis: Muller.
references: 1948, DIS 22: 73-74.
properties: V-shaped chromosome in mitotic metaphase with both arms the length of *Y*^{s}.

***Ys.Ys3**

constitution: *KS bb*$^{+}$*'bb*$^{+}$ *KS;* inferred from probable mode of origin.
origin: Spontaneous product from *X-Y*^{s}*/y*$^{+}$*Y* male.
synthesis: Muller.
references: 1948, DIS 22: 73-74.
properties: Like *Y*^{S}*-Y*^{S}*2.*

Y": see *Y*-YS*

CYTOLOGICAL MARKERS

7: *Chromosome 7*

See *X,* this subsection.

2: Chromosome 2

In mitotic figures, chromosome *2* is less than twice the length of the *X* and slightly smaller than chromosome *3.* It is a V-shaped element with two centrally located heterochromatic segments presumably separated by the centric constriction; the heterochromatic segments are late replicating, according to thymidine incorporation studies (Barigozzi, Dolfini, Fraccaro, Raimondi, and Tiepolo, 1966, Exptl. Cell Res. 43: 231-34). In early prophase there is often a long achromatic gap separating the euchromatic portion of one arm from the heterochromatin. Kaufmann (1934, J. Morphol. 56: 125-55) reported the gap to be in *2L.*

Hinton (1942, Genetics 27; 119-27) stated that both the constriction and the centromere are located in the region between the chromosome *2* breakpoints of $T(1;2)N^{264\text{-}59}$ = *T(l;2)3C8-9;40F* and *T(l;2^j264-23 = T(1;2)3C8-9;41A,* a segment containing one or two bands but comprising about 15 percent of the metaphase length of *2.*

2L: Left arm of chromosome 2

See *2,* this subsection.

2R: Right arm of chromosome 2

See *2,* this subsection.

3: Chromosome 3

A V-shaped element in mitotic figures that is slightly larger than chromosome 2 but less than twice the length of the *X* chromosome. In prophase, there are two medial heterochromatic segments separated by a constriction that presumably marks the position of the centromere; these segments comprise about the proximal one-fifth of each arm at metaphase, and according to tritiated thyraidine incorporation studies (Barigozzi, Dolfini, Fraccaro, Raimondi, and Tiepolo, 1966, Exptl. Cell Res. 43: 231—34), they are late replicating.

3L: Left arm of chromosome 3

See *3,* this subsection.

3R: Right arm of chromosome 3

See *3,* this subsection.

4: Chromosome 4

In mitotic configurations chromosome *4* is a dot-like element that is separated into two segments of grossly unequal size by a sometimes visible centric constriction. Claimed to lack heterochromatic material, but can be involved in rearrangements that produce variegated position effect [e.g., $T(l;4)w^{mS}$ = *T(l;4)3C3-4;101Fl-2\,* and shows incorporation of tritiated thymidine in cells in which only heterochromatic regions of the other chromosomes are labeled (Barigozzi, Dolfini, Fraccaro, Raimondi, and Tiepolo, 1966, Exptl. Cell Res. 43: 231-34). In salivary gland chromosomes, the longer right arm is associated with the chromocenter. The shorter left arm is occasionally discernible within the chromocenter; it has been demonstrated genetically by translocations between it and the *X* chromosome; e.g., *T(l;4)w""l** (Panshin and Khvostova, 1938, Biol. Zh. (Moscow) 7: 359-80) and $T(l;4)w^{mA}$ (Griffen and Stone, 1940, Texas Univ. Publ. 4032: 201-7).

4L: Left arm of chromosome 4

See *4,* this subsection.

4R: Right arm of chromosome 4

See *4,* this subsection,

4-s'im: Chromosome 4 from Drosophila simulans

Chromosome *4* of *D. simulans* was introduced into an otherwise *D. melanogaster* genome by Muller and Pontecorvo (1940, Nature 146: 199-200). Phenotypic effects of *4-sim* were described by Muller and Pontecorvo (1942, Genetics 27: 157) and Pontecorvo (1943, Proc. Roy. Soc. Edinburg B 61: 385-97, 1943, J. Genet. 45: 51—66). *4 sim/4* apparently normal in phenotype; *4~&im/ci* has occasional wing vein interruption; $4\text{-}sim/d^{w}$ has more extreme *d* phenotype than *4/rt** (Uphoff, 1949, Genetics 34: 351—27); no dominance of spa^{Cat} in $4\text{-}simfspa^{Cat}$. Homozygous *4-sim/4-aim* has fair viability with slight morphological peculiarities, e.g., body flattened, trident heavy, and eyes reduced. Male genitalia said to be a little like those of *D. simulans.* Homozygous female fertile, but male sterile, Testes well developed; meiosis occurs but no motile sperm are produced. *4-sim/M(4)* is Minute and male sterile;

4-sim/M(4) is not Minute but is male sterile. Muller and Pontecorvo (1942) suggest a gene necessary for male fertility of *D. melanogaster* is deleted from *Df(4)M* and absent from *4-sim.*

Comparisons of *melanogaster* and *simulans* salivary chromosomes were published by Kerkis (1936, Am. Naturalist 70: 81-86), Horton (1939, Genetics 24: 234-43), and Pätau (1935, Naturwissenschaften 23: 537-43). According to Horton (1939) *4-sim* differs from *4* by a relatively long inversion, which includes at least from 102B1-2 through 102E1-2 and probably through 102E3, 4 and 5. A darkly-staining terminal ring is at the tip of the chromosome. Slizynski (1941, Proc. Roy. Soc. Edinburg B 61: 95—106) identified the short left arm of *4-sim;* it lacks a dark band present in the middle of the arm in *D, melanogaster*. In *melanogaster-simulans* hybrids the fourth chromosomes do not pair in salivary gland cells; however, Slizynski found one nucleus of *sim-4/4* in a *melanogaster* background in which the inverted segment was paired. In triplo-4 larvae with one *4-sim,* the *melanogaster 4's* are paired and the *4-sim* is unpaired. *4* tends to have the tip of *4R* stuck into the chromocenter; *4-sim,* however, always has its tip free of the chromocenter.

BkA: Block A

Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya (1937, Genetics 22: 87-93) defined it as the distal and major portion of the segment of proximal heterochromatin of the X chromosome located between the right breakpoints of $In(l)sc^{L8}$ and $In(l)sc^{8}$. This region was considered to be a unit or the product of a single genetic unit not subject to X-ray-induced breakage. Subsequent work by Kaufmann (1954. In Radiation Biology, A. Hollaender, ed., McGraw-Hill, Inc., Vol. 1, pp. 627-711), and in particular that of Cooper and Krivshenko with *Dp(l;{)* derivatives, suggests that breakability in *Xh* is distributed uniformly over its mitotic length; therefore the block concept of heterochromatic structure no longer seems valid.

BkB: Block B

Muller, Raffel, Gershenson, and Prokofyeva-Belgovskaya (1937, Genetics 22: 87-93) claimed it to be proximal to *BkA* in the region of Xh between the right breakpoints of $In(l)sc^{L8}$ and $In(l)sc^{8}$. Gershenson [l940, Vid. Akad. Nauk SSSR., (Kiev) 3-116] defined it as the segment of the proximal heterochromatin of *XL* to the right of the right breakpoint of $In(l)sc^{8}$, claimed to comprise 20—30 percent *of Xh,* although, according to Cooper (1959, Chromosoma 10: 535—88), a much smaller proportion *of Xh* lies between the right breakpoint of $In(l)sc^{8}$ and the centromere. Existence of *BkB* subject to same doubts as that of *BkA,*

hA

The proximalmost of four segments discernible in the proximal heterochromatin of *XL* (see *X,* this subsection; also Cooper, 1959, Chromosome 10: 535—88).

hB

The second from the centromere of four segments discernible in the proximal heterochromatin *of XL (see X,* this subsection; also Cooper, 1959, Chromosoma 10: 535—88).

hC

The third from the centromere of four segments discernible in the proximal heterochromatin of XL (see *X,* this subsection; also Cooper, 1959, Chromosoma 10: 535-88).

hD

The distalmost of four segments discernible in the proximal heterochromatin of *XL* (see *X,* this subsection; also Cooper, 1959, Chromosoma 10: 535—38).

LA

The proximalmost of three discernible segments of Y^{L} (see *Y,* this subsection; also Cooper, 1959, Chromosoma 10: 535—88).

LB

The middle of three discernible segments of Y^{L} (see *Y,* this subsection; also Cooper, 1959, Chromosoma 10: 535—88).

LC

The distalmost of three discernible segments of Y^{L} (see *Y,* this subsection; also Cooper, 1959, Chromosoma 10: 535—88).

NO: *Nucleolus Organizer*

The region in the proximal heterochromatin of the *X* and the short arm of the *Y* chromosome where the nucleolus is organized. The nucleolus is visible in interphase, and its relation to the *NO* may be seen in early prophase; it may also be seen associated with the chromocenter in salivary gland preparations. The nucleolus is formed at the constriction between hB and AC in the proximal heterochromatin of the *X* chromosome and at the constriction one-third the way from the centromere along the short arm of the *Y.* Homozygous deficiency for the nucleolus organizer is lethal. Ritossa and Spiegelman (1965, Proc. Natl. Acad. Sci. U.S. 53: 737-45) showed that the amount of DNA complementary to ribosomal RNA in a cell is directly related to the number of nucleolus-organizing regions present; they believe that the *NO* is the chromosomal site of ribosomal RNA synthesis. The ribosomal RNA-complementary DNA comprises 0.27 percent of the total DNA of a haploid genome; on the basis of the amount of DNA per cell and the molecular weight of ribosomal RNA in *Drosophila,* they have calculated that the amount of ribosomal RNA-complementary DNA in a haploid genome is sufficient to synthesize 130 molecules each of 18S and 28S ribosomal RNA simultaneously. Ritossa, Atwood, and Spiegelman (1966, Genetics 54: 819-34) postulated that the *NO* is the cytological counterpart of the *bb* locus, on the basis of the demonstration that replacing a normal X with an *X* carrying 66 reduces the amount of ribosomal-RNA-complementary DNA per cell.

Puffs

Localized swellings in polytene chromosomes marking regions of metabolic activity. They are

found in specific regions of the polytene complement, and each puff has characteristic times of appearance and disappearance during development, which have been described by Becker (1959, Chromosome 10: 654—78) for the puffs in *3L* and the distal part *of XL* in the salivary glands. Studies with other diptera show that the puffing patterns in the polytene chromosomes of different tissues are not identical; Becker (1959) describes one puff in region 15BC of *Drosophila melanogaster* that is present in the anterior but not the posterior portion of the salivary gland. The puffing pattern responds to changes in cellular environment; e.g., changes in hormonal concentration (Becker, 1962, Chromosoma 13: 341—84). Becker (1959) and Schultz catalogued the regions of the salivary gland chromosomes of *Drosophila melanogaster* in which puffs may be seen (see following tabulation).

Becker	Schulfcz
1C	1C
2B5-6	2B
2B13-17	
2EF	2F
3AB	3A
3C11-12	
3E	3DE
	4EF
	7AB
	8B
	9B
9EF	
10	10EF
11B	11BC
12E	12-13
13B	
	14EF
15BC	15C
16BC	16A
16DE	16F
21F	21DE
22B	22A
22C	22CD
23C	23BC
	23DE
25A-C	25BC
25D	
	26B
	27-28
	29-30
33B	33B
33E	33E
34A	34A
	34C
	35AB
36F	36EF
37	37B
	38B
38F	39B
	40B
42A	42AB
43E	43-44
44E	
46F	
47A	47AB
47BC	
48B	48A
	49EF
50C	50CD
50D	
	SIDE
	52BC
	53-54
	55B
55E	
56D	56DE
58BC	58A
58F	58DE
59F	60A
60B	60B
62E	62B-E
63E	63C
63F	
	64B
	66B
66B	66DE
67B	
	67E
	68BC
68C	68-69
	70C
70C	71DE
71C-E	72CD
72CD	73C
74EF	74EF
75B	75AB
	76A
76D	
78D	78DE
	79DE
82CD	82BC
82EF	82EF
83AB	83C
	83EF
	84BC
85B	
85CD	85D
85EF	85EF
	86-87
88D	88D
88EF	88EF
89B	89BC
90BC	90C
	92A
93B	
93D	
	94
95F	
	96E
97BC	97B
98B	98B
98F	99B
	99EF

SA

The proximal and smaller of two discernible segments of Y^s (see *Y,* this subsection; also Cooper, 1959, Chromosoma 10: 535—88).

SB

The distal and larger of two discernible segments of Y^s (see *Y,* this subsection; also Cooper, 1959, Chromosoma 10: 535-88).

X: **X chromosome**
Redrawn from Cooper, 1959, Chromosoma 10: 535-88.

X: X *chromosome*

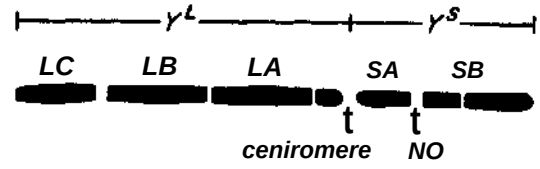
Also known as chromosome 2. Present in one dose in male and two doses in female. In mitotic figures the *X* is virtually a rod-shaped element with a quasi-terminal centromere and a minute second arm designated as the right arm, *XR.* The left arm, *XL,* is divided into a distal euchromatic or isopycnotic region, *Xe,* in which the chromatids are usually separated and a proximal heterochromatic or heteropycnotic region, *Xh,* in which the chromatids are not separated. The relative lengths of these subdivisions of *XL* vary according to mitotic stage; in early prophase the isopycnotic region is longer, but by metaphase the two regions are of about equal length. Tritiated thymidine incorporation studies (Barigozzi, Dolfini, Fraccaro, Raimondi, and Tiepolo, 1966, Exptl. Cell Res. 43: 231-34) demonstrate that the heterochromatic region is late replicating. The proximal heterochromatin of *XL* is subdivided by constrictions into four segments of about equal length; these segments are designated from proximal to distal *hA, hB, hC,* and hD (Cooper, 1959, Chromosoma 10: 535—88). The constriction between *hB* and *hC* marks the position of the nucleolus organizer, *NO;* in early prophase it may be a very long gap occupied by the nucleolus. The polytene *X* consists of just over 1000 bands of which 25—30 correspond to the region that is heteropycnotic in the mitotic *X.* The length of *Xh* is large compared with that of *Xe* when measured at metaphase or estimated by relative frequency of involvement in X-ray-induced rearrangements, but small when measured in salivary-gland chromosomes or by crossing over. Most sex-linked genes are in Xe, only the locus of *bb* and possibly that of *su(f)* being in *Xh.*

Xe: *euchromatin of* X chromosome
See *X,* this subsection.

Xh: heterochromatin* of X *chromosome
See *X,* this subsection.

XL; *Left arm of X chromosome*
See *X,* this subsection.

XR: Rîght arm of X chromosome
See *X,* this subsection.



Y: ***Y*** **chromosome**
Redrawn from Cooper, 1959, Chromosoma 10: 535—88.

Y: Y chromosome

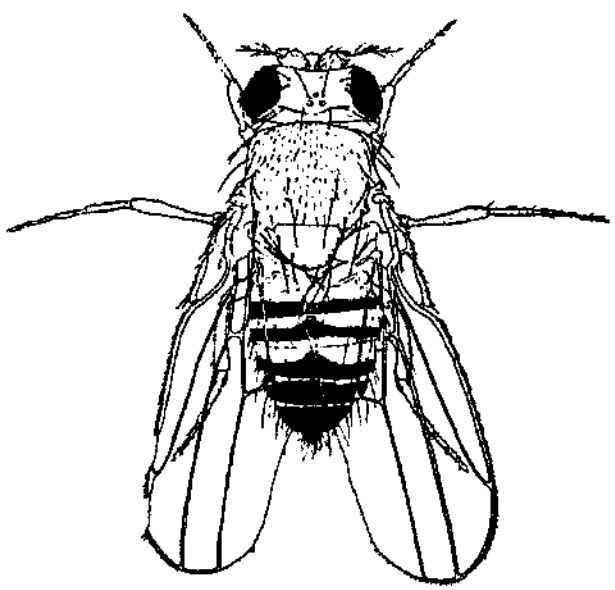
In mitotic figures the *Y* chromosome appears as an entirely heterochromatic element; tritiated thymidine studies (Barigozzi, Dolfini, Fraccaro, Raimondi, and Tiepolo, 1966, Exptl. Cell Ress. 43: 231-34) show it to be late replicating. The *Y* is a two-armed chromosome, Y^s being about two-thirds the length of Y^L. At metaphase, the *Y* is usually somewhat shorter than the *X* chromosome. The position of the centromere is indicated by a constriction. The short arm is subdivided by the constriction associated with the nucleolus organizer into a distal segment, SB, about two-thirds and a proximal segment, *SA,* one-third the length of Y^s. In early prophase the nucleolus may sometimes separate *SA* from *SB* by a considerable distance. Y^L is divided into three segments of about equal size by a pair of constrictions; the more distal of which is the more constant landmark. From the centromere the segments are designated *LA, LB,* and *LC* (Cooper, 1959, Chromosoma 10: 535—88). In salivary gland preparations, Prokofyeva-Belgovskaya (1937, Genetics 22: 94-103) observed a small collection of bands that she attributed to the *Y.* Nicoletti and Lindsley (1960, Genetics 45: 1705—22) found no evidence of bands attributable to the *Y* chromosome in a study of *T(l;Y)'s.* A series of complex structural elements in primary spermatocyte nuclei, whose formation depends on the presence of the *Y,* have been postulated to represent a highly modified state of the *Y* chromosome (Meyer, Hess, and Beerman, 1961, Chromosoma 12: 676—716). The *Y* chromosome carries a normal allele of *bb* and two complexes of factors essential to male fertility; *KL* is on Y^L and composed of five cistrons, *kll-kl5; KS* is on Y^s and composed of two, *ksl* and *k&2.* Brosseau (1960, Genetics 45: 257—74) showed the order of genetically demonstrable factors on the *Y* to be A/5 *kl4 kl3 kl2 Ml • bb^+ ksl ks2.* Addition of F's to a normal chromosome complement suppresses variegated position effects, and removal of the *Y* from the male enhances variegation (1933, Gowen and Gay, Proc. Natl. Acad. Sci. U.S. 19: 122-26). Two or more *Y's* added to the normal complement cause variegation of otherwise self-colored eyes (Cooper, 1956, Genetics 41: 242-64).

Y^L: Long *arm of Y chromosome*
See *Y,* this subsection.

Y^s: Sfiorf *arm of Y chromosome*
See *Y,* this subsection.

DEPARTURES FROM DIPLOIDY

The diploid chromosome complement of *Drosophila melanogaster* may be designated *X/X; 2/2; 3/3; 4/4* for females and *X/Y; 2/2; 3/3; 4/4* for males. Addition to or subtraction from either of these complements of one or more chromosomes produces a departure from diploidy. The non-diploid constitutions are designated by a name but not a symbol except as included in the name, e.g., *X/0 male.* Constitutions are described by listing their component chromosomes, homologous chromosomes being separated by slash bars and nonhomologous chromosomes by semicolons. When two homologous chromosomes are attached to the same centromere, components are listed without separation, e.g., *XX, XY,* and *44.*



diploid metafemale
From Bridges, V922, Am. Naturalist 56: 51-63.

diploidmetafemale

constitution: *X/X/X; 2/2; 3/3; 4/4;* sex chromosome constitution may also be *XX/X.*

source: Produced by triploid and compound-X-bearing females. May result from two-X gametes produced by nondisjunction.

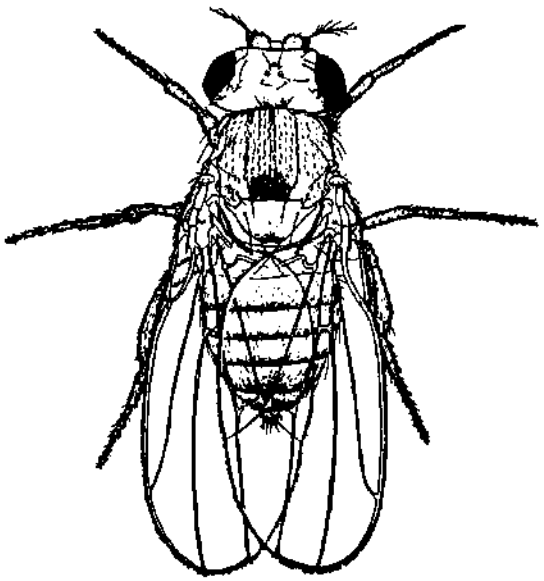
discoverer: Bridges,

synonym: *superfemale.*

references: 1921, Science 54: 252—54.
1922, Am. Naturalist 56: 51-63 (fig.).
1925, Am. Naturalist 59: 127-37.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 153-62 (fig.).

properties: Wings crumpled or incised on inner margin. Rear legs often malformed. Viability low, usually less than 0.5 percent. Flies die mostly in late larval and pupal stages; at 25°C, puparium formation delayed 1—2 days (Brehme, 1937, Proc. Soc. Exptl. Biol. Med. 37: 578-80). Survivors sterile; two fertile metafemales were apparently mosaic for triploid tissue [Rolfes and Hollander, 1961, J. Heredity 52: 61-66 (fig.)]. Larval ovaries from metafemales transplanted into sterile diploids have produced a few progeny (Beadle and Ephrussi, 1937, Proc. Natl. Acad. Sci. U.S. 23: 356-60). Crossing over between the *X* chromosomes appears to be infrequent.

other information: The term metafemale instead of superfemale was suggested by Stern (1959, Lancet 12: 1088).

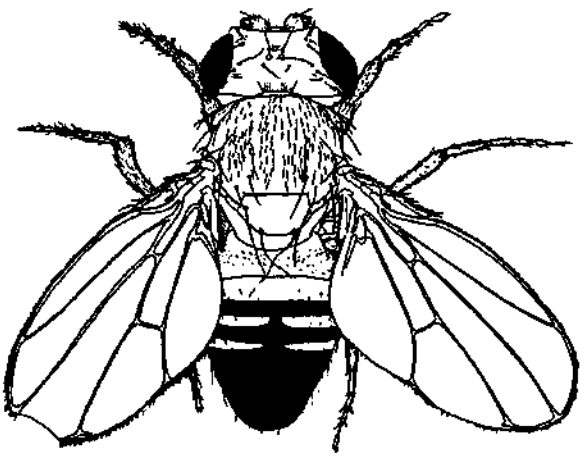


haplo-4
From Bridges, 1922, Am. Naturalist 56: 51-63.

haplo->4
constitution: *X/X; 2/2; 3/3; 4;* sex chromosome constitution may also be *X/Y.*
source: Produced after occasional loss or nondisjunction of chromosome *4* during meiosis. Produced in quantity from crosses of *C(4)RM/0* with normal, or from heterozygous *T(2;4)* or *T(3;4)* females.
discoverer: Bridges, 2Oa30.
references: 1921, Proc. Natl. Acad. Sci. U.S. 7: 186-92.
1922, Am. Naturalist 56: 51-63 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. <Stenet..2: 135-43 (fig.).
properties: Minute phenotype caused by deficiency for *M(4).* Pale body with prominent trident pattern on thorax. L5 often does not reach wing margin. Eclosion delayed 2—4 days. Viability erratic, usually below 80 percent of normal. Usually sterile. Male tends to be more viable and fertile than female.

haploid
constitution: *X; 2; 3; 4.*
source: Recorded as patches of tissue.
discoverer: Bridges.
references: 1925, Proc. Natl. Acad. Sci. U.S. 11: 706-10.
1930, Science 72: 405-6.
properties: Eye facets small in haploid patches. A haploid foreleg bore no sex comb; the tissue is therefore probably female, as expected on basis of balance theory of sex determination.

intersex
constitution: *X/X; 2/2/2; 3/3/3; 4/4/4;* presence of *Y* and number of fourth chromosomes variable.
source: Regularly found among progeny of triploid females.
discoverer: Bridges, 20/.
references: 1921, Science 54: 252—54.
1922, Am. Naturalist 56: 51-63 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 153-62 (fig.).
Bridges, 1939. In Sex and Internal Secretions, E. Allen, C. H. Danforth, and C. A. Doisy, eds. The Williams and Wilkins Co. pp. 15-63.
properties: Large-bodied fly with coarse bristles, roughish eyes, and scalloped wing margins. Small hairs on surface of wing more sparsely distributed than in diploids. Usually has sex combs and a mixture of male and female genitalia; genitalia may be malelike or femalelike. Addition of sections of *X* chromosome shifts intersexes toward femaleness [Dobzhansky and Schultz, 1934, J. Genet. 28: 349-86 (fig.); Pipkin, 1940, Univ. Texas Publ. 4032: 126—56]. Addition of sections of the second or the third chromosome has not resulted in a shift in sexuality (Pipkin, 1947, Genetics 32: 592-607; 1960, Genetics 45: 1205-16). Fung and Gowen reported that a triploid line producing intersexes with preponderantly female genitalia carries several fourth chromosomes and another triploid line producing malelike intersexes carries only two fourth chromosomes.



metamale
From Bridges, 1922, Am. Naturalist 56: 51-63.

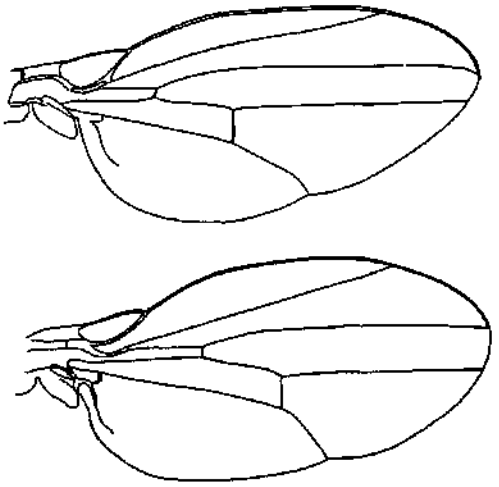
metamale
constitution: *X/Y; 2/2/2; 3/3/3; 4/4/4;* inferred from markers inherited. May also be diplo-4.
source: Occurs among progeny of triploid female.
discoverer: Bridges, 201.
synonym: *supermale.*
references: 1921, Science 54: 252—54.
1922, Am. Naturalist 56: 51-63 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 153-62 (fig.).
properties: Male has small body and spread wings. Late hatching, poorly viable, and completely sterile.

nullo-X
constitution: *Y/Y; 2/2; 3/3; 4/4.*

source: One-fourth the progeny from crosses between certain compound-X-bearing females (e.g., *C(1)RM/Y)* and normal males.
properties: Dies as embryo (Li, 1927, Genetics 12: 1—58). Cleavage nuclei abnormally distributed and blastoderm not formed, according to Poulson (1940, J. Exptl. Zool. 83: 271—325). According to Scriba (1964, Zool. Jahrb. Abt. Anat. Ontog. Tiere 81: 435—90), migration of cleavage nuclei to surface of egg is normal, blastoderm formation irregular, and germ band development frequently incomplete.

nullo-X nullo-Y
constitution: *2/2; 3/3; 4/4.*
source: One-fourth the progeny of crosses such as *C(l)RM/0* females with $Y^{S}X\text{-}Y^{L}/0$ males.
properties: Most embryos die after 10—12 cleavages (von Borstel and Rekemeyer, 1958, Nature 181: 1597-98). Embryology like that of *nullo-X* (Scriba, 1964, Zool. Jahrb. Abt. Anat. Ontog. Tiere 81: 435-90).

superfemale: see *diploid metafemale*
supermale: see *metamale*



tetra-4
above: tetra-4; below: diplo-4
From Grell, 1961, Genetics 46: 1173-83.

tefro-4
constitution: *X/X; 2/2; 3/3; 4/4/4/4.* Sex chromosome constitution may also be *X/Y;* that for chromosome *4* may be *44/4/4* or *44/44.*
references: Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 135-43.
Li, 1927, Genetics 12: 1-58.
Bridges, 1935, Tr. Dinam. Razvit. 10: 463-74.
Grell, 1961, Genetics 46: 1177-83 (fig.).
properties: Viability reduced; usually dies in embryonic or larval stage. Wings of survivors longer and more pointed than normal.
source: Synthesized as females homozygous for *T(1;4)W"4* + $T(1;4)B^{S}$ formed by recombination in region 3C4-15F8 between *T(l;4)w™5 = T(1;4)3C3-4;10IFl-2* and $T(1;4)B^{S}$ = *T(1;4)15F9-16A1;16A7-B1;IO2F* (Grell, 1961). Also recovered among progeny of crosses between males and females that carry *C(4)RM* (E. B. Lewis).

tetraploid
constitution: *X/X/X/X; 2/2/2/2; 3/3/3/3; 4/4/4/4.*
source: Seen on a few occasions as a tetraploid daughter of a triploid female or as a patch of tetraploid gonial tissue in an otherwise diploid female. Extensive attempts to produce tetraploid males have failed.
discoverer: Bridges.
references: 1925, Am. Naturalist 59: 127-37.
Morgan, 1925, Genetics 10: 148-78.
properties: Recognized by production of progeny that are almost exclusively triploids and intersexes.

triplo-4
constitution: *X/X; 2/2; 3/3; 4/4/4.* Sex chromosome constitution may be *X/Y;* that for chromosome *4* may be *44/4.*
source: Product of nondisjunction of chromosome *4.* Regular product of cross between *C(4)RM* and normal diplo-4 flies.
discoverer: Bridges, 21bl3.
references: 1922, Am. Naturalist 56: 51-63.
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 21 (fig.), 135-43.
properties: Phenotypic departure from normal very slight. Body darker than normal and trident pattern subdued. Eyes small. Body and wings elongate. Preferential segregation of the different fourth chromosomes in triplo-4's described by Sturtevant (1936, Genetics 21: 444-66).

triploid
constitution: *X/X/X; 2/2/2; 3/3/3; 4/4/4.* Sex chromosome constitution may also be *X/X/X/Y, XX/X,* or *XX/X/Y.* Triploids from stocks kept for several generations usually carry only two fourth chromosomes, i.e., diplo-4 triploids.
source: Spontaneous from unreduced eggs; incidence increased by treatment with cold (Bauer, 1946, Z. Naturforsch. 1: 35-38; Gloor, 1950, DIS 24: 82) or with colchicine (Braungart and Ott, 1942, Sci. Counselor 8: 105; Schultz). Produced in relatively high frequency by triploid females and by *c(3)G/c(3)G* females (Gowen, 1933, J. Exptl. Zool. 65: 83-106).
discoverer: Bridges, 1920.
references: 1921, Science 54: 252-54.
1922, Am. Naturalist 56: 51-63 (fig.).
Morgan, Bridges, and Sturtevant, 1925, Bibliog. Genet. 2: 135-43.
properties: Eye facets larger and hairs on surface of wings more sparsely distributed than in diploid, giving eyes and wings a coarse texture; bristles also coarse. These characteristics are diagnostic for three sets of autosomes and result from increased cell *size.* Body thickset. Ventral bristles between first and second pairs of legs often missing. Discernible from diploid with practice. Fertility poor owing to production of aneuplold classes of gametes. Since, during first meiotic

division equal numbers of chromosomes tend to go to each pole, euploid gametes are produced with lower than expected frequencies; also gametes with one *X* and two sets of autosomes and with two *X's* and one set of autosomes far outnumber those with one *X* and one set of autosomes or two *X's* and two sets of autosomes (Bridges and Anderson, 1926, Genetics 10: 418-41). Triploids that carry an attached *X* (attached *X* triploids) are more fertile and produce a higher proportion of triploid progeny than free *X* triploids. Triploids are of necessity female and their progeny include metafemales, metamales, intersexes, triploid and diploid females, and diploid males. Crossing over is markedly increased in triploids; Sturtevant (1951, Proc. Natl. Acad. Sci. U.S. 37: 405-7) has mapped chromosome *4* in diplo-4 triploids. *B, Bl, Bx, Cy, D, Dfd, H, Hw, J,* L^2, *Me,* and Sib are classifiable in a single dose in triploids. *Dl, G, N, bv?Vl,* p_{Xi} *s,* and all Minutes are recessive in a single dose. Two doses of *D, Dl, G, H,* bw^{vl}, *Px,* and *Sb* produce an extreme phenotype, whereas two doses of *M* or Me are lethal (Schultz, 1934, DIS 1: 55).

triploid meta female

constitution: *X/X/X/X; 2/2/2; 3/3/3; 4/4/4;* third *4* may be absent.

source: Found among progeny of tetraploid female (Morgan). Also produced by nondisjunction of sex chromosomes in $C(1)RM/In(l)sc^s/Y$ triploid (Frost).

discoverer: L. V. Morgan.

references: 1925, Genetics 10: 148—78.
Frost, 1960, Proc. Natl. Acad. Sci. U.S. 46: 47-51.

properties: Coarse eyes, wing texture, and bristles. Resembles triploid except body smaller and eyes more bulging. Inner wing margins often incised. Using exceptional triploid females as a standard, Frost (1960) determined that triploid metafemales have 25 percent viability. From 24 to 54 percent lay eggs (1 to 150 eggs), and about 11 percent of the eggs develop into adults.

X0 male

constitution: *X; 2/2; 3/3; 4/4.*

source: Product of primary nondisjunction of the sex chromosomes in either father or mother in cross of *X/Y* male with *X/X* female. Forms one-fourth the progeny of crosses such as *X/X* female by $Y^sX\text{-}Y^L/0$ male or *C(l)RM/0* female by *X/Y* male.

discoverer: Bridges.

references: 1916, Genetics 1: 1—52.

properties: Male morphologically normal but entirely sterile. No motile sperm produced. Primary spermatocyte nuclei lack the morphological elements characteristic of normal male; these elements replaced by needle-shaped crystals, which are found in the nucleus, the cytoplasm, and extracellularly (Meyer, Hess, and Beerman, 1961, Chromosome 12: 676—716). Nebenkern and axial filament differentiation during spermiogenesis abnormal (Kiefer, 1966, Genetics 54: 1441-52).

XXY *female*

constitution: *X/X/Y; 2/2; 3/3; 4/4.* Sex chromosome constitution may also be *X/XY* or *XX/Y.*

source: Product of either primary or secondary nondisjunction in either male or female. Also produced from cross of an XF-bearing parent with a normal-X-bearing parent. Condition usually found in compound-X-bearing female.

discoverer: Bridges.

references: 1916, Genetics 1: 1-52.

properties: Phenotype and fertility like those of normal female. Nondisjunction of *X* chromosomes in *X/X/Y* much higher than in *X/X* female; about 4 percent exceptions with two normal *X* chromosomes and much higher if *X's* are heterozygous for inversions (Sturtevant and Beadle, 1936, Genetics 21: 554-604).

XXYY female

constitution: *X/X/Y/Y; 2/2; 3/3; 4/4.* Sex constitution may also be *XX/Y/Y, X/XY/Y,* or *XY/XY.*

source: A common product of crosses such as $Y^SX\text{-}Y^L/Y$ male by $X/Y^SX\text{-}Y^L$ or *X/X/Y* female, or *X/Y/Y* male by $X^SX\text{-}Y^L/X$, *X/X/Y,* or *C(1)EM/Y* female.

discoverer: Stern.

references: 1929, Biol. Zentr. 49: 261-90; 727.
Cooper, 1956, Genetics 41: 242-64.

properties: Eye color mottled to varying degrees. Posterior and middle legs often malformed. Fertility and viability reduced. Gametes preponderantly *X/Y* in constitution owing to the regular segregation of both the *X's* and the *Y's* at the first meiotic division.

XYY male

constitution: *X/Y/Y; 2/2; 3/3; 4/4.* Sex chromosome constitution may also be *XY/Y.*

source: About one-fourth the progeny of crosses such as *X/X/Y* female by *X/Y* male, *C(1)RM/Y* female by $Y^SX\text{-}Y^L/Y$ male, and $X/Y^SX\text{-}Y^L$ female by *X/Y* male.

discoverer: Bridges.

references: 1916, Genetics 1: 1—52.

properties: Phenotype normal; usually fertile, but with certain normal *Y* chromosomes completely sterile (R. F. Grell). The two *Y* chromosomes tend to separate at the first meiotic division, to a degree depending on the source of the y's and the *X* (Grell, 1958, Proc. Intern. Congr. Genet. 10th. Vol. 2: 105).

Xyyy*male*

constitution: *X/Y/Y/Y; 2/2; 3/3; 4/4.* Sex chromosome constitution may also be *XY/Y/Y.*

discoverer: Stern.

references: 1929, Biol. Zentr. 49: 261-90.
Morgan, Bridges, and Schultz, 1934, Carnegie Inst. Wash. Year Book 33: 274-80.
Cooper, 1956, Genetics 41: 242-64.

properties: Morphologically normal male, but with mottled eyes as in *XXYY* female. Almost entirely sterile; Cooper (1956) suggests that the few offspring may result from *X/Y/Y* cysts produced by mitotic loss of a *Y* chromosome.

NONCHROMOSOMAL INHERITANCE

sigma: carbon dioxide sensitivity

origin: Spontaneous.

discoverer: L'Heritier and Teissier, 1937.

references: 1937, Comp. Rend. 205: 1099—1101.
1938, Comp. Rend. 206: 1193-96, 1683.
1945, Publ. Lab. Ecole Norm. Super. Biol, (Paris) 1: 35-74.
L'Heritier, 1948, Heredity 2: 325-48.
1951, Cold Spring Harbor Symp. Quant. Biol. 16: 99-112.
1958. In Advances in Virus Research, Vol. 5, K. M. Smith and M. A. Lauffer, eds. Academic Press, Inc., pp. 195-245.
L'Heriter and Plus, 1963. In Biological Organization at the Cellular and Supercellular Level, R. J. C. Harris, ed. Academic Press, Inc., pp. 59-71.

phenotype: Flies anesthetized with carbon dioxide are paralyzed and die, whereas normal flies recover in a short time. The cause of carbon dioxide sensitivity is a virus or viruslike particle whose diameter is 180 *tafi,* as estimated from filtration experiments and 45 m/i from X-ray target experiments. Carbon dioxide-sensitive strains may be divided into two types: stabilized and nonstabilized. Artitificial inoculation regularly leads to nonstabilized condition. In this state, males do not transmit sensitivity to progeny but females do transmit it to a part of their progeny. Some flies of a nonstabilized strain achieve the stabilized state. Flies in the stabilized state yield only one-fifth as many infectious units as nonstabilized flies; however, all progeny of stabilized females are sensitive, as are part of the progeny of stabilized males. Progeny of stabilized females are also stabilized. In contrast, the sensitive progeny of stabilized males are nonstabilized. Several viral mutations that affect transmission or replication have been studied; the *D. melanogaster* mutant, *ref,* inhibits multiplication of most viral strains.

SR: Sex Ratio

origin: Artificially inoculated into *D, melanogaster* from Si?-bearing *D. willistoni* or *D, nebulosa.*

references: Poulson and Sakaguchi, 1961, Genetics 46: 890-91.
Sakaguchi and Poulson, 1962, Ann. Rept. Natl, Inst. Genetics (Misiraa, Japan) 12: 18-19; 19-21.
1963, Genetics 48: 841-61.
Poulson, 1963. In Methodology in Basic Genetics, W. J. Burdette, ed. Holden-Day Inc., pp. 404—24.

pheaotype: Females with *SR* produce few or no male progeny; *SR* is transmitted only from mothers to daughters. The Si? agent is infective and may be established from artificial inocula. The *SR* condition is always associated with presence of small treponemalike spirochetes in hemolymph of affected females. Degree of stability of the infection differs among *D. melanogaster* strains. Male dies as embryo. Triploid intersexes not killed by S/? nor are transformed females *QC/X; tra/tra).*

WILD TYPE STOCKS

Austin

Started at the University of Texas before 1929. Viability and fertility good.

Canton-S: Canton-Special

Derived from wild flies collected in Canton, Ohio. Selected by Bridges. Contains a recessive for multiple thoracic and scuteliar bristles, which overlaps wild type in most flies but appears sporadically in strains partly derived from Canton-S. Bridges found that salivary chromosomes were normal.

Lausanne-S: Lausanne-Special

Stock derived from wild flies collected in 1938 by Bridges at Lausanne, Wisconsin. Has short posterior scutellar bristles. Salivary chromosomes normal, according to Bridges.

Oregon-R

Stock derived from wild flies collected in 1925 or earlier by D. E. Lancefield at Roseburg, Oregon. Stock contains a slight ebony allele, a branching of the posterior crossvein (in chromosome 2), and an occasional scooped wing. Salivary chromosomes homozygous for *Dt(2R)Ore-R.*

Oregon-R-C

Selected by Bridges in 1938 from Oregon-R. Body color not so dark as that of Oregon-R. Homozygous for *Dt(2R)Ore-R.*

Samarkand

Stock derived from wild flies captured in 1936 at Samarkand, Uzbek Republic in Asiatic USSR [.Dubinin, Sokoloff, and Tiniakov, 1937, Biol. Zh. (Moscow) 6: 1007—54J. Original stock contained a low frequency of inversions in *3R;* chromosomes probably are now all of standard sequence. Ives reports that females of his lines of Samarkand are distinguishable from Oregon-R females in that they have no faint trident on the thorax and there is always a well-defined black band on seventh (most posterior) dorsolateral abdominal segment.

Stephenville

Derived from wild flies captured at Stephenville, Texas in 1935. Salivary chromosomes probably normal. Fertility and viability good.

Swedish-b

Stock established by Bridges from flies collected near Stockholm in 1923. Slight abnormality of abdominal banding and position of scutellar bristles. Salivary chromosomes homozygous for *Dl^Rfiw-R.*

Swedish-c

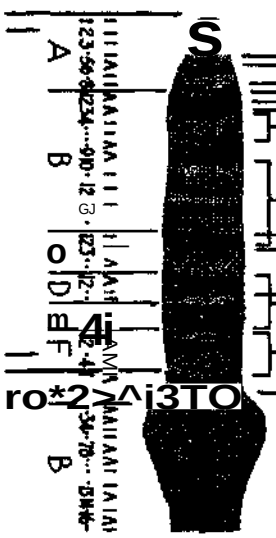
Derived by Bridges from Swedish-b in 1938. Body color lighter than that of Swedish-b. Homozygous for deficiencies in tips of *2L* and *2R.*

Urbana-S: Urbana-Specřal

Selected by Bridges from flies collected at Urbana, Illinois. Body color somewhat lighter than standard wild type. Salivary chromosomes normal.

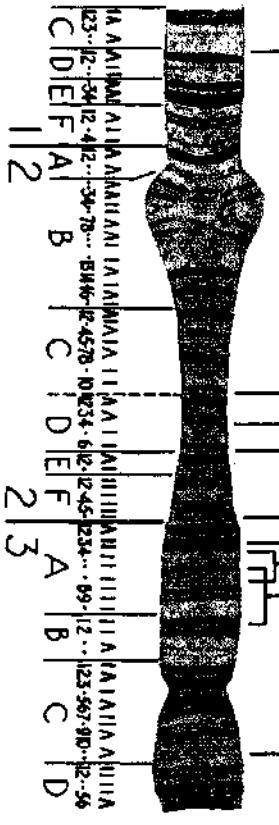
Cytogenetic Maps

All loci with published genetic positions are listed in order in the following table. Mutants are included even when the published position seems unreasonable. A few mutants are included that have been placed according to their cytological positions alone (e.g., on chromosome *4).* Clusters of mutants with similar pheriotype appear as the result of assigning locus names to pseudoalleles and of failure to test for allelism. In this table an asterisk indicates that, according to our records, no mutant allele is known to exist at the locus. Where known the cytological positions of mutants are given; some imprecision has undoubtedly arisen from investigators' having assigned numbers to bands on Bridges' original map instead of using the revised maps, which are used in the table.

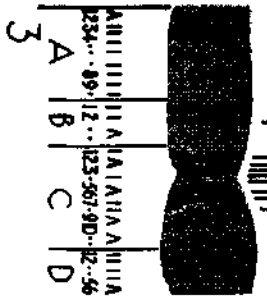


CHROMOSOME 1

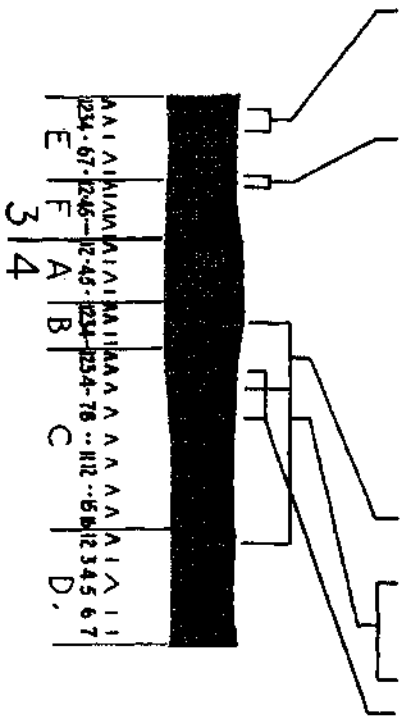
Locus	Symbol	Name	Phenotype
-0.4	**1(1)6*	lethal(1) 6	Lethal
0	**dar*	darky	Fly small, melanized; male sterile
0	**double*	double	Postverticals doubled; wings small
0	**dwp*	dwarp	Body small, pale; wings warped; homozygous lethal
0	*1(1)55a*	lethal(l) 55a	Lethal
0	*1(1)7'e*	lethal(l) 7e	Lethal; modifies *dor*[1]
0	*1(1)sc*	lethal(l) scute	Lethal
0	**l(l)v306*	lethal(l) variegated 306.	Y-suppressed lethal
0	**l(l)X10*	lethal(l) X ray induced 10	Embryonic lethal
0	**pld*	pallid	Body, wings pale
0	*su(s)*	suppressor of sable	Suppresses s and *v*
0.0	*1(1)J<1*	lethal(l) of Jacob s-Muller	Lethal
0.0	*y*	yellow	Body yellow; bristles brown
0.0	*ac*	achaete	Postdorsocentrals missing; hairs sparse
0.0	*Hw*	Hairy wing	Extra bristles, hairs on wings; homozygous female sterile
0.0	*sc*	scute	Bristles missing
0.0	*svr*	silver	Body silvery; bristles, trident dark
0.0	*brc*	brachymacrochaetae	Bristles small
0.0	*cc	chlorotic	Body small, greenish yellow
0.0	**clv-l*	cloven thorax 1	Thorax cleft
0.0	**cpl*	cupola	Fly small; wings short, canopied; male sterile
0.0	*fs(l)N*	female sterile(l) of Nasrat	Female sterile
0.0	**1(1X25*	lethal(l) Q5	Lethal
0.0	*l(l)Q77*	lethal(l) Q77	Lethal
0.0	*1(1)Q217*	lethal(l) Q217	Lethal
0.0	**mul*	multiple	Eyes rough, oval; female sterile
0.0	**saw*	sawtooth	Marginal wing hairs clumped
0.0	**tdd*	tiddler	Body small
0.1	**ge*	genitalless	External male genitalia absent or deformed; male sterile
0.1	**l(l)ne*	lethal(l) non-evaginated	Pupal lethal
0.1	*M(l)Bld*	Minute(1) Blond	Bristles fine; late hatching; male lethal
0.1	**su(b)*	suppressor of black	Suppresses *b*
0.1		ommatidia	Ommatidia disarranged
0.1	*su(w^a)*	suppressor of white-apricot	Darkens w^a
0.3	**ctt*	contorted	Wings short; eyes rough; female sterile
0.3	*1(1)BN2*	lethal(l) EN2	Lethal
0.3	**l(l)Q20*	lethal(l)Q20	Lethal
0.3	*XDQ212*	lethal(l)Q212	Lethal
0.3	**1(1>et*	lethal(l) ring gland rudimentary	Larval lethal
0.3	**l(l)te*	lethal(l) tracheae enlarged	Larval lethal
0.3	*stm*	stubarista	Aristae, antennae stubby; bristles short
0.3	*dor*	deep orange	Eyes orange; female sterile



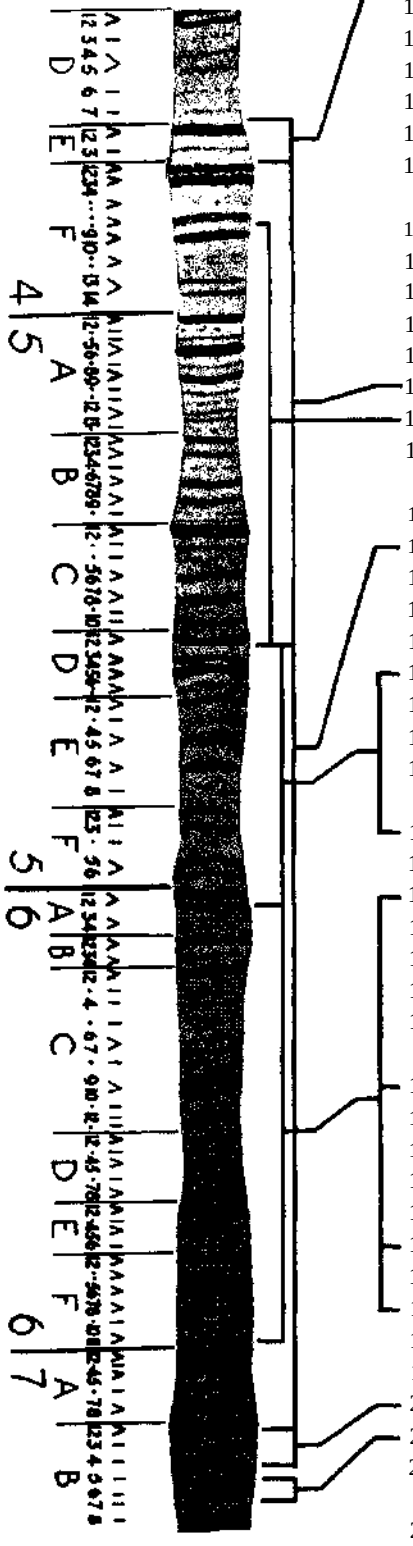
Locus	Symbol	Name	Phenotype
0.4	**mwi*	misheld wings	Wings spread; eyes ovoid
0.4	**pop*	popeye	Eyes small, buigxiig, rough; male sterile
0.4	*tw*	twisted	Abdomen twisted; body small
0.5	**gtd*	giantoid	Head, body large; late hatching
0.6	*rey*	rough eye	Eyes small, rough
0.6	*rsi*	reduced size	Body small
0.6	**srd*	small round	Body small; eyes small, round
0.6	*br*	broad	Wings short, broad
0.7	**dw-sc*	dwarf with scute	Body small
0.8	*mk*	murky	Body small, dark; eyes dull red; female sterile
0.8	*pn*	prune	Eyes brownish purple
0.9	**fc*	faulty chaetae	Bristles short, thin
0.9	*&*	giant	Larva, pupa, adult large
0.9	**ovi*	ovioculus	Eyes small, oval, rough; wings spread; male sterile
0.9	*Pgd*	Phosphogluconate dehydrogenase	Affects phosphogluconate dehydrogenase mobility
0.9	***sbs***	stubs	Wings abnormal; eyes small; female sterile
0.9	*kz*	kurz	Bristles short, thin; postscuteliars missing
1.0	**fb*	fine bristle	Bristles thin
1.0	*ws*	waisted	Abdomen constricted anteriorly
1.0	***e(bx)***	enhancer of bi-thorax	Eyes variegated, enhances most *bx* alleles
1.0	*z*	zeste	Male normal; female eyes yellow
1.1	**bsc*	bent scutellars	Bristles bent
1.1	**1(1)1*	lethal(l) 1	Lethal
1.1	***l(1)zw1***	lethal(l) zwl	Lethal
1.1	*I(l)zw4*	lethal(l) zw4	Lethal
1.1	*I(l)zw8*	lethal(l) zw8	Lethal
1.2	**abe*	abnormal eye	Eyes rough
1.2	*I(l)zw2*	lethal(l) zw2	Lethal
1.3	*1(1)Q219*	lethal(l) Q219	Lethal
1.3	*I(ljzw3*	lethai(l) zw3	Lethal
1.3	*I(l)zw6*	lethal(i) zwo	Lethal
1.3	****mis***	misproportioned	Abdomen deformed; wings short; bristles thin
1.3	****swa***	swollen antenna	Antennae swollen; female sterile



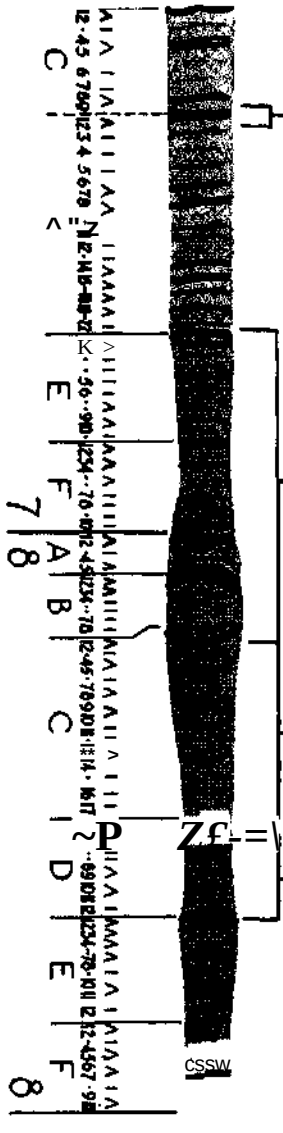
Locus	Symbol	Name	Phenotype
1.4	**crrn*	cramped	Antennae short; aristae crooked; sterile
1.4	**1(1)Q9*	lethal(l) Q9	Lethal
1.4	*I(l)zw5*	lethal(l) zw5	Lethal
1.4	*I(l)zw7*	lethal(l) zw7	Lethal
1.4	*I(l)zw9*	lethal(l) zw9	Lethal
1.4	**pte*	pterygion	Wings short, drooping; abdomen large
1.4	*ves	vestigium	Wings, eyes abnormal
1.5	**l(l)Q40*	lethal(l) Q40	Lethal
1.5	**l(l)TS-56*	lethal(l) 56 of T. Shiomi	Embryonic lethal
1.5	**smh*	smaller thinner	Body small; bristles thin
1.5	*w*	white	Eyes, Malpighian tubules white
1.6	*dwg*	deformed wings	Wings broad; bristles fine; eyes small; male sterile
1.6	*1(1)3C3*	lethal(l) 3C3	Lethal
1.7	**1(1)Q39*	lethal(l) Q39	Lethal
1.7	*rst*	roughest	Eyes rough, bulging; body small; male sterile
2	*1(1)v139*	lethal(l) variegated 139	Y-suppressed lethal
2.0	**l(l)Q41*	lethal(l) Q41	Lethal
2.2	*swb*	strawberry	Eyes large, rough, patchy colored
2.3	*vt*	verticals	Verticals absent
2.4	*fla*	flateye	Body, eyes small
2.5	**cpw*	canopy wing	Wings short, broad; veins incomplete; male sterile
2.5	** l(l)mt*	lethal(l) midget	Larval lethal
2.8	*1(1)Q218*	lethal(l) Q218	Lethal
3	*1(1)EN12*	lethal(l) EN12	Lethal
3	**we*	wee	Body small; eyes rough; bristles fine; wings spread
3.0	*Ax*	Abruptex	Wings short, arched; veins incomplete
3.0	*Co*	Confluens	Veins thick, deltas at margin
3.0	*fa*	facet	Eyes rough
3.0	*spl*	split	Eyes small, rough; many bristles doubled, some missing
3.0	*N*	Notch	Wings cut; veins thick, deltas at margin; male lethal
3.0	*nd*	notchoid	Wings cut; veins thick
3.1	**im*	interrupted margin	Margin nicked, extra veins; female sterile
3.2	*s/c	stiff chaetae	Bristles short, stiff
3.3	*rud*	ruddle	Eyes reddish brown
3.6	**mtb*	matt brown	Eyes dull; wings spread; male sterile
3.6	*sic*	slim chaetae	Bristles thin, short
3.7	**sth*	small thin	Body small; bristles short, thin; female sterile
4.4	*rv*	raven	Body small, dark; eyes dark; wings short
4.5	*A*	Abnormal abdomen	Tergites and sternites frayed; abdominal bristles missing
4.5	**tta*	reduced tarsi	Tarsi short; body, eyes, wings small; male sterile
4.5	*Sc*	Scotched eye	Eyes rough; male lethal
4.6	*dm*	diminutive	Bristles, body small, slender; female sterile



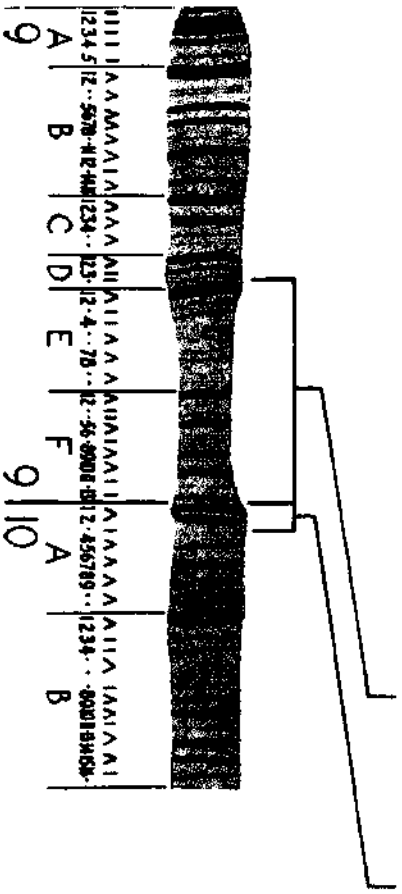
Locus	Symbol	Name	Phenotype
5	**su(dx)*	suppressor of deltex	Suppresses dx^{af}
5	*M(1)3E*	Minute(l) in 3E	Bristles fine; late hatching; male lethal
5.4	*cho*	chocolate	Eyes brown
5.5	**mf*	macro fine	Bristles short, thin; body small
5.5	**Z*	Zerknittert	Wings crumpled
5.5	*ec*	echinus	Eyes large, bulging, rough; wings short, broad
5.6	**te*	tenerchaetae	Bristles short, fine; eyes dark
5.7	*Oce*	Ocellarless	Ocellars missing
5.8	**l(l)TS-45*	lethal(l) 45 of T. Shiomi	Embryonic lethal
5.9	**e(g)*	enhancer of garnet	Enhances *g*
6	*H1)C*	lethal(l) C	Lethal
6.7	*mo*	micro-oculus	Eyes small; wings narrow
6.8	*amb*	amber	Body pale yellow; bristles short, thin; male sterile
6.8	*1(1)Q81*	lethal(l) Q81	Lethal
6.8	*M(1)4BC*	Minute(l) in 4BC	Bristles fine; late hatching; male lethal
6.8	*Qd*	Quadroon	Tergites broadly banded
6.9	*bi*	bifid	Veins fused; wings short, spread
7.3	*lac*	lacquered	Body glistens; bristles, eyes, wings abnormal
7.3	*peb*	pebbled	Eyes rough
7.5	*rb*	ruby	Eyes ruby
8	**l(l)ts*	lethal(l) temperature sensitive	Lethal at 23°C
8.0	*dow*	downy	Bristles short, slender; male sterile
8.0	**l(l)trs*	lethal(l) tracheae stretched	Larval lethal
8.6	*1(1)Q216*	lethal(l) Q216	Lethal
8.7	**mib*	miniature bristles	Bristles short, thin; body dark; male sterile
10	*1(1)EN9*	lethal(l) EN9	Larval lethal
10	*1(1)ml*	lethal(l) melanoma-like	Larval lethal
10.2	*1(1)Q215*	lethal(l) Q215	Lethal
11	**lzl*	lozengelike	Eyes rough



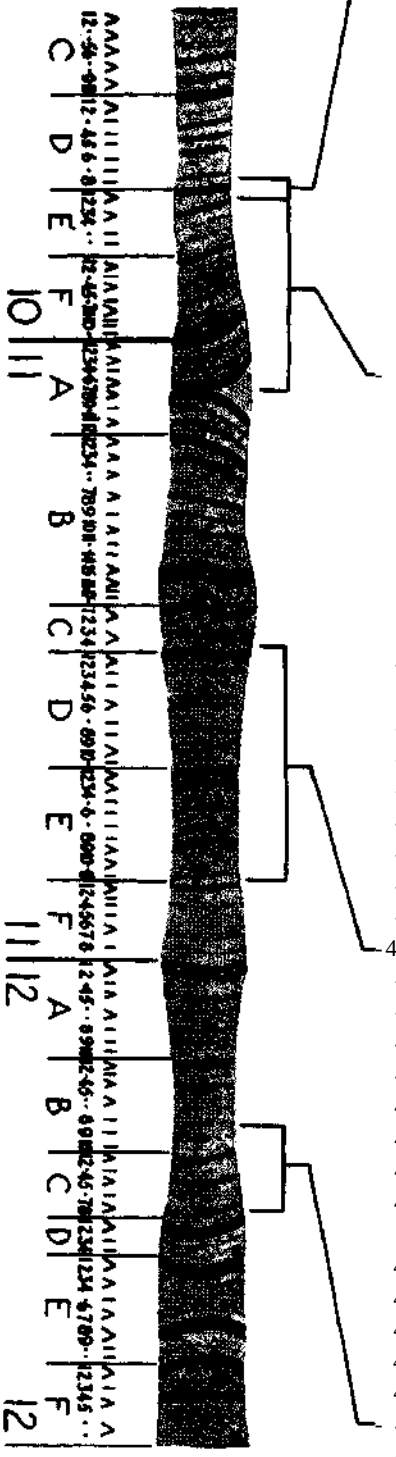
Locus	Symbol	Norne	Phenotype
11.0	*rg*	rugose	Eyes rough; wings thin, margins frayed
11.2	*1(1)Q56*	lethal(l) Q56	Lethal
11.3	**apx*	apexless	Wings broad, blunt, incised
11.5	**rgt*	reduced pigment	Male fifth tergite pale; male sterile
12.5	*bo*	bordeaux	Eyes dark wine
12.7	**1(1)Q49*	lethal(l) Q49	Lethal
12.8	*omm*	omma toreductum	Some peripheral ommatidia missing; eyes rough
13	**Ch*	Curled blistered	Wings curled, blistered with px^{Cb}
13.1	**1(1)Q1*	lethal(l) Ql	Lethal
13.3	**dvw*	divergent wings	Wings spread in male
13.3	**dw(*	dwarfoid	Fly small
13.4	*1(1)EN13*	lethal(l) EN13	Semilethal
13.6	*ex*	curlex	Wings warped, bent upward
13.7	*cv*	crossveinless	Crossveins absent
13.9	**dla*	deformed antennae	Antennae, aristae abnormal; eyes, wings, bristles small; female sterile
14	**l(1)jl*	lethal(l) jawless	Larval lethal
14	**M(l)30*	Minute(l) 30	Bristles fine; late hatching; male lethal
14.3	**mur*	murrey	Eyes red purple; bristles small; sterile
14.4	**rmp*	rumpled	Wings unexpanded; bristles deranged
14.6	**stb*	short bristle	Bristles short, thin
15.0	*rux*	roughex	Eyes small, rough; male sterile
15.2	*Ext*	Extras	Extra veins; male lethal
15.2	**pra*	prawny abdomen	Body slender; wings short
16.0	**sct*	scooped thickvein	Wings short, scooped; veins thick; male sterile
16.3	*vs*	vesiculated	Wings warped, wrinkled, blistered, spread
16.5	**cb*	club	Wings clubbed; sternopleurals absent
17.0	*dx*	deltex	Veins thick, deltas at margins
17.5	**lem*	lemon	Body, wings yellow; bristles black; sterile
17.5	*ov*	oval	Eyes oval, rough
17.5	**tmc*	tonomacrochaetae	Bristles thin; abdomen pale
17.9	**lCl)sd*	lethal(l) scheiben defekt	Larval lethal
17.9	*shl*	shifted	L3 incomplete, shifted toward L4
18	**dep*	depressed	Wings turned down at tips
18	**Eyl*	Eyeluf	One or both eyes small
18.0	**tnt*	"tent	Wings drooping; male sterile
18.7	*!(1)Q82*	lethal(l) Q82	Lethal
18.9	*cm*	carmine	Eyes ruby
19.1	*Fl*	Female lethal	Female lethal
19.3	*scp*	scooped	Wing tips upturned
19.5	**tyb-2*	tiny bristle 2	Bristles small, thin
19.6	**1(1)Q15*	lethal(l) Q15	Lethal
20.0	*ct*	cut	Wings cut, scalloped; eyes kidney shaped
20.1	*bis*	bistre	Eyes brown
20.2	**kf*	kinked femur	Body small; femurs kinked; wings unexpended
20.2	**tre*	triangle eye	Eyes triangular; female sterile
20.3	*KDQ67*	lethal(l) Q67	Lethal
20.4	**stu*	small tumoroid	Body small; pseudotumors present
20.5	*HDQ2J*	lethal(l) Q21	Lethal
20.7	**l(l)Q48*	lethal(l) Q48	Lethal
20.7	**lgh*	long haired	Bristles long; body small; male sterile



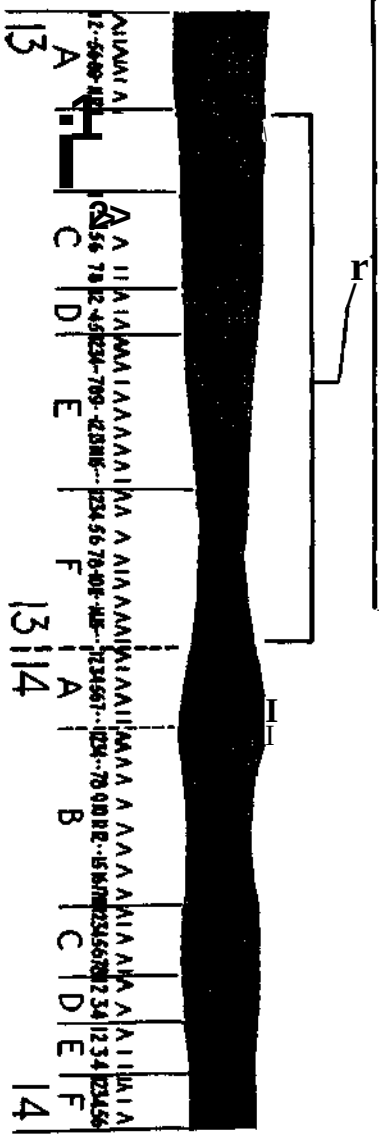
Locus	Symbol	Name	Phenotype
20.9	***pvt**	postverticalless	Postverticals absent; thoracic hairs sparse; female sterile
20.9	**sht*	short tarsi	Legs short
21.0	*sn*	singed	Bristles twisted, short; hairs kinked; female sterile
21.1	**sch*	slender chaetae	Bristles thin, short
21.3	**1(1)8*	lethal(l) §	Larval lethal
21.6	*dfw*	deflected wing	Wings upheld, spread; female sterile
21.7	*l(l)mya*	lethal(l) myospheroid	Embryonic lethal
21.7	**rdb*	reddish brown	Eyes reddish brown; male sterile
21.9	**bwl*	bow-legged	Wings, bristles, legs short; male sterile
22.0	**scr*	scruff	Hairs and bristles absent or doubled
22.4	*shm*	short macros	Bristles short; male sterile
22.6	*spx*	split thorax	Longitudinal furrow on thorax
22.7	**ha*	hair bristles	Body small; bristles thin, short
22.7	**l(l)Q30*	lethal(l) Q30	Lethal
23	**depl*	depressedlike	Wings drooping; fly dark
23	**dis*	distorted eye	Eyes rough
23	*lix*	little isoxanthopterin	Little isoxanthopterin in testis sheath
23.0	**1(1)Q25*	lethal(l) Q25	Lethal
23.1	***ii***	goggle	Eyes protruding; female sterile
23.1	*pt*	platinum	Body, bristles pale; male sterile
23.1	**smb*	slim bristle	Bristles thin, short; female sterile
23.1	*oc*	ocelliless	Ocelli absent; female sterile
23.2	*ptg*	pentagon	Trident dark
23.4	*ccw*	concave wing	Wings short, narrow
23.6	**1(1)Q17*	lethal(l) Q17	Lethal
23.8	**ch-b*	chilblained-b	Tarsi fused
24	**jyx*	jaunty x	Wings upcurved at tips
24	*1(1)EN16*	lethal(l) EN16	Larval lethal
24.2	*1(1)Q244*	lethal(l) Q244	Lethal
24.3	**dd*	displaced	Head shortened; antennae sunken; eyes deformed
24.6	**bre*	bright eye	Eyes bright red; wings short; abdomen large
24.6	**svs*	shortened veins	Wings abnormal; female sterile
25	**sml*	small	Body small; wings short; eyes small, rough, bulging
25	**tbd*	tiny bristleoid	Bristles short, thin
25.1	*e/r	elliptical rough	Eyes oval, rough; wings broad
25.4	*tea*	rearranged tergites	Tergites abnormal
25.6	**smp*	small pallid	Body small, pale; female sterile
25.9	*dlv*	deltoid veins	Extra veins; body, eyes, wings small
26	**asx*	ascutex	Scutellar groove shallow; body pale
26.5	****K1X23***	lethal(l)Q3	Lethal
27	****Lg***	Large	Body large; homozygous lethal
27.1	*con	condensed	Abdomen, thorax, wings short; male sterile
27.2	**ddl*	displacedlike	Head shortened; antennae sunken; eyes deformed; male sterile
27.3	**dss*	disturbed segmentation	Abdominal segments deformed; eyes small; female sterile
27.3	*tar*	tarry	Legs black or spotted
27.5	*t*	tan	Body tan
27.7	*amx*	almondex	Eyes reduced; female sterile
27.7	*Iz*	lozenge	Eyes narrow, ovoid, irregular surface; female sterile



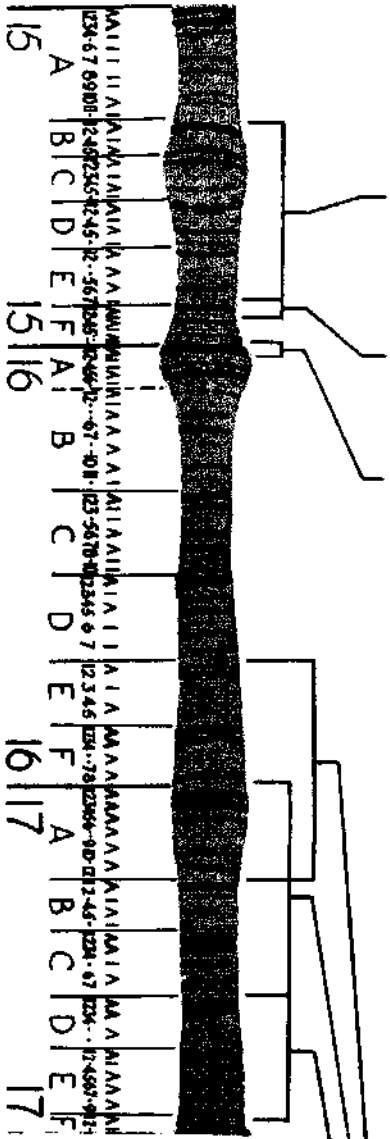
Locus	Symbol	Name	Phenotype
27.8	*tha	thin arched	Wings arched or drooping; bristles short, thin
28.1	dvt	divers	Wings short, dark; body small
28.3	*opb	opaque broad	Wings short, broad, opaque; female sterile
28.6	*ke	kidney eye	Eyes small, rough, kidney shaped; sterile
28.6	*l(l)Q10	lethal(l) Q10	Lethal
28.6	*1(1X>7	lethal(l) Q7	Lethal
29	*pi&	pigmy	Body small; melanotic
29.0	*me	focal melanosis	Lethal
29.3	1(1)Q75	lethal(l) Q75	Lethal
29.6	fin	finer	Body small; bristles short, thin; male sterile
29.8	*sto	stocky	Body short, stocky; male sterile
29.9	*l(l)Q33	lethal(l) Q33	Lethal
29.9	sma	smaller	Body small
30	su(Cbx)	suppressor of Contrabithorax	Suppresses *Cbx*
30.2	1(1)Q6	lethal(l) Q6	Lethal
31	*flw	flap wing	Wings spread, curled; eyes bulging
31.7	*1(1)Q44	lethal(l) Q44	Lethal
32	*aw	awry	Wings upcurled, wavy, convex, opaque
32	*e(w^e)	enhancer of white-eosin	Enhances some *w* alleles; female sterile
32	ny	notchy	Wing tips nicked
32.4	*pat	patchytergum	Abdominal pigmentation patchy; wings spread; male sterile
32.5	*df	defective	Head bristles near ocelli missing
32.6	elm	clumpy marginals	Marginal wing hairs bent; bristles stiff
32.8	KDQ54	lethal(l) Q54	Lethal
32.8	*sbt	shorter bristles	Bristles short, thin; wings spread
32.8	ras	raspberry	Eyes dark ruby
32.9	ww	wider ring	Wings short, broad
33	*brd	broadened	Wings expanded
33.0	*csk	costakink	Eyes, wings small
33.0	*osh	outshifted	Wings short
33.0	*wgv	wing variance	Wings held abnormally; male sterile
33.0	v	vermilion	Eyes scarlet; ocelli colorless
33.2	dwK	dwarfex	Body small; wings coarse
33.2	*1(1X>26	lethal(l) Q26	Lethal
33.4	sbr	small bristle	Bristles small
33.5	dsh	dishevelled	Thoracic hairs deranged; female sterile
33.5	l(l)Q66	lethal(l) Q66	Lethal
33.5	*tny	thorny	Body deformed; eyes small, rough; wings crumpled; male sterile
33.7	*dft	deformed terga	Tergites deformed
33.7	slm	slim	Body small; abdomen narrow
34.0	l(l)Q211	lethal(l)Q211	Lethal
34.3	*stt	spotty	Abdomen spotted; male sterile
34.7	*rdp	reduplicated	Legs malformed, branched
34.9	*fnc	fine chaetae	Bristles short, fine; male sterile
35.7	*ano	anomogenitals	Bristles, hairs sparse; male genitalia abnormal; male sterile
35.8	*tb	tiny bristle	Bristles short, fine
36	tyl	tinylike	Bristles short, thin, stubbleiike



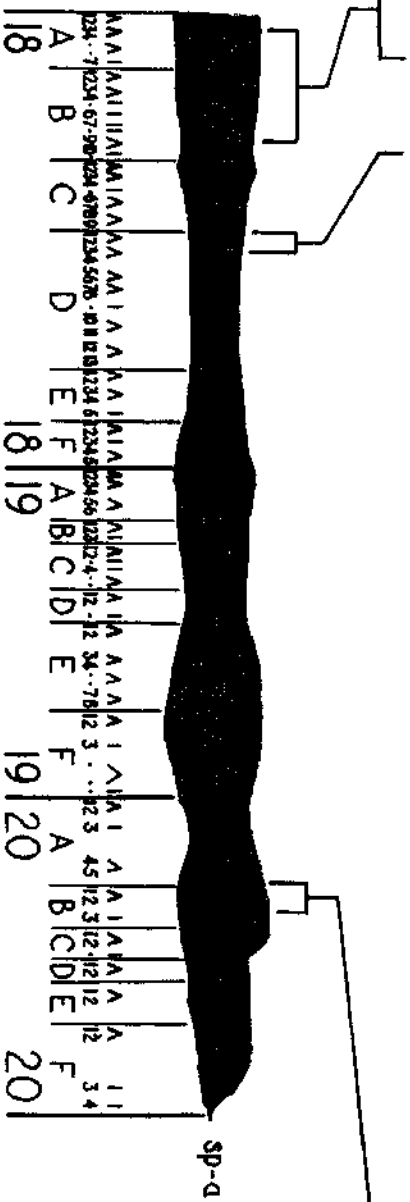
Locus	Symbol	Name	Phenotype
36.1	m	miniature	Wings small
36.2	*dy*	dusky	Wings small, dark
36.3	**M(l)k*	Minute(l) k	Bristles fine; late hatching; male lethal
36.3	**shl*	shorter legs	Body small; legs short
36.3	*trb*	thread bristle	Bristles short, thin; female sterile
36.4	**gr*	gracile	Body small; male sterile
37.1	**twt*	twirled tips	Wings unexpended, tips twisted
37.2	*KW52*	lethal(l) Q52	Lethal
37.2	**ob*	oblique	Wings truncated; veins abnormal
37.2	**plw*	pale wing	Body, wings, bristles pale yellow
37.6	**1(1)Q43*	lethal(l) Q43	Lethal
38.0	**gli*	glide	Wings spread; male sterile
38.2	*1(1JQ58*	lethal(l) Q58	Lethal
38.3	**alo*	alopecia	Abdominal hairs sparse; pigmentation light
38.3	**1(1JQ45*	lethal(l) Q45	Lethal
38.3	*fw*	furrowed	Eyes furrowed; head, scutellum shortened; bristles short, gnarled
38.5	**aw-b*	awry-b	Wings upcurled, wavy, convex, opaque
38.9	*1(1)Q234*	lethal(l) Q234	Lethal
38.9	**wtw*	water wings	Wings short, broad, blistered
39.0	**shb*	shortened bristles	Bristles short, thin; female sterile
39.1	*1(1)Q22*	lethal(l) Q22	Lethal
39.8	**brw*	broader wing	Wings broad, round; male sterile
40.1	*1(1X?202*	lethal(l) Q2O2	Lethal
40.3	*crt*	crumpled tips	Wing tips crumpled
40.8	**som*	sombre	Body, eyes dark
40.8	**ups*	upright scutellars	Scutellars upheld; male sterile
40.9	**1(1)Q2*	lethal(l) Q2	Lethal
41	**tu-53*	tumor-53	Adult melanotic tumors; wings abnormal
41.0	*up*	upheld	Wings upheld
41.1	*pun*	puny	Body small; wings short
41.1	**taw*	tawny	Head, thorax dark; abdomen pale
41.9	**1(1)Q12*	lethal(l) Q12	Lethal
41.9	*wy*	wavy	Wings wavy
42	**kk*	kinky	Bristles bent
42.0	**c!v-2*	cloven thorax 2	Thorax cleft; wings reduced
42.0	*eb*	ebonized	Body dark; wings short; female sterile
42.1	**tht*	thickset	Body short, stocky
42.5	**swy*	swarthy	Body dark
43	*1(1)ENU*	lethal(l) EN11	Lethal
43.0	*s*	sable	Body dark; trident prominent
43.2	**bla*	bladderwing	Wings small, deformed, inflated; female sterile
43.3	*cop*	copper	Eyes brownish red
43.9	**ten*	tenuis chaetae	Bristles short, thin
44.4	*&*	garnet	Eyes purplish ruby
44.5	*t(UQ59*	lethal(l)Q59	Lethal
44.5	*ty*	tiny	Bristles, body small; female sterile
44.6	**dyb*	dusky body	Body dark; eyes brown; female sterile
45	**Bxd*	Beadexoid	Wings long, narrow, ragged
45	**cb(*	clubfoot	Legs short; wings warped
45.2	*na*	narrow abdomen	Abdomen long, cylindrical
45.3	**$1b*	slim body	Body narrow
45.6	**abt*	abnormal tergites	Abdomen, eyes, wings deformed
45.7	**smn*	small narrow	Abdomen narrow; fly weak



Locus	Symbol	Name	Phenotype
46	*1(1)EN1*	lethal(l) EN1	Larval lethal
46.1	**stp*	silver tips	Bristles thin, pale; male sterile
47	*1(1)EN5*	lethal(l) EN5	Larval lethal
47.5	**shp*	shrimp	Body small
47.8	**lme*	lame	Legs, wings deformed
47.9	*Pi*	pleated	Wings pleated
48.0	**thb*	thin bristle	Bristles thin
48.1	*rm*	rimy	Eyes brownish red; wings pleated
48.1	**twg*	twisted genitals	External genitalia positioned abnormally
48.4	**sge*	shifted genitals	Genitalia, anal plates rotated; male sterile
48.6	*sla*	slimma	Body narrow; female sterile
48.7	*mgt*	midget	Body small
48.9	**thm*	thin macros	Bristles short, thin
49.1	*1(1)Q76*	lethal(l) Q76	Lethal
49.3	*vb*	vibrissae	Vibrissae tufted
49.7	*thv*	thick vein	Wing veins thick
49.8	**1(1)Q13*	lethal(l) Q13	Lethal
50	*l(l)EN10a*	lethal(l) ENlOa	Pupal lethal
50	**op*	opaque	Wings opaque, divergent, convex
50	*Tul*	Turneduplike	Wings curled, wrinkled
50.1	**hpa*	hyperantenna	Antennae large; head, eyes deformed; female sterile
50.1	*sld*	slender	Body small, slim
50.6	**Stp-l*	Strapped in chromosome 1	Male wings incised with *Stp-2*
51.2	**slw*	slope wing	Wings spread
51.5	**exl*	exiguous	Fly small, dark
51.5	*sd*	scalloped	Wing margins scalloped; veins thickened
51.6	*Bg*	Bag	Wings inflated; veins abnormal; male lethal
51.6	*tc*	tiny chaetae	Bristles short, fine
51.9	*l(l)Q70*	lethal(l) Q70	Lethal
51.9	**smt*	small thorax	Thorax, head small
52	*1(1)EN4*	lethal(l) EN4	Lethal
52.0	**1(1)Q4*	lethal(l) Q4	Lethal
52.0	**mch*	minute chaetae	Bristles short, fine; body small
52.3	**drw*	droopy wing	Wings drooping; body small; male sterile
52.3	**unr*	unexpanded irregular	Wings somewhat unexpanded
52.4	**ber*	berry tail	Abdomen narrow; male genitalia defective; male sterile
52.5	**us*	undersized	Body small
52.6	**1(1)Q16*	lethal(l) Q16	Lethal
52.6	**msc*	melanoscutellum	Scutellurn dark
52.9	**brb*	broad abdomen	Abdomen broad; thorax, wings short
53	**fi*	frail	Wings small, thin; bristles fine
53.0	*HDQ63*	lethal(l) Q63	Lethal
53.5	**pyp*	polyphene	Wings spread; eyes small, rough; female sterile
53.5	*si*	small wing	Wings short, blunt; eyes large
53.5	**sln*	slimmer abdomen	Body small; abdomen narrow; female sterile
54.0	*me*	microchaete	Bristles, hairs irregular; eyes rough; wings short
54.1	*1(1)Q69*	lethal(l) Q69	Lethal
54.2	nrs	narrow scoop	Wings narrow, short, scooped

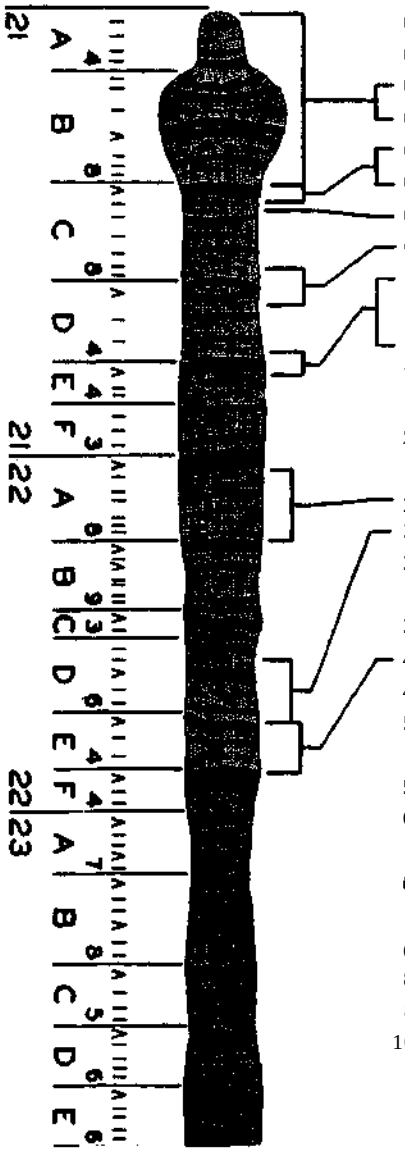


Locus	Symbol	Name	Phenotype
54.4	**rdt*	reduced thorax	Head, thorax small; wings short; male sterile
54.4	*un*	uneven	Eyes small, rough
54.5	*ace*	acclinal wing	Wings upheld, sloping back
54.5	*1(1)Q238*	lethal(l) Q238	Lethal
54.5	*r*	rudimentary	Wings truncated; female sterile
55	*if*	inflated	Wings inflated, small; veins abnormal
55.5	**St*	Stumpy	Body short; bristles short, thin; male lethal
56	*cs*	creased	Wings creased longitudinally
56	**de*	deacon	Body, wings narrow; eyes flat
56	**l(l)tr*	lethal(l) tracheae ramified	Larval lethal
56.5	*std*	staroid	Eyes small, oval, rough; bristles short; male sterile
56.6	*M(l)o*	Minute(l) o	Bristles fine; late hatching; male lethal
56.7	**1(1)Q18*	lethal(l) Q18	Lethal
56.7	*l(l)Q214*	lethal(l)Q214	Lethal
56.7	*I(l)v451*	lethal(l) variegated 451	Y-suppressed lethal; male sterile
56.7	*f*	forked	Bristles short, bent
56.8	**fil*	fine lash	Bristles thin; eyes small
56.9	**Sl*	Splotched	Wing hairs disarranged
57	*lh*	late hatching	Body large, develops slowly
57.0	*B*	Bar	Eyes small, narrow
57.0	*pdf*	pod foot	Tarsi swollen
57.2	**der*	deranged	Thoracic hairs deranged
57.3	*E(B)*	Enhancer of Bar	Enhances *B;* homozygous lethal
57.7	*ff*	fluff	Bristles short, fine
57.7	*Sh*	Shaker	Fly trembles when etherized
57.8	**l(1)Q23*	lethal(l) Q23	Lethal
58	**bu*	bulging	Eyes rough, bulging
58	**rab*	rabbit	Acrostichal hairs irregular
58.2	**cvw*	convex wing	Wings short, arched
58.3	**dwu*	dwarf unexpanded	Body small; semilethal
58.4	**l(1)Q24*	lethal(l)Q24	Lethal
58.5	**siw*	side wings	Wings rooflike; male sterile
58.5	**vac*	vacuolated	Wings blistered
58.6	*spiw*	splay wing	Wings short; eyes small; male sterile
58.7	**tms*	tumorous	Tumors
58.9	**sab*	straight abdomen	Abdomen long, narrow, straight
59	*l(1)EN10*	lethal(l) EN10	Lethal
59	**l(1)tl*	lethal (1) tracheae lacking	Larval lethal
59	*Tu*	Turned-up wing	Wings curled, wrinkled
59.2	*os*	outstretched small eye	Wings spread, eyes small, or both
59.4	*Bx*	Beadex	Wings long, narrow, margins excised
59.5	*hdp*	heldup	Wings upheld
59.5	*fu*	fused	L3, L4 partly fused; wings spread; female sterile
59.8	**bk*	buckled	Wings divergent
59.8	**rdm*	reduced macros	Bristles thin, short
59.9	**bkl*	buckledlike	Wings divergent

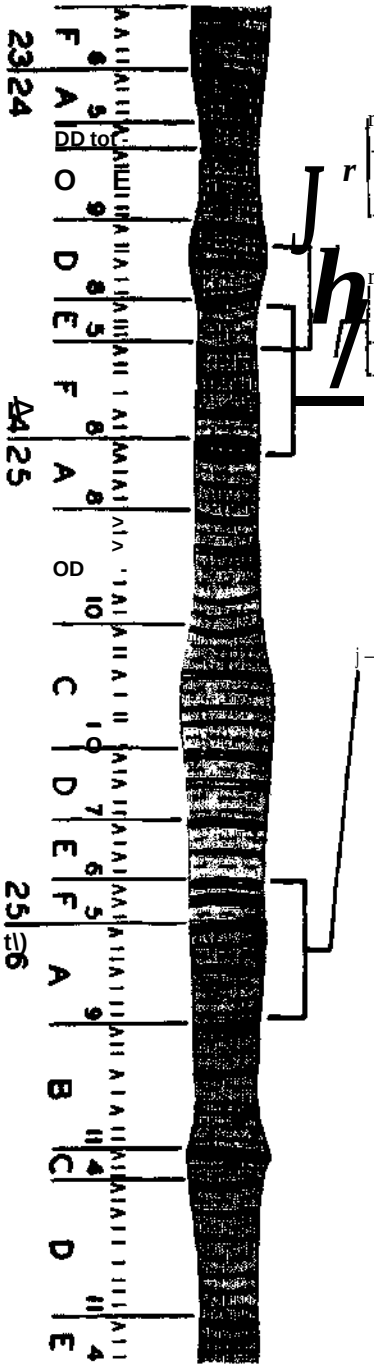


Locus	Symbol	Name	Phenotype
60	*abw*	abnormal wings	Wings small, upturned; L5, crossveins absent
60.1	**crk*	crooked setae	Bristles thin, short
60.1	*obi*	oblique wings	Wings spread
60.1	**ton*	tonochaetae	Bristles short, thin; female sterile
60.3	*sts*	streaked sterni	Sternites striped
60.7	**thl*	thick legs	Legs short, swollen; wings small, broad
60.8	**pph*	polyphenic	Body small; eyes bright; wings abnormal
60.8	**sby*	small body	Body small, pale
61.1	**smd*	smalloid	Body small
61.3	*l(l)Q55*	lethal(l) Q55	Lethal
61.5	**coc*	collapsed ocelli	Ocelli small, fi^t
61.9	**meg*	magaoculus	Kyes large, rough; wings affected
62.0	**srb*	smaller body	Body small; bristles fine
62.5	*car*	carnation	Eyes dark ruby
62.7	**1(1)Q19*	lethal(l) Q19	Lethal
62.7	*M(l)n*	Minute(l) n	Bristles fine; late hatching; male lethal
62.9	*RD(1)*	Recovery Disrupter(l)	Alters sex ratio with *RD(2)*
63	*lo*	folded	Wings unexpanded; halteres shriveled
63	*1(1)EN6*	lethal(l) EN6	Lethal
63	*pub*	pubescent	Bristles short, fine; abdomen pale; male sterile
63	*Zw*	Zwischenferment	Affects electrophoretic mobility of glucose 6-phosphate dehydrogenase
63.1	*unp*	unexpended	Wings unexpanded
63.4	**1(1)X27*	lethal(l) X-ray-induced 27	Embryonic lethal
63.9	**kno*	knobbyhead	Head, eyes abnormal
64.0	*sw*	short wing	Wings spread, incised; veins irregular; eyes small, rough
64.1	**1(1)Q14*	lethal(l) Q14	Lethal
64.1	*meI*	melanized	Body dark; eyes dull red
64.4	*wa*	warty	Eyes rough
64.5	*l(l)Q210*	lethal(l) Q210	Lethal
64.5	*tuh-1*	tumorous head in chromosome 1	Asymmetric head growths with *tuh-3*
64.7	**mdg*	midgoid	Body small, pale
64.8	*mal*	maroonlike	Eyes purple; lacks xanthine dehydrogenase
65.6	**cf*	cleft	Wings small; veins abnormal; male sterile
65.7	**1(W8*	lethal(l) Q8	Lethal
65.7	*ot*	outheld	Wings spread; hairs sparse; male sterile
65.9	*su(f)*	suppressor of forked	Suppresses some *i* alleles; dilutes w^a
65.9	**unc*	uncoordinated	Leg movements uncoordinated; wings upheld, curled
66	**Hv*	Hooked veins	Veins branched; eyes small, rough; female lethal
66	**l(l)w*	lethal(l) white	Male normal; female lethal
66.0	*bb*	bobbed	Bristles small; abdomen etched
66.1	**(m*	fine macros	Fly small; bristles short, thin
67.9	*rtt*	refringent	Wings yellow, iridescent; female sterile
68.1	*It*	little fly	Body small; abdomen narrow, tumorous
68.9	**sme*	smaller eye	Body small; eyes small, dark; male sterile
70	**bottl*	bordered	Wings small; veins ragged

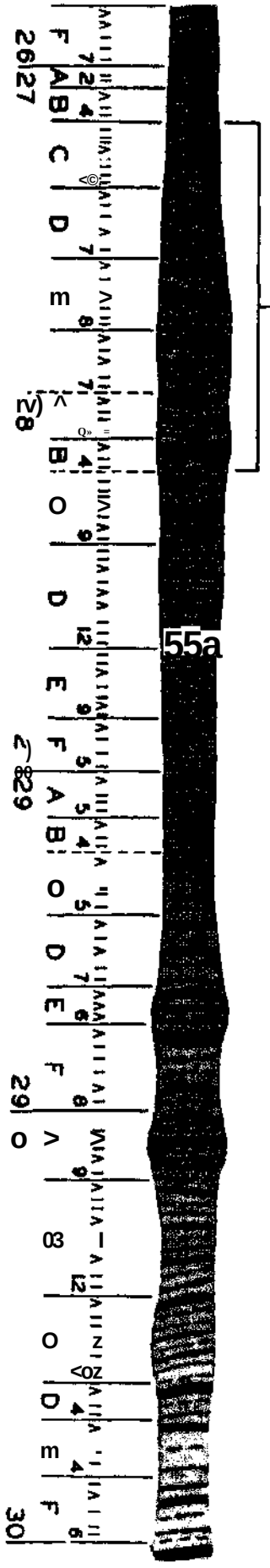
CHROMOSOME 2



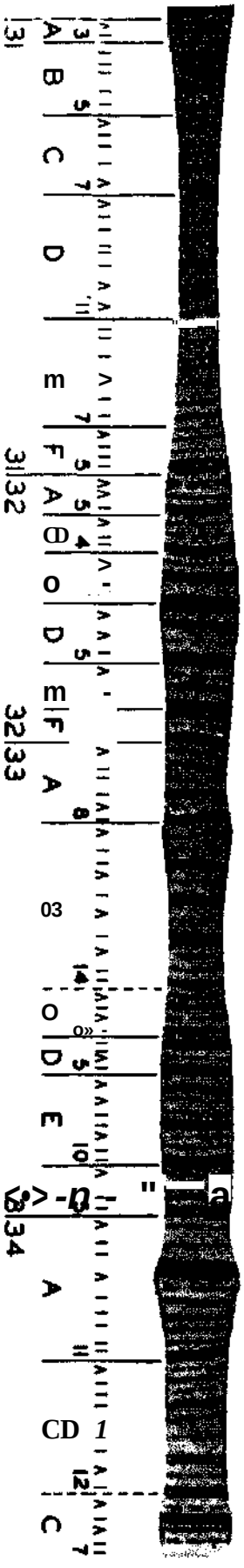
Locus	Symbol	Name	Phenotype
0	*ocr	ochracea	Eyes light, darken with age
0	*tg	telegraph	L2 interrupted or thin
0.0	K2)gl	lethal(2) giant	Late larval lethal
0.0	net	net	Extra wing veins
0.0	M(2)21Cl-2	Minute (2) in 21C1-2	Bristles short, tiny; homozygous lethal
0.1	al	aristaless	Aristae reduced; scutellars divergent
0.1	ex	expanded	Wings wide, large
0.3	ds	dachsous	Wings short, broad; crossveins close
1.3	S	Star	Eyes small, narrow, rough; homozygous lethal
1.3	ast	asteroid	Eyes small, rough; wing veins incomplete
1.9	*l(2)Sp9a	lethal(2) of Speiss 9a	Lethal
2	*Stp-2	Strapped in chromosome 2	Male wings incised with *Stp-1*
2.3	s/ir	shrunken	Body small, dark
3	Su(S)	Suppressor of Star	Suppresses 5
3.2	K2)Sp7	lethal(2) of Speiss 7	Lethal
3.8	shv	short vein	L2, L3 incomplete
4.0	ho	heldout	Wings spread
4.3	*vst	vestar	Wings small, straplike; female sterile
5	fs(2)B	female sterile(2) of Bridges	Female sterile; ovaries tumorous
5.0	rub	rubroad	Eyes rough, kidney shaped; wings broad
6	ECS)	Enhancer of Star	Eyes rough; enhances some S and *ast* alleles
6	*P1	Pearl	Pearl-like nodes in wings; eyes small, rough; homozygous lethal
6.1	Cy	Curly	Wings upcurled; homozygous lethal
8.3	K2)ay	lethal(2) ay	Lethal
8.4	*sq	square	Wings truncated
10	*Dt	Detached	L2 incomplete



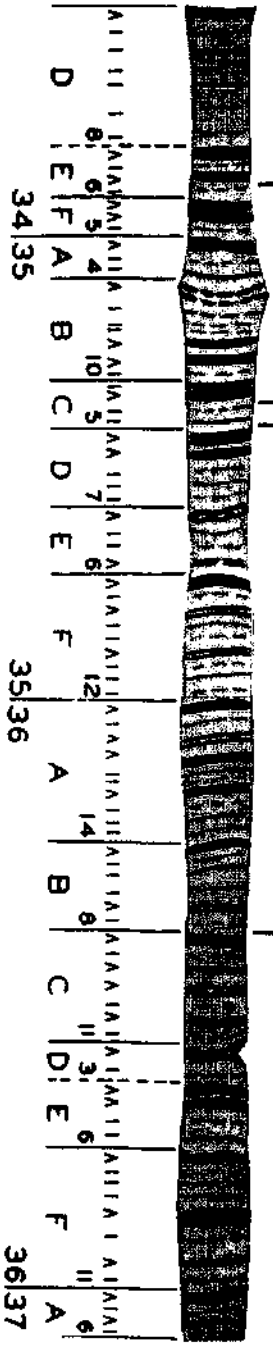
Locus	Symbol	Name	Phenotype
10.5	*ang*	angle wing	Wings upheld, spread
11.0	*ed*	echinoid	Eyes large, rough
12	*G*	Gull	Wings large, spread, curved; homozygous lethal
12.0	*ft*	fat	Abdomen short, fat; thorax broad; wings short, broad
12.9	*M(2)z*	Minute(2)z	Bristles fine; late hatching; homozygous lethal
13	*dw-24F*	dwarf in 24F	Body small; abdomen narrow
13.0	*dp*	dumpy	Wings truncated; thoracic bristles whorled
14	**pw*	pink wing	Eyes ruby; wings short, crumpled
15	**1(2)1076*	lethal(2) 1076	Lethal
15	*l(2)cg*	lethal(2) with comb gap	Lethal
15.0	**M(2)S1*	Minute(2) of Schultz 1	Bristle fine; late hatching, homozygous lethal
16	*tkv*	thick veins	Veins thickened, branched
16.0	*Sk*	Streak	Dark streak down thorax; homozygous lethal
16.5	*c/*	clot	Eyes dark maroon
17	*Pi*	pied	Eyes small, rough; wings arched; male sterile



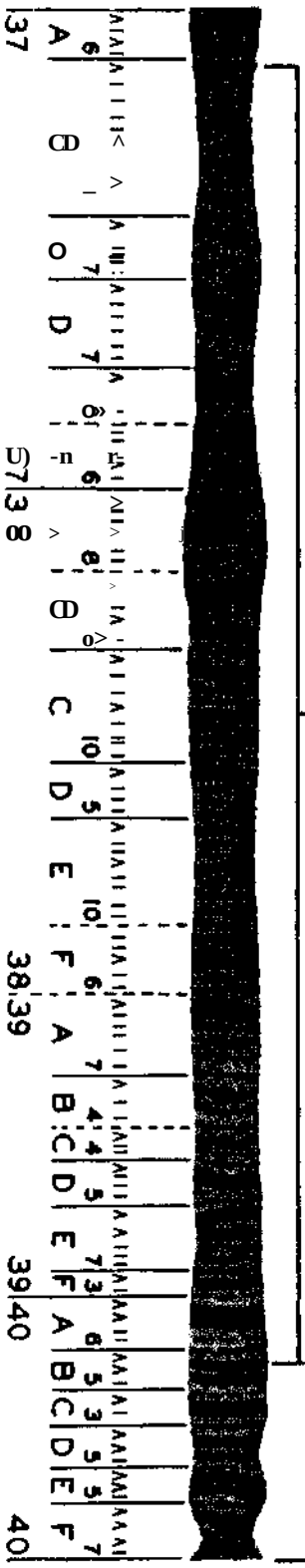
Locus	Symbol	Name	Phenotype
21.9	*spa*	spade	Wings short, broad, pointed at tips
22.0	**fs(2)E2*	female sterile(2) of Edmondson 2	Female sterile
22.0	*Sp*	Sternopleural	Extra sternopleurals; homozygous lethal.
22.9	*lys*	lysine	Accumulates lysine
23.4	*cui*	curvi	Wings upcurved
24	**cr.b*	cream b	Dilutes w^e
24.0	*gt-4*	giant 4	Body large; late hatching
27.3	*re*	red cells	Normal; pigments fat cells of *lys* fly
28	**ms(2)E3*	male sterile(2) of Edmondson 3	Male sterile
29.5	*tu-48*	tumor 48	Abdominal melanotic tumors
30	**flp*	flipper	Fly dwarfed, dark; wings unexpanded; sterile
30.3	*l(2)pm*	lethal(2) polymorph	Larval or pupal lethal
31.0	*d*	dachs	Tarsi four jointed; eyes small, rough
32.0	**l(2)Spl4*	lethal(2) of Speiss 14	Lethal
33	**fy*	fuzzy	Hairs irregular
35.0	**l(2)Spl*	lethal(2) of Speiss 1	Lethal
35.6	**fs(2)E9*	female sterile(2) of Edmondson 9	Female sterile
36	*corr*	corrugated wing	Wings wavy, short



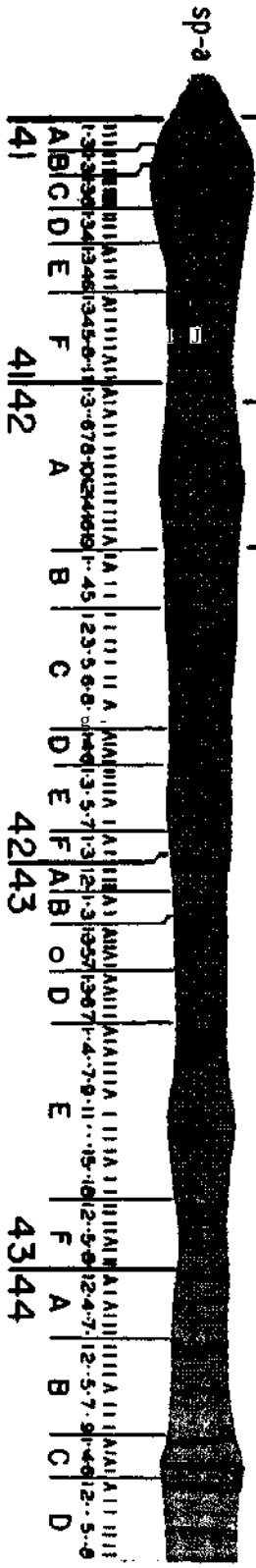
Locus	Symbol	Name	Phenotype
36	**Si*	Ski	Wing tips upturned with *si-3*
36	**ter*	terraced	Eyes seamed horizontally
37.5	**l(2)Spl0*	lethal(2) of Speiss 10	Lethal
38	**Sq*	Squat	Wings, thorax, head short, broad; homozygous lethal
39	**fol*	folded wings	Wings folded
39.3	*da*	daughterless	Female produces no daughters
40	**pg*	prong	Extra crossveins
40	**wd*	wavoid	Wings waved
41.0	***J***	Jammed	Wings narrow
43	*M(2)e*	Minute(2) e	Bristles fine; late hatching; female sterile; homozygous lethal
43.7	**Cpt*	Clipt	Bristles short; homozygous lethal; male sterile
43.8	*l(2)bl*	lethal(2) bluter	Late pupal lethal
44	*an*	ancon	Wings, legs short
44.0	*ab*	abrupt	L5 incomplete
44.0	**ms(2)2*	male sterile(2) 2	Male sterile
44.7	**apb*	apterblister	Wings notched, spread, blistered; short lived
45	**oph*	ophthalmopedia	Eyes kidney shaped
47	**l(2)pup*	lethal(2) pupal	Pupal lethal
47.0	*nub*	nubbin	Wings small, curved; margins interrupted; veins missing
47.5	**fs(2)E3*	female sterile(2) of Edmondson 3	Female sterile; wings narrow, curved
47.9	**ms(2)E4*	male sterile(2) of Edmondson 4	Male sterile



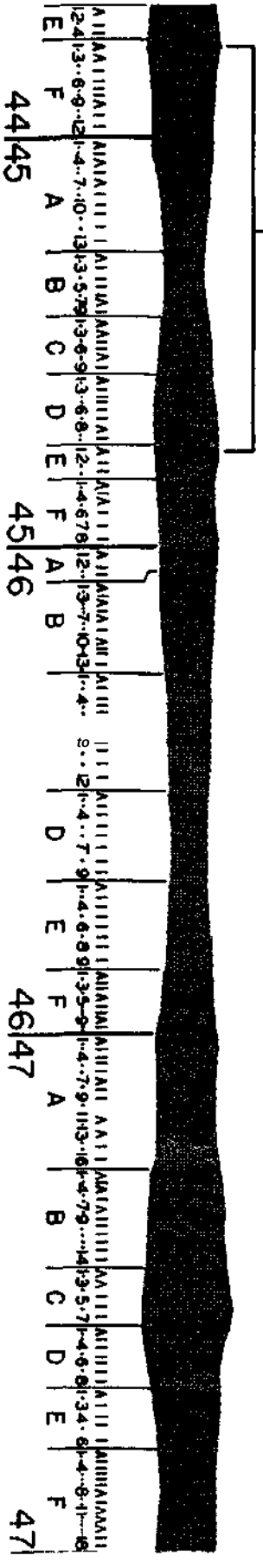
Locus	Symbol	Name	Phenotype
48.2	*rk*	rickets	Legs flattened, bent; wings unexpanded
48.5	*b*	black	Body black
48.5	**is(2)E4*	female sterile(2) of Edmondson 4	Female sterile
48.7	*Coi*	Coiled	Wings curled
48.7	*j*	jaunty	Wings upturned
49	**l(2)Sp2b*	lethal(2) of Speiss 2b	Lethal
49	*l(2)Sp9b*	lethal(2) of Speiss 9b	Lethal
50	*1(2)39a*	lethal(2) 39a	Lethal
50	*I(2)H*	lethal(2) of Humphrey	Usually pupal lethal; few survivors
50	*lm*	limited	Sternites abnormal; bristles sparse; female sterile
50.0	*el*	elbow	Wings extended, bent; L5 shortened; halteres reduced
50.0	**l(2)Sp6b*	lethal(2) of Speiss 6b	Lethal
50.1	*Adh*	Alcohol dehydrogenase	Affects alcohol dehydrogenase electrophoretic mobility
50.4	**ls(2)E5*	female sterile(2) of Edmondson 5	Female semisterile
50.5	**E(H)*	Enhancer of Hairless	Enhances *H*
50.5	*Su(H)*	Suppressor of Hairless	Suppresses *H;* homozygous lethal
51	*pu*	pupal	Wings unexpanded
51.0	*Sco*	Scutoid	Scutellars absent; homozygous lethal
51.2	*id*	reduced	Bristles reduced; female sterile
52	* *baton*	baton	Abdomen elongated; eyes lobed
52	*pys*	polychaetous	Extra bristles
52.4	*tyr-1*	tyrosinase 1	Tyrosinase activity low
52.5	*cm*	cream underscored	Dilutes w^e and *P*
52.8	*ref*	refractaire	Inhibits growth of carbon dioxide sensitivity virus
53	*ck*	crinkled	Wings flimsy, wavy; bristles stubby
53	*rdo*	reduced ocelli	Ocelli small, colorless
53.1	*l(2)Bld*	lethal(2) from Blond	Lethal



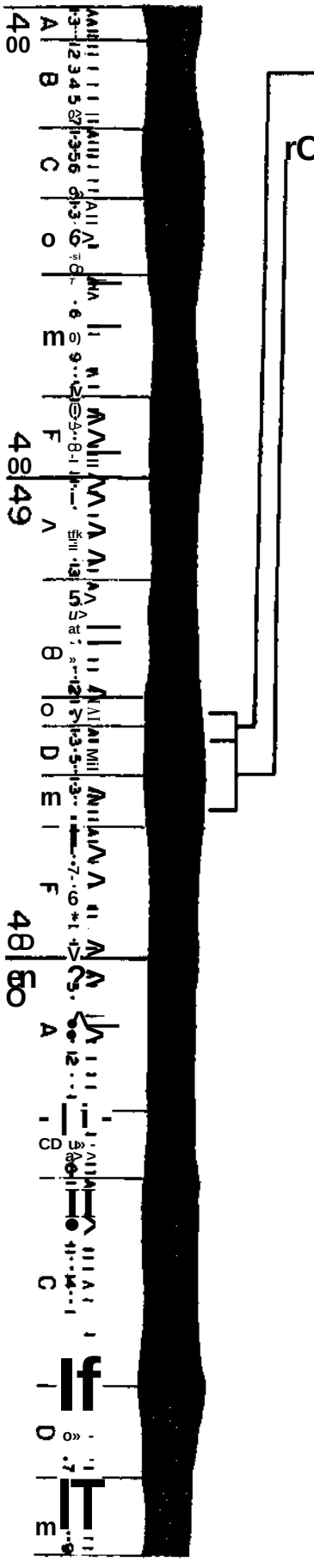
Locus	Symbol	Name	Phenotype
53.2	*Tit*	Tuft	Extra bristles
53.5	*M(2)H*	Minute(2) from *T(Y;2)H*	Bristles fine; late hatching; homozygous lethal
53.9	*hk*	hook	Bristle tips bent; eyes rough; wings divergent
54	*sple*	spiny legs	Leg hairs irregular
54	**M(2)m*	Minute(2) m	Bristles fine; late hatching; homozygous lethal
54.3	*bri*	bright	Eyes bright red
54.4	**fs(2)E6*	female sterile(2) of Edmondson 6	Female sterile
54.5	*pr*	purple	Eyes purplish ruby
54.6	**Cd*	Coiledex	Wings upcurved; homozygous lethal
54.7	*th*	roughish	Eyes rough
54.8	*Bl*	Bristle	Bristles short, blunt, thick; homozygous lethal
54.8	**ms(2)E5*	male sterile(2) of Edmondson 5	Male sterile
54.8	**ms(2)E6*	male sterile(2) of Edmondson 6	Male sterile
54.8	**ms(2)E7*	male sterile(2) of Edmondson 7	Male sterile
54.9	*Alu*	Alula	Alula fused with wing; wings buckled
54.9	*esc*	extra sex combs	Male has extra sex combs; sterile
54.9	**Jag*	Jagged	Wings jagged; eyes small, rough
54.9	*wi*	witty eye	Eyes variegated, rough; extra vibrissae present
55	**inb*	incised balloon	Wings spread, margin incised
55	**1(2)1323*	lethal(2) 1323	Lethal
55	*l(2)CTC*	lethal(2) cryptocephal	Pupal lethal
55	**pads*	pads	Wings unexpanded
55	*SD*	Segregation Distorter	Morphologically normal; segregation abnormal in male
55	*tri*	trident	Trident dark
55	**uex*	unextended	Wings unexpanded
55.0	*l(2)55i*	lethal(2) 55i	Larval lethal
55.0	*It*	light	Eyes yellowish pink; ocelli colorless



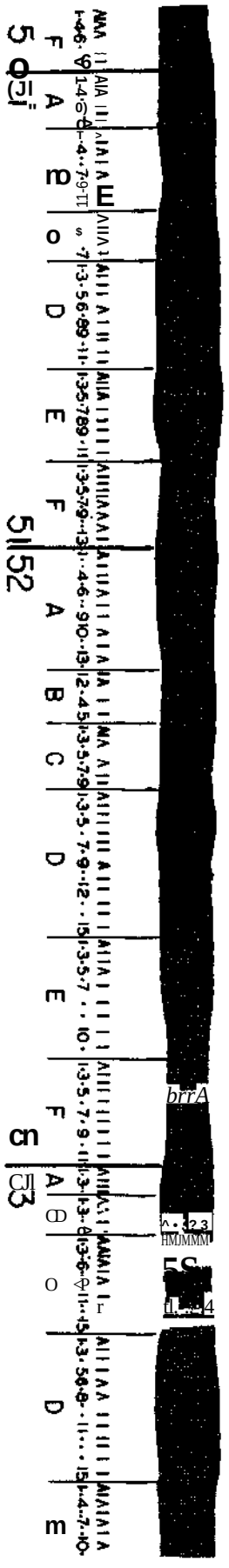
Locus	Symbol	Name	Phenotype
p 55.1	*il*	rolled	Wing edges rolled; L4 interrupted; eyes small, rough
55.1	**l(2)Sp9c*	lethal(2) of Speiss 9c	Lethal
55.1	**I(2)Sp9d*	lethal(2) of Speiss 9d	Lethal
55.1	*l(2)Spll*	lethal(2) of Speiss 11	Lethal
55.1	*l(2)Spl5*	lethal(2) of Speiss 15	Lethal
55.1	*M(2)S2*	Minute(2) of Schultz 2	Bristles fine; late hatching; body pale; homozygous lethal
55.1	*stw*	**strjw**	Hairs yellow; bristle tips pale
55.2	*ap*	apterous	Wings, halteres missing; bristles sparse; sterile
55.2	**Cu*	Curl	Wings curled
55.2	**fs(2)E7*	female sterile(2) of Edmondson 7	Female sterile; eggs collapse
55.2	*msf*	mis formed	Eyes misshapen; wings short, crumpled; legs short
55.3	*pk*	prickle	Acrostichals whorled; costal wing hairs slanted anteriorly
55.3	*tk*	thick	Legs thick; wings short, broad
55.5	*tut*	tufted	Tuft of hairs between eyes and antennae
55.6	**ms(2)E8*	male sterile(2) of Edmondson 8	Male sterile
55.7	*bur*	burgundy	Eyes dull brown
55.8	**ae*	aeroplane	Wings spread; halteres drooping
55.9	**tj*	tarsi irregular	Tarsal segments fused, swollen
56	*l(2)hst*	lethal(2) histolytic	Pupal lethal
56	*ltd*	lightoid	Eyes yellowish pink
56	**mbs*	miniature blistered	Wings small, blistered; bristles bent
56	**Rw*	Rough wing	Wings notched; veins irregular; female sterile
56.6	*ta*	tapered	Wings narrow, pointed; male sterile
56.8	**awu*	augenwulst	Eyes indented anteriorly
57	**dil*	specific dilutor	Dilutes *bw*, w^e, w^{e2}, w^{bl}
57	**M(2)38b*	Minute(2) 38b	Bristles fine; late hatching; homozygous lethal
57	**ms(2)E9*	male sterile(2) of Edmondson 9	Male sterile
57	** Tyr-2*	Tyrosinase 2	Tyrosinase activity low
57.1	**buo*	burnt orange	Eyes bright orange-brown
57.1	*so*	sine oculis	Ocelli absent; eyes small
57.5	*cn*	cinnabar	Eyes bright red
57.5	*Ps*	Pigmentless	Female abdominal pigment reduced; homozygous lethal
57.6	**ls(2)El*	female sterile(2) of Edmondson 1	Female sterile; ovaries rudimentary
58	*put*	puff	Wings inflated, warped
58.5	*bio*	bloated	Wings spread, crumpled, blistered
58.6	**smk*	smoky	Body dark



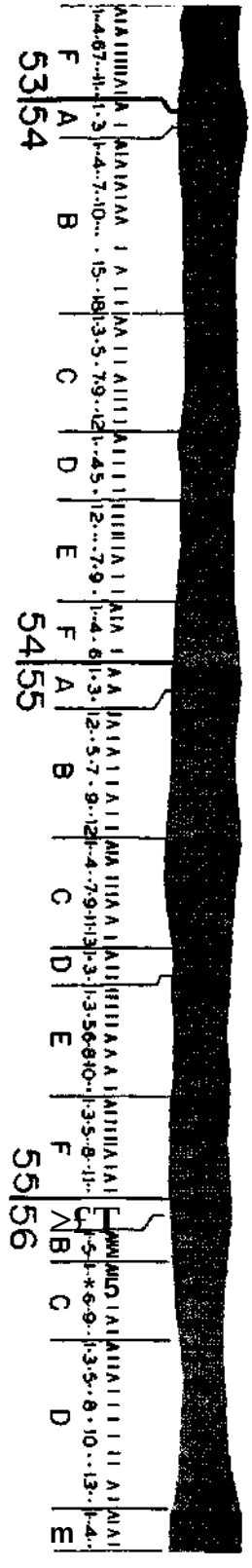
Locus	Symbol	Name	Phenotype
59.5	*Np	Notopleural	Bristles short, blunt; wings short, broad;
60.1	*at	arctus oculus	Eyes small, narrow
60.5	arch	arch	Wings downcurved
60.5	ix	intersex	Female changed into sterile intersex
60.7	ad	arcoid	Wings arched, broad; crossveins close
60.8	chl	chaetelle	Bristles, body small; wing venation abnormal
61	whd	withered	Wings warped or shrunken
61.5	*l(2)Spl2	lethal(2) of Speiss 12	Lethal
61.5	*l(2)Sp8	lethal(2) of Speiss ♀♂	Lethal
62	*upw	upward	Wing tips upturned
62.0	che	cherub	Wings short, downcurved; male sterile
62.0	en	engrailed	Scutellum cleft; bristles hooked; veins interrupted, branched
62.6	*fs(2)E8	female sterile(2) of Edmondson 8	Female sterile
62.7	*Eye	Eyeless dominant in chromosome 2	Eyes small; homozygous lethal
63	*lnd	Indented	Eyes kidney shaped
63.3	spt	spermatheca	Spermathecae abnormal
63.5	twl	twirl	Wings curled
63.6	*sps	spastic	Lethal; survivors weak
64.3	Go	Gold tip	Bristle tips pale, curved; homozygous lethal
64.7	l(2)a	lethal(2) a	Lethal
65	*Bkd	Blackoid	Body black
65	*M(2)40c	Minute(2) 40c	Bristles fine; late hatching; homozygous lethal
65.2	po	pale ocelli	Ocelli colorless
65.3	*1(2)S_P18	lethal(2) of Speiss 18	Lethal
65.5	ms(2)l	male sterile(2) 1	Male sterile; female fertile
66.5	*ms(2)E10	male sterile(2) of Edmondson 10	Male sterile



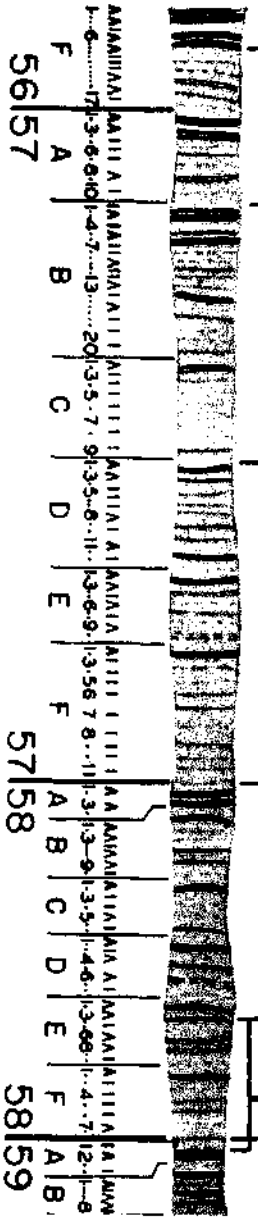
Locus	Symbol	Name	Phenotype
66.7	sea	scabrous	Eyes large, rough
67	**Str*	Stretched wings	Wings held out; homozygous lethal
67.0	*vg*	vestigial	Wings vestigial; halteres small
67.1	*1(2)C*	lethal(2) of Curry	Late larval lethal
68	**ms(2)Ell*	male sterile(2) of Edmondson 11	Male sterile
68	**ts*	telescope	Abdominal segments long
68.2	**ms(2)E12*	male sterile(2) of Edmondson 12	Male sterile
69.7	*wx*	waxy	Wings opaque, small; male sterile



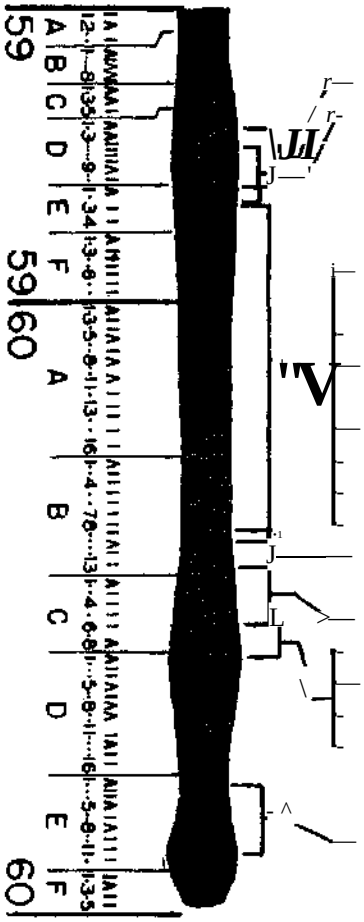
Locus	Symbol	Name	Phenotype
70	*l(2)mr²*	lethal(2) with morula-2	Lethal
70	*U*	Upturned	Wings curled, dark, waxy; hpmozygous lethal
70.8	*Pfd*	Pufdi	Wings spread, blistered
71.0	*bat*	bat	Wings extended, bent back
71.1	*eg*	comb gap	Sex combs large: L4 interrupted; female sterile
71.2	**dr*	droopy	Wings spread, drooping
71*.5	*sf*	safranin	Eyes brown
72	*1(2)me*	lethal(2) meander	Larval lethal
72	**M(2)d*	Minute(2) d	Heterozygote normal; Minute with *M(3)d;* probably homozygous lethal
72.0	*L*	Lobe	Eyes small, kidney shaped
72.0	*N-2G*	Notch 2 from Gallup	Wings cut; homozygous lethal
72.3	*kn*	knot	L3, L4 close or fused; crossveins abnormal
72.5	*ch*	chubby	fly short, thick
73.0	*dke*	dark eye	Eyes dark
74	*6P*	gap	L4 thin or interrupted
74	scrp	scarp	Eyes flattened, furrowed
74	**Su(t)*	Suppressor of forked	Reduces expression of *f;* homozygous lethal
75.5	*c*	curved	Wings downcurved, thin
76	**Wr*	Wrinkle	Wings wrinkled, blistered
77.3	*Amy*	Amylase	Affects amylase electrophoretic mobility
77.5	*M(2)S7*	Minute(2) of Schultz 7	Bristles fine; late hatching; homozygous lethal
79	*pw-c*	pink wing-c	Eyes light; wings short, blunt



Locus	Symbol	Name	Phenotype
80	*it*	fringed	Wing margins snipped
80.5	*tu-bw*	tumor with brown	Larval and adult melanotic tumors
81	*ij*	four jointed	Tarsi four jointed; crossveins close together
81	*ri*	roof wings	Wings sloped
82	**Off*	Off	Bristles missing; eyes large, creased, rough
82	*wt*	welt	Eyes small, narrow, horizontally seamed
83	*abr*	abero	Abdomen abnormal; eyes rough; bristles sparse
83	*nw*	narrow	Wings long, narrow, pointed
83.1	*adp*	adipose	Adult fat bodies abnormal, hypertrophied
86.5	**E(f)*	Enhancer of forked	Bristles short, twisted; enhances f
87.5	**M(2)b*	Minute(2) b	Bristles fine; late hatching; homozygous lethal
90	*dsr*	disrupted	Extra veins; wings warped
90	*l(2)56a*	lethal(2) 56a	Lethal

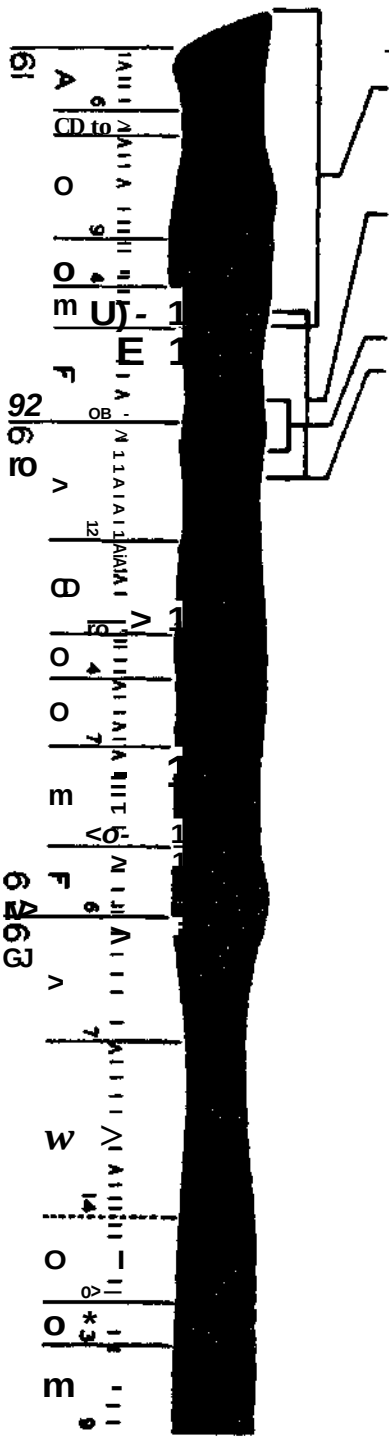


Locus	Symbol	Name	Phenotype
91.5	*sm*	smooth	Abdomen shrunken, denuded; sterile
92.3	*M(2)173*	Minute(2) 173	Bristles short, thin; homozygous lethal
93.2	*rw*	raised wing	Wings upheld
93.3	*hy*	humpy	Thorax ridged; wings truncated
94	**su(B)*	suppressor of Bar	Modifies *B*
96.2	*cv-2*	crossveinless on chromosome 2	Crossveins absent
97	*Pu*	Punch	Eyes purple; homozygous lethal
99	*Elp*	Ellipse	Eyes small, facets fused
99	*l(2)Su(H)*	lethal(2) from Suppressor of Hairless	Lethal
99.2	*a*	arc	Wings broad, bent; crossveins close
100	**fs(2)K*	female sterile(2) of Kikkawa	Female sterile
100	**pkh*	pinkish	Dilutes w^e
100.5	px	plexus	Wings have network of extra veins
101.0	*pa*	patulous	Wings spread
101.2	*M(2)l*	Minute(2) /	Bristles fine; late hatching; homozygous lethal
	crs	crusterile	Male sterile
102	**tit*	tufts	Sternopleurals increased
103.1	*Frd*	Freckled	Body speckled black, tumorous; homozygous lethal
104	**Bsl*	Blisterlike	Wings blistered; extra veins; homozygous lethal
104	*1(2)bw*	lethal(2) with brown	Lethal

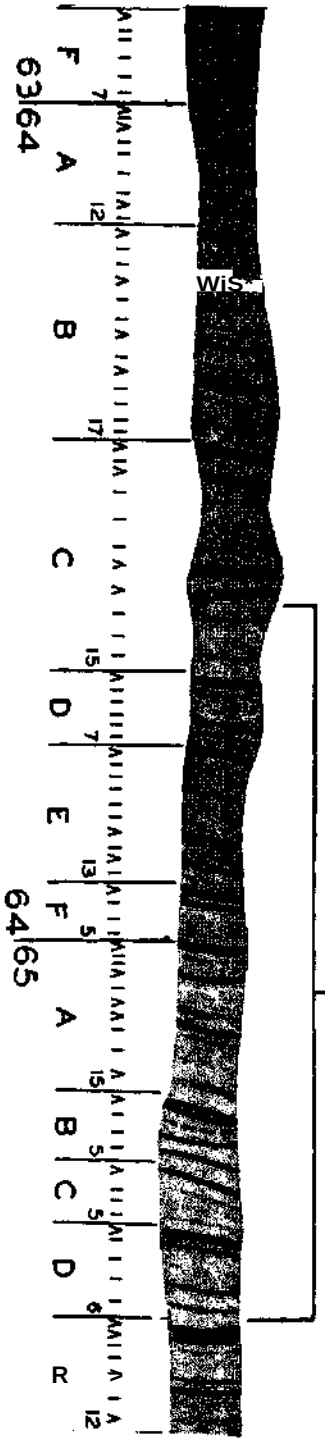


Locus	Symbol	Name	Phenotype
104.0	*hv*	heavy vein	Veins thick, knotted; wings warped
104.5	*bw*	brown	Eyes brown
104.7	*mi*	minus	Bristles small; hairs reduced; female sterile
105.2	*Su(bw^{V1})*	Suppressor of brown-Variegated	Modifies *bw^{VI}*
105.5	*abb*	abbreviated	Bristles small
106.3	*sit*	slight	Body small; bristles short, thin
106.4	*pd*	purpleoid	Eyes maroon
106.7	*mr*	morula	Eyes rough; bristles reduced in size and number; female sterile
106.7	*11*	lanceolate	Wings narrow at tips, slightly divergent
106.9	*l(2)ax*	lethal(2) ax	Early larval lethal
107.0	*or*	orange	Eyes orange
107.0	*Fo*	Forkoid	Bristles short, bent; homozygous lethal
107.0	**1(2)NS*	lethal(2) Nova Scotia	Larval lethal
107.0	*sp*	speck	Black speck at wing axil
107.2	*Px*	Plexate	Wing veins plexuslike; homozygous lethal
107.3	*bs*	blistered	Wings small, pointed, blistered; extra veins
107.3	*Pin*	Pin	Thoracic bristles short, sharply tapered
107.4	*ba*	balloon	Wings blistered, extra veins
107.6	*If*	Irregular facets	Eyes small, narrow, facets irregular
108	*Kr*	Kriippel	Thorax malformed; homozygous lethal
108	*M(2)c*	Minute(2) c	Bristles fine; late hatching; homozygous lethal

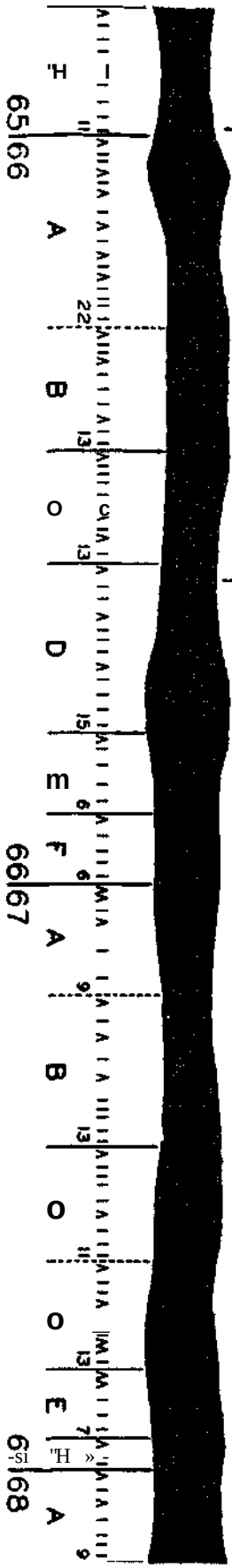
CHROMOSOME 3



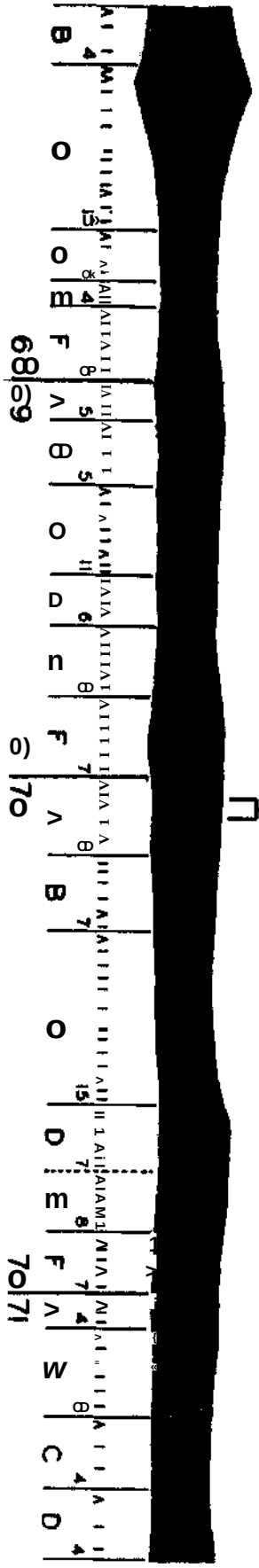
Locus	Symbol	Name	Phenotype
-0.1	*su(ve)*	suppressor of veinlet	Suppresses ve
0	**she*	sherry	Eyes sherry; sterile
0	**tyw*	tiny wing	Wings small; extra bristles
0.0	*aa*	anarista	Aristae bare or tufted; wings broad
0.0	**bos*	bordosteril	Eyes brownish red; female sterile
0.0	**mp*	micropterа	Wings small; veins irregular; legs abnormal
0.0	*mwh*	multiple wing hairs	Wing cell hairs increased
0.0	*rv*	roughoid	Eyes small, rough
0.2	ve	veinlet	L3, L4, and L5 incomplete
1.03	*eyr*	eyes reduced	Eyes small
1.4	*R*	Roughened	Eyes rough; homozygous semilethal
3	**ven*	venation	Veins thick, branched
11	*fs(3)G2*	female sterile(3) of Gill 2	Female nearly sterile; male partially sterile
12	**dw-b*	dwarf b	Body small
14.7	**syn*	syndrome	Eyes brown; wings spread; sterile



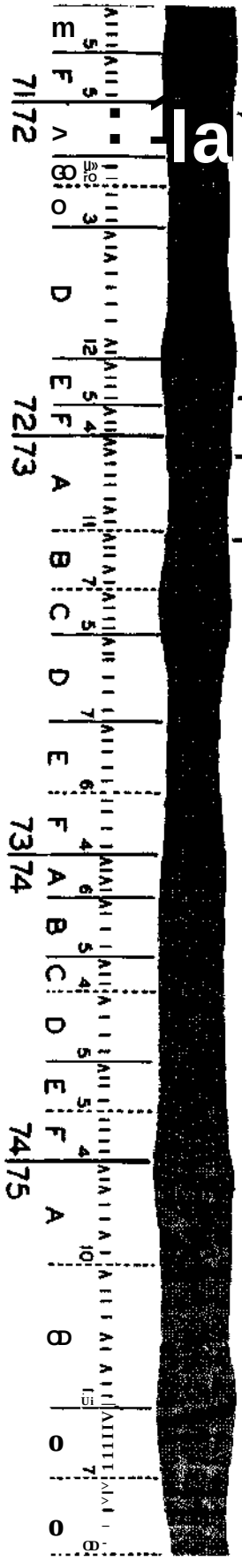
Locus	Symbol	Name	Phenotype
17	**rai*	raisin	Eyes brown
19.2	*jv*	javelin	Bristles, hairs cylindrical
19.2	*Me*	Moiré	Eyes flecked, iridescent; homozygous lethal
19.6	**Vn*	Vein	L4 incomplete; homozygous lethal
20	*l(3)tr*	lethal(3) translucida	Pupal lethal
L-20.0	**dv*	divergent	Wings spread



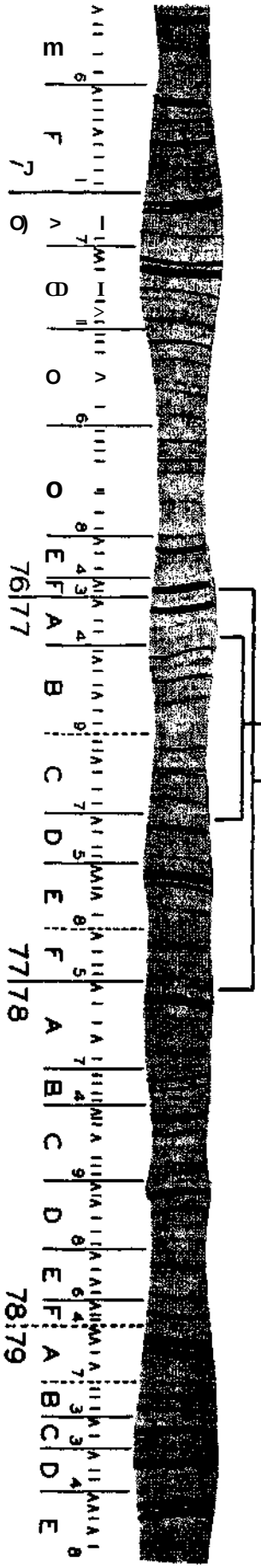
Locus	Symbol	Name	Phenotype
23.0	*Hn*	Henna	Eyes brown; homozygous lethal
25	**be~3*	benign tumor in chromosome 3	Benign melanotic tumors
25	*fs(3)G3*	female sterile(3) of Gill 3	Female sterile; oogenesis incomplete
26	**On*	Open	Wings spread
26	*suCO*	suppressor of tan	Suppresses *t*
26.0	*se*	sepia	Eyes brown, darken to black with age
26.5	*h*	hairy	Extra hairs on scutellum, pleurae, head, and along veins
27	*a(3)26*	abnormal abdomen in chromosome 3 26	Abdomen abnormal
27	*abd*	abdominal	Abdominal bands broken, etched
28.9	**M(3)i*	Minute(3) i	Bristles fine; late hatching; homozygous lethal
30	*cur*	curvoid	Wings diverge, curve down
33	*Ixd*	low xanthine dehydrogenase	Affects xanthine dehydrogenase level
33.8	**l(3)Spl*	lethal(3) of Spiess 1	Lethal
35.0	**rs*	rose	Eyes purplish pink; often sterile
35.1	*gs*	gespleten	Thorax cleft; eyes small
35.5	*eyg*	eye gone	Eyes and head small
36.2	**gv*	grooved	Thorax grooved; eyes small; bristles irregular
36.5	**cr-3*	cream in chromosome 3	Eye color diluted, dilutes w^e
36.8	*Est-6*	Esterase 6	Affects esterase electrophoretic mobility
37	**rag*	ragged	Marginal hairs irregularly absent
37	*Tt*	rotated abdomen	Abdomen twisted; sterile
37.5	*app*	approximated	Crossveins close; tarsi four jointed
38.0	**md*	melanotic lesions	Melanotic lesions throughout body
38.4	**I(3)Spl7*	lethal(3) of Spiess 17	Lethal
39	*pyd*	polychaetoid	Extra bristles
40.0	*tt*	tilt	Wings spread, warped; L3 interrupted
40.2	*M(3)h*	Minute(3) h	Bristles fine; late hatching; homozygous lethal
40.4	*e(dp^v)*	enhancer of dumpy-vortex	Normal; enhances dp^v
40.4	**I(3)Sp6*	lethal(3) of Spiess 6	Lethal



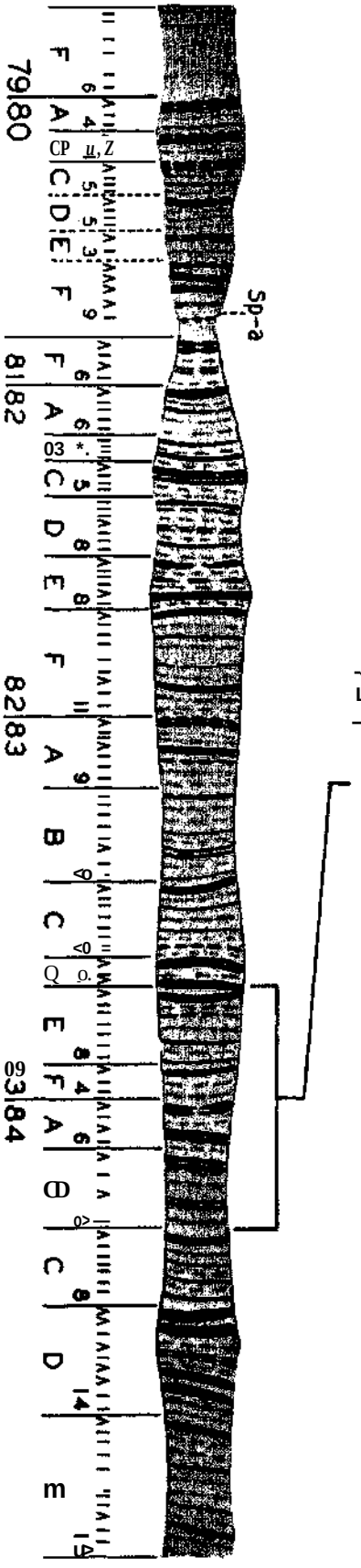
Locus	Symbol	Name	Phenotype
40.5	*Ly*	Lyra	Wing margins excised; homozygous lethal
40.7	*D*	Dichaete	Wings spread; alulae missing; dorsocentrals fewer; homozygous lethal
41.0	**1(3)S_P5*	lethal(3) of Spiess 5	Lethal
41.3	*Su(var)*	Suppressor of variegation	Modifies variegation of *w, rst, fa, sc, spl, nd,* and *y* in variegating rearrangements
41.4	*Gl*	Glued	Eyes small, oblong, shiny; homozygous lethal
41.7	*fz*	frizzled	Hairs and bristles directed irregularly; eyes rough
41.7	**l(3)SplO*	lethal(3) of Spiess 10	Lethal
41.7	*rp	rotated penis	Male genitalia rotated; eyes rough; male sterile
42	*wk*	weak	Bristles, abdomen small; wings warped



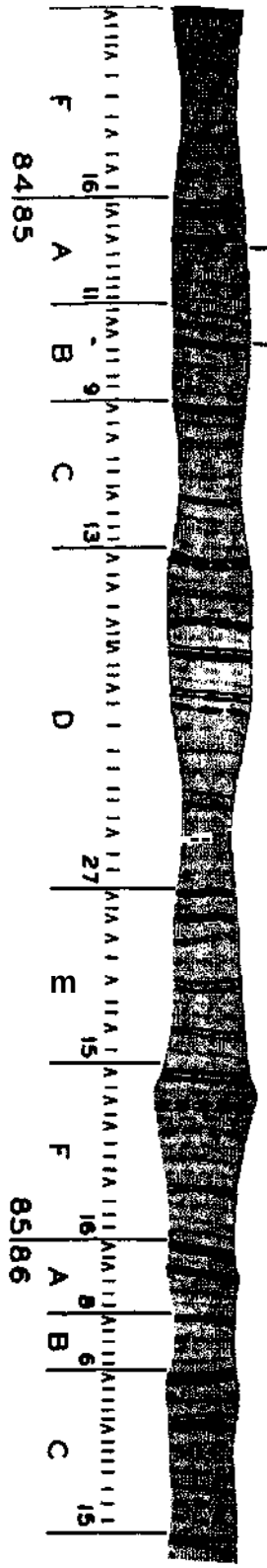
Locus	Symbol	Name	Phenotype
43.0	*We	Washed eye	Modifies *w*, homozygous lethal
43,2	th	thread.	Aristae lack side branches
43.4	*mb	minus bar	Modifies *B*
43.5	*Cm	Crimp	Wings crimped, ruffled; homozygous lethal
43.6	bul	bulge	Eyes large, bulging; wing margin thick
44	*vr	varnished	Eyes small, facets fused; female sterile
44.0	st	scarlet	Eyes bright red; ocelli colorless
44.3	M(3)S34	Minute(3) of Schultz 34	Bristles fine; Jate hatching; homozygous lethal
44.4	db	dark body	Body dark; male lethal
45	*re-6	reduced eyes b	Eyes small
45	tra	transformer	Female transformed into sterile male
45.3	cp	clipped	Wing margins snipped
46	as	ascute	Scutellum elevated; wings drooping
46	*je	jelly	Eyes pink
46	*ml	minute like	Bristles small; late hatching
46	*mot-36e	mottled 36e	Eyes mottled, rough; female sterile
46	Pdr	Purpleoider	Eyes maroon; modifies *pd*
46	tu-48)	tumor 48j	Larval and adult melanotic tumors
46.0	*mot-28	mottled 28	Eyes mottled
46.0	*W	Wrinkled	Wings unexpanded; head spotted
46.3	Aph	Alkaline phos-phatase	Affects alkaline phosphatase electrophoretic mobility
46.5	*si-3	ski 3	Wingtips turned up with Sī
47	*du	dunkel	Body dark; wings blistered; female sterile
47	(s(3)Gl	female sterile(3) of Gill 1	Female sterile



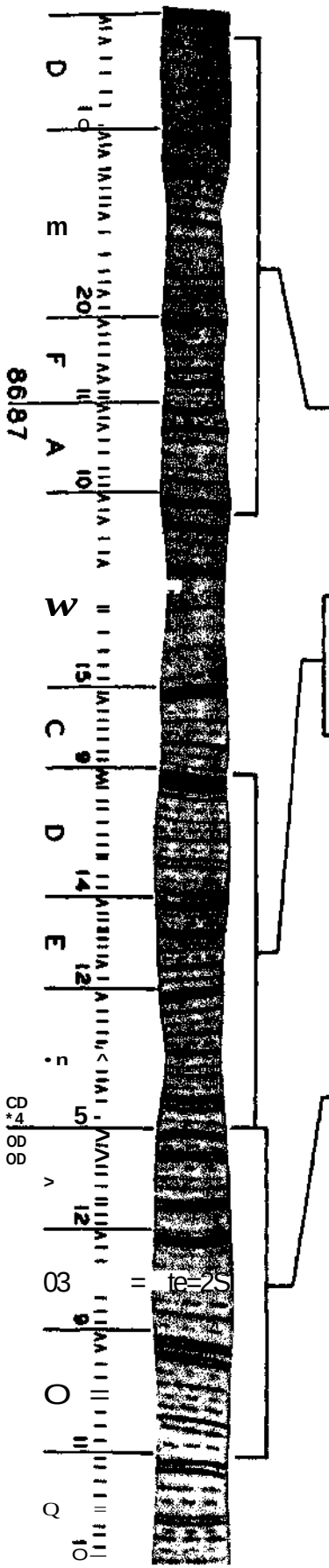
Locus	Symbol	Name	Phenotype
47	*in*	inturned	Hairs and bristles directed toward midline
47	**M(3)S39*	Minute(3) of Schultz 39	Bristles fine; late hatching; body small; homozygous lethal
47	*Sex*	Extra sex comb	Sex combs may be on all male legs; homozygous lethal
47.0	*ri*	radius incompletus	L2 interrupted
47.3	*eg*	eagle	Wings spread
47.5	*Did*	Deformed	Eyes small or furrowed; homozygous lethal
47.5	**wp*	warped	Wings warped, small, spread
47.6	*Ki*	Kinked	Bristles and hairs short, twisted
47.6	*roe*	roughened eye	Eyes rough
47.7	*drb*	dark red brown	Eyes dark red-brown
47.7	*pb*	proboscipedia	Oral lobes tarsuslike or aristalike; female sterile
47.7	*rn*	rotund	Wings short, round; sex combs absent; sterile



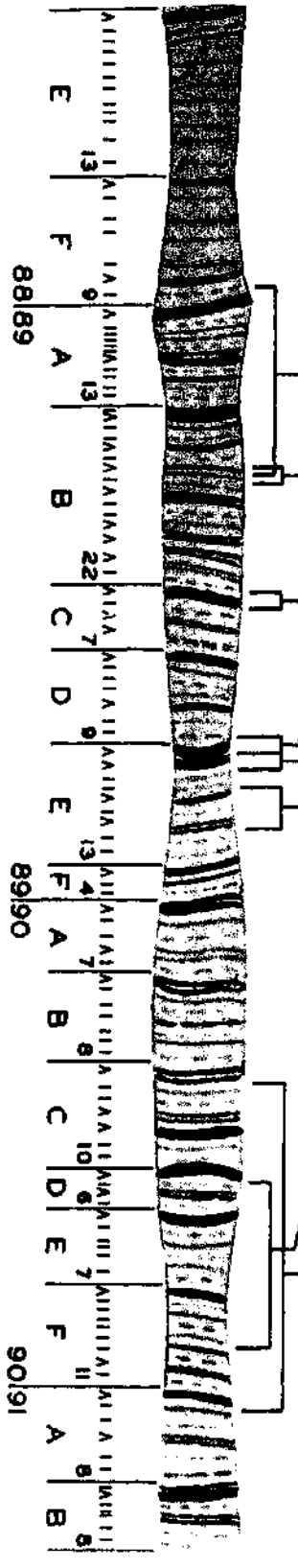
Locus	Symbol	Name	Phenotype
47.8	*wz	wizened	Body small, dark
	Antp	Antennapedia	Antennae leglike; homozygous lethal
48	*Pc*	Polycomb	Sex combs on second and third legs of male; homozygous lethal
48.0	*Msc*	Multiple sexcomb	Sexcombs on second and third legs of male
48.0	*Na*	Nasobemia	Antennae leglike; homozygous lethal



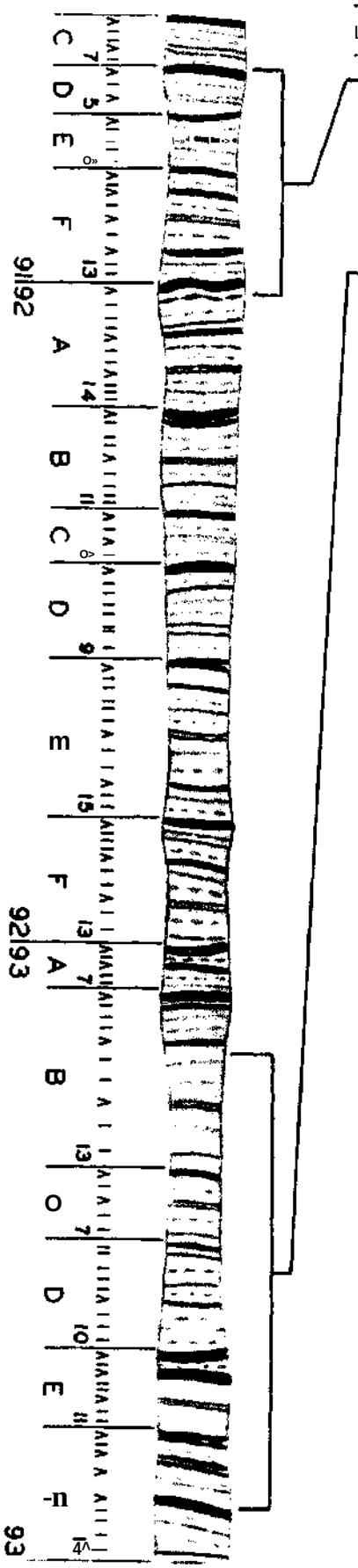
Locus	Symbol	Name	Phenotype
48.0	*P*	pink	Eyes dull ruby
48.1	*dsx*	double sex	Male and female resemble intersexes
48.2	**Kg*	Kugel	Body short, thick
48.3	*bod*	bowed	Body small; wings curved downward
48.3	**moo*	moorish	Body black; male lethal
48.5	**com*	compressed	Head flattened ventrally
48.5	*tet*	tetraltera	Wings halterelike; mesothorax like metathorax
48.7	*by*	blistery	Wings blistered, warped, dusky
49	*Est-C*	Esterase C	Affects esterase electrophoretic mobility
49	*fs(3Xr5*	female sterile(3) of Gill 5	Female sterile; oogenesis incomplete
49.2	*Odh*	Octanol dehydrogenase	Affects octanol dehydrogenase electrophoretic mobility
49.5	**Rst(3)ns*	Resistance(3) nicotine sulfate	Resistant to nicotine sulfate
49.7	*ma*	maroon	Eyes ruby
50	*dn*	doughnut	Light spot in eye
50	**dw*	dwarf	Body small; female sterile
50	**Er*	Erect	Scutellars erect; wings unexpanded
50	**mu*	mussed	Wings thin; thorax arched
50-0	*M(3)S31*	Minute(3) of Schultz 31	Bristles fine; late hatching; homozygous lethal



Locus	Symbol	Name	Phenotype
50.0	*cu*	curled	Wings upcurved; body dark
51	*Hu*	Humeral	Extra humeral bristles
51	*1(3)S1*	lethal(3) of Schalet 1	Lethal
51.3	**ttr*	tetrapter	Halteres winglike
51.5	*1(3)S2*	lethal(3) of Schalet 2	Lethal
51.7	*kar*	karmoisin	Eyes bright red
51.7	*1(3)S3*	lethal(3) of Schalet 3	Lethal
51.9	mes	messy	Extra bristles on head and thorax; wings inflated; sterile
52.0	*ry*	rosy	Eyes reddish brown; lacks xanthine dehydrogenase
52.1	*l(3)S4*	lethal(3) of Schalet 4	Lethal
52.1	*1(3)S5*	lethal(3) of Schalet 5	Lethal
52.1	*pic*	piccolo	Bristles short, fine; tergites abnormal; sterile
52.2	*1(3)26*	lethal(3) 26	Lethal
52.2	*1(3)S6*	lethal(3) of Schalet 6	Lethal
53	*1(3)S7*	lethal(3) of Schalet 7	Lethal
53.6	*red*	red Malpighian tubules	Malpighian tubes red; eyes brown
54.1	*cv-c*	crossveinless c	Posterior crossveins absent or reduced
54.8	*su(Hw)*	suppressor of Hairy wing	Suppresses specific alleles at various loci; female sterile
56	**sh*	short winged	Wings small

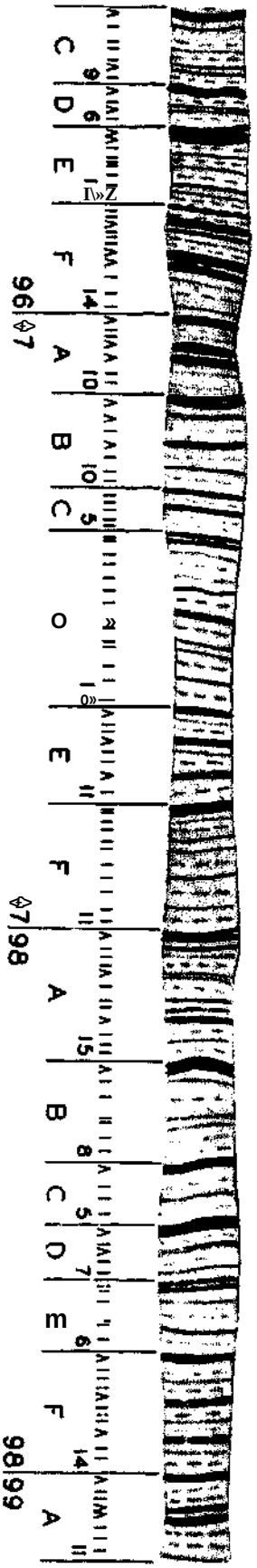


LOCUS	Symbol	Name	PKenotype
56.7	*jvl*	javelinlike	Bristles and hairs cylindrical
57.4	*c(3)G*	crossover suppressor in chromosome 3 of Gowen	Eliminates meiotic recombination
58.2	*sbd*	stubbloid	Bristles short
58.2	*Sb*	Stubble	Bristles short, thick; homozygous lethal
58.3	**Two-b*	Two bristles	Two postverticals absent; homozygous lethal
58.5	*tuh-3*	tumorous head in chromosome 3	Head tumors with *tuh-1*
58.5	*ss*	spineless	Bristles hairlike
58.8	*bx*	bithorax	Metathorax mesothoracic; halteres enlarged
58.8	*Cbx*	Contrabithorax	Mesothorax metathoracic; wings small; venation incomplete
58.8	*Ubx*	Ultrabithorax	Halteres enlarged; homozygous lethal
58.8	*bxd*	bithoraxoid	Metathorax mesothoracic; halteres enlarged
58.8	*pbx*	postbithorax	Posterior metathorax mesothoracic
59	*mfs(3)G*	male and female sterile(3) of Gill	Male sterile; female semisterile
59	*Rf*	Roof	Wings rooflike
59	**Su(sc)*	Suppressor of scute	Suppresses sc
59.0	*Me*	Microcephalus	Kyes small or absent; scutellars curved
59.5	**cal*	coal	Body black
59.5	**wtl*	weltlike	Eyes seamed, small; female sterile
59.5	*fl*	fluted	Wings creased, dark
61	*Su(ss)*	Suppressor of spineless	Suppresses ss; homozygous lethal
62.0	*sr*	stripe	Dark median stripe on thorax
63.1	*61*	glass	Eyes small, diamond shaped, glassy
64	**gt-3*	giant in chromosome 3	Body large; late hatching; male sterile
64	*k*	kidney	Eyes kidney shaped
64	**M(3)S35*	Minute(3) of Schultz 35	Bristles fine; late hatching; body small; homozygous lethal
65	**cv-b*	crossveinless b	Crossveins absent
65	*cv-d*	crossveinless d	Posterior crossveins absent
65	**sprd*	spread	Wings spread
66.0	***Cu-3***	Curl in chromosome 3	Wings curly, thin; homozygous lethal

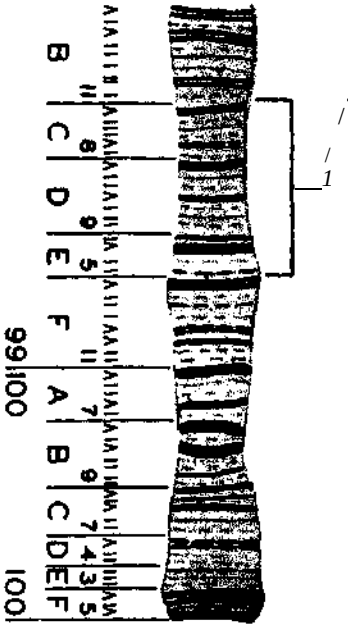


Locus	Symbol	Name	Phenotype
66.2	*Dl*	Delta	Veins thickened, broad at margin; homozygous lethal
67.3	**gn*	glisten	Eyes rough
68.5	**com-d*	compressed dilapidator	Fly small; legs and wings defective
69.5	*H*	Hairless	Bristles sparse; veins incomplete; homozygous lethal
70.7	e	ebony	Body black
72	**bn*	band	Dark transverse band on thorax
72.5	*det*	detached	Crossveins detached or absent

Locus	Symbol	Name	Phenotype
75.5	**dg-a*	degenerated spermatheca	Spermathecae degenerated
75.7	***cd***	cardinal	Eyes yellowish vermilion
76.2	**wo**	white ocelli	Ocelli colorless; modifies w^e
77.5	*obt*	obtuse	Wings short, blunt; thorax humpy
78	*Gd	Gulloid	Wings short, blunt, spread; homozygous lethal
79.1	*bar-3*	bar on chromosome 3	Eyes small, narrow
79.3	****l(3)Sp2***	lethal(3) of Spiess 2	Lethal
79.7	***M(3)w***	Minute(3) w	Bristles fine; late hatching; homozygous lethal
81.6	*1(3)a*	lethal(3) a	Lethal
84.5	***M(3)be***	Minute(3) beta	Bristles fine; late hatching; homozygous lethal
88	*mah*	mahogany	Eyes brown

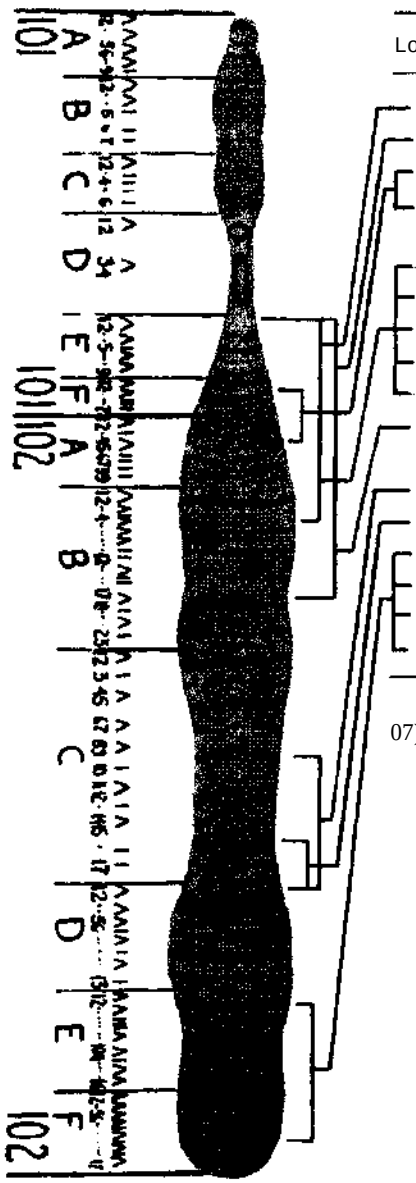


Locus	Symbol	Name	Phenotype
90	*gro*	groucho	Bristles clumped above eyes
90	**Su(y^{3P})*	Suppressor of yellow-3 of Patterson	Partially suppresses y^{3P}
90.0	*Pr*	Prickly	Bristles short, tips thin, twisted
90.2	*1(3)PR*	lethal(3) PR	Lethal
90.2	**M(3)j*	Minute(3) j	Bristles fine; late hatching; female sterile; homozygous lethal
91	*tx*	taxi	Wings held out
91.1	*ro*	rough	Eyes rough
91.8	*!(3)XaR*	lethal(3) XaR	Lethal
92.5	*Ser*	Serrate	Wingtips notched; homozygous lethal
93	*cmp*	crumpled	Wings small, crumpled, or blistered
93.8	*Bd*	Beaded	Margins excised; homozygous lethal
94	**Ble*	Barlike eye	Eyes small, narrow
94.1	**Pw*	Pointed wing	Wing tips narrow; extra veins; homozygous lethal
95	*bf*	brief	Body, bristles small; male sterile
95	**M(3)d*	Minute(3) d	Heterozygote normal; Minute with *M(2)d;* homozygote probably lethal
95.4	*rsd*	raised	Wings upheld
95.5	*su(pr)*	suppressor of purple	Suppresses *pr;* enhances *Hw;* sterile
97.3	*ra*	rasé	Bristles and hairs small, irregularly absent
98.3	*Lap-D*	Leucine amino-peptidase D	Controls leucine aminopeptidase D electrophoretic mobility
99.2	*Dr*	Drop	Eyes small; homozygous lethal
100	**wdn*	wings down	Wings spread, drooping



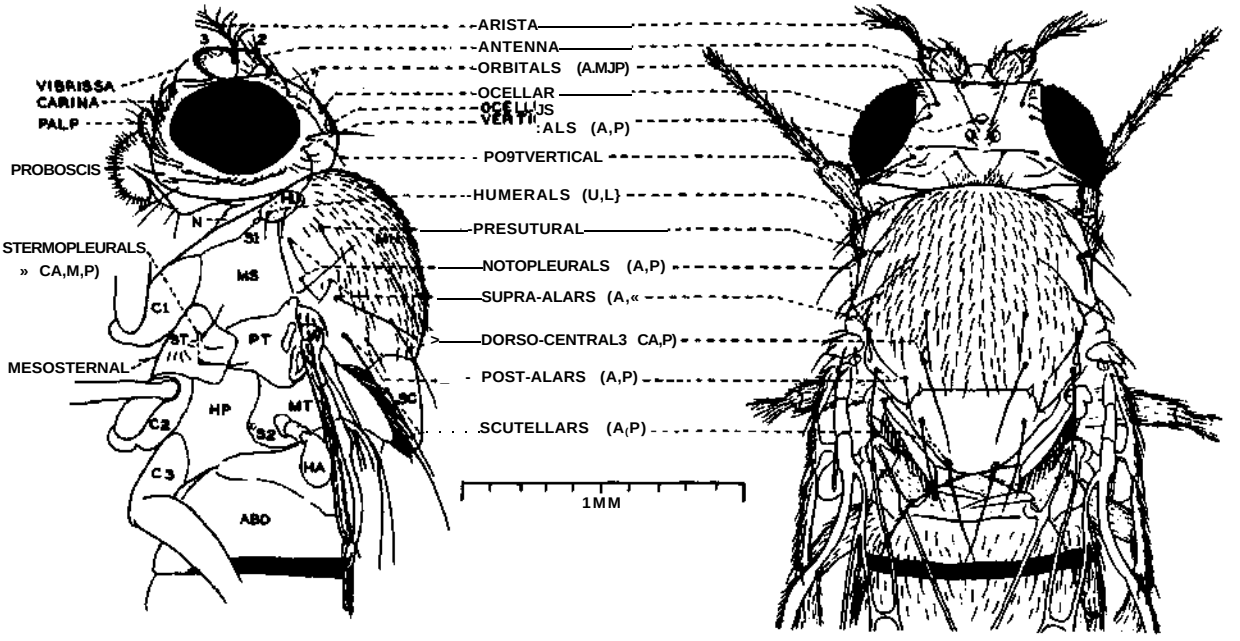
Locus	Symbol	Name	Phenotype
100.7	*ca*	claret	Eyes ruby
100.9	**l(3)Spl9*	lethal(3) of Spiess 19	Lethal
101.0	*M(3)l*	Minute(3) 1	Bristles fine; late hatching; homozygous lethal
101.1	**l(3)Sp9*	lethal(3) of Spiess $^{n}_{y}$	Lethal
101.4	*Acph-1*	Acid phosphatase 1	Affects acid phosphatase electrophoretic mobility
102	*Id*	loboid	Eyes small, kidney shaped
102.7	*bv*	brevis	Bristles short, stubby; body chunky
102.9	*K-pn*	Killer of prune	Normal; lethal with *pn* alleles
105	**M(3)[*	Minute(3) f	Bristles fine; late hatching; homozygous lethal
106.2	**M(3)g*	Minute(3) g	Bristles fine; late hatching; homozygous lethal

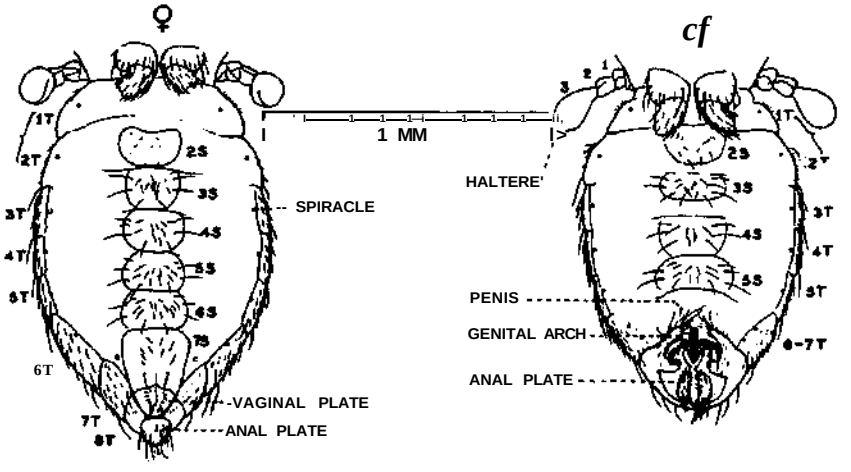
CHROMOSOME 4

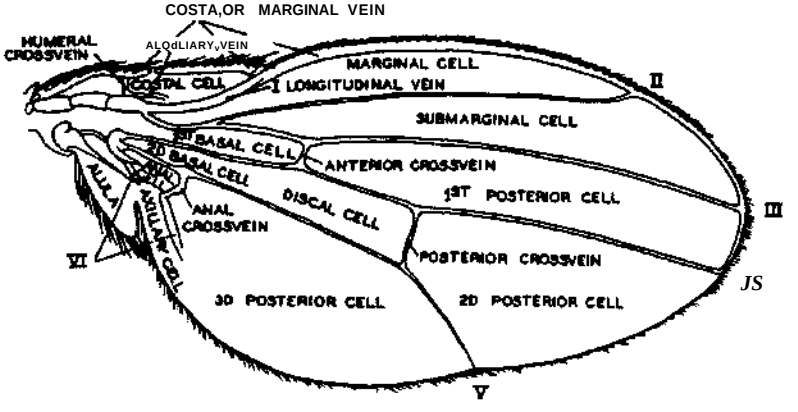


Locus[4]	Symbol	Name	Phenotype
	ar	abdomen rota tum	Abdomen twisted, male sterile
	Ce	Cell	Wing veins abnormal, homozygous lethal
0	*ci*	cubitus interruptus	L4 interrupted
	M(4)	Minute(4)	Bristles fine; late hatching; homozygous lethal
0.2	*gvl*	grooveless	No groove between thorax and scutellum
	1(4)1	lethal(4) 1	Lethal
	1(4)13	lethal(4) 13	Lethal
	1(4)18	lethal(4) 18	Lethal
	1(4)25	lethal(4) 25	Larval lethal
	**Scn*	Scutenick	Scutellum short, edge nicked; homozygous lethal
1.4	*bt*	bent	Wings bent back
2.0	*ey*	eyeless	Eyes small
	1(4)9	Iethal(4) 9	Lethal
	1(4)29	lethal(4) 29	Lethal
3.0	*sv*	shaven	Bristles small
	spa	sparkling	Eyes rough, bulging

*As measured in diplo-4 triploids (Sturtevant, 1951, Proc. Natl. Acad. Sci. U.S. 37: 405—07).

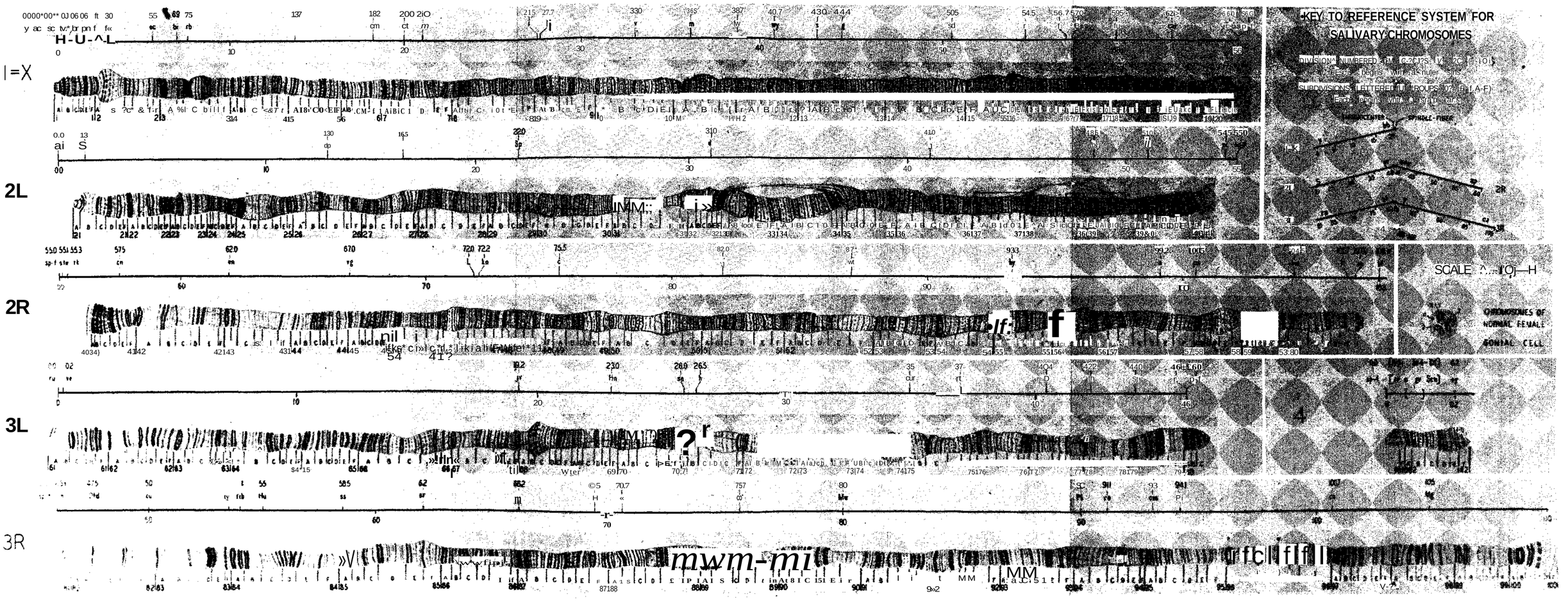




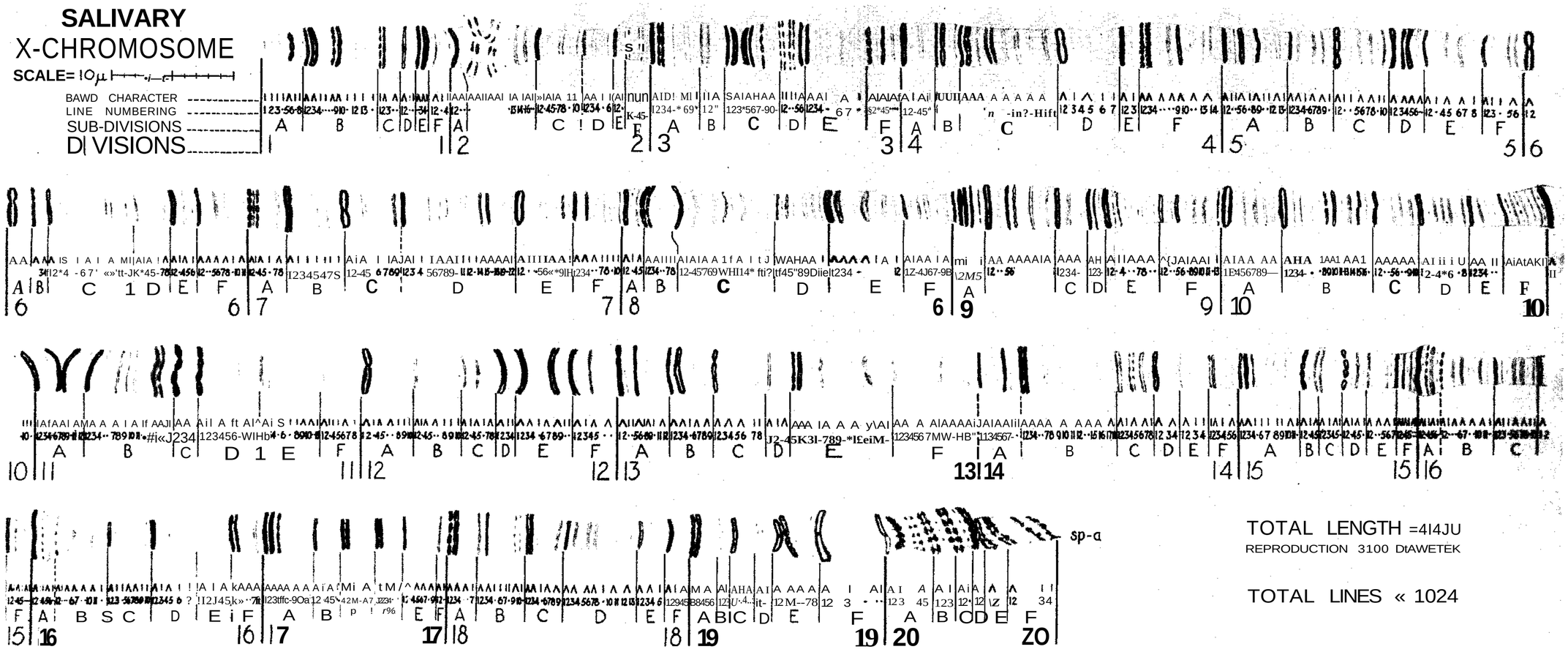


LEGEND:-

A——ANTERIOR
ABO - ABDOMEN
CI, C2, C3 - COXAE
HA--HALTERE
HP--HYPOPLEURA
HU--HUMERU5
L——LOWER
M——MIDDLE
MN--ME5ONOTUM
MS--ME5OPLEURA
MT - -METANOTUM
N- -NECK
P——POSTERIOR
PT--PTEROPLEURA
S——STERNITE
51,52-THORACIC SPIRACLES
SC - - SCUTELLUM
5T --STERNOPLEURA
T——TERGITE
U——UPPER
W——WING

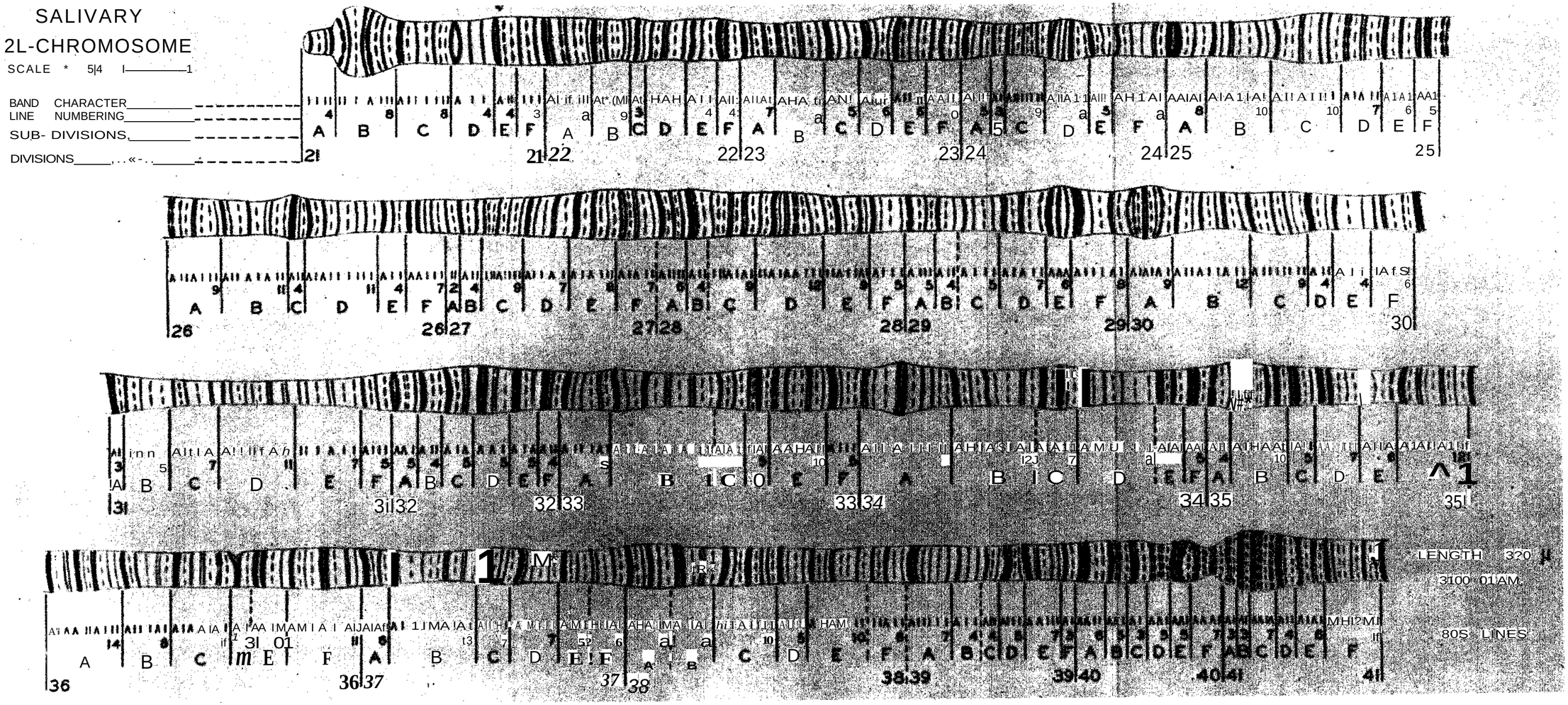


REFERENCE MAP OF THE SALIVARY CHROMOSOMES OF DROSOPHILA MELANOGASTEE



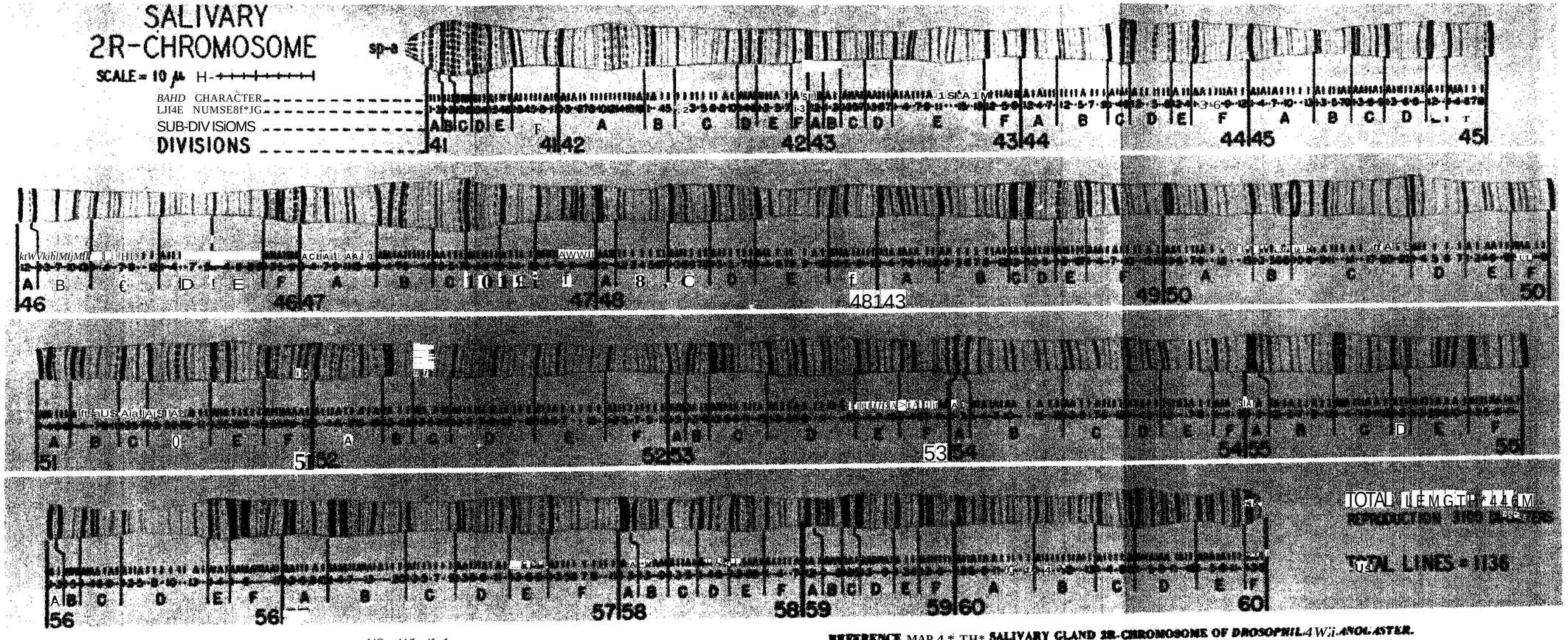
Supplement to *Journd of Heredity,* VoL 29, No. 1, January, 1938.
*C&pyrifkt, 193B, hy thug dm*ncm Genetk A$$m%Mmm.*

REFERENCE MAP OF THE SALIVARY QLAND X-CHROMOSOME OF *BROSOPBIIA MELANOGASTER.*



Supplement to *Journal of Heredity*, **Vol. 33,** No, **11,** November, **1942.**

REVISED REFERENCE MAP OF THE SALIVARY GLAND 2L CHROMOSOME OF *DROSOPHILA MbLA\OG.4$TER:*



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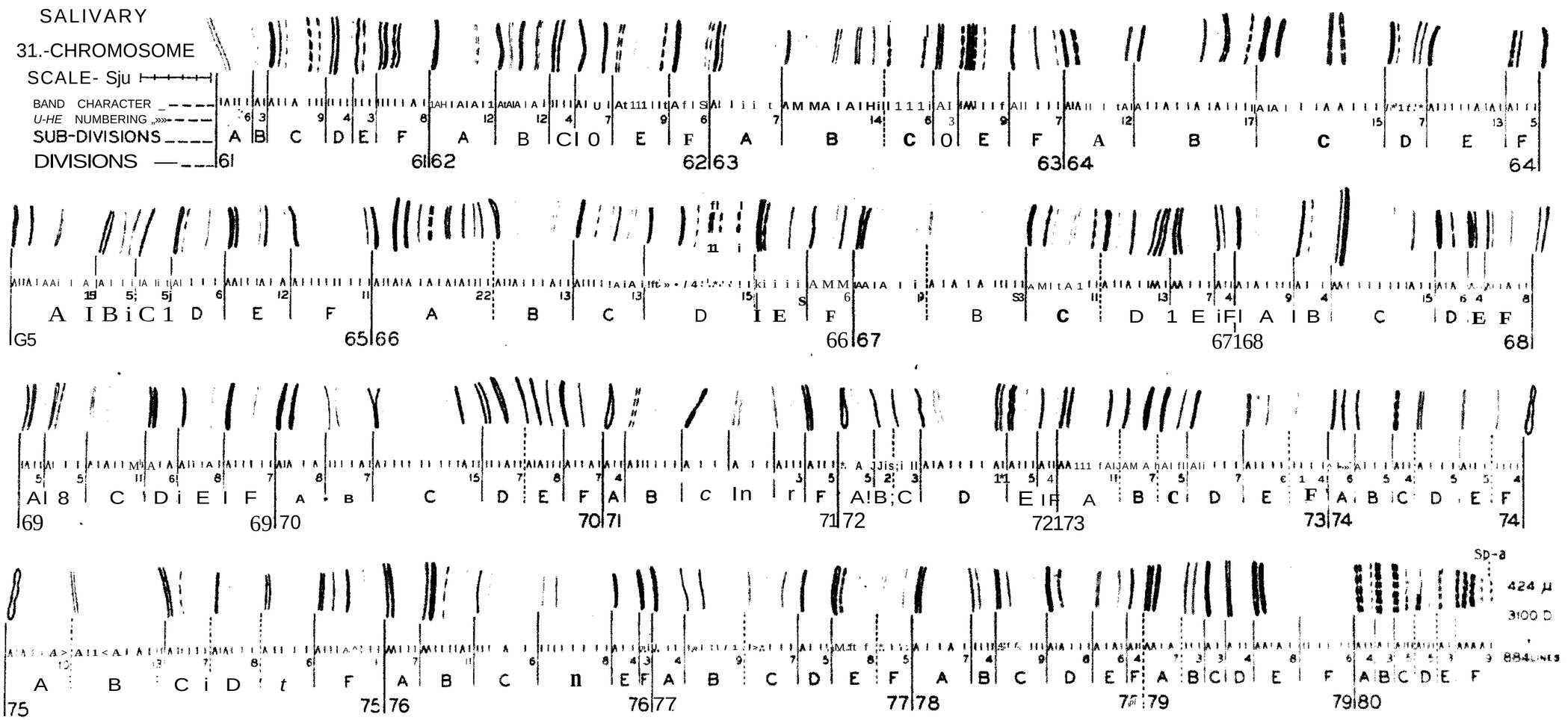
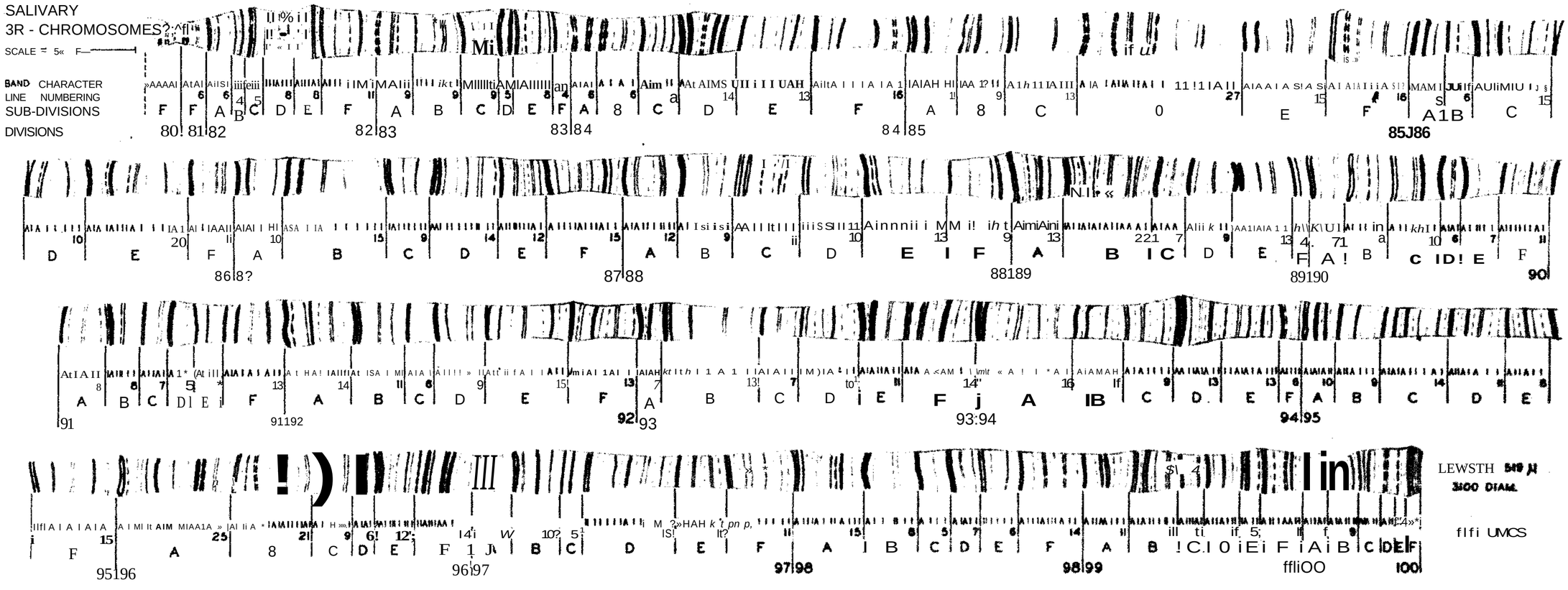
REFERENCE MAP 4 * TH* **SALIVARY GLAND 2R-CHROMOSOME OF** *DROSOPHIL4Wi.ANOL.ASTER.*

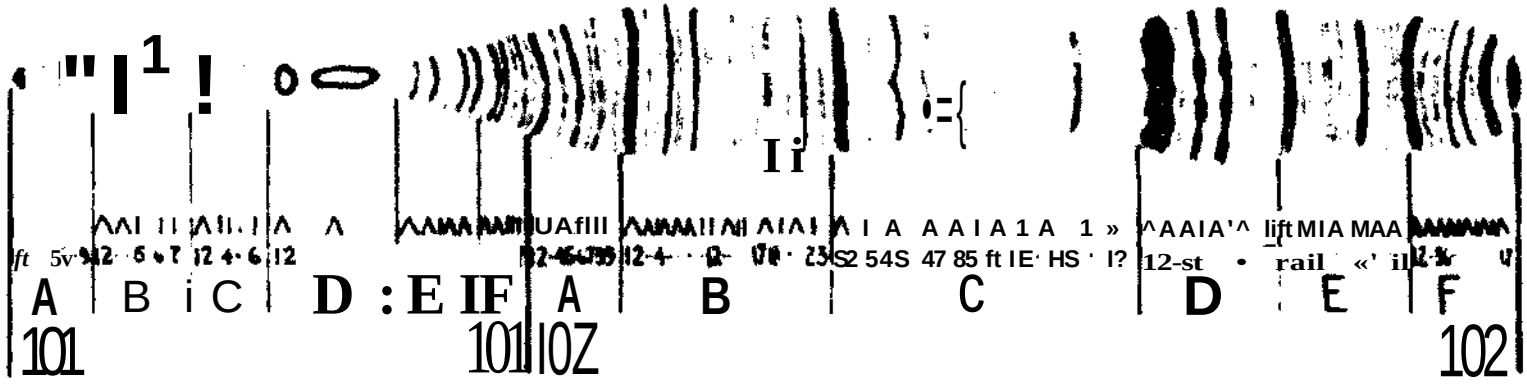


REVISED REFERENCE MAP OF THE SALIVARY GLAND 31. CHROMOSOME OF *DROSOPHILA MELANOGASTER.*



Su|ipiem<^ni lo *Journal of Heredity*^ **Vol. 32, No. 9, Seplerafeer, 1941.**

REVISED **REFERENCE MAP OF** TOE **SAUVARY GLAND » CHROMOSOME OF** *m0.$OPMHA MBLAXOGASTSR.*



Scale • ıOJUL Tota^l bands 137

t_____ *f* lotaI lenfth 46 μ

MAP OF CHROMOSOME 4