Mutation Notes

Dominant wedge-shaped eye mutation (*Wed*) associated with T(1;2) in *D. melanogaster*.

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In one of the experiments with 0.85 MeV fission neutrons conducted in February, 1979, an unusual F_1 female with reduced and wedge-shaped eyes was found among the regular daughters resulting from crossing of irradiated wild-type D-32 fathers with M5 tester-mothers. According to the genetic analysis performed, the new mutation is dominant and viable in homo- or hemizygotes which exhibit the same phenotype showing reduced and wedge-shaped eyes with dark blood red color and glassy texture from fused facetes and irregular squeezable surface on the upper area of eye (Figure 1a). Ventrally narrowed eyes in *Wed* resemble *Gla*. However, *Gla* has more ovoid eyes, generally deluted eye color with black patches and shows recessive lethality (Lindsley and Zimm, 1985). Heterozygous females *Wed*/*Gla* are viable and exhibit more reduced eyes (Figure 1b) than *Wed*/+ (Figure 1c). The further crosses have shown that X and 2nd chromosomes in the *Wed* mutant are linked. Indeed, cytological analysis of the polytene chromosomes in *Wed*/+ heterozygotes revealed that the mutant phenotype is clearly associated with T(1;2) showing one breakpoint in subsection 3C7-8 of the X chromosome and the other one in subsection 27E6-8 of the second autosome. Apparently, the Wed^+ locus is located in the X chromosome near the translocation breakpoint since heterozygous females Wed/w^{88g52} (= Df(1)3C2; 3C12) (Alexandrov *et al*., 1997) exhibit more reduced wedge-shaped eyes (Figure 1d) than *Wed*/+ females (Figure 1c). Further, since only homozygous *Wed*/*Wed* females, but not *Wed*/Y males, show sterility and poor viability, the heterozygous for a

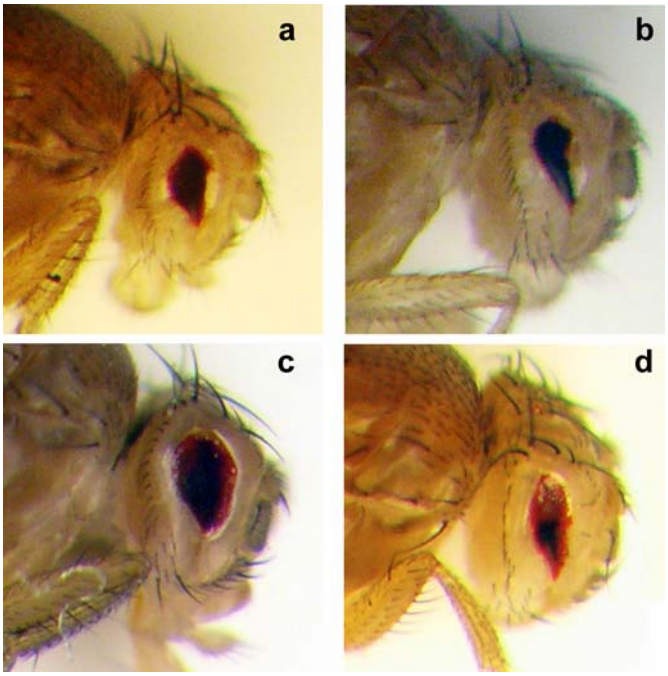

Figure 1. Eye phenotypes of: a) *Wed*/Y males; b) *Wed*/*Gla* females; c) *Wed*/+ females; d) Wed/w^{88g52} (= Df(1)3C2; 3C12) females. Stereo-microscope micrographs were made by an MBS-10 stereomicroscope coupled with color CCD camera under ×56.

normal X *Wed*/+females are fully fertile and as well viable as Wed^{+}/Wed^{+} females. The eyes of *Wed*/+ females (Figure 1c) show the same *Wed* phenotype but the facet number in such heterozygotes is approximately twice as much as that in *Wed*/Y males (Figure 1a) reminding us of the behaviour of Bar. At present, T(1;2)*Wed*=T(1;2)3C7-8;27E6-8 is maintained in *Wed*/Y males with C(1)DX, *y f* females in our *Drosophila* collection.

References: Alexandrov, I.D., I.A. Zakharov, and M.V. Alexandrova 1997, Dros. Inf. Serv. 80: 114; Lindsley, D., and G. Zimm 1985, Dros. Inf. Serv. 62: 146.

Dominant pale body mutation (*Pab*) associated with In(2R) in *D. melanogaster*.

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In large-scale radiation experiments on induction of the locus-specific mutations in male germ cells of *D. melanogaster* by gamma-rays in April, 1979, an unusual F_1 female with pale yellowish silvery body was found among the regular daughters resulting from crossing of irradiated wild-type D-32 males with *y* Ins(1) w^a *; b cn vg* females. As the genetic analysis shown, a new mutation is fully dominant with recessive lethality. Heterozygous males and females show the same phenotype: color of body and antennae is pale yellowish silvery; hairs and bristles black; wings and veins pale gray; black pigment on the female and male tergites nearly absent with an exception of fused 4^{th} -5^{th} tergites in males which show a normal pigmentation. As the genetic tests show, *Pub* is not a specific dilutor of the w^e series of white alleles as does the dominant mutation Pale (Lindsley and Zimm, 1990). According to the cytological analysis, *Pab* is associated with In(2R)*Pab* = In(2R)44C5-6; 48C3-D1. At present, *Pab* is maintained with balancer CyO.

References: Lindsley, D.G., and G. Zimm 1990, Dros. Inf. Serv. 68: 106.

New mutants report: Morphological markers in *Drosophila malerkotliana* and *D. bipectinata.*

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D. malerkotliana and *D. bipectinata* are members of the *ananassae* subgroup of the *D. melanogaster* species group (Bock, 1980). The two species differ in a number of morphological traits, but show only weak genetic differentiation and can be hybridized for the purposes of genetic analysis (Bock, 1971, 1978; Singh and Singh, 2001; Kopp and Barmina, 2004). As part of our work on morphological evolution and speciation in this group, we have isolated a number of visible mutations in each species.

Most mutations were induced in inversion-free strains that were previously isogenized by 15-16 generations of single, full-sib crosses. In *D. malerkotliana*, mutations were induced either in

strain 391.0 (obtained from the Tucson *Drosophila* Species Stock Center) or in the isogenic strain mal0-isoC derived from 391.0. In *D. bipectinata*, mutations were induced in the isogenic strain bip3-isoA, derived from strain 381.3 that was obtained from the Tucson stock center. These and other isogenic strains are available from the authors, and colleagues wishing to conduct genetic screens in these species are welcome to utilize these strains.

To avoid giving identical names to non-homologus genes, we generally stayed clear of names that are already in use in *D. melanogaster*. The only exceptions are the *white*, *Curly*, and *lozenge* mutants, which have unmistakable phenotypes. The following mutations were isolated:

1. D. m. malerkotliana

white (*w*) – causes complete loss of eye pigmentation, indistinguishable from the *D. melanogaster white*.

bad bristle day (*bbd*) – greatly reduced, shriveled bristles, similar to *forked* and *singed* mutants of *D. melanogaster*.

punchy eye (*pey*) – slightly darker, maroon eyes, similar to *D. melanogaster rosy*.

grey body (*grey*) – similar to *D. melanogaster dusky* or a weak *ebony* allele.

polished eye (*posh*) – eye surface glossier and more reflective than in the wild type.

white-apricot (w^a) – a hypomorphic allele of *white*.

Curly (*Cy*) – curled-up wings, indistinguishable from the *D. melanogaster Cy*. Dominant, homozygous-viable.

lozenge (*lz*) – greatly reduced, glossy eye, indistinguishable from the *D. melanogaster lz*. Female semi-sterile and generally weak.

Table 1. Mutations in *D. m. malerkotliana.*

Full name	Abbreviation	Autosomal or X-linked	Recessive or Dominant	Mutagen	Isogenic ?
white	*w*	X-linked	Recessive	X-ray	No
bad bristle day	*bbd*	X-linked	Recessive	X-ray	No
punchy eye	*pey*	X-linked	Recessive	X-ray	No
grey body	*grey*	Autosomal	Recessive	X-ray	No
polished eye	*posh*	Autosomal	Recessive	EMS	Yes
white-apricot	w^a	X-linked	Recessive	EMS	Yes
Curly	*Cy*	Autosomal	Dominant	EMS	Yes
lozenge	*lz*	X-linked	Recessive	EMS	Yes

2. *D. b. bipectinata*

Punk (*Pk*) – shorter, sharply bent bristles, similar to *D. melanogaster Kinked*. Dominant, homozygous-viable.

olive (*ol*) – similar to *D. melanogaster dusky* or a weak *ebony* allele.

rizado (*riz*) – greatly reduced, shriveled bristles, similar to *forked* and *singed* mutants of *D. melanogaster* and the *bbd* mutant in *D. malerkotliana*.

emu (*emu*) – greatly reduced, slightly crumpled wings, similar to *D. melanogaster dumpy* mutants.

sandpaper (*sand*) – slightly uneven eye surface; weaker than *D. melanogaster rough*.

rootbeer (*rob*) – very dark brownish – purple eyes.

Table 2. Mutations in *D. b. bipectinata*.

Full name	Abbreviation	Autosomal or X-linked	Recessive or Dominant	Mutagen	Isogenic ?
Punk	*Pk*	Autosomal	Dominant	EMS	Yes
olive	*ol*	Autosomal	Recessive	EMS	Yes
rizado	*riz*	X-linked	Recessive	EMS	Yes
emu	*emu*	Autosomal	Recessive	EMS	Yes
sandpaper	*sand*	Autosomal	Recessive	EMS	Yes
rootbeer	*rob*	Autosomal	Recessive	EMS	Yes

We have not yet investigated whether similar-looking mutations in *D. malerkotliana* and *D. bipectinata* are allelic.

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References: Bock, I.R., 1971, Taxonomy of the *Drosophila bipectinata* species complex. Univ. Texas Publ. 6: 273-280; Bock, I.R., 1978, The *bipectinata* complex: A study of interspecific hybridization in the genus *Drosophila*. Aust. J. Biol. Sci. 31: 197-208; Bock, I.R., 1980, Syst. Ent. 5: 341-356; Kopp, A., and O. Barmina 2004, Evolutionary history of the *Drosophila bipectinata* species complex. Genet. Res., in press; Singh, S., and B.N. Singh. 2001, Indian J. exp. Biol. 39: 835-844.

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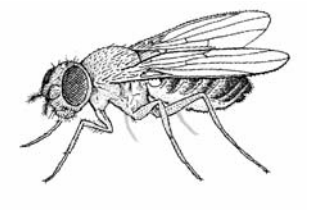

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