Mutation Notes — Other Species

cinnabar, cn: A spontaneous mutation in *Drosophila ararama.*

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Drosophila ararama Pavan and Cunha, 1947, belongs to *annulimana* group which is endemic to the Neotropical region. According to Vilela and Bächli (1990), 15 species, mostly cryptic, have been ascribed to the *Drosophila annulimana* group and they are distinguished only by the male terminalia.

On January 16th 1997 an unfertilized female of the *annulimana* group was collected at *Serra do Cipó*, state of Minas Gerais, Brazil (19°15' S, 43°30' W). Having a suspicion that this specimen could belong to the species *D. ararama*, Dr. C.R. Vilela mated the wild-caught female with a male from an isofemale line (F19F3) from Belém (state of Pará), previously identified by him as *D. ararama* on the basis of the analysis of the F_1 generation males. The F19F3 strain, which was established in 1988, was subsequently lost. The mating was successful, the first generation of imagines was obtained in March 1997, and the second generation one month later. The new strain was then called I61F5. Several males (87) and females (80) showing bright red eyes emerged among a larger amount of wild flies.

The eye color of wild *D. ararama* was described by Pavan and Cunha (1947) as blackish-red, although it looks more like wine.

Virgin females and males both with bright red eyes were crossed and a mutant strain was established (I61F5M1). A wild stock (I61F5M2) was isolated again from several wild-eyed flies of the F_2 generation from the original isofemale line (I61F5).

Table 1. Parental crosses and number of wild and *cinnabar* males and females obtained in the F_1 and F_2 generation.

cross	F_1			F_2				
female X male	wild		total	wild		*cinnabar*		total
	male	female		male	female	male	female	
cinnabar x wild	304	275	579	2,276	2,016	600	556	5,448*
wild x *cinnabar*	298	311	609	2,651	2,234	817	742	6,444

* The deviation of the ratio 3:1 of wild to *cinnabar* was significant at 5% level (chi-square test)

Virgin bright-red-eyed females were mated with wild males (10 pair matings) and virgin wild-eyed females were crossed with bright-red-eyed males (13 pair matings). All the F_1 flies (Table 1) were dark-wine-eyed, leading to the hypothesis that the mutation should be recessive. Furthermore, as the reciprocal crosses cited above yielded only wild-eyed males and females, the gene should be autosomal.

In the crosses of wild females with bright-red-eyed males, the ratio between wine and bright-red eyed F_2 flies (Table 1) was statistically different from 3:1 (Chi-square = 41.54). This may be a consequence of the excess of wild males. Additional experiments are being done to try to figure out the cause of this deviation. In the reciprocal crosses, nearly 3:1 ratio between dark-wine and light-red-eyed flies was found in F_2. This led me to conclude that bright-red eye color in *Drosophila ararama* is a recessive monogenic autosomal mutation. As far I know, this is the first mutant strain to be isolated in any species belonging to the *annulimana* group of *Drosophila*. This mutation is being called *cinnabar* as I am assuming its homology with a similar phenotype produced by an autosomal and recessive mutation known to occur in *Drosophila melanogaster.*

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References: Pavan, C., and A.B. da Cunha 1947, Bolm. Fac. Filos. Ciênc. Letr. Univ. S. Paulo (86), Biologia Geral 7: 20-66; Vilela, C.R., and G. Bächli 1990, Mitt. Scweiz. Ent. Ges. 63 (Suppl.): 1-332.

A spontaneous double mutant in *Drosophila bipectinata*.

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Drosophila bipectinata is a member of the *bipectinata* complex of *ananassae* subgroup of *melanogaster* species group. It is distributed in South East Asia including India. In laboratory stocks of this species, spontaneous mutations such as brown eye, sepia eye, and cut wings have already been described (Hegde and Krishna, 1995; Singh *et al.*, 1995; Banerjee and Singh, 1996). In the present study, we report a spontaneous autosomal double recessive mutation in this species.

We detected several males and females with purple eyes and spread wings double mutant characters in one of our laboratory stocks which was established from a naturally inseminated isofemale line collected from Mysore, Karnataka in 1994. These mutant flies were aspirated out and maintained in separate vials containing food. The crosses between purple eyes and spread wing males and females yielded purple eyes and spread wings, indicating that the stock is pure for both purple eyes and spread wings.

Table 1. Normal and reciprocal crosses between wild and double mutant (purple eyes and spread wings) in *Drosophila bipectinata*.

Class	Number observed	Number expected	χ 2	Number observed	Number expected	χ 2
Wild	459	450	0.18	339	342	0.03
Purple	156	150	0.24	120	114	0.316
Spread	148	150	0.02	116	114	0.035
Purple and Spread	51	50	0.02	36	38	0.10

p value = insignificant at 0.05 level.

The pattern of inheritance of this mutant was studied by crossing mutant males with wild type females. Reciprocal crosses were also made using wild males and virgin mutant females. F_1 progeny consisted of only wild type flies. This shows that the mutant phenotype is recessive. Reciprocal crosses also yielded the same results. Therefore, purple eyes and spread wing mutants are autosomal recessive mutations. The F_1 inbreeding gave both wild and mutant flies in a 9:3:3:1 ratio (Table 1). This shows that the two genes, purple eyes and spread wings, assort independently. Test cross results (Table 2) confirm the difactorial inheritance of the purple eyes and spread wings. This is the first report of a spontaneous double mutation in *D. bipectinata*.

Table 2. The cross between F_1 female and double mutant (purple eyes and spread wings) males in *Drosophila bipectinata*.

Class	Number observed	Number expected	χ 2
Wild	140	133	0.37
Purple	122	133	0.90
Spread	138	133	0.18
Purple and Spread	129	133	0.12

p value = insignificant at 0.05 level.

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References: Hegde, S.N., and M.S. Krishna 1995, Dros. Inf. Serv. 76: 80; Singh, B.N., S. Sisodia, and R. Banerjee 1995, Dros. Inf. Serv. 76: 83; Banerjee, R., and B.N. Singh 1996, Dros. Inf. Serv. 77: 147.