San Miguel Salán, E. Universidad de León, España. Male sterility in four populations of formaldehyde-treated Drosophila melanogaster.

Mutagenic properties of formaldehyde have been known for several years (Slizynska 1957; Auerbach & Kilbey 1971). Its relevance as environmental toxic has been emphasized recently (Perera & Petito 1982). On the other hand, their effects on the partial components of fitness are not yet well understood. In this communication I wish to report the effects of this toxic on the male sterility of D.melanogaster.

Samples of four populations of D.melanogaster were treated with the toxin by the larval feeding method. Populations, experimental treatment, etc., have been described in the previous Research Note (this issue).

Males developed in control medium, and the survivors at 0.2% (v/v) formaldehyde-treated populations were mated invididually with two virgin females of the Cyl/Pm stock, into vials (10 x 2.5cm) containing 10 ml of control medium. The individuals from each vial were kept together for 11 days at 21°C, after which they were removed, and the vials without any emerging adults were scored.

Table 1 indicates the total number of males analyzed (t), and the number of sterile males (s) with their respective percentages (%s). The results suggest that all populations were sensitive to the toxic, at least variably, as shown by the higher sterility percentage in relation to the control populations. More extensive experiments are under way to establish more definitive conclusions.

Table 1.

	Populations							
	TEVERGA		FELGUERA		URBANA		NARANCO	
Samples	s/t	%s	s/t	%s	s/t	%s	s/t	%s
Control	0/50	0.00	1/80	1.25	1/80	1.25	2/80	2.50
Treated	3/37	8.10	5/44	11.36	8/49	16.32	11/80	13.75

References: Auerbach & Kilbey 1971, Ann.Rev.Genet 5:168-187; Perera & Petito 1982, Science 216:1285-1291; San Miguel 1984, DIS 60(in press); Slizynska 1957, Proc.Roy.Soc. Edinburgh 666:284-304.

Sanchez, J.A. and G.Blanco. Universidad de Oviedo, Asturias, Espana. The relationship between variance in rate of development and Adh genotypes in Drosophila melanogaster.

Lerner (1954) has argued that more heterozygous individuals should be characterized by increased developmental stability. Recent reports show evidence for this hypothesis. The more heterozygous populations of different species (lizard, Soule 1979; freshwater bivalves, Kat 1982; killfish, Mitton 1978; monarch butterfly, Eanes 1978; etc.) have lower amounts of fluctuating asymetry and variance for morphological trait. Mitton (1978) retorted that the results are surprising because on the basis of genetic variation of a single locus, a population can be subdivided into two groups that differ in their levels of morphometric variation.

The present paper aims to examine the relationship in D.melanogaster between heterozygosity at an enzyme locus (ADH) and variance of a quantitative trait directly related with the fitness (rate of development).

In this work, the progeny of individuals heterozygous for the Adh locus were classified according to their genotype, sex and rate of development. Two experiments were performed. In experiment A heterozygous flies were obtained from crosses between female F/F and male S/S; and in experiment B from reciprocal crosses. As there are no significant differences in rate of development between the sexes, we combined the data from the sexes in our analysis. Within each genotype (F/F, S/S or F/F) we estimated the phenotypic variation of the character (rate of development) using the variance and the coefficient of variation. The null hypothesis tested here is that individuals heterozygous have the same level of variation as individuals homozygous.

The results show that heterozygous have lower variance and coefficient of variation than both types of homozygotes (Table 1); and in three of the four comparisons these differences are statistically significant (Table 2). Both types of homozygotes have the same levels of variation (Table 1) and there are no significant differences between them (Table 2).

Table 1. Variance and coefficient of variation for the three genotypes in the two experiments performed. σ^2 = variance; n = sample size; c.b.= coefficient of variation.

genotype	F/S	F/F	S/S	Pool of homozygous (F/F + S/S)	
σ^2	1.9185	2.1582	2.2415	2.2063	Experiment A
c.v.	0.0853	0.0914	0.0917	0.0918	
n	817	432	344	776	
σ^2	2.3840	3.0184	3.2675	3.1365	Experiment B
c.v.	0.0928	0.1033	0.1064	0.1048	
n	582	285	255	540	

Table 2. F values in the analysis of variance.

Comparisons	F/S vs F/F	F/S vs S/S	F/S vs Pool homo. (F/F+S/S)	F/F vs S/S
Experiment A	1.1249 n.s.	1.1683 ✗	1.15 ✗	1.0385 n.s.
Experiment B	1.2761 ✗ ✗	1.3705 ✗ ✗	1.3156 ✗ ✗	1.0825 n.s.

n.s.=not significant; ✗ = P < 5%; ✗ ✗ = P < 1%.

The differences in level of variation between heterozygous and both types of homozygous and between heterozygous and homozygous combined (F/F+S/S) (Tables 1 and 2), are consistent with observations compiled by Lerner and the other authors previously cited, and reject the null hypothesis tested here.

No significant difference in variance between F/F and S/S homozygous type were found, thus indicating that the level of variation of the homozygous individuals is independent of the particular allele for which these individuals are homozygote.

References: Eanes,W.F. 1978, Nature 276:263-264; Kat,P.W. 1982, Am.Nat. 119:824-832; Lerner,I.M. 1954, In: Genetic Homeostasis (Oliver & Boyel, Edinburgh); Mitton,J.B. 1978, Nature 273:661-662; Soule,M. 1979, Evolution 33:396-401.

Sato, T. Kansas State University, Manhattan, Kansas USNA. A new homoeotic mutation affecting antennae and legs.

We have isolated a new homeotic mutation which arose spontaneously in the stock of T(1;3)bxd[111]/TM1 (Lewis 1981); for reasons described below, the variant is denoted Bristle on arista of Manhattan (symbolized Ba^m). Preliminary experiments showed it to be a second chromosomal, recessive variant. Male and female homozygotes are viable and fertile, and they show partial transformation of antennae to legs, as well as deletion of some leg structures. Tarsal tissue sometimes including claws develops in place of arista and part of the third segment of antenna (Fig. 1). The third antennal segment usually resembles a patchwork of incompletely differentiated leg cuticle, whereas the first and second segments of antenna are unaffected.

For legs, the region affected is restricted to the distal part and seems to be common in all legs (Fig. 2). Abnormal bristle patterns including reversed polarity appear around segmental boundary between tibia and basitarsus in less extreme cases. This segmental boundary is often very incomplete and accompanied by extrusion of supernumerary cuticles (Fig. 2G and H). In more extreme cases, deletion of distal tibia and whole basitarsus is revealed by missing or reduction of numbers of bristles typical to these parts, e.g., transverse rows on prothoracic leg, apical bristle on mesothoracic leg and preapical bristles on all legs for tibia as well as transverse rows on pro- and metathoracic legs for basitarsus (Fig. 2D, E, F). Frequently in these cases, the number of tarsal segments is also reduced to two or three and