Anxolabehere, D., P. Girard, L. Palabost and G. Periquet. University of Paris, France. Genic variation and degree of heterozygosity in natural populations of Drosophila melanogaster.

In an attempt to estimate the genic variations in natural populations, D. melanogaster flies were collected in October 1971 in the south of France and kept in mass culture at 20°C+1. This natural population appears to be highly polymorphic when one looks for visible recessive mutants. Population studies revealed the presence of at least 17 mutants (some of which are described in D.m. New Mutants section).

Allelic variation was then studied on 26 loci. 17 of them were randomly chosen from the visible recessive mutation class and 10 randomly chosen from the allozymic mutation class (rosy locus is in both classes). For the first class, analysis was made on single virgin flies crossed with multi-marked strains; for the second class, electrophoresis on starch gel was performed with the current techniques generally used.

The results are presented in Tables 1 and 2.

Table 1. Frequencies of alleles in the visible recessive mutation class.

Locus	Tested number of flies	Observed number of heterozygotes	% of heterozygotes	% of the mutant alleles
black (b)	184	0	0	0
brown (bw)	100	0	0	0
dumpy (dp)	84	0	0	0
ebony (e)	71	0	0	0
forked (f)	127	0	0	0
frisé (fri)	613	2	0.3	0.2
garnet (g)	103	0	0	0
miniature (m)	127	0	0	0
rosy (ry)	43	0	0	0
ruby (rb)	103	0	0	0
scarlet (st)	43	1	2.3	1.2
sepia (se)	119	1	0.8	0.4
vermilion (v)	127	0	0	0
vestigial (vg)	100	0	0	0
vin (vi)	121	1	0.8	0.4
white (w)	613	7	1.1	0.6
yellow (y)	613	3	0.5	0.2

Table 2. Frequencies of alleles in the allozymic mutation class.

Locus	Tested number of flies	Observed number of genotypes			Allelic frequencies	
		FF	FS	SS	F	S
αGPDH	110	36	50	24	0.56	0.44
Acph.1	120		monomorphic		1.00	0
Aph.2	112	27	(85)*		0.49	0.51
ADH	120	101	19	0	0.92	0.08
Est.6 males	60			60	0	1.00
Est.6 females	60	2	24	34	0.23	0.77
Est.C	120		monomorphic		1.00	0
ME (NADP)	120		monomorphic			
ODH	120		monomorphic		1.00	0
To	240		monomorphic			
XDH (ry)+	120		monomorphic			

* FS and SS indistinguishable, allelic frequencies expected from Hardy-Weinberg distribution.

Interesting comparisons can be made between these two genome samples. In the first class mutations, 35% of the loci tested appeared to be polymorphic without any statistical difference between autosomal and sex linked mutations. The same amount of variation is encountered

in the second class, 40%, but the degree of heterozygosity in the individual's genome is considerably different: 0.3 % in the first case and 11.3% in the second.

For the enzymatic polymorphism the amount of heterozygosity per individual observed in D.m. falls in the range (.08 - .25) already observed on Drosophila species.

However, genetic variants studied in our two classes are probably different. In fact, for the rosy locus the electrophoresis technique allows one to see functional allozymic variants whereas the visible recessive phenotype technique shows the mutation corresponding to a "non functional" allozymic variant.

Thus, systematic comparisons in natural populations of the amount of polymorphism for the two mutation classes will provide interesting information on polymorphism, its nature and its maintenance.

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Jayasuriya, V.U. de S. and W.E. Ratnayake
Vidyodaya Campus, University of Sri Lanka, Nugegoda, Sri Lanka. Screening of some pesticides on Drosophila melanogaster for toxic and genetic effects.

The mutagenic effects of chemicals were discovered by Auerbach (1943) using Drosophila melanogaster. Sobels (1973) has very convincingly shown that Drosophila melanogaster is still the organism par-excellence for mutagenic studies. Although D. melanogaster has been used extensively for mutagenic studies, this organism has not been widely used for screening mutagenicity of pesticides. Instead, pesticides have been tested widely for genetic and cytogenetic effects on prokaryotes like E. coli, phage and on eukaryotes like Vicia faba and Allium cepa which are plants (Epstein and Legator 1970).

Benes and Sram (1969) studied the mutagenic effects of 34 chemicals (of which 16 were pesticides), by injecting relatively high concentrations into adult D. melanogaster flies and scoring for sex linked lethal mutations. The pesticides tested were mostly insecticides and they did not show any significant mutagenic activity.

In the present study a larval feeding method was employed for testing the mutagenic effects of pesticides. Initially, various concentrations of different pesticides (six - see Table 1) obtained by the serial dilution method were made up in Drosophila food medium and 50 1st instar larvae were introduced into 3" x 1" vials containing about 8 - 10 ml of treated food medium.

Table I. Pesticides used in the study.

1. Fenbar (fenitrithion)	
2. Endrin	1,2,3,4,10,10Hexachloro 6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo-endo5,8-dimethanonaphthalene
3. Gamalin	Benzene hexa chloride
4. Deenol (D.D.T.)	1,1,1, Trichloro 2,2 bis(p-chlorophenyl) ethane
5. Nicotox	3-(1 Methyl-2-pyrrolidyl) pyridine
6. Stam 34	DDVP

The developmental period and percentage of emergence of adult flies were recorded. The results are summarized in Table II. Data obtained from these dosage mortality studies show that within a certain dose range, which varied from one pesticide to another, percentage mortality increased at different rates. It was also observed that development of D. melanogaster larvae was affected. In general, low concentrations did not affect the developmental period, but at increasing non-lethal concentrations of pesticides development was delayed. This is comparable to observations of Ramel & Magnusson (1969) for organic mercury compounds.

The approximate LD 50 concentrations of pesticides obtained from the above studies were then used to treat 1st instar larvae which were subsequently used in genetic tests. The genetic tests carried out were the Muller-5 technique for sex linked lethal mutations and the induced crossing over test in males. Oregon-K (wild type) larvae were treated for the former Test, while + + + +/dp b cn bw larvae were treated for the latter test. Table III summarizes the data obtained from these tests.

The sex linked lethal frequencies for the pesticides tested are almost at the spontaneous