
The adaptation of D. melanogaster to environments with high levels of alcohol is a question of interest to several authors. McKenzie & Parsons (1974) find that flies from wine cellar populations have a higher tolerance to alcohol.
than those from other populations. Najera & Mensua (1979) analyzed two cellar populations and they found that flies from these populations had a greater number of eye colour mutations than flies from other non-cellar populations.

In order to explain this fact we tested the behavior of some wine cellar mutants against their wild allele in artificial populations, comparing two culture mediums, one supplemented with alcohol at 10% and the other without alcohol. We chose four eye colour mutants for their phenotype: two of light colour and two of dark colour, which we named 2/54A (allele of cardinal), 2/74B (strain segregating cardinal and cinnabar mutants), 2/58A (allele of sepia), and 1/51.3 (dark eye not yet identified).

The Buzzati-Traverso (1955) serial exchange technique was used to study the action of natural selection and to follow the population dynamics. The populations were started with 100 heterozygotic individuals, obtained from crossing each mutant with a wild wine cellar stock descending from a female which did not give any variability in F2 of eye colour mutants. The initial frequency of both alleles was then, p=q=0.5.

Two replicates for each mutant population in each medium (alcohol and non-alcohol) was made (making a total of sixteen populations). The culture temperature was 19±1°C and the exchanges to new bottles were carried out every week. All individuals were counted every three weeks at the beginning, every six weeks afterwards, and every twelve weeks at the end of the experiment. Figure 1 shows, in graphic form, the evolution of all populations.

Each mutant attained different gene frequency at equilibrium. Equilibrium was attained approximately 300 days from starting. There were no differences between the normal and the alcohol experiment except in the 1/51.3 mutant, in which the gene frequency was clearly higher in the alcohol medium.

It seems that the different gene frequencies attained are correlated with the grade of colour from darker to lighter.