Marengo, N.P. 1999. A laboratory simulation of natural selection in *Drosophila*. *Dros. Inf. Serv*. 82: 132-133.

A laboratory simulation of natural selection in *Drosophila*.

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In an undergraduate course in genetics, a laboratory exercise was devised to illustrate how, in a single generation of *D. melanogaster*, a significant shift in phenotype proportions in a population could be achieved by introducing a selective environmental hazard. This would be a structure or condition in the environment limiting the viability and reproductive capacity of one of the phenotypes and therefore favoring the viability and reproductive capacity of the other.

The success of the experiment was of such a significant degree, that its communication to the educational and scientific communities appears warranted.

Large numbers of wild type (+) and vestigial (*vg*) flies were cultured separately in conventional milk bottle cultures of tomato-paste agar (Lewis, 1942). After emerging and aging for several days they were issued to students. Some students received five pairs of each phenotype and some received ten. Both population samples yielded similar results.

The students worked in twos, with one responsible for the "control" culture, and the other the "experimental".

The cultures were identical except that the experimental culture had a 20 mm × 60 mm piece of flypaper (Dars bug-all flycatcher, Dars-Met-All Industries, Inc., Long Island City, New York 11101) pierced twice by a swabstick and held suspended over the food mass by having the top of the swabstick pushed through the foam plug of the bottle (Figure 1).

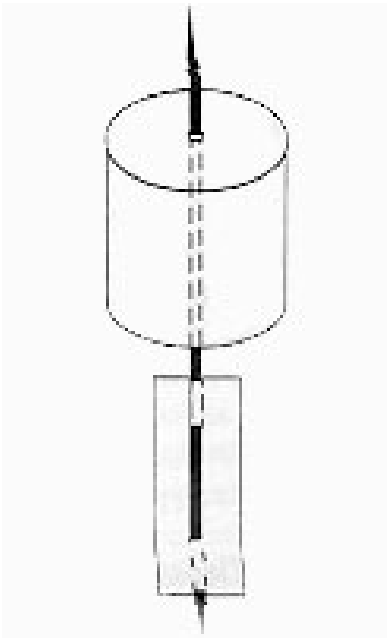

Figure 1. Sketch of the selective hazard consisting of a piece of flypaper attached by a swabstick inserted through bottle plug.

Each class met twice per week and the experiment was completed in three weeks. The first period was taken up with issuing five or ten pairs of each phenotype to each student. These were issued etherized and were placed in small plugged test tubes until active, at which time they were transferred to the breeding bottles. One period of the second week was used to check the fertility of the cultures and remove the surviving parental phenotypes originally introduced.

At room temperature, the cultures were ready for counting two weeks after the start. Two counts were made of each culture, and each student's totals were entered on a master tally-sheet. The figures were then consolidated and compared. A total of thirty student-cultures provided the data. The consolidated results are shown in Table 1.

Table 1.

Control		Experimental	
+	Vg	+	Vg
1561	1361	702	2038

The striking difference in the proportion of phenotypes in the control and experimental cultures indicates that the introduction of a selective hazard can in one generation change significantly the genetic constitution of a population.

References: Lewis, M.T., 1942, Science 96(No. 2490): 282.