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Strain-specific aggregation of adults of competing strains of D. melanogaster.

Fifty virgin females and an equal number of males of one strain of D. melanogaster (homozygous for the mutant, ebony) were introduced into a 4"x4"x2" plastic population cage with a like number of adults from either of two wild type strains. (A2- a strain with a history of inbreeding and A6- a strain maintained by mass mating.) Eight equally spaced, removable vials protruded from the sides and opened into the central part of the cage. These vials contained 5cc. of standard Cornmeal-Molasses-Agar media that had been seeded with a 10% live yeast suspension. Twice a day, the vials were removed from the cage, the flies within each vial were etherized and counted, the vial repositioned in the cage, and the flies returned to the center of the cage. After seven days, the vials were removed to allow emergence of the F1 within the vials. The flies of this generation were then introduced into cages and fresh vials inserted. Of the eight new vials, two had been pre-conditioned by placing 60 adults of the ebony strain in the vials for 24 hours, and two had been similarly pre-conditioned by the other strain represented in the cage. Counts were made twice daily for six days.

Using a 2 x 8 contingency table (the two strains with eight vials to choose from) on the daily counts of flies per vial, X^2 values were obtained that indicated an increasing non-random distribution of adults in the eight vials over the 7 day period of counting for the competing ebony and A2 parents. On the other hand, no discernible pattern could be seen for the competing A6 and ebony adults. The data are reported in Table 1.

Table 1

	day 1	2	3	4	5	6	7	
X^2 values	7.32	7.80	6.97	8.74	17.13	14.73	32.73	A2-ebony competition
	4.89	19.12	11.24	4.35	7.70	8.30	12.56	A6-ebony competition

For 7 degrees of freedom, the X^2 value is equal to 14:07 at the 5% level of significance.

Table 2 is a summary of the data for the second generation. Heterozygotes between ebony and A2 were recognized by the trident pattern and it was confirmed by progeny testing. In this case, the data are reported in a 3 x 3 contingency table since there were three classes of flies (ebony, A2 and the heterozygotes) and they had three choices of media (non-conditioned and preconditioned by either A2 or ebony adults for 24 hours.) The numbers in the table are the total of that class on that medium for the 6-day period of counting. The numbers in parentheses represent the X^2 values, and in cases of significant differences, the plus or minus sign indicates whether the observed number was greater or less than the expected. It is apparent that all three classes of flies distribute themselves randomly with regard to the ebony pre-conditioned medium. On the A2 preconditioned medium, however, there were significantly fewer ebony and a significant excess of A2 flies. There is an indication of preference by ebony flies for unused media, while heterozygotes show no preference at all. The suggestion from this data is that ebony and A2 flies seem to establish biotic or ethological niches for themselves within a physically uniform environment.

Table 2

		Class of Flies: Ebony	A2	Heterozygotes
Media pre-conditioned by	Ebony	25 (.11)	104 (.11)	139 (.48)
	A2	7 -(15.56)	166 +(12.41)	139 (1.50)
	Neither	107 +(4.40)	366 (2.62)	489 (.02)