be recognized. Nevertheless, it was realized that w^{ch} is located to the left of w, which in turn signifies that w^{i} is located to the left of w.

In the present crossing over tests with w^{i} and other mutants of a subsite, the frequencies of recombinational derivatives were comparatively low in general when compared to that of the mutants of two different subsites. This may be explained most plausibly due to close sharing of location of w^{i} with the employed mutants, rather than that w^{i} inactivates recombination in this genetic interval. This supplements our earlier findings (Hazra et al. 1978) that w^{i} is a point mutation rather than a duplication as hypothesized by Bowman (1965).

References: Bowman, J.T. Jr. 1965, Genetics 52:1069; Hazra, S.K., J. Banerjee and S.K. Sen 1978, Heredity 40:299; Judd, B.H. 1959, Genetics 44:34; Lewis, E.B. 1959, Genetics 44:522; Lindsley, D.L. and L. Sandler 1963, in: Methodology in Basic Genetics, p. 390.

Hedrick, P.W. and E. Murray. University of Kansas, Lawrence, Kansas. Competition between D. melanogaster and D. simulans from natural populations.

D. melanogaster and D. simulans are sympatric over much of their distributions and they appear to have similar ecological niches. Generally, melanogaster is the more common species where they coexist although there are some exceptions. In samples captured in a single location in Lawrence, Kansas, melanogaster was the most common of the two species in both 1977 and 1978 (Table 1). At all sampling times, the proportion of melanogaster was around 90% and the overall proportion is exactly 90.0%.

Table 1. The number of melanogaster and simulans males trapped in Lawrence, Kansas.

Date	mel	sim	% mel
7/77	292	25	92.1
9/77	218	35	86.2
7/78	50	1	98.0
9/78	86	11	88.7
Total	646	72	90.0

The proportions of two species observed in nature may be a reflection of a number of factors, such as predation, interspecific competition, sampling techniques, habitat selection, etc. Therefore, an interspecific competition experiment was set up to examine whether the results of interspecific competition in the laboratory were consistent with the field data. As a result only males could be scored, since females of the two species are very difficult to distinguish. At least 50 males were scored for each replicate every generation except in a few generations where there were slightly less than 50 males in a replicate. The two lines of melanogaster, mel 1 and mel 2, were randomly selected isofemale lines caught at the Lawrence location and had been in culture for approximately six months. One simulans line, sim 1, was initiated from approximately 10 females caught in a Kansas City, Kansas park about 35 miles from Lawrence and had been in culture for approximately 30 months. The other simulans line, sim 2, was an isofemale line that was caught at the Lawrence location and had been in culture for approximately 18 months.

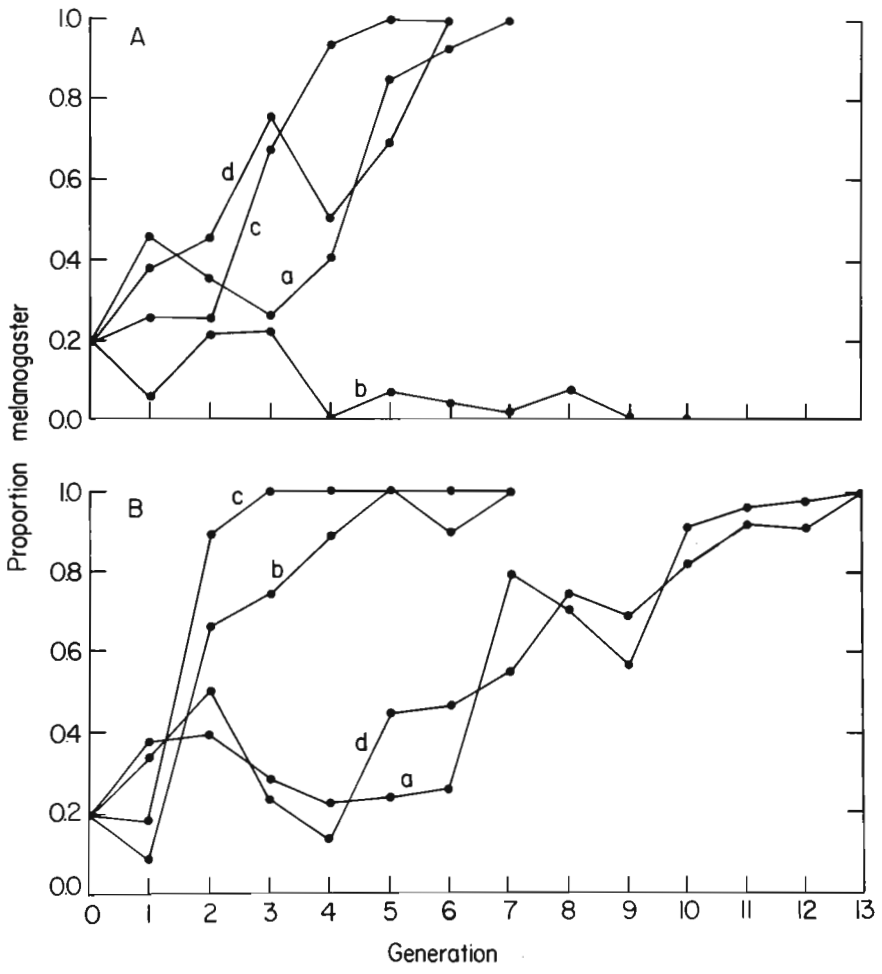
Since melanogaster was in higher proportion in local natural populations and generally outcompetes simulans in laboratory tests, the experiments were initiated with 6 pairs of melanogaster and 24 pairs of simulans, giving an initial frequency of 20% melanogaster. Four replicates of each of the four combinations of the melanogaster and simulans lines were set up. Generations were discrete and kept at 14-day intervals with the adults allowed to lay eggs for four days. Other details are as in Hedrick (1973).

The results of competition for sim 1-mel 1 and sim 1-mel 2 are given in Figures 1A and 1B, respectively. In only one replicate did simulans outcompete melanogaster and become fixed, replicate (b) of the sim 1-mel 1 competition. In all other replicates, melanogaster eventually became 100% of the culture. There is variation between replicates, however, with replicates (a) and (d) of the mel 1-sim 2 competition containing a few simulans even after 12 generations. When sim 2 was competing with mel 1 and mel 2, simulans was elminated within five generations in five of the replicates. In the other three replicates, no melanogaster were ever scored. It appears that for some unexplained reason, the initial six females in these replicates did not produce any progeny.

One can measure the relative competitive ability of these two species for the different replicates by finding the "best" numerical fit of the change in proportions over time. Since melanogaster was the winner in all but one replicate, the relative competitive ability of

Table 2. Relative competitive ability estimated from the best fit to the observed change in species composition for each replicate.

	sim 1		sim 2	
Replicate	mel 1	mel 2	mel 1	mel 2
a	0.70	0.80	0.25	0.70
b	1.30	0.45	-	-
c	0.65	0.30	0.45	0.65
d	0.70	0.80	0.25	-
Mean	0.84	0.59	0.32	0.68



Figs. 1A and 1B

melanogaster was assumed to be unity and the simulans competitive ability (x) was varied at 0.05 increments until the smallest sum of squared deviations was found. More specifically, competition was assumed to be analogous to selection in a haploid where p_i and q_i are the proportions of melanogaster and simulans in generation i, respectively. Then the proportion of melanogaster in generation $i+1$ is

$$p_{i+1} = p_i/(p_i + xq_i)$$

The difference between these proportions and those estimated in the replicates was squared and summed for different values of x. The value of x which gave the minimum sum of squared deviations is given in Table 2. The relative competitive ability for the melanogaster lines can be calculated as $1/x$.

An interesting finding from this analysis is that the estimated "relative competitive ability" for the two melanogaster lines are quite similar while those for the simulans lines are quite different. The mean relative competitive abilities for mel 1 and mel 2 were 1.64 and 1.61, respectively, and for sim 1 and sim 2, they are 0.72 and 0.46, respectively. The similarity of the melanogaster lines might have been expected since these lines were established from single females at the same time. On the other hand, sim 1 was different from sim 2 in that it was established earlier and with a larger initial number of females. Either of these factors may have contributed to the greater competitive ability of sim 1. The earlier establishment date would have allowed more time for adaptation and the larger initial sample could have given more genetic variation for factors important to competitive ability.

References: Hedrick, P.W. 1973, Evolution 26:513-522.

Table 1.

Distribution of different Drosophila species in Lonavala, Poona and Mahabaleswar.

Sub-genus:			Sophophora														Drosophila			Scapto-droso-phila			Dorsilopha			
Species group:			melanogaster														immigrans									
	Collection locality	Altitude (in meters)	D. ananassae	D. anomelani	D. bipectinata	D. coonorensis	D. eugracilis	D. jambulina	D. kikkawai	D. malerkotliana	D. melanogaster	D. mysorensis	D. pseudoananassae	D. montium	D. rajasekari	D. suzukii	D. nasuta	D. neonasuta	D. immigrans	D. nigra	D. krishnamurthyi	D. varietas	D. busckii	Phorticella striata	Total	Total number of Drosophila species
Wild	Poona	550	-	-	24	2	2	248	-	228	-	9	-	-	33	-	46	7	-	-	-	-	-	9	608	10
	Lonavala	500	-	-	105	-	6	224	-	179	-	-	2	1	36	1	41	4	-	2	1	-	-	-	602	12
	Mahaba-leswar	740	-	19	74	-	13	484	8	277	-	12	5	2	22	2	186	42	8	2	-	26	-	4	1186	17
	Total	-	-	19	203	2	21	956	8	684	-	21	7	3	91	3	273	53	8	4	1	26	-	13	2396	19
Domestic	Poona	550	145	-	-	-	-	-	-	-	152	-	-	-	-	-	-	-	-	-	-	-	2	-	299	3
	Lonavala	620	684	-	4	-	-	-	-	6	35	-	-	-	-	-	-	-	-	-	-	-	-	-	729	4
	Mahaba-leswar	740	74	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	94	2
	Total	-	903	-	4	-	-	-	-	6	207	-	-	-	-	-	-	-	-	-	-	-	2	-	1122	5
Grand Total		-	903	19	207	2	21	956	8	690	207	21	7	3	91	3	273	53	8	4	1	26	2	13	3518	22

(Hedge, S.N.)