release point. The traps consisted of 2-gallon wax paper buckets containing some fermenting banana to attract Drosophila. One-half hr after the release of flies 4 traps were again evenly spaced on a circle roughly 10 meters from the center. Two additional traps were placed at the center. These 6 latter traps were kept sealed outside the experimental field until needed. For 2 hr after the release, flies were collected from all 14 traps by sweeping with a net over the bait. Flies unable to fly (at the central traps only) were aspirated into a vial and kept separate from the 'flying' flies. These walking flies invariably turned out to be marked and were not included in the LOW line flies selected, since the act of handling these flies may have injured them, impairing flight ability. At the conclusion of the experimental run, all flies were returned to the laboratory where marked and unmarked flies were sorted out under ultraviolet light. Marked flies collected at the periphery became the parents of the next HIGH line generation, while viable marked flies trapped at the 2 center traps produced the following LOW line generation. A total of 7 such releases were conducted in an open grassy field on the campus of N.C.State University.

Results. The results of directional selection for 6 generations in the field are shown in Table 1. The divergence between the lines (HIGH minus LOW) and the cumulative selection pressure are also shown. Movement data in generation 1 are for the original native population prior to selection of HIGH and LOW lines. As tabulated, only between 11 and 50% of the 2,000 HIGH and LOW flies released each generation were recaptured. Six generations of selection in the field resulted again in significant divergence between HIGH and LOW selected lines (sign test, $p<.05$; t-test ($df=6:4.94$, $p<.01$)). Heritability over the 6 generations for the controlled divergence was estimated to average 0.04 (4%) with a standard error of 0.0081. The estimates of heritability for both cage and field work should be doubled if all mating took place prior to selection. Therefore, a heritability range of 4-8% is obtained.

A significant trend was associated with selection progress in the field in that the percentage of released flies recaptured increased from ca. 11% in the first 2 generations to above 40% in both HIGH and LOW lines by generation 7 (sign test, $p<0.001$).

In conclusion, the evidence indicates that a genetic component, albeit small, exists for field dispersal ability in D.melanogaster. The presence of such heritable variation in natural populations provides some flexibility to adapt should there be selection in favor of either fast or slow moving flies.

References: Connolly,K. 1966, Anim.Behav. 14:444; Ewing, A.W. 1963, Anim.Behav. 11:2; Grant, B. & W.E.Mettler 1969, Genetics 62:625; Hirsch, J. & J.C.Boudreau 1958, J.Comp. Physiol.Psycho. 51:647.

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Modification of recombination frequency by ethyl methanesulphonate and chloroquine phosphate in female D.melanogaster.

Effect of ethyl methanesulphonate (EMS) and chloroquine phosphate (CHQ) was studied on the frequency of recombination in female germ cells of D.melanogaster by dividing the 96 hr larval period (at 25°C) into three equal parts. Using LD_{50} as a criterion, optimum doses of EMS and CHQ were determined. For the 1st, 2nd and 3rd parts of D.melanogaster larvae, the LD_{50} values for EMS, respectively, were 0.90, 0.75 and 0.75%; the corresponding values for CHQ were 0.185, 0.165 and 0.180%. These concentrations of EMS and CHQ were used in the present experiments. Thirty-five to forty females of stock dumpy black cinnabar (dp b cn: 2nd chromosome markers) were mated with wild type (Oregon-K) males for 1-2 days. Inseminated females were starved for 2-3 hr and then allowed to lay eggs for 2 hr. The resultant eggs were transferred on to the food medium with or without EMS or CHQ. The F_1 larvae were thus reared in the 1st, 2nd or 3rd part of larval life on food mixed with respective optimum dose of EMS or CHQ in ratio 9:1. A two-day old F_1 female was mated with 3-4 dp b cn males. The difference in frequency of recombination obtained in the treated and untreated testcross populations was tested using z-test.

Genetic positions of the second chromosome markers in standard genetic map are: dp - 13.0; b - 48.5; cn - 57.5. In the present studies, the percentages of recombination in untreated F_1 females of D.melanogaster in regions dp-b and b-cn were very close to the values of standard genetic map (Table 1).

Decrease in the recombination frequency was observed in both the regions (dp-b and b-cn) studied when treatment with EMS or CHQ was given in the 1st, 2nd or 3rd part of larval life

Table 1. % recombination in regions 1 (dp-b) and 2 (b-cn) in EMS- and CHQ-treated F_1 females of D.melanogaster.

Chemical/ Larval period treated	No. F_1 females treated	Population size	% recombination in region 1	2
Control	20	3723	35.4	9.0
EMS/I	24	3596	29.4[c]	6.4[c]
II	18	2761	26.6[c]	5.1[c]
III	34	1794	32.2[a]	9.0
CHQ/I	24	3206	30.0[c]	5.3[c]
II	22	5370	26.4[c]	4.1[c]
III	23	2302	30.8[c]	6.7[b]

$\bar{P}$ values: [a]0.05; [b]0.01; [c]0.001

(Table 1) (except in one case in region b-cn where the decrease was non-significant when EMS was given in the 3rd part.

Throughout the entire larval life the ovaries contain only oogonia, no oocytes. The oogonia present in the 1st, 2nd and 3rd part of larval life of D.melanogaster responded differently with regard to reduction with EMS and CHQ in the frequency of recombination in regions dp-b and b-cn; the oogonia present in the 2nd part of larval life appear to be most sensitive for reduction in recombination frequency with EMS and CHQ for both the regions studied.

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Black pepper (Piper nigrum) is not mutagenic to D.melanogaster.

Black pepper is a widely used spice. Recently there has been some evidence that pepper is carcinogenic (Concon et al. 1979); however, Rockwell & Row (1979) found black pepper to be non-mutagenic with respect to Salmonella/microsome assay. Whole peppercorns showing no evidence of mold or insect infestation were ground into a fine powder. To make sure that the pepper was ingested by the Drosophila, various concentrations of the pepper were mixed with the Drosophila media: 1.9g Carolina Biolgoical Supply Co. instant Drosophila media 4-24; 0.1g Brewer's yeast and 9ml of water on which OR/y^+B^S were reared from egg to adult. Offspring survived to adulthood only on concentration of less than .005g of pepper/10ml of food. The loss of X or Y chromosomes was determined by rearing OR/y^+YB^S on media containing .002 or .003g of pepper/10ml of food. Adult male offspring which emerged were allowed to feed for an additional two days on the media to insure that mature spermatozoa were also exposed to the pepper and then mated to y^2w^{sp} females for two, three day broods. The data presented in Table 1 indicated that the feeding of .002 and .003 pepper/10ml of food did not increase nondisjunction, the loss of the X or Y chromosome, the loss of B^S or y^+ in any of the broods compared to the controls. A 2 x 2 contingency table with Yates' correction factor was used in the analysis.

To determine whether feeding on black pepper during the entire larval life would induce recessive sex-linked lethals, Oregon R males were also permitted to feed for two additional days as adults and then mated to M-5 females for broods 0-3 and 3-6 days.

Table 1. Nondisjunction and loss of X and Y chromosomes, loss of B^S and y^+ in offspring of OR/y^+YB^S fed black pepper.

Pepper Conc/10g	Brood in days	Total Gametes	XXY	loss of X or Y	loss of B^S	loss of y^+
Control	0-3	11100	2(.018%)	9(.081%)	0	0
	3-6	12629	4(.032%)	19(.15%)	2(.016%)	1(.0079%)
.002g	0-3	21745	2(.0092%)	12(.055%)	3(.014%)	1(.0046%)
	3-6	23727	7(.0295%)	35(.1475%)	2(.008%)	0
.003g	0-3	23045	9(.039%)	17(.074%)	2(.0087%)	2(.0087%)
	3-6	25125	2(.008%)	28(.111%)	3(.012%)	2(.008%)