show that there must exist interactions between all three chromosomes without considering their origin.

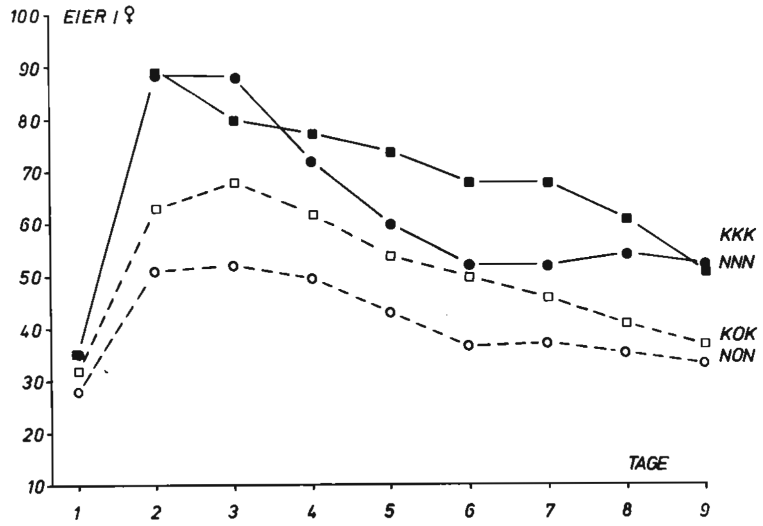

Figure 1. Fecundity (eggs/♀) of the base populations NON and KOK and the re-synthesized lines NNN and KKK until the ninth day.

Nevertheless it is interesting that each line with an X-chromosome from the selected photonegative strain leads to a higher fecundity in comparison with all the other exchange lines. This may support the conclusion that genes which increase fitness are linked with those being directly selected because the effect of the X-chromosome for negative phototactic behavior in D.m. is obvious (e.g. Köhler, 1977).

Similar results were obtained from the egg to adult survival rates. In this case the rank order is KNN < KNK < NKK < NNK < KKN < NKN. The first and second lines show significant differences as compared with the last three lines ($P < 0.01$).

Another interesting result came from the comparison of the fecundity of the populations NON and KOK with the strains NNN and KKK, which were again synthesized from the exchange lines. It is obvious (Fig. 1) that the fecundities of both lines (NNN, KKK) are higher than those of the base populations KOK and NON. This may be an effect of the exchange procedure which lasted 15 generations and must have brought a higher degree of heterozygosity.

References: Hadler, N.M. 1964, DIS 39:131; Hirsch, J. 1967, in Behavior-Genetic Analysis, McGraw Hill, New York; Köhler, W. 1977, Genetica 47:93-104; Nöthel, H. 1967, Strahlentherapie 134:609-624; Siegel, S. 1956, Nonparametric Statistics, McGraw Hill, Tokyo.

Mikasa, K. and T. Narise. Josai Dental University, Sakado, Saitama, Japan. The relation between dispersive behavior and temperature. II. Sex difference.

The experiments were conducted to examine the sex difference in dispersive behavior of D. melanogaster. The strains used were two wild strains, MS-1 and Oregon-R, and six mutant strains (cn bw, e, ss, ss^a, vg and w^a) of melanogaster. In addition, six wild strains (HD, AM, KZ, OD, AT and FO) newly collected in Japan were utilized. Fifty pairs of one to three day old flies of a strain were introduced in a Sakai's migration-tube (original tube) and kept for 24 hrs in it. Then, three new tubes having fresh food were connected with the tube

Table 1. Dispersive activities of both sexes at 15, 20, 25 and 30°C in laboratory and wild strains of D. melanogaster.

Strain	Temp.	15	20	25	30°C
vg	♀	2.4	4.2	2.2	7.4
	♂	5.6	13.0	9.4	11.4
ss^a	♀	3.4	1.8	1.6	10.6
	♂	6.0	21.0	16.2	15.8
cn bw	♀	1.8	4.2	16.4	22.2
	♂	1.8	15.0	29.6	32.8
e	♀	2.0	3.8	2.8	13.4
	♂	0.4	1.6	5.8	9.0
ss	♀	1.6	2.2	3.2	17.0
	♂	3.2	3.8	8.8	17.4
w^a	♀	4.0	2.8	4.4	10.2
	♂	2.0	4.0	9.0	17.6
MS-1	♀	0.0	1.6	4.4	1.8
	♂	1.8	11.0	21.8	8.6
Oregon-R	♀	0.8	5.2	9.8	20.8
	♂	2.8	6.6	25.0	16.4
HD	♀	14.2	21.8	23.6	45.0
	♂	17.8	34.2	28.0	45.2
AM	♀	7.2	36.4	28.2	31.4
	♂	12.4	26.0	25.6	32.4
KZ	♀	12.8	33.4	37.6	30.4
	♂	15.8	27.6	31.8	33.8
OD	♀	9.2	35.0	35.0	32.8
	♂	13.0	27.0	32.8	37.2
AT	♀	20.4	31.2	37.8	32.6
	♂	23.2	29.2	37.4	35.6
FO	♀	6.0	10.8	11.6	36.6
	♂	7.4	36.6	30.0	36.6

and dispersal was allowed for six hours. After that period of time, dispersed male and female flies in the three connected tubes were counted separately. Four kinds of temperature, 15, 20, 25 and 30°C, were used, and the experiments were carried out at each temperature in a dark room. Ten replications were made, and the dispersive activity was calculated in percent of dispersed flies to the number of flies introduced into the original migration tube in each sex.

Table 1 shows the dispersive activities of both sexes for each temperature in each population. From Table 1, it can be said that in general, the activities of both sexes increased with increasing temperature, and the activity is quite different among strains. Table 2 presents the female ratio (number of dispersed female flies/total dispersed flies) for each temperature in each population. As seen in Table 2, male flies move more frequently at each temperature in eight laboratory strains with few exceptions. However, in newly collected wild strains it was observed that female flies dispersed more often than males at optimum temperature for melanogaster, 20° and 25°C, in AM, KZ, OD and AT strains, while at unfavorable temperatures like 15° and 30°C female flies move frequently in two other strains. Furthermore, there was a tendency for female flies to move more often at 30°C than at other temperatures in each strain. The correlation between activities of both sexes at each temperature was also studied, and no correlation was detected.

From this experiment, it was found that the response of dispersive activity to temperature was quite different between sexes as well as strains. It was also detected that in wild strains there were two types of response to temperature. One of them is that female flies disperse more frequently at optimum temperature as seen in AM, KZ, OD and AT strains, and the second is that at optimum temperature male flies move more often than at unfavorable temperature. Five strains out of eight in laboratory strains belong to the second type (vg, ss^a, cn bw, e, and w^a), while female flies tend to disperse more frequently with increasing temperature in three other strains.

Strain	Temp. 15	20	25	30°C
vg	.29 ± .18	.24 ± .14	.16 ± .17	.37 ± .17
ss^a	.33 ± .30	.08 ± .10	.07 ± .11	.34 ± .23
cn bw	.46 ± .50	.20 ± .13	.32 ± .15	.39 ± .16
e	.88 ± .21	.75 ± .40	.26 ± .25	.60 ± .13
ss	.36 ± .39	.46 ± .34	.44 ± .32	.50 ± .22
w^a	.66 ± .41	.40 ± .39	.30 ± .23	.46 ± .27
MS-1	.00 ±	.10 ± .12	.16 ± .09	.18 ± .21
Oregon-R	.25 ± .27	.53 ± .27	.29 ± .21	.56 ± .11
HD	.43 ± .15	.39 ± .14	.44 ± .10	.51 ± .08
AM	.36 ± .21	.59 ± .07	.52 ± .07	.50 ± .10
KZ	.45 ± .17	.55 ± .08	.55 ± .10	.48 ± .08
OD	.37 ± .23	.56 ± .09	.51 ± .05	.47 ± .07
AT	.45 ± .15	.52 ± .06	.50 ± .06	.47 ± .10
FO	.31 ± .30	.25 ± .13	.26 ± .11	.48 ± .15

Table 2. The female ratio at 15, 20, 25 and 30°C in laboratory and wild strains of D. melanogaster. (Mean and standard deviation)