homologous to II R of D. melanogaster. A number of wild males from Cinisy (Sicily) were crossed individually to cn, ma or vg, pp females. From the offspring heterozygous single cn ma/++ or vg pp/++ males respectively were back-crossed to ten or more mutant females in order to get a big enough number of offspring flies to detect any male recombination with a rate higher than 0.5%. The results are shown in the table.

There was not a single male recombination in any of the various wild chromosomes and no segregation distortion could be observed. The predominance of + + phenotype is due to the poor performance of the double mutant phenotypes. Segregation distortion, however, is expected to be effective against the + + chromosomes. There is no evidence for such an effect in any of the cultures. The results can certainly not be taken as a general proof of absence of male recombination in D. subobscura but might be an indication that the phenomenon is not a general one for all crosses, for all populations and all chromosomes of the genome.

(The technical assistance of Mrs. Stögerer and Miss Kaipf is highly appreciated.)

Stamatis, N.D. University of Patras, Patras, Greece. Male recombination elements in a southern Greek D. melanogaster population.

Since 1971 (Hiraizumi), chromosomes associated with male recombination elements have been isolated from natural populations of D. melanogaster, covering almost all the world. During the autumn of 1971 and in the course of a study which aimed to detect recessive lethals in a natural population of southern Greece, one lethal second chromosome (symbol 31.1) was discovered to be associated with male recombination element(s) (Yannopoulos and Pelecanos 1977).

The aim of the present communication which constitutes a part of a much wider investigation is to ascertain whether male recombination elements are still present in the same population and to estimate their frequencies.

Wild flies were collected in June 1977. Captured females were transferred individually on fresh food (consisting of a standard cornmeal medium) and were allowed to lay eggs for five days. All cultures were kept in 25±0.5°C.

The progenies of each captured wild female were then crossed in a brother-sister mass mating; thus, a number of wild lines were established. Afterwards, strains Cy/+;Ubx^{130}/+, bearing one second and one third chromosome from each wild line, were established by the following procedure:

G_1: +/+;+/+ x Cy/bw^{vI}; Ubx^{130}/Sb* (1 ♀ x 3 ♂)

G_2: Cy/+;Ubx^{130}/+ x Cy/bw^{vI};Ubx^{130}/Sp (1 ♀ x 3 ♂)

G_3: Cy/+;Ubx^{130}/+ x Cy/+;Ubx^{130}/+ (1 ♀ x 1 ♂)

↓

strain Cy/+;Ubx^{130}/+

In order to determine whether the wild chromosomes of these strains have the ability to induce male recombination along the second chromosome, males Cy/+;Ubx^{130}/+ were mated with dp b cn bw;ve virgin females. The F_1 +/dp b cn bw;+/ve and +/dp b cn bw;Ubx^{130}/ve sons (at least ten for each case) were then separately selected and individually mated with dp b cn bw; ve virgin females (see Table 1; crosses A and B, respectively). The F_2 progenies of both crosses were scored for recombinants until the 18th day after setting up the matings.

Among the 23 strains tested 13 (56.52%) have shown an association with MR elements, for they yielded male recombination frequencies higher than those of the control (see Table 1, line 14). Moreover, the spontaneous level of male recombination frequency is known to be 0-8/10,000 (Demerec 1965). For control, F_1 Canton/dp b cn bw Canton/ve males derived from Canton (wild type stock) fathers were mated with dp b cn bw; ve virgin females and their progeny were scored for recombinants.

The results show that the presence of the wild third chromosome influences male recombination along the second chromosome.

Our data do not allow us to suggest that one or more of the MR elements are identical

*For description, see Lindsley and Grell (1968).

Table 1. Male recombination frequencies in +/dp b cn bw;+/ve (A) and +/dp b cn bw;Ubx^{130}/ve (B) males. (+ stands for the whole second and third chromosomes.)

	A				B			
Strain	Male recombination frequency (%)	No. of males which produced recombinants (%)	No. of progeny	Average K*	Male recombination frequency (%)	No. of males which produced recombinants (%)	No. of progeny	Average K*
1	4.12	25.00	1844	0.53	0.13	6.67	1707	0.58
2	1.75	65.38	1660	0.46	0.08	6.67	1181	0.59
3	--	---	--	--	0.47	20.00	1909	0.51
4	0.46	13.33	2161	0.49	0	0	1114	0.55
5	0.31	30.77	1923	0.51	0	0	825	0.53
6	0.28	14.29	717	0.57	0.21	8.33	1421	0.57
7	0	0	1719	0.52	0.27	12.50	1100	0.54
8	0.05	6.67	1949	0.51	0.24	25.00	418	0.54
9	0.20	11.11	987	0.47	0	0	772	0.53
10	0.17	10.00	563	0.52	0	0	2250	0.59
11	0	0	1665	0.53	0.16	5.88	1899	0.60
12	0.15	19.19	1370	0.53	0	0	1018	0.55
13	0	0	1082	0.57	0.15	12.50	684	0.54
14	0	0	1835	0.55	0	0	2153	0.56

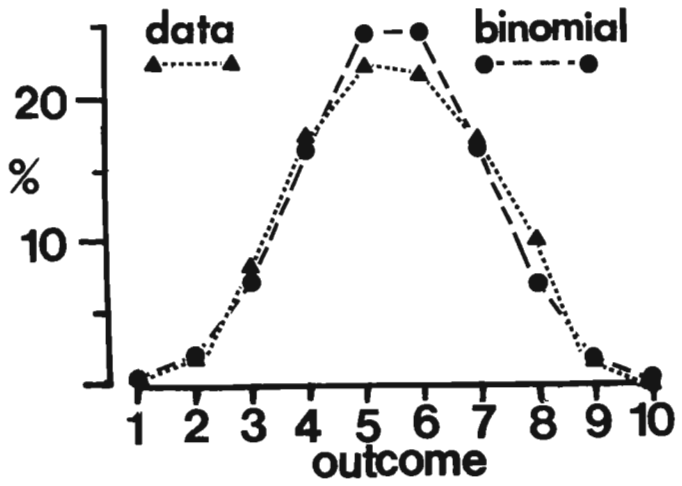
*Average K = the proportion of wild-type among total progeny (excluding crossovers).

with the 31.1 MRF, which was found in the same population. Moreover, it is still obscure whether the above mentioned population is polymorphic as regards the male recombination elements. New experiments are needed before jumping to conclusions. Our investigation is still in progress.

References: Demerec 1965, Hafner Publishing Co.; Hiraizumi, Y. 1971, Proc. Nat. Acad. Sci. USA 68:268-270; Lindsley, D.L. and E.H. Grell 1968, Carnegie Inst. of Wash. Publ.; Yannopoulos, G. and M. Pelecanos 1977, Genet. Res. 29:231-238.

Stark, W.S., K.G. Hu and R.B. Srygley. The Johns Hopkins University, Baltimore, Maryland. Comparisons of phototaxis properties in differing mazes.

The purpose of this communication is to dramatize the dependence of phototactic behavior in D. melanogaster upon the conditions of the experiment. Specifically, we have found flies to be photoneutral in a 10-outcome Hirsch-Hadler (Hadler 1964) classification maze at an illumination wavelength and intensity to which flies are highly phototactic in our straight and Y-shaped arenas (Hu and Stark 1977). The accompanying figure plots the outcome placements in the Hirsch-Hadler classification maze of white-eyed cn bw D. melanogaster (N = 339) under medium intensity (6.3×10^{13} quanta/cm^2.s) blue-violet light (from a GE ribbon filament bulb, 6V 18A, with Corning filters CS-5-57 and CS-3-75 transmitting from 400 to 500 nm). Outcome 10 is towards light. Under these conditions, unselected flies were photoneutral (mean score = 5.51), consistent with a slight photonegativity greatly lessened by lack of eye color pigment (see Markow and Scavarda, 1977 recently). Even though the subject number, N = 339, is summed from 7 runs of 26 to 87 flies, the data show a slight flattening from the expected binomial distribution, perhpas due to crowding at early central decision points. On the other hand, the same Drosophila are highly positively phototactic in our straight (and Y) arenas: they go in increasing numbers to the brighter side in a choice. This is expressed as a high correlation coefficient (typically r = 0.9) in the function relating proportion of flies on one side with the log of the intensity on that side for 7 intensity levels spanning 2 log units. At these illumination levels, phototaxis was found to be dominated by compound eye receptor cells R 7/8 (see Hu and Stark 1977).



The discrepancies in phototactic behavior among different experimental situations are rarely discussed (except see Rockwell and Sieger 1973; Markow and Merriam 1977). Polygenic selection experiments using the classification maze find unselected flies photoneutral while in most studies emphasizing function of compound eye receptors, Drosophila are photopositive (Bertholf 1932; Schümperli 1973; Heisenberg and Buchner 1977; Hu and Stark 1977; Jacob et al. 1977). In this study, we compared the same fly strain under similar illumination conditions to reduce the number of variables which differ between most straight, Y or T arena vs. Hirsch-Hadler maze experiments. To this end, we used much dimmer monochromatic light, typical of the receptor input experiments conducted at specific receptor thresholds, rather than bright white fluorescent lighting used in genetic-selection experiments. Even so, flies were photoneutral. Lewontin (1959) has reported that agitation can increase phototaxis. This could account in part for the clear distinction of phototactic flies from nonphototactic mutants using Benzer's (1967) counter current device (see also Markow and Merriam 1977). Clearly, flies meandering through a classification maze overnight are unagitated. But in some of the receptor-input studies cited (Schümperli 1973; Heisenberg and Buchner 1977; Jacob et al. 1977) flies were also unagitated. Our experiments using straight or Y arenas, as well as the classification maze, would minimize the contribution of the predominant photoreceptor type R1-6, by