

# COMPETITION BETWEEN MALES IN THE DETERMINATION OF MATING SPEED IN *DROSOPHILA PSEUDOOBSCURA*\*

By D. KAUL† and P. A. PARSONS†

Kaul and Parsons (1965) showed that the mating speed of *ST/ST*, *ST/CH*, and *CH/CH* karyotypes (*ST* = Standard and *CH* = Chiracahua gene arrangements) differed, and that the differences were almost entirely male-determined. This observation was based on single-pair matings for all possible combinations between these karyotypes, of which there are nine, taking into account reciprocals.

TABLE 1  
TIME ELAPSING TO FIRST MATING AND MATINGS OCCURRING IN 1 MIN IN  
MALE- AND FEMALE-CHOICE EXPERIMENTS

Karyotype	Time Elapsing to First Mating (min)	No. Mated†	No. Unmated‡	$\chi^2_1$
<i>ST/ST</i>				
Male choice	0.56	34	16	} 4.91*
Female choice	1.22	22	28	
<i>ST/CH</i>				
Male choice	0.35	39	11	} 9.55**
Female choice	1.08	23	27	
<i>CH/CH</i>				
Male choice	1.00	25	25	} 4.20*
Female choice	2.28	14	36	
<i>Pooled data</i>				
Male choice	0.53	98	52	} 19.30***
Female choice	1.40	59	91	

\*  $P < 0.05$ .      \*\*  $P < 0.01$ .      \*\*\*  $P < 0.001$ .

† No. of replications out of 50 (or out of 150 for pooled data) in which mating occurred in 1 min.

‡ No. of replications out of 50 (or out of 150 for pooled data) in which mating did not take place in 1 min.

Recently we have carried out two series of choice experiments consisting of one female with three males (female choice) and three females with one male (male choice) to see whether competition between individuals of the same sex occurs. In the first (a control experiment) a given male or female was mated with three males or three females, respectively, of the same karyotype (Table 1), and in the

\* Manuscript received June 24, 1966.

† Department of Genetics, University of Melbourne.

second a given male or female was mated with three males or three females, each individual in the trio being one of the three karyotypes given above (Table 2).

Both experiments revealed that the period elapsing until the first mating occurred (computed as in Kaul and Parsons 1965) was less in the male-choice than in the female-choice situation. The significance of the  $2 \times 2$  contingency  $\chi^2$ 's for the contrast of number mated in 1 min and number remaining unmated in 1 min,

TABLE 2  
TIME ELAPSING TO FIRST MATING AND MATING OCCURRING IN 1 MIN IN  
MALE- AND FEMALE-CHOICE EXPERIMENTS

In these experiments one fly of a given karyotype of one sex (*ST/ST*, *ST/CH*, or *CH/CH*) is offered the choice of three flies of the opposite sex, each of these three flies being a different karotype

Karyotype	Time Elapsing to First Mating (min)	No. Mated†	No. Unmated‡	$\chi^2$
<i>ST/ST</i>				
Male choice	0.35	39	11	} 7.34**
Female choice	1.12	25	25	
<i>ST/CH</i>				
Male choice	0.46	35	15	} 12.97***
Female choice	1.59	16	34	
<i>CH/CH</i>				
Male choice	0.98	27	23	} 9.55**
Female choice	2.53	11	39	
<i>Pooled data</i>				
Male choice	0.54	101	49	} 30.73***
Female choice	1.30	52	98	

\*\*  $P < 0.01$ . \*\*\*  $P < 0.001$ .

† No. of replications out of 50 (or out of 150 for pooled data) in which mating occurred in 1 min.

‡ No. of replications out of 50 (or out of 150 for pooled data) in which mating did not take place in 1 min.

with male and female choice, shows clearly the shorter mating speed in the male-choice situation for each karyotype and the pooled data. The likely interpretation is that in the female-choice situation, the males interfere with each other, so delaying mating compared with the male-choice situation, where presumably the one male tends to mate more rapidly, having no competition from other males, and there is little interference between females. This seems to confirm that the determination of mating speed resides more in the male than in the female for these karyotypes.

Both tables show that the *CH/CH* karyotype has the slowest mating speed, as found previously (Kaul and Parsons 1965), and the mating speeds for each karotype in the two experiments correspond very closely.

In conclusion, choice experiments in which mating speeds are recorded provide a method of ascertaining the more important sex in determining mating speed. However, if the total frequency of matings at a later stage, say 30 min later, were used as the criterion without taking mating speeds into account, then insignificant results would be obtained, since matings occurred in nearly all trials within 30 min. Thus, as pointed out elsewhere (Parsons 1965), interpretations may depend on the time after the commencement of the experiment that the data are first recorded.

One of us (D.K.) wishes to acknowledge support from the Commonwealth of Australia Scholarship and Fellowship Plan.

### References

- KAUL, D., and PARSONS, P. A. (1965).—The genotypic control of mating speed and duration of copulation in *Drosophila pseudoobscura*. *Heredity* **20**: 381–92.
- PARSONS, P. A. (1965).—The determination of mating speeds in *Drosophila melanogaster* for various combinations of inbred lines. *Experientia* **21**: 478.

