It is very probable that the factor for the stimulating male effect behaves similarly with the factor for the female sterility reported by Picard (1979); in other words, it could be transposed from one chromosome to another without classical crossing over. Further investigations of this problem are in progress.

References: Picard, G. 1979, Genetics 91:455-471; Polivanov, S., P. Peck and K. Dornan-Kendig 1980, J. Hered., in press.

Pot, W. University of Groningen, Haren (Gr.), The Netherlands. Courtship and mating success in alcohol dehydrogenase genotypes of D. melanogaster.

Investigating the role of mating behavior in the maintenance of the alcohol dehydrogenase (Adh) polymorphism, Pot et al. (1980) found large differences in numbers of matings performed by flies having different Adh genotypes. In multiple choice experiments FF males were about five times as successful as SS males, and FF females were almost three times as successful as SS females, as indicated by the mating chance ratio r. This paper describes observations of courtship behavior of individual flies in single pair mating chambers (19 mm diameter, 7 mm deep) which were carried out in order to investigate whether differences in the pattern of courtship were involved in the differential mating success.

Table 1. Numbers of matings and percentages mated in single pair mating chambers.

	Time (min.)				% mated
♀ x ♂	0-10	10-20	20-30	>30	within 30 min.
FF x FF	26	10	4	3	93.0
FF x SS	15	11	7	10	76.7
SS x FF	28	7	2	6	86.0
SS x SS	16	13	4	10	76.7
FF ♂♂	54	17	6	9	89.5
SS ♂♂	31	24	11	20	76.7
FF ♀♀	41	21	11	13	84.9
SS ♀♀	44	20	6	16	81.4

First, mating success in the single pair chambers was measured in 30 min. observation periods (this time limit was also used in the multiple choice experiments). At the time of the experiments the flies were 6 days ± 8 hours old; the sexes had been separated within 8 hours from eclosion. One female and one male were introduced without anaesthesia and the time the copulation started was noted. Table 1 gives the results. The percentages of flies mating within 30 min. were much higher than those in the multiple choice experiments (those were: FF males 54.9%, SS males 14.3%, FF females 46.9%, SS females 22.3%). Not surprisingly, starting a copulation appears to be much easier when only one male and one female are present. Probably as a consequence of this the differences in mating success between the genotypes were much smaller in the single pair experiments. The difference between the males was still significant (FF vs. SS, mated vs. not mated: $\chi^2_1 = 5.02$, $P = 0.05$) but the difference between the females was not significant any more ($\chi^2_1 = 0.37$). Testing the distribution of matings over consecutive periods of time (0-10 min., 10-20 min., 20-30 min., and >30 min.) yielded a similar result (FF males vs. SS males: $\chi^2_3 = 13.06$, $P < 0.005$; FF females vs. SS females: $\chi^2_3 = 1.91$, N.S.).

Table 2. Courtship latency times of FF and SS males with FF females.

	Courtship latency time (min.)					
	0-1	1-2	2-3	3-4	4-5	>5
FF ♂♂	-	4	9	1	1	5
SS ♀♀	1	6	5	2	2	4

For a behavioral observation one female (always FF) and one male (either FF or SS) were introduced into a mating chamber. Twenty replicate observations were carried out for each male genotype. Table 2 gives the distribution of the courtship latency times, that is the time till the first vibration (see below) occurred. No significant difference was found between the distributions of FF and SS (data taken together in three periods: 0-2 min., 2-4 min., and >4 min.; $\chi^2_2 = 1.35$, N.S.). The behavior of the males was recorded on an event recorder during the first 5 min. after introduction. The following elements of courtship were distinguished: orientation (or): the male stands still, facing the female; approaching (ap): the male walks towards the female or follows her if she is moving; wing vibration (vi); licking (li); and attempted copulation (ac). (For a description of the latter three elements, see Bastock and Manning 1955.) The frequencies (number of times an element was performed) and duration (total time spent performing an element) of the courtship elements were calculated over a period of 30 sec. and a period of 60 sec., both starting with the first vibration. The duration of li and ac could not accurately be recorded as these activities lasted very short. The bout lengths (duration divided by frequency) of the elements were calculated over the complete courtship periods. Table 3 gives the outcomes. FF males show significantly higher frequencies of ap and vi. The duration of vi is also significantly longer for FF, while its bout length is exactly the same for FF and SS. FF and SS show no significant differences in duration and bout length of or and ap. So FF males show a more active courtship behavior in which especially the element of vibration, which is performed more often, though not in longer bouts, might be responsible for the higher mating success. Vibration has been shown to be very stimulating to the female (Bastock 1956).

Table 3. Frequencies, duration, and bout lengths of the courtship elements (average values of N observations).

		N[1]	or	ap	vi	li	ac
frequencies:	FF (30)	13	3.9	6.2	6.2	0.8	0.6
	SS (30)	14	4.1	4.2*	4.3*	0.6	0.3
	FF (60)	12	7.3	11.8	11.8	1.8	0.7
	SS (60)	12	7.3	7.4**	6.6**	1.2	0.3
duration:	FF (30)	13	4.3	9.8	12.6		
	SS (30)	14	6.7	7.5	8.2**		
	FF (60)	12	9.0	19.5	22.6		
	SS (60)	12	12.1	17.5	12.8**		
bout lengths:	FF	15	1.2	1.8	2.0		
	SS	16	1.7	2.3	2.0		

Significance of the difference between FF and SS: *P 0.05, **P 0.02 (Mann-Whitney U test). (30) and (60) indicate values over the first 30 and 60 seconds after the start of the first vibration, respectively.

[1] In a number of observations the courtship period was shorter than 60 sec., or even 30 sec., therefore N is always smaller than 20.

It is theoretically possible that the difference in behavior between the FF and SS males is not an intrinsic quality of the males themselves, but is mediated by the females. Females might be able to distinguish between the genotypes and to exert a differential influence on their courtship, for instance by making more repelling movements (see Bastock and Manning 1955) towards SS males, thus causing more breaks in their courtship.

References: Bastock, M. 1956, Evolution 10:421-439; Bastock, M. and A. Manning 1955, Behavior 8:85-111; Pot, W., W. van Delden and J.P. Kruijt 1980, Behav. Genet. 10:in press.

Rahman, R. and D.L. Lindsley. University of California, San Diego. Ysu(f)$^-$, a spontaneous derivative of Ymal$^+$.

Ymal$^+$ is an x-ray induced derivative of $Y^SX\cdot Y^L$, In(1)EN that arose through the deletion of the majority of the X euchromatin [l(1)Jl$^+$ through car$^+$] (E.H. Grell). Among a number of stocks in which Ymal$^+$ was being used to cover proximal lethals induced on the X chromosome by Lifschytz and Falk (1968), one was found that differed from the rest in that the Y, although still covering the proximal lethal in the stock, no longer covered deficiencies for su(f). Tests of this Y in combination with an array of proximal X-linked lethals indicate that it is a derivative of Ymal$^+$ from which the X-derived segment from l(1)R10-10 through su(f) has been deleted. This segment includes the loci of lethals designated R10-10, Q463, X4, and X1 by Lifschytz and Falk, as well as that of su(f); the Y carries at least one dose of bb$^+$ as determined from its phenotype in combination with bb^1. The constitution of this duplicated Y, which we designate Ysu(f)$^-$, may be designated as follows:

$$KL\cdot bb^+? \quad sw^+--l(1)Q\text{-}56^+ \; bb^+? \; KS$$