Backcross A = G_1 (4/33) males x McD-4 females C = G_1 (11/33) males x McD-11 females
B = " " " x McD-33 females D = " " " x McD-33 females.

Since there is no expected crossing over in males, association between chromosome 3 and receptivity speed can be ascertained with a 2x2 test. Backcross progeny females were aged for 2 days at 25° and tested for receptivity with fast courting doublecross hybrid males (Yu & Spiess 1978), in lots of 20 pairs per mating chamber. After 30 minutes, females mated (M) or not mated (NM) were electrophoresed and determined by amy-variant genotype to be either homozygous (amy-1.09; amy-1.00) or heterozygous (1.09/1.00). Association contingencies given in Table 1 show the numbers of females in each category.

It is clear from the "control" backcrosses to line McD-33 (B & D in the table) that there is no significant difference between the heterozygous females and homozygous McD-33. With both lines McD-4 and McD-11 however receptivity is at about 30% compared with more than 62% mating in the controls. Thus after recombination of whole chromosomes in G_1 males, factors for low receptivity are still associated with the particular line's KL arrangement chromosome.

References: Yu,H.F. & E.B.Spiess 1978, Genetics 90:783-800.

Spiess,E.B. & L.I.Salazar. University of Illinois, Chicago, Illinois. Age of males as a factor in female mate choice in D.melanogaster.

Previously in this laboratory it has been shown that females of D.melanogaster with red (R) (bw^{75}/bw^{75}; st/st) and orange (O) (bw^{75}/bw; st/st) eye color tend to accept the type of male that is not the first to court, presumably because they become conditioned against signals from that male's type (Spiess 1982a,b; Spiess & Schwer 1978; Spiess & Kruckeberg 1980). In earlier tests, flies of both sexes were aged for 5 days posteclosion, while they were aged 3 or 4 days in the more recent tests. One contrasting point between earlier and later tests, in addition to those points emphasized by Spiess (1982b), was that the red (R) and orange-eyed (O) males tended to mate about equally (55% R: 45% O) in the earlier tests; in later tests, O males were significantly less successful than R, especially when flies were more inbred (O males mated 25-28%), while outcrossed O males mated more (35%).

Experiments by Long, Markow, and Yaeger (1980) indicated that males mated at higher frequency with increasing age. Thus a control factor that could account for earlier test results was male age. If the R males had a sexual advantage over O during the first two or three days of the adult, it might diminish as both types approach 4-5 days posteclosion, since the latter might catch up with the former within a day. Eye color of these mutants darkens within that period of time, though they are always distinguishable. Thus perhaps a day's difference in visual ability or other factors of maturation during the first 4 days of the adult could be minimized by testing the O type when a day or two older than the R type male.

Table 1. Experiment 1: matings with all males 3 days old.

Female	Male first to court	Total matings male mated R	Total matings male mated O	Excluding trials where one male only courted R	Excluding trials where one male only courted O	χ^2 c
R	R	23	15	12[a]	15[b]	5.9
	O	18	11	18[b]	5[a]	
O	R	44	11	16[a]	11[b]	4.7
	O	20	10	20[b]	3[a]	
	Total:	105	47	66	34	

a=Total x first male to court = 36; b=Total x second male to court = 64; c=Chi-square contingency on trials where both males courted.

Flies of R and O were cultured with the same method as that used by Spiess & Kruckenberg (1980). Mutant strains bw^{75};st and bw;st homozygote males were first outcrossed to Lausanne-Special (LS) wild type females that had shown positive female conditioning (discrimination ability) previously (Spiess 1982a), and progeny (G_1) were inbred to produce recombinant G_2 homozygotes of red and white eye color (Spiess 1982b). Crossing G_2 red x white gave orange-eyed progeny that were then backcrossed male O x female R. On emergence flies were sexed and

Table 1. Experiment 2: matings with R males 2 days old, O males 3 days old.

Female	Male first to court	Total matings male mated R	Total matings male mated O	Excluding trials where one male only courted R	Excluding trials where one male only courted O	χ^2
R	R	23	17	8^a	17^b	13.9
	O	21	10	21^b	4^a	
O	R	25	20	11^a	20^b	13.6
	O	19	8	19^b	3^a	
	Total:	88	55	59	44	

a=Total x first male to court = 26; b=Total x second male to court; c=Chi-square contingency on trials where both males courted.

stored, 10 to 15 per food vial (yeasted). Flies matured for 3 days when testing with no age differential (experiment 1) or for 2 days in the case of R males when testing with an age differential (experiment 2). Testing was done with one R + one O male followed by the female into a 9.5 x 2.5 cm glass vial, and courtship by either male was recorded. All other conditions were the same as those used (Spiess & Kruckeberg 1980). Tables 1 and 2 present the mating data for experiments 1 and 2, respectively; total matings include the trials in which just one male occurred.

In conformity with prevous results, females accepted the second to court male preferentially in both experiments 1 and 2 in the trials where both males courted. Associations are significantly negative between courtship order and mating success. However the amount of mating to the second-to-court male is significantly greater when the O males are a day older than the R males (experiment 2) than when the two types are of equal age (experiment 1). Using confidence limits tables for percentages (e.g., Table W in Rohlf and Sokal's Statistical Tables, Freeman & Co. 1969), we find the total matings (above footnotes)to be significantly different at the 95% confidence level. In addition, it should be noted that O males mated about 10% more in experiment 2 than in experiment 1, and at a level comparable with that achieved in earlier tests with 4-5 day old males (cited above).

References: Long,C.E., T.A.Markow & P.Yaeger 1980, Behav.Genet. 10:163-170; Spiess,E.B. 1982a, Am.Nat. 119:675-693; ----1982b, Behav.Genet. 12:209-221; Spiess,E.B. & J.F.Kruckeberg 1980, Am.Nat. 115:307-327; Spiess,E.B. & W.A.Schwer 1978, Behav.Genet. 8:155-168.

Springer, R. University of Vienna, Austria. "White" D.subobscura prefers darkness for pairing.

In the light-independent strain of D.subobscura (Springer 1973, DIS 50:133) the allele white, sex-linked, recessive, was rediscovered as a spontaneous mutant by Irene Stursa (see new mutants, spp. in this copy). While in the past (Wallace & Dobzhansky 1946) white individuals proved themselves unable to breed because of the dependence of courting and mating on visual stimuli, in the light-independent strain the allele w shows reasonable fertility. Nevertheless some of the mass cultures always failed to breed. The phenomenon vanished when the cultures were kept in complete darkness. In order to establish the peculiar effect 108 culture-bottles were started with about 20 individuals each. The flies, 0-1 day old, from the w-strain that was kept in darkness were distributed in red light, without narkosis, into the bottles. 54 cultures stayed in complete darkness (DD) at 19.5-20.5°C, the other 54 were exposed to constant day-and-night light (LL) at 18°C. All 54 cultures bred normally in the dark, only 39 of the cultures in LL yielded offspring (larvae and/or pupae) within three weeks.

To obtain more detailed quantitative data, single pair cultures in 25 cc tube glasses were used. Besides LL and DD conditions, a simulated circadian rhythm of light, 8 hr a.m. - 8 hr p.m. and darkness "overnight", was tested (LD). The temperatures were:

DD: 19-20.5°C LL: 19-21.5°C LD: 18°C .

Flies from the w-strain kept in darkness were isolated according to sex at the age of 0-1 day. The glasses with 50 or more individuals of same sex were permitted to age in darkness 7-9 days at 18°C. Then single pairs were put into the tube glasses. Each individual of these tests therefore twice underwent light narkosis with ether. 18-20 days later the