Crossley, S. Monash University, Clayton, Victoria, Australia. Mating reactions of certain mutants.

Rendel (1951, Evolution) and Jacobs (1961, Ecology) reported that ebony mutants of D. melanogaster mated better in the dark than in the light. Attempts to confirm this result have been unsuccessful. Laboratory stocks of ebony, vestigial and Oregon-R were compared in homozygous mass matings in the light and dark as in Rendel's experiment. Ebony and Oregon-R mated equally well in both light conditions. Vestigial mated less successfully than either winged form in both light and darkness. In the tables below + = number of females inseminated and - = number of females which did not mate during the 2 hour test period.

	Light		Dark				
	+ ♀♀	-	+ ♀♀	-	χ^2	d.f.	p.
++ x ++	112	31	108	31	0.02	1	>.8
e x e	291	105	281	107	0.11	1	>.7
vg x vg	23	67	16	78	2.4	1	>.1

This differs from Rendel's results for he found that ebony mated better in the dark than in the light and wild-type and vestigial mated better in the light than in the dark.

In a second experiment mating times were obtained by viewing single pair homoganic matings every three minutes from introduction. Ebony and vestigial outcrossed stocks were used. Dark tests were examined in red light. Mating occurred in 3" x 1" vials and onset of courtships (lag) and copulation times were noted. There were no differences in lag times all pairs in the dark and light beginning to court within a few minutes of introduction.

Copulation times were significantly delayed by darkness in vestigial but not in ebony matings. The table compares the numbers mating within 15 minutes from introduction ($p<.01$*).

	Light		Dark			
	+ ♀♀	-	+ ♀♀	-	d.f.	χ^2
e x e	27	10	19	13	1	0.88
vg x vg	29	13	9	20	1	8.50*

(Average copulation times did not give a good measure because of a few long courtships in all conditions.)

The reason why darkness delayed vestigial matings but not ebony was investigated by analysing the courtship of these mutants. Male and female behaviour was recorded on alternate beats of a metronome set at 80. The wild-type which had been used for outcrossing served as a basis for comparison. The behaviour of ebony males did not differ in the light and dark in contrast to the behavious of wild-type and vestigial males which differed in the light and dark. Ebony males lost courted females frequently in the light and in the dark. Breaks in courtships followed, which delayed copulation times. Frequent breaks in courtships are typical of ebony courtships in the light and in the dark.

Vestigial and wild-type males are persistent courters in the light and seldom break off courtship. In the dark however they behave like ebony, losing their females and breaking off courtships. It was concluded that ebony behaves similarly in the dark and the light because it does not use visual stimuli during courtship. This finding supports Hotta and Benzer's conclusion that ebony has defective vision (1969, Nature). Other ways in which ebony courtships differ from the wild-type, such as decreased amounts of vibration and licking could not be related to defective vision. Vestigial males differed from the wild-type in lacking the vibration component and in decreased licking. Neither mutant male mated as quickly as wild-type males with wild-type females because mutant male courtship was less stimulating. No significant differences were found between the behaviour of mutant and wild-type females.

Several observations suggest that ebony is not completely blind. Studies in progress of activity in the dark and light may throw more light on the earlier findings of Rendel and Jacobs.