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Control of fecundity in D. melanogaster.

Data pertaining to the control of fecundity in a 'Pacific' wild-type strain of D. melanogaster have been collected. Daily egg production for individual females was measured after the following treatments: 1. mated with fertile males on day 3; 2. mated with sterile males on day 3; 3. mated with sterile males on days 3, 5 and 8; 4. maintained as virgins. Males used in the sterile matings were obtained from a stock, kindly supplied by Dr. A. Manning, which when outcrossed yields males lacking a 'Y' chromosome, with consequent sterility.

Young virgins lay almost no eggs, whilst mated individuals of the same age may have high fecundity. The differences in egg output brought about by the treatments may therefore be described in two ways:

a. Comparisons of numbers of individuals laying within each group, i.e. dichotomising layers v.s. non-layers. Fig. 1 shows this treatment, the percentage which layed in each group being plotted for each day. Fisher exact probability tests indicate that the increase in the proportion of individuals laying which follows sterile matings is significant, in comparison to the virgins, until day 8.

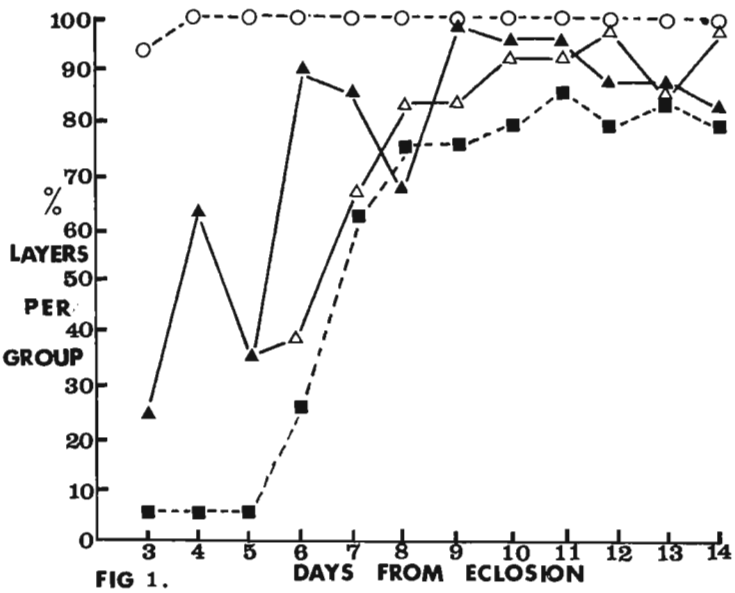

FIG 1.

b. Comparisons on the basis of absolute egg production, after excluding the individuals which do not lay. Fig. 2 shows mean number of eggs produced per group per day, with non-laying individuals excluded. Sterile mating results in a marked increase in egg laying measured 24 hours after the mating. By 72 hours post-mating, however, the level has dropped precisely to that of the virgin females.

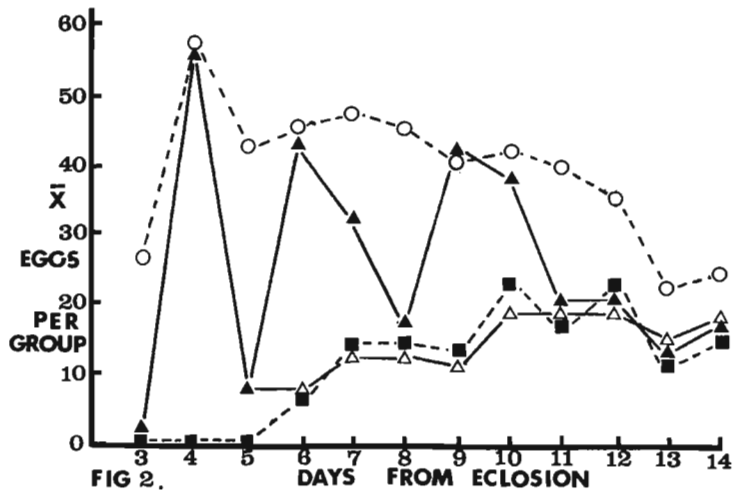

FIG 2.

○---○ females fertilised day 3. N=16.
▲——▲ females sterile mated days 3,5&8. N=22.
△——△ females sterile mated day 3. N=18.
■- - -■ virgin females. N=19.

Conclusions: 1. Fertile mating results in a massive increase in egg production, as many other workers have found.

2. Sterile mating results in variable 'activation' of increased egg production, many individuals being apparently unaffected.

3. Individuals which are activated by sterile mating lay at a level comparable to that of fertilised females, but the increase is extremely transient, returning rapidly to the virgin level.

4. Initially egg production by virgins is at an extremely low level but from day 5 onwards there is a drift upwards. This appears to represent a real, shifting baseline to which previously activated females return.

5. These results are in some disagreement with David (1963) who finds only a slight increase in egg output following sterile mating. David did not measure the egg production of individual animals and in consequence he was unable to determine the proportion of flies activated by this treatment.

References: Cook, R.M. & Connolly, K.J. 1968, DIS 43: 201; David, J. 1963, J. Ins. Physiol. 9: 13-24.