

Humidity Reaction in *Drosophila melanogaster*

IN an investigation on the chemoreceptivity of *Drosophila melanogaster* (Oregon), Begg and Hogben¹ stated that the normal undesiccated males of this species showed a response to moisture if the difference in relative humidity exceeded 50 per cent. In the desiccated males the reaction grew more pronounced. The preferred relative humidity was reported to be about 90 per cent. No response to humidity differences was observed in normal or desiccated females.

Using a technique modified from the methods of Gunn and Kennedy², and Wigglesworth³, we have studied the reactions of *Drosophila melanogaster* (Berlin Wild) and obtained results which differ greatly from those obtained with Oregon flies by Begg and Hogben. In our experiments, comprising more than 70,000 position records with about 5,000 specimens, a clear reaction to humidity differences was observed both in males and females, the reaction being stronger in males. Even the smallest difference in humidity used, namely, 3 per cent, was clearly perceived at the moist end of the humidity range by both males and females. Begg and Hogben observed a reaction towards the drier side only in the antennaless mutant, and based their conclusions concerning the humidity receptors on the difference in reaction between the normal fly and this mutant. In our experiments, the reaction of the normal flies towards the drier or moister side depended on the humidities used. If two humidities at a time were available to the flies,

both high (100, 97 and 87 per cent relative humidity) and low (0, 20, 34 per cent relative humidity) humidities were constantly avoided, provided the humidity difference in question was not too great. With a choice between 77 and 34 per cent, 77 and 67 per cent, or 77 and 87 per cent relative humidity, 77 per cent relative humidity was always chosen by both males and females. When the flies were desiccated over silica gel at 26° C. for three hours (males) and five hours (females), a strong reaction towards the moister side appeared in all experiments.

The accompanying graph shows that the intensity of the reaction is dependent on the degree of desiccation. Normal undesiccated females, given the choice between 100 and 34 per cent relative humidity, show a reaction towards the drier humidity, females desiccated for 3 hr. at 26° C. show a moderate response towards moist conditions, but females desiccated for 5 hr. display a very strong moist reaction; the males, on the other hand, need only 3 hr. desiccation to reach the same high intensity of reaction. It was noted that, when desiccated at 26° C., the males died earlier and the percentage loss of weight was more rapid in males than in females.

Work on further problems of the humidity reactions in *Drosophila melanogaster* is in progress and the results will be published in fuller detail elsewhere.

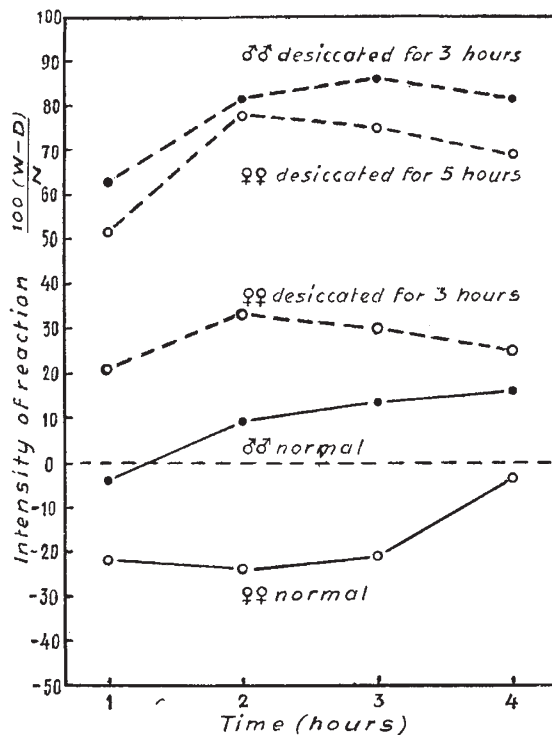
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¹ Begg, M., and Hogben, L., *Proc. Roy. Soc.*, B, 133, 1 (1946).

² Gunn, D. L., and Kennedy, J. S., *J. Exp. Biol.*, 13, 450 (1936).

³ Wigglesworth, V. B., *Parasitology*, 33, 67 (1941).



Intensity of humidity reaction in *Drosophila melanogaster* at 20° C., expressed as excess percentage, W representing the number of position records on the moister side, D the number on the drier side and N the total number of position records. Humidity difference 100-34 per cent relative humidity. Each line represents 960 position records. For the controls, 100-100 per cent relative humidity, the value never exceeded 6 per cent

X and neo-Y Mechanism of Sex-Determination in the Grasshopper, *Thisiocetrus pulcher*

A NUMBER of instances of X and neo-Y mechanism of sex-determination is now on record in the Acrididæ¹. The purpose of the present communication is to record a further case found in the grasshopper, *Thisiocetrus pulcher* of the subfamily Catantopinae, collected in the area adjoining the Biology Departments of the University of Calcutta. Only two male individuals could be found, on two separate occasions, in spite of extensive search. The observations reported here, therefore, are from sectioned preparations of the testes of the first, and Feulgen squash preparations of the testes of the second, specimen. A large number of dividing cells was obtained in both of them, which enabled us to study the behaviour of the sex chromosome complex during spermatogenesis.

Many clear spermatogonial metaphase plates show that the diploid number is 22 (Fig. 1). The primary constrictions are very much pronounced in all the chromosomes. One of the chromosomes on the plate is V-shaped, the two arms being unequal, and the rest have sub-terminal centromeres. The metacentric chromosome when examined from nuclei in early spermatogonial divisions (Fig. 2) shows that the shorter arm is negatively heteropycnotic (a feature which seems to be universal for the X-chromosome of the Acrididæ), whereas the other arm is stained like the rest of the chromosomes in the complement. It is evidently formed by the fusion of the X-chromo-