

Church, R. and F. W. Robertson. Institute of Animal Genetics, Edinburgh, Scotland. Biochemical comparisons of growth in selected lines of *D. melanogaster*.

Ten lines of *D. melanogaster*, which have been selected for large or small body size, fast or slow development time on different chemically defined media, have been compared with the unselected stock, in terms of their biochemical composition

at successive stages of growth. The data include estimations of wet and dry weight, lipids, protein, free amino-acids, RNA and DNA for the egg, several larval stages, pupa and adult. In addition, in the case of the unselected stock, the RNA, derived from successive stages, was fractionated by sucrose gradient centrifugation, while the DNA from adults was characterised in terms of molecular weight, T_m and base ratio. The growth and biochemical data represent the most extensive information of this kind for any insect, while the large differences in size and development time between these lines make them unique material for a comparative biochemical analysis.

The selected lines can be classified into two groups in which: (a) there is a strongly correlated change in body size and duration of development and (b) only body size has changed. This contrast in selection response was reported by Robertson (1963) who interpreted it in terms of alteration or constancy of the "critical size" at which larvae attain the capacity to pupate, even if they are removed from food. It turns out that the distinction based on the presence or absence of correlation between body size and development time is quite fundamental. Where development time does not differ from the controls, the DNA content per individual is constant, while the RNA/DNA ratio varies with respect to the size of the adult. On the other hand, where there are correlated changes in both characters, there are also correlated differences in the DNA content per adult, while the RNA/DNA ratio is comparatively unaltered. This suggests that, in the first case, it is cell size and, in the second, cell number which has been altered by selection.

Reference: Robertson, F. W. (1963) The ecological genetics of growth in *Drosophila*. 6. The genetic correlation between the duration of the larval period and body size in relation to larval diet. *Genet. Res.* 4:74.

Chauhan, N. S. and F. W. Robertson. In Institute of Animal Genetics, Edinburgh, Scotland. Quantitative inheritance of red eye pigment in *D. melanogaster*.

A general survey has been completed of genetic variation in the quantity of red eye pigment in *D. melanogaster*. The pigment, which comprises the three drosopterins, is extracted from individual flies which are also scored for eye width

and thorax length. There is generally a high genetic and environmental correlation between pigment content and eye size, which can vary, to a considerable extent, independently of thorax length. However, this correlation presents interesting aspects since, although it is very obvious when eye and body size vary, due to differences in larval food supply, comparable variation in size due to temperature is without effect on the pigment content. Comparison of the variance of pigment content in wild populations, inbred lines and the F_1 of crosses between inbred lines, suggests that about 40% of the variance, which is independent of eye size, is due to genetic segregation. Replicated selection for high and low pigment content has led to about 60% difference after 8 generations. The response tends to be asymmetrical, since selection is more effective for low than high pigment content. In comparisons of pigment content in three inbred lines, derived from the same population, one has the same pigment content as the original population, in another the content is reduced by 30% and, in the third, by 90%. The 90% reduction is apparently due to a strictly additive combination of the effects of two recessive genes, located on respectively chromosomes II and III. The studies are being extended to a quantitative analysis of associated pteridines in the selected lines, crosses, inbred lines etc.