XXII. SOMATIC MUTATIONS AND ELYTRAL MOSAICS IN BRUCHUS

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Contribution No. 19, Second Series.

During the years 1918-1921 thirty-one unusual females were discovered during the progress of our work upon the geneties of *Bruchus quadrimaculatus.* The most striking feature about these insects was the fact that the elytra were of different colors. These differences are therefore elytral mosaics, and the fact that no mosaic was transmitted when mated with normal individuals indicates that these are caused by somatic mutations.

Since these mosaics originated from cultures used for a detailed study of a multiple allelomorph series, it seems desirable to consider the normal homozygous insects for each mutant tested. The unsual expectancy for homozygous cultures is that the elytra of the normal female will be red-red for the red mutant stock, black-black for the black one, white-white for the white mutant, and tan-tan for the wild type. But in these thirty-one cases, types of mosaic elytra have appeared such as red-black, black-red, tan-black, black-tan, white-black, etc.

It is easier to interpret these mosaics if one describes them in the order of their dominances (red, black, white, and tan or wild type). No mosaics were discovered in any pure culture for red, because they would all be recessives and could not be seen. Twelve black-red and eight red-black mosaics originated from homozygous black cutures because red is a somatic dominant to black. One black-white mosaic was found in a pure culture for white; here black is dominant to white. The wild tocks produced eight mosaics in all: six had tan-black elytra, one black-tan elytra, and the last one white-tan elytra. It is evident that the appearance of a mosiac was visible because it was dominant to the body and elytra color for which the culture was pure.

Discussion

These somatic modifications in *Bruchus* are not due to factor mutations in the germ cells, because they are not transmitted. The obvious conclusion is that these elytra mosiacs are due to somatic mutations. The evidence indicates that these somatic mutations are like several somatic factor mutations in plants, because the characters involve a mutation from a recessive gene to a dominant one.

The author has applied the mechanism of chromosome elimination to the observed results for these mosaics, but this is not essential to account for dominant elytral mosiacs in *Bruchus*. He believes that the most plausible explanation is to regard these thirty-one dominant mosiacs as somatic mutations that originate in an autosome on one side of the body of the female sometime during its ontogeny. Since any mutation in a somatic tissue, if recessive, would be concealed by the presence of the normal allelomorph in the homolozygous chromosome, only dominant mosaics were observed.

It is evident that these somatic mutations in *Bruchus* concern the autosome in which the multiple allelomorph genes for R (red) is located, because it indicates that there is a chromosome continuity between the gene R (red) in this autosome in the germ cell and this same gene as manifested through its thirty-one mutations. Of these, twenty somatic mutations occurred from recessive black to dominant red from homozygous black cultures; only one mosaic originated from a pure white culture through a mutation from recessive white to dominant black; while from the wild stocks, even mutated from recessive tan to dominant black, and only one from recessive tan to dominant white.

In conclusion, the most noteworthy result is that germinal and somatic mutations are identical factor mutations because both iriginate through a mutation in the same chromosome.