A SECOND-CHROMOSOME GENE, Y3, PRODUCING YELLOW ENDOSPERM COLOR IN MAIZE

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Correns (1)³ accounted for the inheritance of yellow endosperm color in maize on the basis of a single factor pair. Emerson (3) reported the linkage of a factor pair Y, y, (presumably the same as that of Correns) with Pl pl, genes which differentiate purple from sunred plant color. These genes are in the linkage group now designated as group 6 (4).

Other genes affecting endosperm color have been reported by East (2), Hayes and Brewbaker (6), and Eyster (5). The interrelations of these genes are unknown and all are now lost save Eyster's Y₂ which is reported in linkage group 5. As the gene reported in the present paper belongs in group 2, it is assumed to be different from Y₂ and is designated Y₃. The interrelations of Y₁ and Y₃ have not been studied. The interrelations of Y₁ and Y₃ will be discussed below.

In material segregating for Y₁y₁, the yellow endosperm color may vary from a deep orange to a lemon color. The term "yellow" is used to designate this entire range. The white segregates may vary from nearly pure white to pale lemon or cream. This slight coloration depends on factors other than Y₁ and which usually do not interfere seriously with classification.

RELATION OF Y₃ TO Y₁

Crosses between white endosperm stocks of the genotype y₁y₁ and a certain other white endosperm stock produced only yellow F₁ seeds. In the F₂, segregations approximating 9 yellow to 7 white were obtained. This indicated the presence of a new factor similar in effect and complementary to Y₁. This hypothesis has been tested by making appropriate crosses, studying F₁, F₂, and F₃ breeding behavior and finally by locating the new gene Y₃y₃ in its appropriate chromosome group.

The F₂ data from crosses involving Y₁ and Y₃ are presented in Table 1. The results clearly indicate the presence of two factors conditioning the development of yellow pigment. Yellow seeds from these cultures were planted, the resulting plants selfed, and the F₃ progenies classified. The results are presented in summary form in Table 2, and are in complete agreement with the two-factor hypothesis.

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³Figures in parenthesis refer to "Literature Cited", p. 996.