

PIONEER HI-BRED CORN COMPANY
Johnston, Iowa

1. Interactions between maize genotypes and teosinte cytoplasm.

The inbreds WF9 and C106 have been backcrossed 5 times, as males, into 10 different cytoplasmic sources. The 10 include 5 exotic open-pollinated varieties of maize, 4 inbred lines of maize, and a strain of "Florida" teosinte. One plant of each cytoplasmic source was used as source of cytoplasm for backcrossing to both WF9 and C106. At the fifth backcross all 9 of the strains with maize cytoplasm were identical in appearance to their pollinator parent. However, the C106 with teosinte cytoplasm and the WF9 with teosinte cytoplasm were markedly reduced in vigor throughout the growing season and produced plants with slenderer culms, narrower leaves, fewer internodes, fewer tassel branches and both strains were about a week late in flowering, compared to their pollinator parent. In general, the effect resembled that reported for teosinte cytoplasm by Mazoti (Rev. de Invest. Agric., 1954). Both strains also were partially female sterile; that is, no ears had more than a scattering of kernels, even when pollinated with plentiful supplies of fertile pollen. In addition, the WF9 in teosinte cytoplasm was completely pollen sterile. This may have been only an effect of reduced vigor on the naturally poor pollen shedding abilities of WF9. On the other hand, it may be that the teosinte cytoplasm used here has an interaction with certain genotypes which results in pollen sterility, independently of vigor effects. Appropriate crosses to test this hypothesis are being made.

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2. Rapid recurrent and reciprocal selection.

In Newsletter #33 p. 95 a modification of recurrent and reciprocal selection is described which utilizes simply inherited kernel characteristics displaying incomplete dominance to reduce the number of generations required to complete a cycle of selection. Since that time progress has been made on two studies associated with the scheme.

Seven white (A34, A177, A188, Ky27, NY2, 4Co.82, and 33-16) and seven yellow (A334, A375, NY3, Oh40B, Oh51A, Osh20, and W25) inbred lines representing virtually 14 different open pollinated varieties were used in the studies.

A. The 98 possible crosses (including reciprocals) among the two groups were made and observed to examine the complexities of separating 3/3 yellow, 2/3 yellow-1/3 white, 2/3 white-1/3 yellow, 3/3 white endosperms necessary to segregate intercrossed from testcrossed seed via the previously described scheme.

Use of an Agron Color Control Instrument (courtesy of Kurth Malt-ing Co.) indicated perceptible differences in endosperm color between reciprocals of a given cross but was generally ineffective over the range of all the material studied. The writer's observation was that some 2/3 yellow-1/3 white endosperms were more yellow than other 3/3 yellow (viz. Oh51A crosses compared to Oh40B selfed, for example). All 2/3 white-1/3 yellow vs. 3/3 white differences appeared sufficient for separation. Evidently a recurrent selection program would be feasible