This may result in significant departures from random mating, as demonstrated by the differential effectiveness of pollen in mixtures. The alternative techniques of making controlled plant to plant crosses will avoid gametic selection between pollens of different plants and may result in fewer deviations from random mating.

R. H. Moll

4. Comparison of selection methods for increased yield.

Four selection experiments which involve the two open-pollinated varieties, Jarvis and Indian Chief, provide a comparison among three alternative methods for systematic improvement of grain yield. Two of the three methods lead to improvement of the varietal hybrid, whereas the third method involves improvement of the varietal composite. One method being studied is direct selection for performance of the varietal hybrid by reciprocal recurrent selection procedures. Another of the methods is full-sib family selection within each variety separately. The improved varieties are crossed, and their improvements are utilized indirectly in their hybrid. The third method is to intermate the original variety hybrid for several generations to form the varietal composite, and subsequently to improve the varietal composite by full-sib selection.

Comparisons have been made among these procedures after 3 selection cycles and again after 6 selection cycles. After 3 selection cycles there was no detectable difference between the two methods which lead to an improved variety hybrid. The improved variety hybrid was distinctly superior to the improved varietal composite. However, after 6 selection cycles, the highest yield was obtained in the varietal hybrid resulting from reciprocal recurrent selection. This crossbred population was 20.4% greater in yield than the original varietal hybrid, and 10.7% greater than the average yield of two commercial double cross hybrids. The yield of the crossbred when the varieties were improved separately was 15.1% greater than the yield of the original varietal hybrid, and approximately 5.3% above the average of the two commercial hybrids. The yield of the varietal composite after 6 selection cycles is

approximately equal to the yield of the original variety hybrid.

Heterosis in the varietal hybrid appears to have decreased slightly following independent selection within each variety. Heterosis following reciprocal recurrent selection appears to have increased markedly from 19.2% in the original to 30.2% following 6 selection cycles even though the midparent has also increased.

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1. Chlorophyll mutation in DES treated opaque-2 maize.

It was reported earlier that out of 559 surviving plants from homozygous opaque-2 seeds treated with nine different concentrations of DES, 176 plants showed three types of chlorophyll sectors, i.e. yellow, albino, and yellow green (MNL 43:136, 1969).

One particular plant in the 0.005 M treatment had a yellow green sector on the 13th leaf. When selfed, it segregated 21 normal and 28 yellow green plants in the M_2. The M_3 segregation from six yellow green and three normal plants is shown in the following table.

Table 1

M_3 Segregation of mutant seedlings from selfed yellow green and normal plants.

S. No.	Line	Total No. of plants	Yellow green	Yellow	Albino
1	Yellow green	6	-	6	-
2	"	12	7	4	1
3	"	11	4	7	-
4	"	16	6	3	7
5	"	7	5	-	2
6	"	9	4	4	1
7	Normal	14	10	4	-
8	"	7	-	5	2
9	"	9	-	4	5
		91	36	37	18