

## PROGRAM AND RESULTS

As information was collected from farmers, it became evident that length of the growing season was a major concern of farmers in deciding which variety to plant. A majority of plantings are made in late March, April, and early May, in soils that conserve sufficient moisture from the previous rainy season. Farmers use late-maturing varieties for these early plantings. Early-maturing varieties make up the remainder of the maize planted in late May and June after the rains begin.

Farmers find a wide range of kernel colors—white, yellow, red, blue, and mixes—acceptable for home consumption. For the market, however, whites and yellows are preferred, since local buyers sometimes discriminate against reds and blues.

Overall, the maize improvement program has emphasized the production of high-yielding varieties, that are resistant to diseases and lodging, for both early and late plantings.

### Production of Hybrids

During the summer of 1967, several local varieties were examined, and the variety Pinto Salvatori was chosen as germplasm for the production of cryptic double-cross hybrids. Five hundred crosses of selected plants were made and the second ears of each of the 1,000 parental plants were self-pollinated. Because of problems in obtaining sufficient seed of the cross, as well as the self-pollinations, the program realized only 94 complete sets.

During the winter of 1967-1968, topcrosses were made at the experiment station of the National Seed Production Company near Tepalcingo, Morelos, by crossing H-28 and  $S_1$  lines of several varieties that were outstanding in the summer varietal trials. Individual plants of the variety were selfed at the same time they were crossed with 10 to 15 plants of H-28.

The 94 cryptic double-crosses from the variety Pinto Salvatori and 68 topcrosses from the winter program were yield-tested in 1968 at four locations in the Puebla area. Eleven of the cryptic double-crosses and eight of the topcrosses to H-28 yielded significantly more than did the best commercial hybrids.

The  $S_1$  parents of the five best cryptic hybrids were planted for increase and to obtain more seed of the crosses at the Tepalcingo station during the winter of 1968-1969. Also, these 10 parental lines were arbitrarily divided into two groups to form two composites (A and B). The cross between these two composites was made in detasseling blocks and seed was produced for semi-commercial testing in the Puebla area.

Comp A x Comp B, together with the five best topcrosses to H-28 and other promising materials, was tested at three locations in the Puebla area during the summer of 1969. Selected farmers were given small lots of Comp A x Comp B for comparison against their local varieties. The results with Comp A x Comp B were not up to expectations.

During the summer of 1970, Comp A x Comp B was included in varietal tests at 16 locations and was planted on a semi-commercial scale at a few sites. From the results obtained in 1969 and 1970, it was evident that Comp A x Comp B was not superior to the parental variety, and it was decided not to promote the use of Comp A x Comp B in the Puebla area.

The five outstanding cryptic hybrids, the five best topcrosses to H-28, and Comp A x Comp B, were continued in the varietal trials in 1971 and 1972. The relative yields, days to flowering, and lodging percentages of these hybrids and other promising materials, are given in Table 4.1. Several conclusions can be drawn from these data: (a) compared to the parental variety Pinto Salvatori, Comp A x Comp B yields slightly less, has a slightly longer growing season, and has the same tendency to lodge; (b) four of the cryptic hybrids outyield Pinto Salvatori by 5 to 11 percent (two of these, 113 and 246, lodge less and have about the same growing season as the parental variety); and (c) the five topcrosses with H-28 yield from 2 to 7 percent more than H-28 (topcross 257 yields 7 percent more and flowers in 3 days less than H-28).

### Production of Varieties

Observation nurseries, including 41 composites of earlier collections from the Puebla area and 18 other promising materials, were planted at two locations in the summer of 1967. The relative performance of the several entries provided guidance to select those materials to be used in the genetic improvement program. Two composites were formed at Tepalcingo during the following winter: (a) an early composite by intercrossing Puebla groups 10, 11, 26, and 30; Chapalote x Cónico; Chalqueño x Cónico; Harinoso de Ocho x Cónico; Colorado Salvatori; and H-28; and (b) a late composite by intercrossing Puebla groups 33, 44, and 49; Batán E-CIV; Hidalgo 8 M-CI; Pinto Salvatori; and Blanco Salvatori.

During the summer of 1968, mass selection blocks were planted and carried through the first cycle of selection with the early and late composites. The first cycle of mass selection in an opaque-2 composite was also conducted. The opaque-2 composite was formed by mixing seed that carried the opaque-2 gene from Mexico group 10, Hidalgo 8, Pinto Salvatori, and Blanco Rubín.

The mass selection blocks were fertilized each year according to the recommendations of the Project. Plant densities of 24,000 plants/ha were used in 1968, 1969, and 1970. Densities were changed to 50,000 plants/ha in 1971 as a result of a study at Chapingo indicating that the plant density in mass selection blocks should be similar to that in commercial plantings.

Mass selection with the early composite was done at four locations in 1968, five locations in 1969, and one location in 1970. Work with this composite was discontinued in 1971 when it became clear that it was not sufficiently early for late May and June plantings in the Puebla area.