

genetic milieus. Whether the mutant expresses itself in one genotype because the inbred involved is already "loaded" with teosinte genes or fails to express itself in another because the inbred strain is relatively free of teosinte genes or is already strongly "buffered" against their effects are questions still unanswered.

P. C. Mangelsdorf

8. Heterosis in tripsacoid derivatives of maize.

The object of this study has been to determine whether the chromosomes or chromosomal segments which contribute to the tripsacoid features of certain races of maize are heterotic or not when in heterozygous combination in the near isogenic background of an inbred A158. For this purpose, all possible crosses were made between strains of A158 which had been modified by introducing chromosomes or chromosomal segments extracted from tripsacoid races of maize from Argentina, Bolivia, Paraguay, Brazil, Venezuela, Nicaragua, Honduras and Mexico. The F_1 plants were grown in the summer of 1960 and heterosis was measured for each intercross in terms of averages of (1) days to anthesis, (2) height of the plant from base to the first tassel branch, (3) length of central spike, and (4) yield of grain. The results, though preliminary, indicate that chromosomes producing tripsacoid effects are usually heterotic when in heterozygous combination. Maximum heterosis has been observed in crosses of Honduras x Brazil, Coroica (Bolivia) x Brazil, Coroica x Argentina, and Honduras x Argentina. However, the combinations Paraguay x Coroica, Coroica x Venezuela, and Honduras x Venezuela are in general deleterious. This may be because the same chromosomes are contributed by each of the parents resulting in nearly homozygous condition.

Evidence is accumulating which shows that these chromosomes, except those extracted from Mexican and Honduras varieties, are the result of direct Tripsacum introgression since teosinte is unknown in the other countries represented by these studies.

S. M. Sehgal

9. A new method for estimating teosinte and Tripsacum introgression into maize.

The method used by Wellhausen et al (1952) to estimate teosinte introgression in races of maize in Mexico was highly subjective and was based upon approximate scores of 0-4 for the induration of rachis and lower glumes. In the present study, a somewhat objective approach

is attempted. Two types of modified strains of A158 have been used: (1) those which are homozygous for introduced teosinte chromosomes or chromosome segments and (2) strains homozygous for introduced chromosomes or chromosomal segments extracted from races of maize which are not in obvious contact with teosinte.

After removal of the grains, the cob is securely fastened in a vise and sawed longitudinally between the two consecutive rows of spikelets with a scroll saw holding a fine-toothed blade. The split halves of the cob are then smoothed with the help of a fine file until a few spikelets in the middle of the cob are exposed in a longitudinal section. Further smoothing is done with the aid of an electric sander employing a fine aluminum oxide abrasive paper. The data have been taken from five to seven spikelets from the middle of each cob under a dissecting microscope. Averages from five to seven cobs of each stock are then compared with the unmodified inbred A158 for each of the following characters: (1) length and angle of inclination of the rachilla, (2) width of the cupule, (3) shape of the lower glume, (4) degree of induration of rachis, cupule tissue and lower glume. The "impressor hardness tester" has been used for this purpose.

Studies have not yet been completed to give exact estimates of teosinte and *Tripsacum* introgression, but from the preliminary data, it seems evident that both teosinte chromosomes and "extracted" chromosomes produce in general the same effects. These are: (1) shortening in the length of the rachilla and its position somewhat inclined to the axis; (2) widening of the cupule; (3) lower glume curved upwards; (4) great induration of the tissues, especially those of rachis, cupule and lower glume.

S. M. Sehgal

10. *Tripsacum floridanum* crosses readily with corn.

What may be the most primitive species of *Tripsacum*, *T. floridanum* ($n=18$), which is now isolated geographically from corn in the Everglades region of southern Florida, has a high degree of crossability with corn. Each of the thirty-five ears with shortened styles which were pollinated with *T. floridanum* pollen yielded at least a few hybrid kernels and, as might occur naturally, some of these hybrid kernels germinated without benefit of embryo culture. The crossability of corn with other diploid species of *Tripsacum* is very much lower as found by Mangelsdorf and Reeves (1939) and other recent workers.