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1. Field studies on hybridization and parallel variation in the wild relatives of maize in Central Mexico II.

Field studies of the wild relatives of maize in Central Mexico begun last year [MGNL 43:182] were continued in the fall of 1969. Selected maize fields were studied along the transect from Cuitzeo to Moro Leon (50 kms) and from Cuitzeo to Churintzio (150 kms). The maize planted throughout the region is basically a rather uniform low elevation Conico-Chalqueno-Celaya complex though there is sometimes considerable variation from field to field and within fields. Teosinte is wild throughout the region and occurs along the margin of fields or as a weed in the fields. The variation in maize from a single field appears to be more extreme in fields where teosinte is present as a weed.

Mapping of fields planted to maize where teosinte was present indicates specific patterns from which a model for the effectiveness of maize x teosinte hybridization and resultant introgression into maize can be constructed. When F_1 hybrids do occur they are often bunched, suggesting a common parent; this is true even in fields where the distribution of teosinte is reasonably uniform throughout the field and indicates the effectiveness of the partial seasonal isolation between teosinte and maize. When teosinte is abundant, the frequency of F_1 hybrids increases proportionally but the frequency of backcrosses to maize does not appear to increase significantly. [Field identification of the first maize backcross is reasonably accurate, the second and third become increasingly more difficult. The first and second backcross to teosinte are detectable, but subsequent backcrosses are difficult to identify in the field. At present, suspected field-collected second and third generation backcrosses in both directions are undergoing genetic experimentation.] When teosinte is present, but not abundant, and distributed throughout the field, the absolute number of F_1 hybrids decreases but the number of subsequent backcrosses increases. Apparently the most effective structure for the introduction of teosinte germplasm into maize is to

have a low percentage of teosinte plants well distributed throughout the field which are partially seasonal isolated from maize. The F_1 hybrids are earlier than teosinte and therefore hybridize with maize, resulting in a greater abundance of backcross progeny than F_1 hybrids.

Sample Area	Number of Plants Total (Maize & Teosinte)	Teosinte	% Teosinte Maize	F_1	Mbc
Teosinte not abundant - F_1 hybrids less frequent than backcrosses					
Cuitzeo, Michoacan	5/8 acre	10,622	129	1.2%	2 8
Teosinte abundant - F_1 hybrids more frequent than backcrosses					
Uriangato, Guanajuato	1/2 acre	2,493	473	19%	9 1

The *Tripsacum* present in and around these fields belong to the T. lanceolatum group. Field-collected clones from the study areas are being maintained for crossing studies in the Maize Relatives - Genetic Garden of Tulane University.

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1. Malate dehydrogenase in maize endosperm.

A. Intracellular Localization

Multiple molecular forms of malate dehydrogenase have been demonstrated in numerous animal and plant tissues and the existence of isozymes appears to be the rule. The endosperm of *Zea mays* L. has been examined with regard to the presence of this enzyme and several isozymes have been detected using acrylamide gel electrophoresis. Studies have been concentrated on the two isozymes which migrate most rapidly toward