These eleven collections were sampled: Guatemala 207, Guatemala 269, Guerrero 174, Panama 5P, Panama 12P, Panama 39P, Costa Rica 45, Nicaragua 3432, Nicaragua 3406, Costa Rica 400, and Guatemala 835. A total of 27 plants were characterized successfully for chromosome morphology. One plant in each of three collections (Guatemala 269, Panama 5P, and Panama 39P) showed a heterochromatic block similar to that terminating abnormal chromosome 10L terminating 9S. The abnormal 10 condition was seen in four other plants.

Due to poor plant growth and lack of adaptation to Ithaca conditions, it was not possible to obtain selfed lines. Crosses were made to other plants, however, and stocks carrying the unusual chromosome 9 have been obtained.

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4. Iojap and teosinte cytoplasm.

Mazoti (1950) has reported that the expression of the iojap gene is greatly reduced or entirely lacking in homozygous ij ij plants which contain teosinte cytoplasm. Several years ago Mazoti (kindly) gave us seed of two of his iojap stocks. One was a standard gl gl ij ij line with maize cytoplasm, and the other a stock derived from the first line by backcrossing it as male parent for 8 generations to teosinte cytoplasm. The second line with teosinte cytoplasm was thus also presumably gl gl ij ij. The two lines, however, clearly differed in the degree of chlorophyll variegation. The strain with teosinte cytoplasm has shown few striped plants in the four seasons it has been grown, and the few striped plants that did appear usually contained only one or a few short white stripes. The stock carrying maize cytoplasm has given all variegated plants which typically have a moderate number of relatively narrow stripes. That the stock with teosinte cytoplasm is homozygous ij ij has been confirmed by crossing it as male parent to standard ij ij and ± ij female parents with maize cytoplasm. We have continued the backcrossing for three more generations with no change in the expression of the iojap phenotypes in the two lines.

The strain with teosinte cytoplasm was also crossed as female parent with two of our standard iojap stocks (obtained originally from the Coop. and maintained by selfing). The F_1 families, all ij ij in teosinte cytoplasm, were vigorous. At maturity both progenies contained more striped plants than were present in the ij ij teosinte cytoplasm female parent. Each family also had solid green plants (4 green, 15 striped in one family, 8 green, 12 striped in the second family).

Green plants in the F_1 families were backcrossed as seed parents by the standard iojap stocks. One backcross progeny contained 7 green or slightly striped plants and 7 plants with a moderate number of stripes. The second backcross progeny had 2 green, 2 slightly striped plants and 7 plants judged to be typical iojap like the recurrent male parent. A second backcross generation stemming from both green and striped female parents consisted of 6 families all of which contained only striped plants. The intensity of variegation in the BC2 progenies was not obviously correlated with the degree of variegation of the BC1 females (pollen from the same plant was used in making all backcrosses), all 6 BC2 progenies showing about the same degree of variegation whether derived from green or striped seed parents.

The expression of the iojap phenotype in the BC2 families was much more pronounced than in the original ij ij, teosinte cytoplasm stock from Mazoti, but was probably somewhat less pronounced than in the standard ij ij recurrent parents. The teosinte cytoplasm may thus be interacting with the ij genotype in our stocks, but if so the resultant modification of the iojap phenotype is less dramatic than in Mazoti's stocks. If one rules out pollen transmission of maize plastids and cytoplasm, the results to date might suggest, among other things, differences in iojap alleles or differences in modifiers of the iojap gene in the different stocks. Our standard iojap stocks (with maize cytoplasm) are considerably more variegated than the standard stocks received from Mazoti, and it appears that these differences are also manifest by the degree of expression of the two genotypes in teosinte cytoplasm.

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1. Conversion of inbreds to Texas-sterile cytoplasm by androgenesis in a tetraploid-diploid cross.

A Texas-sterile cytoplasm, tetraploid version of the "Emerson Brown" marker, a B Pl, was used as the female parent in a cross by the Purdue inbred H52. Among the progeny, there was one individual, diploid and paternal in phenotype. This individual was partially fertile and set some seed upon self pollination. In the second generation, field grown, most individuals were completely sterile; a few were partially fertile; all were phenotypically indistinguishable in other characteristics from normal H52. Apparently an unreduced gamete from the male functioned androgenetically and, as expected, acquired the cytoplasm of the female parent. This gamete, presumably, was heterozygous for partial fertility; or, possibly, the greenhouse environment in which the androgenetic individual was grown favored pollen formation.