

4. Maizoid and manisuroid effects of Tripsacum chromosomes added to maize.

Tripsacum chromosomes having "maizoid" (see previous item) effects in the direction of archaeological wild maize or primitive races of living maize include the homeologs of maize chromosomes 2 and 9. The chromosome 2 homeolog produces longer internodes in the rachis associated with shorter ears bearing only eight rows of grain. The homeolog of chromosome 9 produces a staminate tipped ear, a characteristic of wild maize. These changes are not associated with increases in glume or rachis induration as they might be had they been caused by either teosinte or Manisuris germplasm. All of the maizoid isolates from Tripsacum have been completely female fertile and at least partially if not completely male fertile.

In sharp contrast are the effects of the "manisuroid" isolates which have extra chromosomes not markable by any of the seven marker genes from WMT maize and which, if Manisuris is one parent of Tripsacum, may represent the chromosomes originally from Manisuris. The manisuroid isolates tiller more profusely, have narrower leaves, smaller spikelets, smaller kernels, increased induration of rachis and glumes, less specialization between the staminate and pistillate glumes and are partially female sterile and usually completely male sterile.

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5. Pollen fertility and type of Tripsacum chromosome.

Pollen studies of maize hyperploid for a Tripsacum dactyloides chromosome (Maguire 1956) with genes corresponding to maize chromosome 2 suggested the presence of a dominant "gene" on that chromosome for pollen sterility when present in the maize nucleus. Such a factor for pollen sterility did not exist in the corresponding chromosome which we have independently isolated from our stock of T. dactyloides from Manhattan, Kansas. In fact the average size, range, and distribution of sizes and starch accumulation in the pollen of plants with this Tripsacum homeolog to maize chromosome 2 is essentially identical to that of isogenic plants not bearing this extra chromosome. Although pollination tests for male transmission of this chromosome have not been made, the normal appearance of the pollen suggests that it would have equal male and female transmission as did the Tripsacum homeolog to maize chromosome 4. The indication is that stocks bearing the markable or "maizoid" Tripsacum chromosomes are male fertile while those bearing the nonmarkable or "manisuroid" Tripsacum chromosomes are essentially male sterile. The latter have smaller, usually empty pollen grains and anthers do not extrude from the spikelets.

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