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1. A comparison of corn and *Tripsacum* in genetic composition and chromosome structure.

In connection with our hypothesis that *Tripsacum* is an amphidiploid hybrid of *Manisuris* and wild maize, we presented data suggesting that only the chromosomes of the 'maizoid' genome carried alleles to the seven recessive genes in white multiple tester, "WMT", while the other or 'manisuroid' genome did not have such alleles (Galinat, et al, 1963). We now find evidence that the alleles of the recessive loci of corn are distributed on most of the chromosomes of *Tripsacum* rather than confined to a genome of nine or ten chromosomes. Some chromosomes or chromosome arms still have many loci in common, but differ in their alleles. Perhaps these may be considered homologous. Others have differentiated to various degrees and are no more than homoeologous.

The structure of the *Tripsacum* chromosome whose long arm bears loci corresponding to the short arm of corn chromosome 2, as reported by Maguire (1957), fits the data for *Tripsacum* chromosome 5 in the idiogram for *T. floridanum* diagrammed by Chaganti (1965). A different and very short *Tripsacum* chromosome has the V_4 locus and probably other linked loci representing at least part of the long arm of corn chromosome 2. If the progenitor of *Tripsacum* chromosome 5 was originally similar to the present corn chromosome 2, then the transfer of the part of its long arm marked by " V_4 " left its centromere in a subterminal relationship instead of its original submedian one. Similar translocations may account for some of the other subterminal positions of centromeres in *Tripsacum*.

With respect to corn chromosome 4, we have found an even higher degree of differentiation. The *Tripsacum* chromosome marked by Su_1 on the short arm of corn chromosome 4 does not have the La locus which is on the distal end of that arm in corn nor Gl_3 located on the long arm of the same corn chromosome. Conversely, the *Tripsacum* chromosome which bears the Gl_3 locus of corn does not have Su_1 . Thus, at least some of the longer chromosomes of corn such as 2 and 4 have their loci distributed among several shorter chromosomes in *Tripsacum*.

Not only are the shorter chromosomes of corn (nos. 7 to 10) similar in length and arm ratios to some of the longer chromosomes of *Tripsacum* (nos. 1 to 4) (Longley, 1941), but at least two of the shorter chromosomes (7 and 9) have homoeologs in *Tripsacum* with similar genetic composition. A single *Tripsacum* chromosome carries at least four loci

(V₅, Ra₁, Gl₁, I₁) in common with corn chromosome 7 and another Tripsacum chromosome has a series of at least 5 loci (Yg₂, C, Sh₁, Bz, Wx) found on corn chromosome 9. The data for constructing idiograms for these two isolated Tripsacum chromosomes have not yet been obtained.

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2. Selection for increased transmission of a Tripsacum chromosome and its resulting homozygosity.

The male and female transmission rates for the Su^d chromosome from T. dactyloides 4n of Florida on a background of a su gl₃ tester stock of corn were originally about 10% for either sex alone instead of 50% and self-pollinated ears had about 19% starchy kernels instead of 75%. By selecting for increased Su^d transmission among hundreds of ears over several generations, the transmission rate for either sex alone was raised to over 40%. Self-pollinated ears from these higher transmission lines yielded some ears (about 25% of the total) which showed 80 to 95% starchy kernels. At least some of these ears with around 90% starchy kernels are assumed to be addition disomics (20+2) with the extra Su^d chromosome from Tripsacum homozygous. The failure to obtain 100% starchy kernels on such ears would result from an occasional loss of both members of a pair of Su^d chromosomes which may not be coordinated in their meiotic behavior with the maize chromosomes. The cytological analysis of this material has not been completed.

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3. Homozygosity of a possible interchange chromosome from Tripsacum.

We did obtain one ear which had 100% Su^d Su^d kernels, but this plant has 20 rather than 22 chromosomes. This may have resulted from a homozygous substitution of a corn-Tripsacum interchange chromosome. Since the Su^d chromosome is known to lack some of the loci of corn chromosome 4 (La and Gl₃), it presumably would not provide a functional substitution in itself. This particular plant was partially male sterile and the ear had 26 per cent defective kernels (out of 133). Here again, the cytological analysis is incomplete.

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4. Additional evidence of somatic mosaicism in corn grass.

In last year's MNL, we reported that certain differences in morphology between two ears borne at different nodes on a corn grass plant were inherited rather than mere physiological variations. Since the action of the corn grass locus seems to involve the phase change process, it appeared that here was evidence for the involvement of a mutational (or paramutational) mechanism, as suggested by Brink on other grounds. However, Brink raised the question that my results could have come from a physiological difference carried through the cytoplasm of the egg.