

renders a highly advantageous function in helping to cytologically identify the tripsacum chromosomes after they have been transferred to the genome of maize.

As a result of the preparation of this cytological map of T. dactyloides, a few of the cytogenetically analyzed chromosomes extracted from tripsacum have now been assigned to their respective positions within the complement of tripsacum, as described in another item of this MNL (item 16).

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9. Morphology of the homeolog for corn chromosome II derived from *Tripsacum dactyloides* (2n = 36).*

One of the *Tripsacum* chromosomes, as previously reported by us as well as Maguire (1956, 1961), is homeologous to the short arm of corn chromosome II and so far as is known covers the recessives ws, lg₁, gl₂, sk and fl₁. Its pachytene morphology, ascertained from addition disomic stocks in which the extra pair shows uniform and regular homologous pairing, is described in this report. Its probable identity within the complement of T. dactyloides is also suggested.

The total length of the chromosome is about 23 microns; the two arms measure about 8 and 13 microns to give an arm ratio of 1.7 and the long arm is terminated by a knob, by means of all of which this chromosome can be easily distinguished from those of corn in the pachytene nuclei.

These figures are at variance with the data of Maguire who reported a total length of about 35 microns and an arm ratio of over 3.0 for the homeolog identified in her material. While Maguire's data are based upon a univalent that had undergone an interchange (reciprocal) in an earlier generation, and therefore was possibly altered, the chromosome described now in its disomic condition is believed to be the unaltered form. Tantravahi (1968) reports normal pairing in the hybrid T. dactyloides x

*In this and following articles, the maize chromosomes are identified by Roman numerals and *Tripsacum* chromosomes by arabic numerals.

T. floridanum, and both he and Chaganti (1965) have described the occurrence of chromosomes similar to the one reported now in the complements of T. floridanum. Furthermore, our own data on the cytological map of the Kansas form (Bussey clone) of T. dactyloides, from which this particular chromosome was extracted, indicate that chromosome 9 of its complement is nearly identical to that reported now (vide items 8 & 16).

Preferential pairing of the corn II homologues to the exclusion of the extra tripsacum chromosome(s) is observed at meiosis in both the 20+1 and 20+2 stocks; crossover products involving the two loci tested (Lg Gl) are recovered only at a low frequency among thousands of plants. It would thus appear that the tripsacum chromosome, when transmitted to the progeny, has remained virtually unaltered in most of our materials.

Other differences with Maguire's observations are:

While she reports total pollen sterility in her 21 chromosome plants of the constitution $2, 2+T^2$ and $2, 2^T+T^2$, most of our stocks have been nearly normal and fertile. Crossing over between lg and gl was rare in her material, while we have recovered both the reciprocal products at a low but regular frequency in each of the generations.

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10. Cytology of $lg_1 Gl_2$ and $Lg_1 gl_2$ crossover progenies of a corn-Tripsacum hybrid.

Both of the reciprocal crossovers lg Gl and Lg gl are recovered at a frequency of about 3-5% when the 20+1 Lg Gl plants are selfed. The regularity in the appearance of these phenotypes in each of the generations indicates that crossing over does take place between the short arm of corn chromosome II and the long arm of its tripsacum homeolog (T9), although at a relatively low rate. In the lg Gl plants, over a hundred PMC's at diakinesis show a trivalent frequency of nearly 90%. Analysable pachytene nuclei, however, give a frequency of only a little over 50%. In the remainder the univalent chromosome shows nonhomologous centric associations with the centromeres of corn bivalents. It appears that these associations persist up to and possibly beyond diakinesis and give the appearance of trivalents, which they are not.