

7. Possible premeiotic gene exchanges between corn and *Tripsacum* homeologs.

A higher rate of gene transfer than would be suspected on the basis of chromosome associations at meiosis has been occasionally observed in some addition disomics. Our studies on the synaptic behavior of the *Tripsacum* homeologs for corn chromosomes 7 and 9 indicate that at least part of this crossing over occurs at some stage prior to pachytene.

In 33 out of 46 PMC's in which the extra pair could be identified, the *Tripsacum* bivalents show normal, regular and complete pairing at pachytene. In the exceptional PMC's these two chromosomes are of unequal lengths and the extra segment of the longer partner shows nonhomologous pairing within itself and appears as a buckle. The buckle, showing the pairing configuration characteristic for duplication/deficiency chromosomes, is always internal but variable in its extent and position from cell to cell. In two cases a corn bivalent showing a similar buckle is recorded within the genome. In two other nuclei the two heteromorphic bivalents of corn and *Tripsacum* were seen to be paired for short segments at the region of the buckle.

Apparently these two bivalents represent the reciprocal interchange products. Since both the normal and the abnormal (heteromorphic) bivalents occur in different cells of the same plant (sometimes within the same anther) it appears that the concerned chromosome segments were exchanged earlier than pachytene, possibly in some premeiotic stage.

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8. Progress in the cytogenetic comparison of the genomes of corn and *Tripsacum*.

The present state of knowledge in our comparison of extracted chromosomes of *Tripsacum* on marker gene stocks of corn is summarized in Table 1.

A cytological map of the eighteen chromosome pairs in the Kansas form of *T. dactyloides* ( $2n = 36$ ) from which the different homeologs have been extracted is not yet available. However, Tantravahi (Bussey Inst., Harvard Univ., 1968) reports complete and regular pachytene pairing in the *T. floridanam* x *T. dactyloides* hybrid and it may therefore be assumed