7. High trivalent formation in maize-tripsacum-teosinte heterozygotes for the Su_1 chromosome.

Two maize-tripsacum-teosinte heterozygotes [M4, Tr7 and t4] for the Su_1 marked chromosomes of these three relatives were produced by hybridizing a homozygous addition [20+2] stock for Tr7 with teosinte derivatives of A158 in which teosinte chromosome 4 from Florida teosinte and Nobogame teosinte was substituted for the corresponding maize chromosome.

The stock involving Florida teosinte chromosome 4 was studied at pachytene. The tripsacum chromosome [Tr7] was found as a univalent folding back on itself. It measured on an average of 23.7 μ which compares well with the data given by Galinat et al. [MNL: 44] for this chromosome in 2n+2 condition. This chromosome showed a feeble association at pachytene with the maize-teosinte bivalent in 6 out of 17 observations. The association involved the terminal region of the Tr7 chromosome with the maize-teosinte bivalent away from the proximal region where their common Su locus is situated [Galinat et al., MNL: 43]. Three different plants [70-375-10; 70-376-5; 70-377-1] provided the material for scoring the trivalent frequency at diakinesis and metaphase I. In all three cases a high percentage of trivalent formation was observed [Table]. The second maize-tripsacum-teosinte stock is identical with the first except that the teosinte chromosome 4 is derived from Nobogame teosinte. Here also, a high trivalent frequency was observed at diakinesis and metaphase I [Table]. In this heterozygote a bridge and a fragment was observed at anaphase I. Although an isogenic control produced by crossing the homozygous addition stock [20+2] for Tr7 by normal A158 has been produced, it has not as yet been grown for cytological comparison. Data somewhat comparable are available, however, for the original 20+1 and 20+2 Tr7 addition stocks not carrying a teosinte chromosome 4. In this background homozygous for maize chromosome 4, the frequency of trivalents and/or quadrivalents observed in either the 20+1 or 20+2 Tr7 addition stocks was only about 6 percent. The increase in trivalent frequency in the maize-tripsacum-teosinte heterozygote is probably related in some way to the presence of all three of these chromosomes from the three species within the same nucleus. The final determination awaits a study of the isogenic control.

Table showing the trivalent frequencies observed at diakinesis and metaphase I in maize-tripsacum-teosinte heterozygotes

Stock No.	Diakinesis			Metaphase I		
	Total No. Cells Observed	No. of Cells with $9_{[11]}+1_{[111]}$	Percentage	Total No. Cells Observed	No. of Cells with $9_{[11]}+1_{[111]}$	Percentage
Florida teosinte						
70-375-10	50	39	78	50	31	62
70-376-5	35	25	71	32	27	84
70-377-1	54	35	65	53	32	60
Pooled Data	139	99	71	135	90	73
Nobogame teosinte						
70-382-4	45	33	73	27	19	70

Further studies on this are also in progress to determine at pachytene if the partial homology from tripsacum [Tr7] has a greater affinity to teosinte chromosome 4 rather than to chromosome 4 or others of maize or if it is the mere presence of heterozygosity for maize and teosinte 4 which enhances the crossover potential for the tripsacum homeolog with one or the other of them.

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8. Comparative studies of American Maydeae and the Andropogoneae: II. Morphology of pachytene chromosomes of two collections of Elyonurus tripsacoides from Texas and Veracruz.

The morphology of the pachytene chromosomes of Elyonurus tripsacoides from Veracruz, Mexico, has been previously reported [MNL 1970, item 19]. The present study consists of observations at meiosis of Elyonurus tripsacoides from Texas. The two collections have different plant habits. Hence a detailed study of their chromosome morphology may have evolutionary significance.

Extensive studies of chromosomes at the pachytene stage of meiosis in the pollen mother cells have been made. Considerable difficulty was encountered in the identification of the chromosomes because of the poor spread in the material, as a result of which not even a single cell showed clearly all the 10 chromosomes. However, data from the individual chromosomes at pachytene from 300 observations have been analyzed and the ten chromosomes identified [Table 1].

Meiosis is regular. At pachytene the twenty chromosomes form ten bivalents. The individual chromosomes are distinguished by their relative lengths and arm ratios. There are no distinct features as knobs or chromomeres to demarcate one from the other. The adjacent regions of the centromere are more darkly stained, but this is not consistent hence cannot be taken as a criteria for distinguishing one from the other. The nucleolus organizing body is terminal with the satellited portion at the distal end and is on the short arm.