8. Variable transmission for Tripsacum homeolog to maize chromosome 9.

In contrast to the consistent female transmission rate observed for the Tripsacum homeolog to chromosome 2 of maize, the Tripsacum homeolog of maize chromosome 9 showed a sudden reduction in its transmission on the female side after separation from the rest of the Tripsacum genome. This transmission is scored as percent of nonwaxy kernels on ears of addition monosomics for this extra chromosome which had been backcrossed to chromosome 9 tester maize. The data are as follows:

Year	Backcross Generation	No. Tripsacum Chromosomes	Wx %	N
1962	1	18	37.0	92
1963*	2	1	12.3	1688

*Pooled data from 7 ears.

On the male side, the transmission of this extra chromosome may be much higher. When 202 pollen grains of one of these addition monosomics (63-470-1) were scored, 116 or 57.4% were classified as nonwaxy.

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9. Transmission of Tripsacum chromosomes in the progeny of a maize-Tripsacum dactyloides hybrid derivative.

Segregation of Tripsacum chromosomes in the progeny of a maize-Tripsacum dactyloides hybrid derivative with three extra Tripsacum chromosomes was studied in backcross progenies. One of the three chromosomes also carried the dominant allele for the lg_1 (chromosome 2) gene of maize. The transmission frequency of the Lg_1 carrying chromosome is reported in a different entry (see No. 6). The observed and random-expected segregation of the three chromosomes on the female side is shown in the following table.

Table 1
Segregation of Chromosomes in the Backcross Progeny of 62-588-89

Pedigree	Number of Chromosomes			
62-588-89 x lg_1 gl_2 B v_4 (23 chs. in ♀)	20	21	22	23
Plants observed	32	15	1	0
Plants expected with random segregation	6	18	18	6

As in the case of the segregation of Tripsacum floridanum chromosomes in the progeny of the triploid hybrid reported above, here also the distribution is nonrandom. However, a study of chromosome numbers in the microspores of 62-588-89 itself showed that the 10, 11, 12, and 13 chromosome classes are randomly distributed as shown in the following table.

The observed nonrandomness of segregation of the Tripsacum chromosomes on the female side could then be due to either preferential segregation on the female side or to gametic or zygotic lethality.

Table 2
Distribution of Chromosome Numbers in the Microspores of 62-588-89

	Number of Chromosomes			
	10	11	12	13
Microspores observed	3	9	12	3
Microspores expected with random distribution	3	10	10	3

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10. Intra- and intergenomic affinities of maize and Tripsacum chromosomes.

In order to assess the significance of chromosome association in maize-Tripsacum hybrids, intragenomic synaptic relationships of maize and Tripsacum were studied. The frequencies of chiasmatic associations and side by side associations of chromosomes (which probably represent homologous or homeologous pairing, Person, Canadian Jour. Bot. 33:11-30, 1955; Kimber and Riley, Bot. Rev. 29:480-531, 1963) at meta-anaphase of meiosis in a haploid maize plant and at metaphase in the haploid genome of Tripsacum from the triploid hybrid [(maize x T. floridanum) x maize] were scored. If the association frequency found in the hybrid (chiasmatic and side by side) resulted to a large extent from intergenomic pairing, then such association should be in excess of the sum of the individual pairing frequencies of the haploid genomes of the constituent species. If, on the other hand, the pairing in the hybrid is autosyndetic or predominantly so, then the association in the hybrid should be equal to or less than the sum of the pairing in the haploid genomes of the parental species. The mean per cell of chiasmatic association in haploid maize, haploid genome of Tripsacum, and the F_1 hybrid was 0.06, 0.20, and 2.28 respectively while the mean per cell of side by side association in the three materials respectively was 0.28, 0.20, and 0.69. It can at once be seen that the pairing in the hybrid is much higher compared to the sum of mean pairing in the haploid genomes of maize and Tripsacum (2.28:0.26 chiasmatic and 0.69:0.48 side by side associations). Thus a significant amount of pairing in the maize-Tripsacum hybrids is intergenomic and involves maize and Tripsacum chromosomes.

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11. Nonrandom segregation of Tripsacum floridanum chromosomes in the progeny of the triploid hybrid [(maize x T. floridanum) x maize].

In order to study the mode of segregation of the Tripsacum chromosomes on the female side of the triploid hybrid, the distribution of chromosome numbers in a progeny population of 150 plants obtained by backcrossing the triploid hybrid by the maize parent was studied. The data are presented in the following table.

Random segregation of Tripsacum chromosomes would follow a distribution obtained by expanding the binominal $(1/2 + 1/2)^{18}$. The above data show clearly that the distribution is extremely skewed toward the side of the