

Contrary to our expectations there were no other crossovers for the rest of the tested loci, with exception of two crossover individuals showing the waxy (wx) phenotype. Suppression of crossing over as well as differences in gene sequence and/or their map distances on the tripsacum chromosome seem to be the plausible explanations for the lowered value of 6.6% recombination observed in our testcross. Further tests are in progress.

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15. The possible occurrence of a gene for asynapsis (as) in chromosome 5 of *T. dactyloides*.

Both the 20+1 and 20+2 chromosome plants, carrying one or two extra tripsacum chromosomes homeologous to corn IX marked with 8 recessives, show near normal fertility and seed set. In contrast, their 20 chromosome derivatives, representing homozygous substitutions for all dominants from tripsacum, were either partly or totally sterile. The results of 276 self-pollinations of homozygous substitutions are summarized below:

- |  |              |
|--|--------------|
| a) No. of pollinations (69-651 to 69-700): | 276          |
| b) No. of ears without any kernels:        | 177* (64.1%) |
| c) No. of ears with kernel set:            |              |
| (i) greater than 50%:                      | 16 ( 5.8%)   |
| (ii) less than 50%:                        | 83 (30.1%)   |

\*Of these, 40 ears were from 11 rows in which all the plants selfed, without exception, gave no kernels.

Cytological studies made from samples collected at random from either the same plants or related ones revealed partial or total asynapsis of one or more bivalents at pachytene, variable frequencies of univalents at diakinesis and metaphase I, their uneven segregation at anaphase I, and associated irregularities at meiosis II, resulting in abortive spores. The univalent frequencies ranged from 0 to 20 per cell in different plants or in different sister nuclei of the same plant. The average univalent frequencies and the degree of kernel set in the

Table 1

Comparison of univalent frequency at Meiosis I and percentage kernel set on selfed ears of homozygous substitution stocks ( $2n=20$ ).

Plant No.	Cytological Observations			Fertility Studies			
	No. of PMC's Observed	Total No. of Univalents	Average Univalent Frequency/Cell	No. of ears Selfed	Ears with Kernel Set		
					None	More than 50%	Less than 50%
69 - 656	21	82	3.9	5	2	-	3
666	31	12	0.39	5	4	-	1
667	26	154	6.4	7	5	-	2
668	31	16	0.52	3	2	-	1
669	20	128	6.4	4	2	-	2
671	35	16	0.46	6	5	-	1
672	33	58	1.8	6	3	-	3
673	30	92	3.7	6	2	-	4
674	26	508	19.5	2	2	-	-
675	33	34	1.03	1	1	-	-
676	28	500	17.9	3	3	-	-
681	26	58	2.3	7	5	-	2
683	24	84	3.5	7	6	-	1
684	33	90	2.7	3	2	-	1
697	26	60	2.4	4	3	-	1
698	28	44	1.6	7	6	-	1

concerned plants are compared in Table 1. It is apparent that a very high univalent frequency is related to total failure in kernel set but that the contrary is not always true. In one family in particular (68-818) and its  $F_2$  derivatives (69-674 & 676) this asynaptic characteristic acquired both a stronger or complete effect on the majority of individuals. Some degree of independence from the presence of the tripsacum chromosome in the genomes of these substitution stocks was also evident in some of the individuals which were completely fertile, while 25% of their segregants showing the recessive phenotypes for all tested loci became asynaptic and therefore sterile. There are three possible explanations for this variation: (i) some form of mutagenic effect of tripsacum introgression; (ii) spontaneous deletion of a segment with As on chromosome I of corn (As As being regulatory in function, As as also would induce asynapsis and univalency--Baker & Morgan, Genetics, 61, 1969) and (iii) the As in chromosome I being substituted by as of tripsacum subsequent to an interchange involving this locus. The unexpected occurrence of higher associations (quadrivalents or trivalents + univalents) in some of the related stocks, suggestive of additional homeologies to chromosomes other than chromosome IX, as previously reported (MNL, 1969), would seem to favor an interchange between this tripsacum chromosome and corn chromosome I, while at the same time maintaining its greater homeologies to chromosome IX. Absence of a direct correlation between univalent frequency and the degree of fertility observed could be due to the inherent variability in the expression of as as or ds ds recognized for maize and other genera (Riley & Law, Adv. Genet., 13, 1965).

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16. Progress on the cytogenetic comparison of maize and Tripsacum chromosomes.

The morphological features at pachytene of the tripsacum chromosomes homeologous to the different corn chromosomes ascertained from both the genomes of maize and Tripsacum dactyloides are compared on p. 127. The rela-