Table 2
Morphological features of the pachytene chromosomes of different Tripsacum species comparable to the Su^d chromosome in corn-Tripsacum addition disomics (2n = 20+2)

Species	Chromosome No.	Length (microns) Short arm	Long arm	Total	Arm ratio	Author & Year
T. australe	11	7.98	23.52	32.60	2.9:1	Ting, 1960
T. australe	12	8.19	21.36	31.00	2.5:1	Ting, 1960
T. maizar	10	7.81	21.87	31.25	2.8:1	Tantravahi, 1967
T. laxum	9	10.40	21.84	33.80	2.5:1	Tantravahi, 1967
T. dactyloides	*	7.31	20.40	29.28	2.8:1	Present study

*Su^d chromosome

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8. Synaptic affinities and altered morphology of the Tripsacum chromosome from addition disomics of corn.

The morphological features of the Su^d chromosome present in plants of a second addition disomic line (67-260) are given in Table 1 together with similar data from the related stocks (67-258 & 259) reported earlier.

When these two Su^d chromosomes, occurring in different but related 20+2 stocks are compared, a change in the position of the centromere from submedian (arm ratio 2.8:1.0) to nearly subterminal (arm ratio 4.4:1.0), thus altering the chromosome morphology, becomes evident. Considering that these two types of Su^d chromosomes had a common origin from 20+1 addition monosomics, the altered morphology could be ascribed to (a) a deletion of a part of the short arm or (b) a possible crossing over and chromatid exchange between the Tripsacum chromosome and any one of the corn chromosomes in one or more of the preceding generations. From the regular and complete pairing at pachytene as well as the occurrence of only bivalents in the later stages of meiosis 1, it appears that in either case, the chromosome is homozygous for the alteration, the situation in this case being different from the 20+1 stocks of Maguire (Genetics, 45:195-209 & 651-664; 1960) where she found evidence of complete synapsis in chromosome 2 heterozygous for the ZT interchange segment. In the absence of readily distinguishable markers like, for example, the terminal knob for the Tripsacum chromosome isolated by Maguire (Genetics, 42:473-486; 1957), it would be difficult to readily locate the corn chromosome involved in

Table 1

Morphology of the Tripsacum chromosome at pachytene in the corn-Tripsacum hybrid derivatives; Stock 67-260. (2n = 20+2).

Sl. No.		Length in Microns: Short arm	Long arm	Total	Arm ratio
1		4.5	22.5	29.3	5.0
2		4.5	20.3	26.1	4.5
3		5.4	22.5	29.3	4.2
4		5.4	23.4	30.6	4.3
5		4.5	18.0	23.9	4.0
6		5.4	22.5	29.3	4.2
7		4.5	22.5	28.8	5.0
8		4.5	18.9	24.8	4.2
9		4.5	20.3	27.0	4.5
10		4.5	22.5	28.4	5.0
11		4.5	18.0	24.3	4.0
12		4.5	18.0	24.8	4.0
13		4.5	20.3	26.1	4.5
14		5.4	22.5	29.7	4.2
15		5.4	24.8	32.0	4.6
16		5.4	22.5	29.3	4.2
17		4.5	23.4	29.3	5.2
18		4.5	18.0	24.3	4.0
19		4.5	18.0	24.3	4.0
20		4.5	22.5	28.8	5.0
	Mean	4.77	21.07	27.52	4.42:1.0
Stock	SE	0.094	0.499	0.557	--
67-257	Mean	7.31	20.40	29.28	2.79:1.0
& -258	SE	0.432	0.951	1.34	

suspected interchange leading to the altered morphology of the Su^d chromosome. An obvious recourse is to analyze the entire chromosome complement in this material and compare the data obtained with that of Longley (in Rhoades, 1950) for each of the 10 corn chromosomes.

Preliminary studies on these lines indicate that chromosome 4 remains morphologically unaltered. The possibilities of the Tripsacum chromosome having equal, if not greater, synaptic affinities with chromosomes other than 4 of corn, therefore, have to be considered. In at least two of the nuclei observed at pachytene, in which some of the corn chromosomes could also be identified, chromosome 8 shows an arm ratio of 4.5 against the expected 3.2 while the other chromosomes correspond fairly well with the data of Longley. Detailed studies to verify the possible implications of the variation are in progress.

It may be of additional interest to mention that consistent with the otherwise regular course of meiosis, these Su^d Su^d plants yielded 100% Su kernels when backcrossed with the recessive female parent both in the present and the preceding generations.

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9. Meiosis in some addition disomic corn-Tripsacum hybrid derivatives carrying the Su^d chromosome.

The source of the cytological materials for this report is the same as that referred to previously in items 7 and 8.

In a large majority of the pollen mother cells, the 22 chromosomes behave normally at meiosis and yield functional spores with 11 chromosomes each. In these, the two extra chromosomes undergo regular synapsis in prophase I and show normal disjunction at anaphase I and anaphase II. However, in a low percentage (about 5%) of cells, the Su^d chromosomes deviate from the normal in the course of their meiotic behavior as outlined below:

(a) Occurrence as univalents at diakinesis and metaphase I, which probably is due to ineffectual synapsis at pachytene (pairing not followed by chiasma formation) between one of the Tripsacum chromosomes and a pair of corn chromosomes;

(b) Occurrence of higher associations at diakinesis (types 7, 11 & 17);

(c) Precocious second meiotic division of the chromosomes at metaphase I;

(d) Unequal segregation (3:1 half-chromosomes or chromatids) at anaphase I;

(e) Occurrence of chromatin bridges at anaphase I with a chromatin 'knot' on the equatorial plate (arrested terminalization?) involving one of the corn bivalents and independent of the Tripsacum chromosomes, and

(f) Probable deletion-duplication in the corn chromosome pair involved in the bridge formation.