

living bank is to have a ready source of variation to screen for any trait of emergency value. If the breeder wishes to maintain maximum variability comparable to that in a wild population of teosinte, only 1 or 2 seeds from each plant, regardless of ear size, should be saved to propagate the gene pool. In contrast, if all seed is bulked and a random sample planted, there will be automatic selection for certain traits such as increased ear size with resulting loss of variability. The least productive plants may, in some adverse circumstances, hold the greatest potential for corn improvement.

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### 3. Chromosome morphology of white multiple tester and its hybrid with Burnham Spreader.

In view of the fact that the white multiple tester is used extensively in genetic studies, it was found desirable to study in detail the chromosome morphology to distinguish the individual chromosomes.

The ten chromosomes of these two stocks have been identified from preparations of cells showing all the ten chromosome pairs. The averages of ten such cells, with additional information on some of the chromosome pairs lying free of the rest either individually or in groups of varying numbers, have been tabulated. The rates of contraction of different chromosomes within cells and between cells tend to vary. Hence, a great number of cells was examined.

#### White multiple tester:

At pachytene the twenty chromosomes form 10 bivalents and one of them is the nucleolus organizing pair. The longest chromosome is 84.6  $\mu$  with an arm ratio of 1.9. Chromosome 4 has a knob situated internally on the long arm. The fifth chromosome, which has a nearly median centromere, has a small chromomere in the longer arm. The nucleolus organizer chromosome has a small internal knob in the long arm and is similar in morphology to the organizer chromosome of other stocks; it occupies the 6th position by virtue of its length. The long arm of chromosome 8 bears an internal knob and adjacent to this knob towards the terminal end there is a small chromomere. Chromosome 9 is terminated by a knob in its short arm while chromosome 10 is distinct in having a short arm the greater part of which is heterochromatic (Table 1).

Table 1

## Pachytene Chromosomes of White Multiple Tester

Chromosome	Long arm (microns)	Short arm (microns)	Total (microns)	Arm ratio	Knob position
1	54.0	28.8	84.6	1.9	-
2	41.4	28.8	72.0	1.4	-
3	41.4	18.0	61.2	2.3	-
4	36.0	18.0	55.8	2.0	IK/LA
5	28.8	27.0	57.6	1.1	-
6	41.4	16.2	59.4	2.6	IK/LA N.O.
7	32.4	12.6	46.8	2.6	-
8	41.4	10.8	54.0	3.8	IK/LA
9	27.0	14.4	43.2	1.9	TK/SA
10	23.4	9.0	36.0	2.6	-

IK - Internal knob  
TK - Terminal knob

LA - Long arm  
SA - Short arm

N.O. - Nucleolus organizer

White multiple tester X Burnham Spreader:

The white multiple tester was outcrossed with the Burnham Spreader stock and the resulting hybrid was studied in detail for the morphology of chromosomes at pachytene. In this stock the pachytene spread was found to be very good and all the individual chromosomes could be easily distinguished. By considering both the total lengths and arm ratios, as well as knob and chromomere patterns, all of the 10 chromosomes could be identified.

The mean absolute lengths of the longest and shortest chromosomes are 90.0 u and 45.4 u, respectively. Chromosome 2 has small chromomeres at the terminal region of the short arm, while 3 has a distinct chromomere adjacent to the centromere in its short arm. Chromosomes 4, 7 and 8 have internal knobs in their long arms. In addition, a subterminal chromomere is found in the short arm of chromosome 4. Chromosome 5, with a nearly median centromere, has a chromomere in one of its

arms. The nucleolus organizing chromosome, i.e., the 6th chromosome, has a conspicuous knob in its long arm. The 7th chromosome is heterozygous for the knob and has a heterochromatic region adjacent to the centromere in its long arm. Chromosome 9 has a terminal knob in its short arm, while 10 has a very distinct short arm which has a greater segment of its length heterochromatic (Table 2).

Table 2

## Chromosomes at Pachytene of the WMT hybrid

Chromosome	Long arm (microns)	Short arm (microns)	Total length (microns)	Arm ratio	Knob position
1	53.6	36.0	90.0	1.4	-
2	48.9	34.2	84.9	1.3	-
3	53.3	25.9	80.6	2.1	
4	44.3	25.9	72.0	1.7	IK/LA
5	35.3	32.0	68.8	1.6	-
6	42.8	12.6	57.2	3.4	IK/LA
7	37.4	14.8	54.0	2.6	IK/LA
8	39.9	13.3	55.1	3.1	IK/LA
9	32.4	16.6	49.0	2.0	TK/SA
10	30.6	11.2	45.4	2.7	-

IK - Internal knob  
TK - Terminal knob

LA - Long arm  
SA - Short arm

N.O. - Nucleolus organizer

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4. More on affinity of Tripsacum chromosome 7 to maize and teosinte chromosome 4.

We reported previously that when the addition monosomic (20 + 1) for the Tr7 chromosome from Tripsacum marked by Su<sub>1</sub> was on a normal Al<sup>58</sup> maize background, it had a trivalent frequency of about 6.1 percent from associations with the maize bivalent for chromosome 4 (M4). When the maize background was changed by making the fourth chromosome bivalent