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1. Maize and teosinte relationship.

Reeves and Mangelsdorf (Reeves and Mangelsdorf, 1942) first proposed that maize and teosinte should be congeneric. During the last decade, I have studied the relationship between these two species and have found additional evidence to support their proposal (Ting, 1964; Ting, 1967). However, the controversy on the relationship between these species has recently arisen again. It seems to me that this is completely unwarranted.

For the past two years, I have employed new techniques, such as electron microscopy and DNA-binding fluorochrome staining, to investigate further the relationship between these species at a subchromosomal level. The data obtained through these studies also agree with the previous conclusion that maize and teosinte should be congeneric. I think that this should be accepted.

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2. Additional studies on the synaptonemal complex of haploid maize.

During the last year, studies on the synaptonemal complex of haploid maize have continued. It was observed that the lateral elements of the complex are undoubtedly bipartite in structure. Based on four randomly chosen samples, the average width of the central element was 499 \AA , while that of the lateral elements was 524 \AA . Flanking both sides of the central element, the space between the central and lateral elements was 419 \AA crosswise (Table 1). Hence, the average width of a single complex is about 2385 \AA , which is close to that of single complex in diploid maize.

In certain thin sections, it was shown that the component fibrils of the central elements were clearly two in number. However, central elements with three longitudinal components, as reported in Gryllus, were never found, nor were the ladder-like central elements as in Philaenus. Unfortunately, great difficulties were encountered in trying to definitely identify transverse fibers between the central and the lateral elements

Table 1
 Diameters (width) of the components of the synaptonemal
 complex in different haploid maize plants (in Å).

Components	Plant No.				\bar{X}
	1	2	3	4	
Lateral element	519	513	577	487	524
Central element	519	513	577	390	499
Distance between lateral element and central element	346	385	461	487	419

such as those found in mice and quails. As the division advanced to early diplotene stage, the central element appeared first to undergo disintegration. Short fibrils in the center of the complex became evident. These fibrils were, however, only lightly stained in contrast to the chromatin regions next to the lateral elements.

Differing from the behavior of the synaptonemal complex of certain animal meiocytes, the complex of haploid maize was never observed to be attached terminally to the nuclear envelope. It was difficult to ascertain the relationship between the nuclear envelope and the chromatin fibers around the complex.

At diakinesis, even though the axial elements of some chromosomes remained clear, those of most chromosomes disappeared. In the areas presumed to be chromosomal, only the densely stained chromatin was present. By acetocarmine squash technique, it was found that in the same stage a majority of the cells had 10 univalents. Approximately 26 percent of the cells had from one to two bivalents. They were frequently formed by end-to-end associations. It is likely that they were brought about by stickiness of heterochromatin rather than by previous exchange of chromatids. In other words, no convincing chiasmata were observed. Table 2 shows the percent of cells having 10 univalents as well as those having eight, seven and six univalents in a total of 674 randomly selected cells. In addition, bridges and fragments were rarely seen at both anaphases I and II. Hence,

it is reasonable to conclude that no cytological evidence of crossing over was obtained.

Table 2
Chromosome associations at diakinesis in
five haploid maize plants.

Type of associations	Number of cells	Percent of total
10 I*	494	73.3
8 I, 1 II	160	23.7
7 I, 1 III	2	0.3
6 I, 2 II	18	2.6
Total	674	

*I, II, and III designate univalent, bivalent and trivalent, respectively.

Furthermore, ears born on F_1 progeny from the cross between various haploids and an inbred diploid were also examined at harvest to determine whether ovule abortion was sufficiently high to indicate the presence of inversions or reciprocal translocations. Ovule abortion of all ears examined was no greater than five percent. Therefore, it may be concluded that no inversions or translocations were present in the F_1 plants employed. This again indicates that no crossing over occurred in the parental haploids.

These data support my previous conclusion that the synaptonemal complex does not lead to crossing over.

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