

The results obtained show that the additive portion of variation is highly significant in all the three series of crosses considered, whereas the estimates of H_1 are not statistically different from zero. These results suggest that the determination of the height of the plant in our material is completely additive.

Table 1 shows also that the estimates of the H_2 component are statistically different from zero, whereas the estimates of h^2 are not significant. As a consequence the estimator, $H_2/4H_1$, which is expected to give a measure of asymmetry, is very high, while the estimator, h^2/H_2 , indicates that a very small number of groups of genes are involved in the manifestation of the variability observed.

Considering all the results obtained we should draw the conclusion that between plants derived from a single grain of an autodiploid strain there are differences which are genetically determined in an additive way. The high values of the asymmetry estimator suggest that over all loci there is a disproportion between the number of alleles of different types (+ and -). This supports the hypothesis that the autodiploid strain was originally very homogeneous and that the additive genetic variability observed is not probably due to residual heterogeneity, but mostly to spontaneous mutations. This view is also supported by the low value of the estimates of the number of groups of genes involved in the manifestation of the variability present in the considered population.

References

- Hayman, I. B., 1954. The theory and analysis of diallel crosses. Genetics 39: 789-809.
- Sprague, G. F., Russell, W. A. and Penny, L. H., 1960. Mutations affecting quantitative traits in the selfed progeny of doubled monophloid maize stocks. Genetics 45: 855-866.

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1. Further studies on teosinte chromosomes.
 - a. Huixta Teosinte. Microsporocytes of five F_1 hybrids of Huixta teosinte and maize were cytologically investigated. The teosinte seeds employed in this study are different from those studied previously (Cytologia, Ting, 1958). At pachytene, seven chromosome knobs, all terminal, were observed. Except for those on the long arms of chromosomes 4 and 8, all of them were homozygous. This is the first report that only terminal knobs were present in this teosinte. However, in a few cases asynapsis involving the distal one-third of the short arm of chromosome 4 was identified.

The knobs on the short arms of chromosomes 1, 2, and 6 were small. On the long arm of chromosome 4 and the short arm of chromosome 7, the knobs were large in size. Medium-sized knobs were present on the long arm of chromosome 9.

Despite the occasional occurrence of terminal asynapsis in the short arm of chromosome 4, no definite inversion in this chromosome was identified at pachytene. However, at anaphase I of the microsporocyte divisions, chromatid bridges and fragments were frequently observed in certain hybrids. It is likely that some short inversions were present in this teosinte. Perhaps the lengths of these inversions were so short that the force of homologous pairing could not overcome that of non-homologous pairing. Hence, only rod-shaped configurations were formed at pachytene.

- b. Perennial teosinte: Microsporocytes of four perennial teosinte plants were studied. These plants belong to the progeny of a selfed plant obtained through the courtesy of Dr. D. L. Shaver of Cornnuts Inc., California. It was found that the pachytene chromosomes of these plants were virtually knobless. There were terminal large chromomeres on the short arms of chromosomes 8 and 9. Most of the chromosomes formed regular bivalents at pachytene. Very few multivalents were demonstrated. No deficiencies, inversions or translocations were observed. Apparently these plants are different in terms of chromosome characteristics from those studied earlier by the author (Chromosomes of Maize-teosinte Hybrids, 1964).

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2. Further studies on the B-chromosomes of maize.

In the last year, 79 plants of the selfed progenies of two inbred maize strains, carrying six B-chromosomes each, were examined. For the inbred 67-14, the number of B's per plant among a subtotal of 18 plants was found to vary from three to 12, with the largest number of plants in the six B class. As for the other inbred 67-17, among a subtotal of 61 plants studied the number of B's per plant was found to range from two to 12, with the largest number of plants in the class with five B's.

For a study of the effect of B-chromosomes on the seedset of maize, three additional inbreds were used. They were 66-14, with 15 B's, and 66-15 and 66-16, each with 12 B's. Selfings of three plants in each of these strains were attempted in the summer of 1966. It was later observed that seedsets of all of these plants were very poor, averaging less than five per cent. However, seedsets of sib plants having zero to five B's per plant were close to normal. Hence, the poor seedsets of these plants were attributed to their possessing a large number of B-chromosomes. However, before a definite conclusion can be drawn, a study on a large number of plants together with a statistical analysis should be carried out. Furthermore, the plants with many B's were also