

leaves in normal maize. When corn-grass leaves are somewhat broader than those of the original grass-like extreme, as may result from minus modification, then the upper leaves have streaks of bloom interspersed with pubescent areas.

Another peculiarity of the original grass-like type of corn grass plant, which has not been recorded previously, is a convex rolling of the leaves. The direction of this roll is opposite to that which occurs in normal leaves which have been subjected to drought.

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16. Further cytological studies of maize-teosinte derivatives.

Materials and techniques used and some of the results of the cytological studies of maize-teosinte derivatives were reported in last year's News Letter. The following is a brief account of additional studies.

A. Asynapsis: Asynaptic configurations varying in size, shape, location, and the chromosomes involved were observed at pachytene. Involved in this type of irregularity were chromosomes 1 and 4 of Florida teosinte, and chromosomes 8 and 10 of Durango teosinte,

B. Non-homologous association: In the derivatives of Durango teosinte foldback types of non-homologous association involving chromosomes 2, 4, 5 and 8 were observed, while in Florida-teosinte derivatives non-homologous association between two different pairs involving chromosomes 7 and 8 were found. The length of the chromosome segments within various non-homologous associations varied in different collections.

C. Chromosome knobs: In Durango-teosinte derivatives additional knobs were recorded on chromosomes 2, 5 and probably 8. In Nobogame-teosinte derivatives an additional knob was present on chromosome 4.

D. Inversions: Since the last report a terminal inversion on the short arm of chromosomes 8 was found in three more progenies of Durango-teosinte. At diakinesis the chromosomes, heterozygous for this inversion, usually did not pair normally. Among 151 cells studied in the progeny No. 5913, 29 had the two chromosomes completely dissociated and acting as univalents. In the remaining 122 cells some of the chromosome 8 bivalents were associated only at one end. Bridges and fragments at anaphase I or early telophase were found. However, frequencies of the appearance of bridges and fragments were very low (see table). Furthermore, no bridges were recorded at anaphase II among 1090 cells studied.

It was also observed that at anaphase I the heterozygous chromosomes 8 frequently underwent precocious division. These early-divided chromosomes were always found persistent in the center of the cells, while the other diads had approached the poles.

Number of bridges and fragments found at anaphase I in the progenies of maize-Durango teosinte derivatives which are heterozygous for In8.

Progeny	no bridge no fragment	1 bridge no fragment	1 bridge 1 attached fragment	1 bridge 1 free fragment	2 bridges no fragment
5911	638	5	1	5	0
5913	353	4	6	8	0
5915	567	34	1	11	0
5919	400	4	0	2	1
Total	1958	47	8	26	1
Percent of total	96	2.3	0.3	1.3	0.004

E. Binucleated sporocyte: In the progeny No. 5915 of a Durango-teosinte derivative several sporocytes were found to have two nuclei at mid-prophase of meiosis. The two nuclei were different in the stage of division in all of the cases. These two nuclei were undergoing prophase division within a common cell wall but were not within a common nuclear membrane. Perhaps caryokinesis accompanied by a failure of cytokinesis, just before the sporocyte division, may result in this kind of irregularity.

F. Heterochromatic fragments: Several heterochromatic fragments, smaller than regular B-chromosomes, were observed in two progenies of Florida-teosinte derivatives and one progeny of a Nobogame-teosinte derivative: At pachytene these heterochromatic fragments had an average length of less than  $20 \mu$ , and they varied in configurations, although most of them appeared to fold back upon themselves. All of them occupied a relatively peripheral region of the cells. Meanwhile, the other chromosomes of the cells in which these fragments were found, appeared normal; no translocation, deficiency or any other chromosome alterations could be identified.

All of the chromosome irregularities such as asynapses, non-homologous associations, binucleated sporocytes and heterochromatic fragments described above were not found in the checks. It appears certain that these irregularities were induced by hybridization between maize and teosintes. The additional knobs present in both Durango- and Nobogame-teosinte derivatives were undoubtedly inherited from teosinte.