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1. Further studies on sorghoid maize.

The sorghoid plants reported in the Maize Genetics News Letter (1966) were selfed as well as sib pollinated during the spring season of 1966. Some of these plants were also crossed to normal maize. The F_1, F_2 and backcross generations resulting from such crosses were studied during the regular season, i.e. late summer.

Plants in the first filial generation had normal tassels and ears except that in several plants the ears were branched. In almost all cases, there was only one branch and that arose from near the bottom of the ear. Number of kernel rows on the branches varied from 6 to 8. These branched ears were no different than those commonly observed in some of the modern races of maize. The main ear and the branch had normal cob (pith). In the second filial generation some plants were observed that had relatively more branching of the ear than the F_1. The number of kernel rows on the branches was decreased and the amount of pith was also reduced. Plants with three to four branches were also observed in this generation. Backcrossing to the normal parent gave progenies which had normal ears. Progenies of the plants backcrossed to the sorghoid type parent had a relatively higher percentage of branched ears.

Study of the selfed progenies of the sorghoid plants revealed that the tassel character, especially the condensed branching, attained a relatively high degree of uniformity while the typical sorghoid branching of the ear could only be observed in a few plants in some of the progenies. The most interesting feature in the progenies of self-pollinated sorghoid plants was the tendency towards hermaphrodite florets in the tassel. The carpels were, however, nonfunctional and the stigmas were unbranched. Study of this character in further generations will be continued.

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1. Notes on Tripsacum cytotaxonomy.

Cytological studies of plants at the Fairchild Tropical Garden during the past year have contributed information that may be useful in clarifying certain species relationships. Most of the observations were made on plants from our 1963-1965 collecting trips to Mexico, Guatemala and Colombia, S. A., additional collections from Guatemala and Honduras made in December, 1966, and a recent collection by Dr. John Popenoe, director of the Fairchild Garden, from Great Inagua Island in the Bahamas.

Chromosome counts of $2n = 36$ were obtained from three populations of T. latifolium Hitch. at Cubilguitz, Alta Verapaz in the tropical rain-forest area of central Guatemala, from two additional populations of this species from the north shore of Lake Izabal in southeastern Guatemala,

and from a cultivated field of Guatemala Grass near El Zamorano, Honduras consisting of plants in the rosette stage having the foliage characteristics of this species. Since there are elsewhere in Guatemala tetraploid populations having many of the characteristics of T. latifolium described by Hitchcock it is possible that the chromosome counts by Reeves and Mangelsdorf, on the basis of which this species was reported in 1935 to be tetraploid, were obtained from such populations.

Our chromosome studies of T. laxum Nash, a species very similar to T. latifolium and also grown for forage in various Latin American countries and the Caribbean as Zacaton Maizar or Guatemala Grass, has confirmed that it is a tetraploid as originally reported by Reeves and Mangelsdorf. Plants collected in the general neighborhood of Vera Cruz, Mexico, where the type locality is believed to have been located, had approximately 72 chromosomes and the very irregular meiotic chromosome behavior considered by Dodds and Simmons to explain the very low fertility of this species. The presence at meiosis of multivalents and univalents in addition to bivalents and the fact that laxum and latifolium have many taxonomic features in common suggest that the former species originated as an amphidiploid having the latter species as one parent.

Specimens of Tripsacum collected recently on Great Inagua Island in the Bahamas by Dr. John Popenoe, identified in the Bahama Flora of Britton and Millspaugh as T. dactyloides, are now growing at the Fairchild Garden, and chromosome counts from root-tip smears of plants from three different clones of this collection showed them to be diploids with 36 chromosomes.

This may be quite significant since these plants do resemble the tetraploid dactyloides of Florida in foliage characteristics such as width of rosette leaves, absence of pubescence on leaf sheaths and blades, and varying amounts of sun-red plant color. And being located geographically between Florida and South America, where there is an essentially glabrous form of T. australe very similar to the Florida dactyloides widely distributed on the western slopes of the Andes in Venezuela and Colombia, the Inagua plants might be a missing link between these two taxonomically similar, widely distributed species of North and South America. But more critical evaluation of these taxa is needed; difference in ploidy should not be overlooked; and determinations of chromosome knob frequencies and size differences incidental to tests of crossability between indigenous types of maize and Tripsacum at Medellin, Colombia in 1964 and much earlier at Ithaca, New York indicate that their pachytene karyotypes are very different and that superficial resemblances may not be a reliable indicator of natural relationships among these taxa.

When Hitchcock described T. dactyloides ssp. hispidum from northern Mexico (Bot. Gazette 41: 295, 1906), he emphasized that it connects the dactyloides of the central United States with the T. lanceolatum Rupr. of Mexico but he did not know of the difference in chromosome number between the diploid dactyloides of the central United States and the tetraploid form of this species from the eastern United States. In this connection it is perhaps noteworthy that we have examined cytologically many populations from central and southern Mexico and also from

Guatemala that are more similar to T. lanceolatum than to other species thus far described from these countries, and all have been tetraploid. However, a recent collection by Garrison Wilkes from Chihuahua in north-central Mexico, now growing at the Fairchild Garden under accession number FG65-1253, is listed as a diploid, and appears to have the differentiating characters of Hitchcock's T. dactyloides ssp. hispidum.

If the natural affinities of T. latifolium and laxum; australe and the dactyloides of Inagua, and of the eastern United States; the dactyloides of the central United States and dactyloides ssp. hispidum and lanceolatum of northern Mexico; suggested by similarities in traits of taxonomic significance and numerical chromosome relationships, are substantiated by tests of crossability, pachytene karyotype analyses, and other cytogenetic evidence, there will remain for evaluation the many dissimilar populations of Mexico, Guatemala and elsewhere in Latin America that appear to be diverse genetic recombinants at the tetraploid level of natural alloploid derivatives of the very dissimilar T. maizar and zopilotense.

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1. Perennial maize.

The perennial habit in maize appears to be conditioned by the recessive condition at three loci, pe, gt, and id.

A cross was made in 1964 between homzygous pe/pe gt/gt maize and normal segregates in selfed progenies segregating for id. The cross was selfed in the winter of 1964-1965, and the progeny grown out in the summer of 1965 in a pilot experiment to determine if any segregate had a perennial phenotype. From a progeny of 940 in the Salinas Valley nursery, 15 possibly perennial plants were selected, propagated, and observed critically in the Florida winter nursery for perennialism. Only 3 proved to be perennial, and continued to make totipotent growth through the end of the winter season. One of these was grown as a houseplant during the same winter season, and was reset into the 1966 summer nursery at Greenfield, where it continuously made totipotent growth all summer, and still survives as of January 1967, at the age of 21 months. The clone has produced seed twice, and flowered many successive times without loss of vegetative vigor.

According to the mechanics of the cross made, the expected frequency of perennial segregates is 1/2 x 2/3 x 1/64, or 5 triply recessive (perennial) plants from the progeny of 940. Only 3 were realized. However, cultural conditions may be held suspect since any plant that died a cultural death would have been classified as nonperennial. In fact, it has been found that perennial maize is difficult to clone unless one waits until the propagules have formed adventitious roots before they are removed from the