reported above. Since seed of reciprocal crosses is available it should be possible to test the genic or cytoplasmic nature of this phenomenon.

Although the results suggest that there may be a relation between combining ability and pollen tube growth, final conclusions must await the results of actual yield tests of the crosses made. Such results should become available during the present season. If such a relation exists it should be a great help in the evaluation of inbred lines for combining ability on an extensive scale and thus help materially to speed up the Hybrid Maize Program.

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1. Effects of gibberellic acid on maize plants homozygous for the recessive gene (la).

A compound of interest to both geneticists and physiologists is gibberellic acid. Reports indicate it differs physiologically from most other auxins in that it is usually much less active in assays based on response of isolated plant parts, but stimulates growth of intact plants much more than most other auxins, as evidenced by increases in height, fresh weight, and dry weight. It has been shown to produce responses on known gene controlled auxin characteristics in maize. The present study was undertaken to determine if gibberellic acid would affect a genetically controlled auxin factor where bending of the stem from perpendicular to horizontal is concerned. The gene in question (la in maize), when in the homozygous condition causes an auxin differential between sides of the stem resulting in a horizontal growth form. The redistribution of auxins in lazy stems is reversed from normal horizontal stems, so that about 55 percent of the auxin moves in the upper half (Shafer, J., Botanical Gazette 101: 68 (1939).

Gibberellic acid was applied by three types of application and at three stages of growth. (1) a .5 percent gibberellic acid - lanolin paste was applied to the cotyledonary node and coleoptile of the embryo at the time the coleoptile broke through the pericarp during germination, (2) an aqueous solution of gibberellic acid at the concentration of .01, .1 and 1.0 ug. was injected into the stem by use of an ordinary hypodermic needle or sprayed on the leaf surface by using a small atomizer to previously untreated plants beginning at the fifth leaf stage of growth and repeating treatments at weekly intervals for a four week period, (3) a .5 percent gibberellic acid-lanolin paste was applied to previously untreated plants on the under side of the curvature as soon as bending of the internodes started. This was done by removing a

small section of the leaf sheath and applying the paste directly to the base of the internode. Check plants were maintained for all trials. The study showed that gibberellic acid would not overcome the unequal balance of auxin concentration at the base of internodes just above the soil surface in lazy corn, even though the acid was applied to the side having the lower natural auxin concentration during the bending stage. A possible explanation of this may lie in the rapid lateral transport of gibberellic acid to the higher auxin side. The basis for this explanation would have to be further investigated.

It was shown, however, that leaf and internode tissue of lazy corn elongate excessively when gibberellic acid is applied. There was indication that very small amounts of the acid, .04 ug./plant are as effective in bringing this elongation about as are higher concentrations, 4 ug./plant, and that there may not be an inhibitory effect by higher concentrations as is often evidenced by many auxins.

Treatments numbers 1 and 2 brought about excessive elongation of those internodes in corn that normally remain short and below the soil surface. Normally the second through the fourth or fifth internodes fail to elongate sufficiently to cause this portion of the corn stem to be above the soil surface. It was found that all internodes above the second in treated plants had elongated. Some were found to be eight or nine times the normal length.

Measurements were made of several internodes. Table 1 presents the analysis of data on measurements of the fourth internode following injection or spray treatment.

Table 1. Length of the fourth internode in cm. following treatment with gibberellic acid by injection or spray. Treatments started at fifth leaf stage and repeated at weekly intervals on same plant for 4 weeks.

Treatment	Concentration in ug./plant/ treatment	Total amount applied to each plant	Length of 4th Internode in cm. Plants 1	2	3	S	Mean
Injection	0.01	0.04	1.4	1.3	2.5	5.2	1.73
	0.1	0.4	1.5	3.5	2.5	7.5	2.50
	1.0	4.0	2.5	3.2	5.1	10.8	3.6
Spray	0.01	0.04	4.0	2.6	2.0	8.7	2.87
	0.1	0.4	1.7	2.0	1.2	4.9	1.63
	1.0	4.0	.9	2.3	2.5	5.7	1.90
Check	0	0	1.0	.9	1	2.9	.97

Table 1. Continued.

Analysis of Variance			
Source of Variation	d.f.	s.s	M.S.
Total	20	24.383	
Between treatments	6	13.916	2.319*
Error	14	10.467	.748

*Significant at the .05 level.

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1. Maize-Tripsacum hybrids.

Hybrids between Texas inbred 203 and diploid Tripsacum dactyloides backcrossed to inbred 203 for five generations are under study, and the results obtained thus far are different in certain respects from any yet reported. Two related groups of the hybrid derivatives may be recognized on the ground that the phenotypic differences between them are significant for certain characters. One peculiar feature of both groups is that, in spite of their being fifth generation backcrosses, above 99 percent of the plants are completely pollen sterile and about 90 percent ovule sterile.

Although most of the work done to date is genetical in nature, cytological examinations have been made on about half of the nearly sterile B_3 plants of each group, and every plant examined was found to have an extra chromosome. Many of them also showed a chromatin tie and occasionally other irregularities. The plants of inbred 203 used in the work contained no B-chromosomes, and the Tripsacum had only the usual 18 pairs, characteristic of the diploid forms. Much additional cytological work is needed, but a tentative conclusion that most or all of the nearly sterile plants are 2n+1 is justified.

2. Characters of hybrid derivatives having only inbred 203 in their maize ancestry.

In 1955, 45 B_3 plants which had inbred 203 as their only source of maize ancestry were grown to maturity; in 1956, 290 B_4 plants; in 1957, 84 B_5 plants. Of these 419 plants only three had fertility approaching normal. These three plants produced pollen in abundance, and their ears were approximately filled with grains. However, their pollen,