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1. Effect of cytoplasm on agronomic characters in maize.

The cytoplasm in a double-cross corn hybrid is obtained from one inbred line, the female inbred in the seed parent of the double cross. The same genotypic yellow double, GAC 0211, was made with the four following sources of cytoplasm:

<u>Female</u>	x	<u>Male</u>
(GA 172 x GA 199)	x	(CI 21 x GT 112)
(GA 199 x GA 172)	x	(CI 21 x GT 112)
(CI 21 x GT 112)	x	(GA 172 x GA 199)
(GT 112 x CI 21)	x	(GA 172 x GA 199)

This investigation was made to determine if the cytoplasm affects agronomic characters such as yield, lodging, plant and ear heights, and date of silking. Paired one-row plots (15 hills in length) for the six possible cytoplasmic comparisons were used in a randomized blocks design with ten replications in 1957. Some preliminary results were obtained in 1952 and 1953 under extreme stress of drought.

The 1957 results show the following: Significant differences were obtained between the yields of GA 199 and GT 112 cytoplasm with 89.7 bushels and 82.7 bushels per acre, respectively. GA 172 had more erect plants than CI 21 and GT 112. GA 199 silked earlier than GT 112. CI 21 produced taller plants and higher ears than GA 172.

These results indicate a cytoplasmic effect on the inheritance of the agronomic characters--yield, erect plants, date of silking, plant and ear heights--in the double cross, (GA 172 x GA 199) x (CI 21 x GT 112).

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2. Heterofertilization and pleiotropism.

Several progenies of GT 112 are being maintained which show a 3 yellow to 1 "lemonade" endosperm color segregation. "Lemonade" kernels produce albino seedlings, except for a percentage of 1.45 which produce green seedlings. No albino seedlings from yellow kernels have been obtained. Thirty-six "lemonade" kernel-green seedling plants

produced ears segregating in the 3:1 ratio indicating that they are the result of heterofertilization. No ears homozygous for "lemonade" have been obtained.

The theory of close linkage of genes (two) is not supported in Chi-square tests of 29 families over a two-year period. Results indicate that the condition is of a monohybrid nature. "Lemonade" is due to a single pleiotropic recessive gene which also affects chlorophyll development. The absence of a yellow kernel-albino seedling class may be due to selective heterofertilization caused by a lethal condition induced by this gene or some other gene, such that albinism would not be expressed in the presence of heterozygous endosperm.

The percent of heterofertilization was calculated on the basis of 2897 seedlings grown from "lemonade" kernels. Theoretically, it would be 2.9 percent, or 1 out of 34, instead of 1.45 percent if two classes were obtained from heterofertilization instead of one.

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3. Attraction of insects by corn.

For three generations a number of sublines from some leaf-blight resistant inbreds have exhibited a peculiar attraction to insects. These inbreds were developed from material originally obtained from Dr. C. C. Werhnam of Pennsylvania State University. The insects are of both types; sucking and chewing. The attraction occurs approximately two weeks after pollination and appears to be dependent on the age of the plant. The period of attractiveness on each individual plant lasts from one to two weeks.

The insects are apparently drawn to the leaf surface where they appear to be feeding. Minute areas have been observed which may be punctures or globules of a liquid. Determinations are being made of the substance or substances which are attracting the insects. It is hoped that these will lead to a study of the inheritance of this character.

Potential value of this material may be that of luring insects to traps as a control measure or even more specifically, its use as a trap crop for an especially damaging corn insect.

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