

twenty-five races by looking among the smaller farms in less progressive areas. The races of corn now being grown have apparently changed relatively little except in those areas in which the National Corn Commission has established corn seed production (hybrids and/or varieties). With the rapidly expanding net-work of good roads, the growth of the production program of the National Corn Commission, the growth of the Extensive Service plus the growing interest on the part of farmers themselves, a change in the corn race distribution will probably take place at a greatly accelerated pace. This change is already evident in areas where crop improvement programs have been initiated.

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## 2. Resistance to ear and tassel smut in Mexico.

Data from 1958 corn plantings in the Bajío region of west central Mexico show distinct differences of reaction among several hybrids and varieties of corn to the ear and tassel smut incited by the organism Sphacelotheca reiliana (Kuhn) Clinton.

Plantings of 12 varieties were made at 4 different planting dates. Highly significant differences were found among varieties and among dates of planting in reaction to the fungus. The most susceptible hybrids were those that included lines introduced from tropical corns. Of plantings made March 15, March 31, April 15, and May 1, the highest percentages of infection were obtained in the May 1 planting.

Commercial corn plantings in the area ranged from no infection to individual fields with 40% or more of the plants infected. Literature reports of the disease indicate it to be of minor importance, but experience in Mexico suggests the desirability of incorporating genetic resistance to the disease in corns for the Bajío region of the country.

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## 1. Relation of root rot and root type on yield and maturity of maize.

Inbred lines derived from two ears of Fulton's yellow dent have been shown to differ in the expression of root rot. The evaluation of the importance of root rot and other morphological characteristics was estimated from a series of multiple measurements involving the roots of corn

plants dug in August and September. These measurements include scores for root type, root abundance, apparent disease resistance, brace roots and fine roots. Correlations between these measurements and yield and moisture at harvest, taken on top-cross progenies of these inbreds in 1957 are presented in Table 1.

Table 1. Correlation coefficients between various root and yield measurements obtained from three-way hybrids involving inbred lines and two single cross testers grown in 1957.

	Type	Abundance	Disease	Fine Roots	Brace Roots
Yield	+0.403	+0.300	+0.232	+0.356	+0.282
Moisture Per Cent	+0.433	+0.304	+0.313	+0.418	+0.344
Fine Roots	+0.656	+0.776	+0.708	1.000	+0.268

Significant r at 1 per cent level = .239.

The corn roots were dug with a mechanical digger which enabled the removal of a definite portion of the root system free of soil. The roots harvested by this procedure made it possible to carefully remove for observation and scoring the main and fine branches of the secondary root system. The 1957 results suggest "fine roots" as one of the most useful morphological characters in selecting for root rot resistance in corn.

Diallel crosses between the four most resistant and the four most susceptible lines developed in this work have now been made, along with outcrosses to an early and a late tester. This material, when grown in 1959 and 1960, should furnish information on the heritability of root rot resistance.

The 1957 data show that top cross progeny root rot scores have little correlation to similar scores taken on inbreds. The possibility of heterosis or overdominance effects is indicated.

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## 2. Modification of cold resistance and combining ability of corn inbreds by Cobalt 60 treatment.

Dormant dry seeds of two long time inbred lines of maize, S.D. 5 and B8, were treated with 4750r units of gamma irradiation from a Cobalt 60 source in 1957, immediately prior to planting. Plants grown from the irradiated seeds of each inbred were selfed and outcrossed to check