DISTRIBUTION OF CORN PLANTS IN THE FIELD

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Doctor Basil Benson once said that the factor which has had the greatest influence in determining the width of corn rows is the length of the ox yoke. In other words, the convenience of the cultivator has been largely influential in fixing the customary distance between corn rows. In order to increase the plant population per acre and to permit cross cultivation, two or more plants are grouped together in a hill. Casual observation in any corn field thus planted will show that the close association of plants in the same hill results in competition which reacts to the relative disadvantage of the weaker individuals.

With the advent and improvement of tractor planting and cultivating equipment, the suggestion was made by Chester A. Hunt, Grundy County, Ill., that the rows of corn be spaced closer together and that the plants be uniformly distributed over the field. In 1930, some tests were begun by the Agronomy Department, Illinois Agricultural Experiment Station, to compare the performance of corn in single-plant hills with corn in multiple-plant hills at the same plant population per acre. These tests have been continued through seven seasons and this report is a summary of the results obtained.

EXPERIMENTAL METHODS

Multiple-plant hills were 39.6 inches apart, a distance which permitted the planting of five rows per rod. Distance between single-plant hills varied with the plant population. With 6,000 plants per acre the distance between hills in both directions was 32.3 inches; with 8,000 plants, 28.0 inches; with 10,000 plants, 25.0 inches; with 12,000 plants, 22.9 inches; with 14,000 plants, 21.2 inches; with 16,000 plants, 19.8 inches; and with 20,000 plants, 17.7 inches. Plots were 1 rod square. Plantings in single-plant hills were made alongside plantings of multiple-plant hills of the same population per acre, as shown in Fig. 1. Position of plots representing different plant populations was randomized. In most years plots were planted thick and later thinned to the desired stand. In other years the error due to irregularities in stand was mitigated by harvesting for yield only those hills which contained the correct number of plants and which were bounded by hills of a correct stand. All test plots were replicated. The following number of plots of each rate and method of planting were made: In 1930, eight; 1931, eight; 1932, three; 1933, three; 1940, six; 1941, six; and 1942, four.

In the early years of the test both open-pollinated and hybrid corn were used, but in recent years U. S. Hybrid 13 has been used exclusively. Plots were cultivated by means of a man-pushed garden plow.

Yields obtained from plantings in 39.6-inch hills have been compared with those obtained from closely spaced hills of the same population rates. The significance of the difference has been tested by determining the value of t at the 5% and 1% points.

RESULTS

Yield of grain, being the most important item of performance, was