THE EFFECT OF POLLEN SOURCE UPON THE GRAIN YIELD OF CORN

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A study was made to determine the immediate effect of fertilization by foreign pollen upon the grain yield of corn (Zea mays, L.) when a change either in endosperm type or in heterozygosity is involved. The problem has been attacked from the standpoints of individual plant yield and acre yield. It is an outgrowth of corresponding earlier studies of individual kernel response in the case of ears fertilized with pollen mixtures. Increased kernel weight had been found in such tests to result from pollinations which increased the heterozygosity of the embryo and endosperm and also when a change from sweet to starchy type of endosperm occurred. Because of the possibility that these differences in kernel weight within an ear might merely reflect competition between kernels varying in vigor of growth or in ability to precipitate carbohydrates, it did not seem justifiable to interpret such differences in terms of plant or acre yield effects. To secure direct information on this point, the experiments herein reported were conducted. The results should be of interest in connection with the farm practise of mixing seed of two varieties and also as a study in the technic of field variety tests with this crop.

LITERATURE AND PREVIOUS INDICATIONS

The literature bearing on this problem has been rather fully reviewed by KiesSELbach in a bibliography of 10 papers.

The experimental data heretofore reported by various workers have been concerned largely with the comparative weights of pure and hybrid kernels occurring on the same corn ear. The general indications from such earlier work may be summarized as follows:

1. In case kernels of similar endosperm type differ in heterozygosity due to differential pollination, a positive correlation with increased kernel weight may be expected. Both embryo and endosperm are likely to be affected in the same direction. The most striking effects occur with crossed kernels in selfed lines and single F1 hybrids and with selfed kernels in open-pollinated varieties.

1Contribution from the Department of Agronomy, Nebraska Agricultural Experiment Station, Lincoln, Nebr. Paper No. 123, Journal Series, published with the approval of the Director. Received for publication November 20, 1931.

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