THE EFFECT OF TYPE OF ENDOSPERM UPON CARBOHYDRATE DISTRIBUTION IN THE MATURE CORN PLANT

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A sweet corn plant usually does not appear to produce as great a weight of grain as a dent corn plant of equal size and leaf area. McCluer (1) and Kiesselbach and Cook (2) show that the individual kernel on a sweet corn ear has its weight increased about 20 to 30% by pollination with dent corn pollen. Unpublished studies by Rothgeb at this Station not only show that the individual kernel on a sweet corn ear has its weight increased 20 to 25% by pollination with dent corn pollen, but indicate also that the total weight of grain produced by the sweet corn plant is increased by such pollination.

It appeared as unlikely that the carbohydrate-assimilating power of the plant is increased by fertilization with dent corn pollen. Therefore, it seemed logical to assume that the change in the type of endosperm induced by such pollination affected the proportion of total carbohydrates which entered the kernels from the plant.

Studies were carried on during 1928 and 1929 in an effort to determine whether the distribution of carbohydrates in a corn plant can be varied by changing the type of endosperm in the kernels produced by that plant. The 1928 results were brought into question because plants were prostrated and partially uprooted by the heaviest rain in the history of the local weather station. However, the general findings in that year were corroborated by those of 1929. Analyses of dent corn plants were made also, but the results are not included because it seems desirable to confine all comparisons to plants of one genetic type.

The following procedure was carried out for the tests included in this report. Two sugar corn strains that resulted from many years of inbreeding were crossed to produce a vigorous progeny that would show a high degree of genetic uniformity. Seed resulting from the cross between these two inbred strains was planted in four rows 54 hills long. The plants in these rows were treated in one or another of three different ways. On some plants bags were put over the ear shoots to prevent pollination from any source. Other plants were pollinated with sugar corn pollen. Still others were pollinated with dent corn pollen. Repeated pollinations were made to insure well-filled ears.

It was desired to learn whether absence of grain on a plant results in the accumulation of excess sugars in the various plant parts; whether the presence of sugar corn kernels results in a partial drainage of these sugars into the kernels; and finally, whether the presence

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3Figures in parenthesis refer to “Literature Cited.” p. 524.

Published June, 1934