FACTORS AFFECTING THE SUCCESS OF POLLINATION IN CORN

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ADVERSE weather during the critical flowering period of corn, Zea mays L., is perhaps one of the greatest hazards to corn production in the Great Plains area. High temperatures and extreme desiccation, or both, may blast the entire tassel or kill the pollen grains after they are shed, or may otherwise interfere with pollination by causing the silks to wilt rapidly, thus hastening the loss of their receptiveness to pollen. This interference with the pollination process is reflected in poorly pollinated ears at harvest and consequently a reduction in the yield of grain.

Previous work at the Kansas Agricultural Experiment Station (4, 5) has shown that the leaves of some inbred lines and hybrids fire badly at relatively low temperatures, while others growing alongside may remain green through severe periods of drought. These studies also indicated that most hybrids that are resistant to leaf firing have an advantage in yield of grain over susceptible types during years when severe droughts occur. Corn hybrids resistant to leaf firing, however, may frequently produce low yields. It appears, therefore, that the reduction in yield may be due to interference with normal fertilization as well as injury sustained by the vegetative portion of the plant. It seemed desirable to study some of the factors affecting grain yield under drought conditions. The primary objective was to determine how seed setting in corn is affected by temperature, age of silks, and source of pollen, and how these factors are conditioned by soil moisture and the drought reaction of the material.

MATERIALS AND METHODS

The effect of daily maximum temperatures upon seed setting was studied in 1940 and 1941 on a total of over 7,000 self-pollinations. In 1940, 15 inbred lines were grown for increase in a plot that could be irrigated with an overhead sprinkler system. Success of pollination was estimated as the percentage of the ovules on the ear developing into mature seeds. These data from more than 2,000 ears were correlated with the maximum temperature on the day of pollination. The daily temperatures were obtained from the U. S. Weather Bureau report for Manhattan, Kans. Similar data were obtained in 1941 on some 5,100 ears produced under irrigation. A wide range of breeding material was represented by including lines involved in commercial or promising experimental hybrids from 17 states. Temperature and humidity records in 1941 were obtained from

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Also, unpublished data by R. W. Jugenheimer on resistance of corn strains to leaf firing.

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