MATURITY is an important objective in corn breeding, especially in the northern sections. The wide variability in length of the pre-flowering period provides the most important basis of selection for earliness in corn at the present time. The possibility of variation in the post-flowering period has been suggested by Hoppe, et al. (8), and by Smith (12). Differences in the rate of moisture depletion between varieties of sweet corn were observed by Culpepper and Magoon (6). On the other hand, Alberts (1) found that the period of silking to denting was approximately 40 days for both early and late varieties in one season. Genes controlling endosperm type have been observed by Andrew, Brink, and Neal (4) to influence the rate of maturation in corn as measured by moisture content. The sugary kernels lose their moisture less rapidly than the starchy ones. Diseases may also affect maturation of corn. Smith and Trost (13) reported that resistance to Diplodia infection was associated with lateness.

The investigations reported here were undertaken to determine (a) whether the rate of moisture depletion and dry matter deposition varies among inbred lines of corn, (b) how maturation of the kernel is affected by varying the source of pollen, and (c) to what extent the rate of maturation is changed by the presence of Diplodia stalk rot.

MATERIAL AND METHODS

Two inbred lines, R4 and WF9, were used in preliminary studies in 1944. Grain moisture was determined by sampling five ears in each of the two lines from plants self-pollinated on the same day. A sample of 25 kernels from two rows was collected from the same ears at each of the following days after pollination: 30, 34, 38, 42, 46, 52, 58, and 64. After each harvesting the husks were refolded around the ear and held in place with rubber bands. Cob moisture was based on five ears in each line at each of the following days after pollination: 30, 34, 38, 42, 46, 52, and 58.

In 1946, two early lines, 9 and M13; two late lines, R4 and WF9; and their hybrids, 9×M13 and R4×WF9, were grown according to a split-plot design replicated four times. Four split-plots were formed respectively by the four inbred lines sib-pollinated and cross-pollinated by each other. The remaining split-plots contained the two hybrids 9×M13 and R4×WF9, which were sib-pollinated only. Half of the sib-pollinated plants of the six strains in each split-plot were inoculated with Diplodia stalk rot while the other half were not. Each of these strains was planted at different times so that they could be pollinated at about the same time.

In 1946, sampling was made by collecting two ears at random in each of the four replications at each date of harvesting. The samples were collected between 8 and 10 a.m. at 7-day interval, from the fortieth to the sixty-eighth day after