Clipping Corn Plants to Delay Their Development

GEORGE H. DUNGAN AND HAROLD W. GAUSMAN

SOMETIMES it is desirable to cross corn inbreds and single crosses which do not normally tassel and silk at the same time. Synchronization of reproductive development may be accomplished (1) by planting the earlier one a few days later than the late one; (2) by fertilizing the soil when planting the late one so as to provide it with an abundant supply of well balanced plant-food nutrients; and (3) by clipping the plants of the forward strain during their early stages of growth. This paper deals with the last one of these methods of bringing about simultaneous tasseling and silking of strains that differ in maturity.

The purpose of the investigation reported here was to determine (1) how much retardation in reproductive development could be attained by clipping; (2) at what stage and how severely should corn plants be clipped to bring about the desired delay in tasseling; and (3) what effect does clipping have on grain yield.

Methods

Field experiments were begun in 1945 and were continued through 1946, 1947, and 1948. In the first 3 years, adapted double-cross hybrids, U.S. 13, Illinois 201, and Illinois 972, were used. In 1948 eight adapted single crosses and eight standard inbreds were used. Single crosses included 187-2 × L317, WF9 × Hy, WF9 × M-14, K4 × L317, Hy × O7, Hy × 187-2, Hy × L317, and WF9 × 38-11. Inbreds used were K4, L317, O7, 187-2, Hy, M-14, WF9, and 38-11.

In 1945 the plants in normal width check rows were thinned to one plant per hill, and alternate plants within each row were cut to certain heights as shown in the graph, Fig. 1. The undipped plants within each row served as controls. A ruler with the end resting on the ground was held alongside each plant so that the top could be cut off with a sharp hand sickle at the intended point. In making clippings level with the ground, the soil surface served as a guide in cutting the plants.

In 1946, 1947, and 1948 the plots were arranged in a latin square design with either four or five replications. In 1946 each plot was 5 × 5 hills in size; in 1947 each plot was 3 × 3 hills; and in 1948 the plots were 6 × 8 hills made up of eight 2 × 3 hill subplots arranged in random order. Two plants were in each hill.

Height of plants was taken at the time treatments were made by measuring from the ground to the top of the longest stretched up blade. The position of the growing point, or tassel fundament, was also determined by dissecting plants of the same kind of corn and of comparable size. Counts were taken of plants which were killed by clipping too low.

An analysis of variance was made for each investigation. Differences large enough for significance at the 1% and 5% levels are indicated in the text and in the table.

Results

Average dates of pollen shedding and silking of clipped plants were compared with those of undipped plants, and the differences are reported as days delay caused by cutting the plants back. Reductions in grain yield are presented as a per cent of the yield of uninjured plants. Data on the double-cross hybrids are summarized graphically in Fig. 1.

Two stages of plant development are represented in the results shown in Fig. 1. In one group of plants to the tip of the longest blade the clipping varied from 27 to 32 inches; in the other group, plant height varied from 18 to 20 inches. Fig. 2 shows a 20-inch corn plant and stubbles made by clipping at different levels.

Clipping the plants of the taller group level with the surface of the soil delayed silking over 16 days and retarded tasseling almost 14 days, whereas a similar clipping of the shorter group of plants delayed silking approximately 6 days. In general, clipping the tall plants at any specified height delayed silking more than the clipping of short plants.

All treatments, except one, resulted in a statistically significant reduction of grain yield per acre. Clipping of 27- to 32-inch plants level with the ground reduced

Fig. 1.—Days delay in silking and tasseling and percentage reduction in grain yield resulting from clipping double-cross hybrids at different heights. Summary of data obtained in 1945, 1946, and 1947, Urbana, Ill.