Progress Report Series No. 63 *March, 1956*

AGRICULTURAL EXPERIMENT STATION
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Comparative Yields Of Early- And Late-Harvested Corn

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CORN GROWERS have long recognized that field losses often are sustained between time of maturity and the time a crop is dry enough to store safely. To what extent these losses affect harvestable yield in Alabama has been a matter of speculation. Certainly, the losses will vary from year to year depending upon climatic conditions. Whether the losses are great enough to justify early harvest and artificial drying could only be determined by a series of tests over a period of several years to study the magnitude and frequency of field losses.

A small scale experiment was begun in 1953 on the Agricultural Engineering Farm of the Alabama Polytechnic Institute Agricultural Experiment Station at Auburn to determine the corn lost between early and late harvest. Coker 811 corn was used in the 3-year study. During dry seasons the corn was irrigated to assure a normal yield. Although fertilization varied somewhat each year, the treatment in 1955 was as follows: 1,000 pounds of 4-10-7 placed under the corn and a sidedress application of 198 pounds of nitrogen per acre in the form of anhydrous ammonia. Seeding rate was 10 pounds per acre, with the stand at maturity averaging a stalk every 15 inches.

PROCEDURE

In 1953, a 2-acre field was divided into 4 plots of approximately equal area. Two of the areas were chosen at random for early harvest and the remaining 2 were harvested late. In 1954, approximately 3 acres was divided into 10 plots and random plots were used as early- and late-harvest plots. In 1955, approximately 4 acres was divided into 12 plots at random into early- and late-harvest plots. Plots for early and late harvest were planted the same day.

Two rows from each plot were hand pulled to determine total yield. Also, stalks in these rows were counted to determine stand and lodging percentage. A stalk was considered lodged when it leaned more than 45 degrees from upright. Moisture, weight per bushel, and shelling percentage were determined for all plots.

A corn picker was used to harvest the plots. Plot areas were determined and corn left by the picker was gleaned by hand and weighed. All weights given in this report have been corrected to 15.5 per cent moisture corn and 56-pound bushels.

RESULTS and DISCUSSION

Results of the 3-year study are given in Table 1. It should be noted that 1953 was a poor curing year. The late-harvest plots were exposed to 6.3 inches of rainfall and high winds resulting from a partially dissipated hurricane. In contrast, 1954 was an ideal curing year. Only 0.63 inches of rain fell between early and late harvest and no high winds damaged the corn. The third year, 1955, was more of a "normal" curing year, with 2.35 inches of rainfall and moderate winds.

In 1953, the percentage of lodged stalks increased from 2 to as much as 90 per cent between early and late harvest. Ear corn that could be gleaned increased from 0.8 bushels at early harvest to 8.6 bushels following the hurricane winds. Harvestable yields averaged 74.6 bushels from the early-harvest plots and only 47.9 bushels from the late-harvest plots. High winds and rain reduced the harvestable yield; in 1953 an early harvest would have been profitable.

The entire summer of 1954 was dry. Supplemental irrigation was necessary to produce corn. Weather between early and late harvest was dry and no high winds prevailed. Lodging increased from 2.6 to 3.8 per cent between early and late harvest. Gleanings following early harvest amounted to 1.2 bushels and following late harvest 2.4 bushels. The average harvestable yield from early-harvest plots was 66 bushels and from late-harvest plots, 67 bushels. In 1954, there was no appreciable difference in harvestable yield; early harvest would have been of little value.

In 1955 there was some rainfall, but only moderate winds between early and late harvest. However, there were several small patches of lodged corn in certain late-harvest plots (Figure 1). Lodging percentages averaged 2.3 for early- and 10.4 for late-harvested corn. Gleanings averaged 3.8 bushels following early harvest and 11.2 bushels after late harvest. Harvestable yields from early and late harvest were 94.5 and 78.3 bushels, respectively.

In addition to these measured data, it was noted that early-harvested corn was cleaner since the stalks

TABLE I. HARVESTABLE YIELD, LODGING, GLEANINGS, MOISTURE, AND WEIGHT PER BUSHEL OF EARLY CORN IN 1953, 1954, AND 1955

Date of harvest	Lodging percentage	Moisture	Weight per bushel	Gleanings shelled	Harvestable yield, shelled	
					Early	Late
	Pct.	*Pct.*	*Lb.*	*Bu.*	*Bu.*	*Bu.*
1953[1]						
September 17	2.00	27.0	53.7	0.85	74.6	
November 12	90.00	14.0	58.5	8.65		47.9
1954[2]						
September 15-17	2.60	19.2	57.7	1.20	66.0	
October 11-12	3.80	14.6	61.8	2.40		67.0
1955[3]						
October 13-14	2.33	18.9	58.7	3.80	94.5[4]	
November 21-22	10.40	15.4	60.8	11.20		78.3[4]

[1] A poor curing season-6.3 inches rainfall, heavy winds.

[2] A good curing season-0.63 inches rainfall, little wind.

[3] An "average" season-2.35 inches rainfall, little wind.

[4] LSD for 1955: .05 = 10.23; .01 = 14.15.

did not break up as easily in the high-moisture corn as in the low-moisture, late-harvested corn. Also, the late-harvested corn had a much higher insect infestation, especially in 1955. Early-harvest moistures ranged from 17 to 27 per cent, whereas late-harvest moistures were less than 15.5 per cent. Weight per bushel was consistently lower for the early-harvest plots. The corn harvested in these tests shelled 76.3 pounds for each 100 pounds of ear corn.

ARTIFICIAL DRYING

Corn that is harvested above 15 per cent moisture should be dried to 12 per cent for shelled storage or 15 per cent if stored on the ear in a ventilated crib. This applies to field-shelled corn harvested with combine corn attachments or field shellers. Drying costs (fuel and electricity) usually vary between ½ and 4 cents per bushel, depending upon the type of drier, weather, crop moisture, and drier efficiency. This does not include the cost of the drier, which will vary with size and type. An air flow of 5 CFM (cubic feet per minute) per bushel of grain has been adequate for normal Alabama moisture and climatic conditions. Under conditions of low moisture content and dry weather, less air flow might do the job, but the advice of a recognized agricultural engineer should be obtained before designing for less than 5 CFM per bushel.

SUMMARY

During a harvest season of high winds and rainfall, there was quite an advantage in early harvesting as compared with late harvesting. In 1953, early-harvested plots yielded 74.6 bushels of corn, whereas late-harvested plots yielded 47.9 bushels.

During a season of little rain and wind, there was no advantage gained from early harvest. In 1954, early-harvested plots yielded 66 bushels as compared with 67 bushels for late-harvested plots.

During a season of moderate rainfall and wind, there was some advantage in early harvest. In 1955, early-harvest plots yielded 94.5 bushels per acre as compared with 78.3 bushels for late harvest.

Early-harvested corn had less foreign material and far less insects than the late-harvested corn. Late corn weighed more per unit of volume.

Artificial drying at an operating cost of ½ to 4 cents per bushel will be necessary to assure safe storage of high-moisture, early-harvested corn. The same will apply to field-shelled corn harvested with combine corn attachment or field shellers.

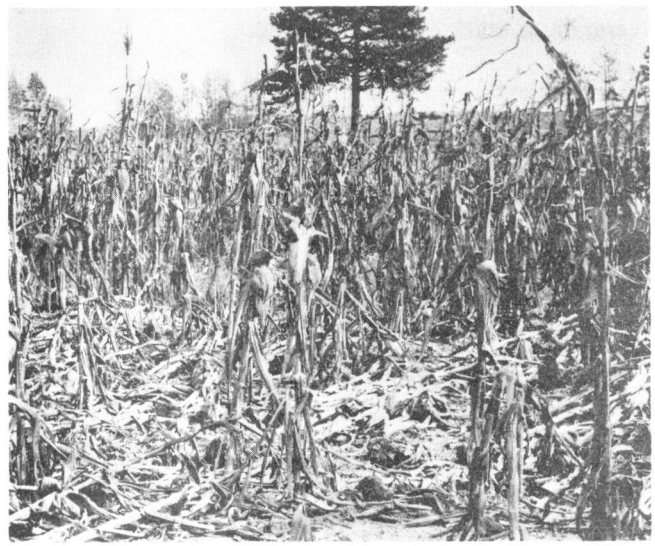

Figure 1. Lodged patches like the one shown above occured in 1955 late-harvest plots following an average curing season.