

Corn Ear and Grain Development

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Summary

The development of the corn ear and grain resulted in an excellent time and moisture level predictor for grain maturity related to days following silking in the Wintergarden. Grain development followed a straight line to maturity rather than the typical “S” curve for many biological activities. Maturity was reached in all three varieties 50 days after silking.

Problem

Black layer is the final event that seals the kernel from the cob. At that point, the grain is physiologically mature and does not increase in weight. Milk line is most often used to follow the development of the grain. The question for producers in our area, “Over how many days do these events occur?” Is it possible to predict black layer formation?

Objectives

The objectives of this investigation was to detail the rate of grain development and stages of maturity as a function of days after silking.

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Materials and Methods

Three varieties, Asgrow Rx897, Pioneer 3163 and Hyperformer 9905 were selected out of the Uvalde County variety trial conducted by Kenneth White, CEA, on the Jimmy Parker Farm. These are commonly grown varieties in the area. The varieties were planted on a 38" row spacing and grown under "normal" irrigated farming practices for the area. The field was checked frequently to determine the date of silking for each variety. Beginning 1-3 days after silking, 10 ears were randomly selected from each variety two days each week, on Monday and Thursday. Total ear dry weights and percent moisture were determined after drying in a forced air dryer at the Uvalde Extension and Research Center.

When the grain was large enough to be cut from the cob (19 DAS days after silking), dry weights of the husk, cob, grain and total ear were recorded. Ears were broken in the middle and checked for "milk line" and kernels cut to determine black layer. Pictures of ear and grain development were taken each day ears were harvested.

Gypsum blocks were buried at the 1 and 2 foot levels in each variety evaluated. Moisture blocks were read each time ears were collected. The spring season was wetter and cooler than "normal" for the Wintergarden area. Only one in season irrigation was applied. The corn did not stress for water until very late in the season.

Results

The following charts detail the development of the ear by variety and average of the three varieties and the soil moisture levels.

Conclusions

Grain development was a straight line from the time the kernels were large enough to be separated from the cob (18 DAS). At 46 DAS, black layer formed in kernels at the top of the cob. At 50 DAS, black layer formed in grain on the middle of the cob and no additional weight gain was recorded after that date. Once the "milk line" began to form (3/4 of the grain was white), it only took 14-15 days to reach black layer. 46 days after silking, 92.5% of the total grain weight had accumulated.

Using this information, a grower can estimate the approximate number of days to black layer after silking, count backwards and determine the last irrigation. Using a water use chart for corn, the water use/day is approximately 0.25 inches. A 3 inch irrigation will last about 12 days. The last irrigation could be applied approximately 38 days after silking or about 1/2 milk line without sacrificing yield. Irrigation through center pivots could be used on an as needed basis. Irrigation can be scheduled with confidence without wasting irrigation water.

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