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Planting Date Effects on Yield and Grain Composition of High Oil Corn

Abstract

TopCross Blend® high oil corn hybrids have added a new dimension to the specialty grain market. Producers have been able to utilize the higher oil content of the grain for their own livestock operations or contract their grain for a premium price. Little is known about the effects of cultural agronomic practices on the grain composition of high oil corn, particularly how the percentage of oil is affected. As a result, research is needed to evaluate the effects of planting date and to determine if there is a limited period in which high oil corn can be planted without detrimental effects. During the 2000 and 2001 growing seasons, the effects of planting date were evaluated. In addition to this location, this study was conducted on two other university research farms.

Disciplines

Agricultural Science | Agriculture

Planting Date Effects on Yield and Grain Composition of High Oil Corn

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Introduction

TopCross Blend[®] high oil corn hybrids have added a new dimension to the specialty grain market. Producers have been able to utilize the higher oil content of the grain for their own livestock operations or contract their grain for a premium price. Little is known about the effects of cultural agronomic practices on the grain composition of high oil corn, particularly how the percentage of oil is affected. As a result, research is needed to evaluate the effects of planting date and to determine if there is a limited period in which high oil corn can be planted without detrimental effects. During the 2000 and 2001 growing seasons, the effects of planting date were evaluated. In addition to this location, this study was conducted on two other university research farms

Materials and Methods

The experiment was designed as a randomized complete block design with four replicates. Three 108-day relative maturity TC Blend[®] hybrids were evaluated: Pioneer 34B25 (2000, 2001), Wyffels W5545 (2000), and Wyffels W5546 (2001) at three planting dates (April 14, May 10, June 3, 2000; and April 20, May 9, June 4, 2001). A Kinze six-row planter was used on all plots. Individual plots were 12 rows wide × 60 feet long, with 30-inch row spacings. The study was surrounded by a minimum of 10 feet of sterile corn and was a minimum of 100 feet from neighboring non-high oil corn. The

individual plots were temporally isolated by means of separating the like dates from one another within reps. The experiment was planted into no-till ground at a final plant density of 29,900 plants/acre. Yields were taken by hand-harvesting 100 square feet (approximately 68 plants) from the center of each plot on October 13. Grain composition was analyzed by the Iowa State Grain Quality Lab with a Foss Infratec 1229 NIR. Plot yields (corrected to 15.0% moisture) and grain composition are shown in Tables 1–4.

Results and Discussion

Tables 1–4 summarize the effects on yield, oil, protein, and starch for each date of planting. For both growing seasons, there were significant differences on yield between the last planting date and the other two dates, with Date 1 providing the highest yield. Oil content was significantly lower for the latest date each year. Protein concentration increased with later planting, but there was not a significant difference between Date 1 and Date 2. For all three dates, there were no significant differences with regard to starch concentration. Data from the combined years showed that earlier planting had a positive effect on yield and oil content, with a negative effect on protein concentration. This analysis suggests that high oil corn production is supported by earlier planting to maximize yields and oil concentration.

Acknowledgments

We would to thank Pioneer Hi-Bred International, Inc. and Wyffels Hybrids, Inc. for providing the seed used in this study.

Table 1. Effect of planting date on corn yield (bushels/acre) at the Northeast Research and Demonstration Farm, Nashua, IA.

Planting Date*	Year		Average
	2000	2001	
Date 1	141.5 A	182.2 A	161.8 A
Date 2	130.9 A	179.8 A	155.4 A
Date 3	93.9 B	154.3 B	124.1 B
Average	122.1	172.1	147.1

Significant differences (P=0.05) noted by different letters in same column.

*Date 1: Apr 14, 2000 and Apr 20, 2001 Date 2: May 10, 2000 and May 9, 2001 Date 3: June 3, 2000 and June 4, 2001.

Table 2. Effect of planting date on oil content (%) at the Northeast Research and Demonstration Farm, Nashua, IA.

Planting Date*	Year		Average
	2000	2001	
Date 1	6.2 A	7.0 A	6.6 A
Date 2	6.2 A	7.0 A	6.6 A
Date 3	5.7 B	6.6 B	6.2 B
Average	6.0	6.9	6.5

Significant differences (P=0.05) noted by different letters in same column.

*Date 1: Apr 14, 2000 and Apr 20, 2001 Date 2: May 10, 2000 and May 9, 2001, Date 3: June 3, 2000 and June 4, 2001.

Table 3. Effect of planting date on protein content (%) at the Northeast Research and Demonstration Farm, Nashua, IA.

Planting Date*	Year		Average
	2000	2001	
Date 1	8.0 A	7.5 A	7.7 A
Date 2	8.5 AB	7.5 A	8.0 A
Date 3	8.9 B	7.9 B	8.4 B
Average	8.4	7.6	8.0

Significant differences (P=0.05) noted by different letters in same column.

*Date 1: Apr 14, 2000, and Apr 20, 2001. Date 2: May 10, 2000, and May 9, 2001. Date 3: June 3, 2000, and June 4, 2001.

Table 4. Effect of planting date on starch content (%) at the Northeast Research and Demonstration Farm, Nashua, IA.

Planting Date*	Year		Average
	2000	2001	
Date 1	57.9 A	57.4 A	57.6 A
Date 2	57.5 A	57.4 A	57.6 A
Date 3	57.8 A	57.4 A	57.4 A
Average	57.7	57.4	57.5

Significant differences (P=0.05) noted by different letters in same column.

*Date 1: Apr 14, 2000, and April 20, 2001. Date 2: May 10, 2000, and May 9, 2001. Date 3: June 3, 2000, and June 4, 2001.