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

Abstract

TopCross Blend[®] high oil corn blends 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 this study, which was conducted concurrently at 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 blends 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 this study, which was conducted concurrently at 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 high oil blends were evaluated: Pioneer 34B25 (2000, 2001), Wyffels W5545 (2000), and Wyffels W5546 (2001) at three planting dates (April 13, May 10, June 9, 2000; and April 20, May 9, and June 3, 2001). A John Deere 7000 series four-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 30 feet of sterile corn and grown a minimum of 100 feet from neighboring non-high oil corn. Individual plots were temporally isolated by separation of 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 October 13 by hand-harvesting 100 square feet (approximately 68 plants) from the center of each plot. Grain composition was analyzed with a Foss Infratec 1229 NIR at the Iowa State Grain Quality Laboratory. Plot yields (corrected to 15.0% moisture) and grain composition is 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. There were dramatic differences between the two years on the effect of planting date. Overall, there was an advantage to planting by mid-May with the earliest date of planting yielding the highest. Oil content in 2001 increased with delayed planting, but decreased in 2000. Averaging the two years showed that there was not a significant effect of planting date on percentage of oil. Percentage of protein increased with delayed planting each year, and there was a significant difference between the first and second planting dates and the third date. There also was a significant effect in starch concentration between the first and second dates and the third date, as starch percentage decreased with delayed planting. In summary, high oil corn production is supported by earlier planting to maximize yields and maintain 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 Armstrong Research and Demonstration Farm, Lewis, IA, 2000–2001.

Planting Date	Year		Average
	2000	2001	
Date 1	139.7 A	123.9 A	131.8 A
Date 2	120.6 B	137.4 A	129.0 A
Date 3	79.3 C	118.1 A	101.5 B
Average	116.3	126.5	121.6

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

** Date 1: April 13, 2000; April 20, 2001. Date 2: May 10, 2000; May 9, 2001.
Date 3: June 9, 2000; June 3, 2001.

Table 2. Effect of planting date on oil content (%) at the Armstrong Research and Demonstration Farm, Lewis, IA, 2000–2001.

Planting Date	Year		Average
	2000	2001	
Date 1	6.4 A	5.9 A	6.2 A
Date 2	6.2 A B	6.3 A	6.3 A
Date 3	6.0 B	6.4 B	6.2 A
Average	6.2	6.2	6.2

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

** Date 1: April 13, 2000; April 20, 2001. Date 2: May 10, 2000; May 9, 2001.
Date 3: June 9, 2000; June 3, 2001.

Table 3. Effect of planting date on protein content (%) at the Armstrong Research and Demonstration Farm, Lewis, IA, 2000–2001.

Planting Date	Year		Average
	2000	2001	
Date 1	8.4 A	9.4 A	8.9 A
Date 2	9.0 B	9.4 A	9.2 A
Date 3	9.5 C	10.2 B	9.9 B
Average	8.9	9.7	9.3

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

** Date 1: April 13, 2000; April 20, 2001. Date 2: May 10, 2000; May 9, 2001.
Date 3: June 9, 2000; June 3, 2001.

Table 4. Effect of planting date on starch content (%) at the Armstrong Research and Demonstration Farm, Lewis, IA, 2000–2001.

Planting Date	Year		Average
	2000	2001	
Date 1	57.2 A	56.7 A	57.0 A
Date 2	56.9 A	56.4 A	56.6 A
Date 3	56.8 A	55.2 B	55.9 B
Average	57.0	56.1	56.5

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

** Date 1: April 13, 2000; April 20, 2001. Date 2: May 10, 2000; May 9, 2001.
Date 3: June 9, 2000; June 3, 2001.