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Twin Row vs. Single Row Spacing at Variable Seeding Rates

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Abstract
As corn production practices improve, row widths decrease. Although most producers plant in 30-in. rows, more and more acres are being planted to narrower row widths (15 in. to 20 in.). In addition, plant populations continue to increase every year with the introduction of more stress-tolerant hybrids. Wider row widths force more plants into a concentrated area, whereas narrower rows allow more equidistant spacing of plants.

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Twin Row vs. Single Row Spacing at Variable Seeding Rates

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Introduction

As corn production practices improve, row widths decrease. Although most producers plant in 30-in. rows, more and more acres are being planted to narrower row widths (15 in. to 20 in.). In addition, plant populations continue to increase every year with the introduction of more stress-tolerant hybrids. Wider row widths force more plants into a concentrated area, whereas narrower rows allow more equidistant spacing of plants.

In theory, many advantages should exist with narrower row widths. Advantages include using the same planting equipment for corn and soybean, increased light utilization, more even plant-to-plant spacing, reduced weed competition, and earlier canopy closure. However, previous Iowa State University (ISU) research (1995–2000) found no yield difference when comparing 15-in. to 30-in. row widths. While considering the investment in different harvest and spray equipment when transitioning to a narrow spacing system, one might consider twin-rows on 30-in. centers as an alternative.

More recent research (2003–2005) conducted at the ISU Armstrong Research and Demonstration Farm (Lewis, IA) showed no yield difference between a twin-row configuration and 30-in. row spacing.

Research conducted at the ISU Northwest Research and Demonstration Farm, Sutherland, IA in 2009, compared the response of three corn hybrids in a twin row system to that in 30-in. spacing at several seeding rates.

Materials and Methods

A Great Plains planter was used to plant the 30-in. and twin rows on May 4. The twin row configuration places two rows on 30-in. centers with 8 in. between the twin rows. Three DeKalb hybrids were chosen (DK 48-37, DK 52-59, and DK 41-60) and planted at four seeding rates: 28,000, 33,000, 38,000, and 43,000 seeds per acre. The plots were four 30-in. rows or eight twin rows (10 ft) wide and approximately 240 ft long.

The research was conducted on a field that was planted to corn in 2008. Stalks were chopped and the field was chiseled in the fall of 2008. In the spring of 2009, the field was disked once and field-cultivated twice. Nitrogen was applied at 28% at 200 lb/acre in the spring. Weeds were controlled with one pre-emergent herbicide application as well as hand-weeding during the summer. The plots were harvested November 26 and 27; grain yield was adjusted to 15% moisture basis.

Plots were arranged in a randomized complete block design (RCBD) with hybrid as the main plot, seeding rate as split plot, and row spacing as the split-split plot. SAS PROC MIXED was the statistical program used in analyzing the data, with a significance level of $P \leq 0.05$.

Results and Discussion

Grain yields were lower than expected, ranging from 140 to 175 bushel/acre. However, long-term Iowa research has identified an average yield penalty for corn following corn as approximately 15% compared with corn following soybean. High yields may have approached 200 bushel/acre if this trial were following soybean instead of

corn. In addition, volunteer corn may have resulted in variable stress levels among treatments within a replicate.

Hybrids differed in grain yield, grain moisture, and stalk lodging as shown in Table 1. The early season hybrid, 91-day relative maturity (RM), DK 41-60, yielded less than the two fuller-season hybrids, DK 48-37 at 98 RM, and DK 52-59 at 102 RM.

Grain yields were similar across the four seeding rates evaluated. Single, 30-in. rows yielded 3% more than twin rows (Table 1). These differences in grain yield between twin and 30-in. rows were consistent across all three hybrids and all four seeding rates.

Early-season plant populations were slightly less in twin than in 30-in. rows. At maturity, R6, plant populations of both row widths were similar. In addition, early plant populations of twin rows at the highest seeding rate were about 2500 less per acre than those of 30-in. rows (data not shown). However, at maturity, these differences were not detected. The differences in plant population early in the season may have affected yield potential of twin rows. However, small plant population differences like this usually affect yield very little.

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