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Row Width and Plant Density Effects on Corn Yield in Iowa

Dale E. Farnham
Iowa State University

Jason Myli
Iowa State University

David Rueber
Iowa State University, drueber@iastate.edu

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Row Width and Plant Density Effects on Corn Yield in Iowa

Abstract

During the late 90s, research in the northern Corn Belt comparing 15- and 30-inch row corn illustrated yield benefits to narrow rows. In addition, many Iowa producers found soybean yields were optimized when soybean row widths were decreased below 30-inches. As a result, Iowa producers questioned whether benefits to narrow row corn (< 30 inches) existed in Iowa. To answer these questions, research was conducted to evaluate the effect of row spacing and related planting decisions on the yield of modern high-yielding corn hybrids. During the 1997, 1998, and 1999 growing seasons, the effects of row width and harvest plant density were evaluated. The objective of the study was to identify the optimum plant density for corn planted in 15-inch rows compared with 30-inch rows. In addition to this site, this study was conducted on five other university research farms.

Disciplines

Agricultural Science | Agriculture

Row Width and Plant Density Effects on Corn Yield in Iowa

Dale E. Farnham, assistant professor and
extension agronomist
Jason Myli, research associate, agronomy
Dave Rueber, superintendent

Introduction

During the late 90s, research in the northern Corn Belt comparing 15- and 30-inch row corn illustrated yield benefits to narrow rows. In addition, many Iowa producers found soybean yields were optimized when soybean row widths were decreased below 30-inches. As a result, Iowa producers questioned whether benefits to narrow row corn (< 30 inches) existed in Iowa. To answer these questions, research was conducted to evaluate the effect of row spacing and related planting decisions on the yield of modern high-yielding corn hybrids. During the 1997, 1998, and 1999 growing seasons, the effects of row width and harvest plant density were evaluated. The objective of the study was to identify the optimum plant density for corn planted in 15-inch rows compared with 30-inch rows. In addition to this site, this study was conducted on five other university research farms.

Materials and Methods

The experimental layout was a randomized complete block design with split plots and three replicates. Whole plot treatments were row widths (15- or 30-inch) and split plot treatments were plant densities (24,000, 28,000, 32,000, and 36,000 plants per acre). A single 102- to 106-day relative maturity European corn borer-resistant hybrid, N4640Bt (Syngenta Seeds), was evaluated. Individual plots were 6 rows (30-inch) or 11 rows (15-inch) by 40 feet long. A White 6100 series corn planter outfitted with a 6900 series splitter attachment was used to plant

all plots. Planting dates were 12 May 1997, 4 May 1998, and 5 May 1999. Plots were overplanted and then hand-thinned to desired target stand levels on 27 June 1997, 12 June 1998, and 14 June 1999 while corn was near the fifth vegetative stage of development (ISU Extension Special Report No. 48). All plots were mechanically harvested on 16 October 1997, 21 October 1998, and 11 October 1999. Reported plot yields (corrected to 15.5% moisture) are shown in Table 1.

Results and Discussion

Summarized in Table 1 are the results from 1997-1999. Averaged across plant densities and years, 30-inch rows produced a 5% yield advantage over 15-inch rows. A consistent yield advantage to 30-inch rows was observed each year and for each plant density. The highest yield in 15-inch rows was produced at 32,000 ppa, and 28,000 ppa produced the highest yield in 30-inch rows. Figure 1 illustrates the row width response to increasing plant densities. Increasing the plant density beyond 28,000 ppa was not beneficial in 30-inch rows, and only a slight yield benefit (2%) was observed in 15-inch rows. Finally, grain moistures remained relatively similar between row widths in this study.

In summary, the highest yields were produced in 30-inch rows. In addition, maximum yields for both row widths were achieved when planted at approximately 28,000 ppa.

Acknowledgments

We would like to thank John Harker and Syngenta Seeds for providing the seed used in this study.

Table 1. Effect of row width and plant density on corn grain yield and moisture at Kanawha, IA (1997-1999).

Plant Density	1997		1998		1999		Average	
	15-inch	30-inch	15-inch	30-inch	15-inch	30-inch	15-inch	30-inch
-----Grain yield (bu./acre)-----								
24,000	167	172	154	165	138	149	153	162
28,000	159	174	170	163	145	167	158	168
32,000	166	181	166	162	155	162	162	168
36,000	162	170	152	170	161	164	158	168
Average	163	174	160	165	149	160	157	166
-----Grain moisture (%)-----								
24,000	16.7	17.0	16.7	16.7	15.8	16.1	16.5	16.6
28,000	16.7	17.2	16.7	16.9	15.5	15.4	16.3	16.5
32,000	17.0	17.1	16.8	16.9	15.2	16.1	16.3	16.7
36,000	16.9	17.2	16.7	16.8	16.6	16.5	16.7	16.8
Average	16.8	17.1	16.7	16.8	15.7	16.0	16.4	16.6

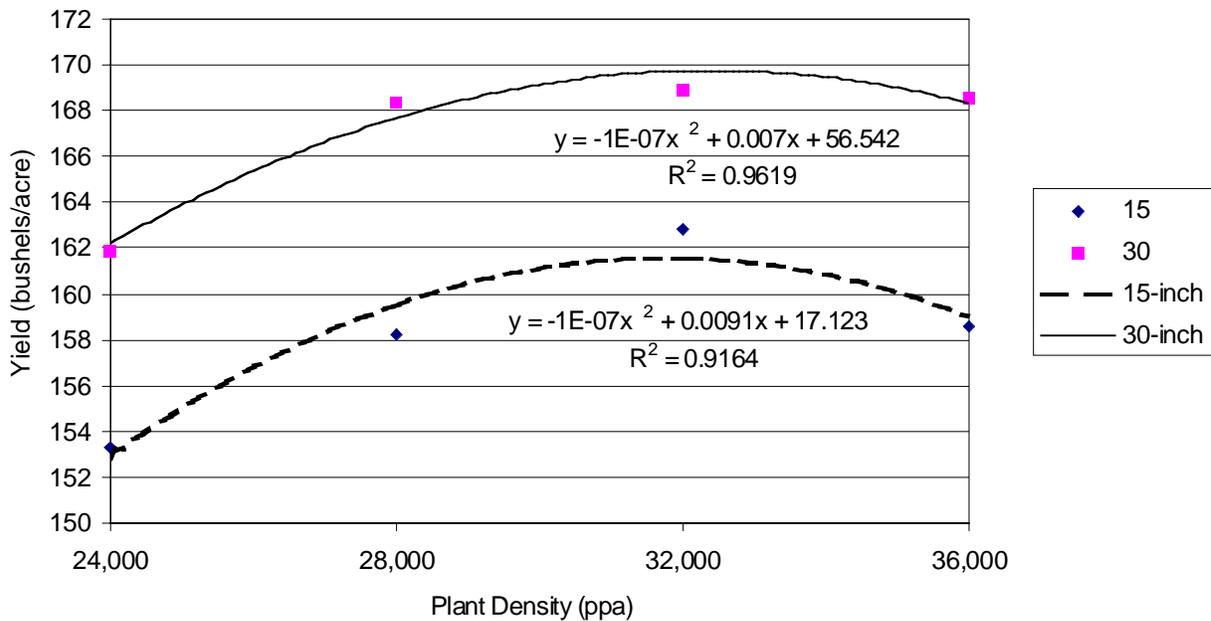


Figure 1. Mean yield response of 15- and 30-inch rows to plant density (1997-1999) at Kanawha, IA.