

Corn Yield Response to Wide or Conventional Row Widths at Varying Plant Densities

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Introduction

Today in Iowa a large majority of corn producers plant corn in 30-inch row widths, now commonly termed “conventional” width rows. However, “wider” row widths are still used by a small percentage of farmers in Iowa. Often questions arise as to the benefits of 30-inch rows over wider rows, but recommendations are difficult because current data do not exist. Yield benefits to 30-inch rows were evident in the ‘70s, but evolving improvements in hybrids, fertilizers, pesticides, and machinery have created a need for more recent research. During the 1998, 1999, and 2000 growing seasons, the effects of row width and harvest plant density were evaluated. The objective of this research was to (1) identify any row width yield benefits, and (2) determine the optimum plant density for corn planted in 30-inch rows compared with 38-inch rows. In addition to this site, this study was conducted on two other university research farms.

Materials and Methods

The experimental layout was a randomized complete block design with three replicates. Treatments were row widths (30- or 38-inch) and plant densities (28,000, 32,000, or 36,000 plants per acre). During 2000, a plant density of 24,000 ppa and the addition of another treatment replication were included in the study. A single 102- to 106-day relative maturity European corn borer-resistant hybrid, N4640Bt (Syngenta Seeds), was evaluated each year. Individual plots were 4 rows by 40 feet long. An International 185 series planter

was used to plant all plots. Individual row units were independently ground driven and adjusted for the desired row widths. Planting dates were 13 May 1998, 29 April 1999, and 4 May 2000. Plots were over planted to approximately 44,000 ppa. Plots were hand-thinned to desired stand levels on 2 July 1998, 7 June 1999, and 7 June 2000. All plots were hand harvested on 4 November 1998, 5 October 1999, and 12 October 2000. Reported plot yields (corrected to 15.5% moisture) are shown in Tables 1 and 2.

Results and Discussion

Summarized in Table 1 are the results from the 1998 and 1999 studies. Averaged across plant densities and years, yields were greatest for 30-inch rows. This response was statistically significant ($P \leq 0.05$). Averaged across years, maximum yields in 30-inch rows were achieved at 32,000 ppa; however, in 38-inch rows, yields were consistent across plant densities.

Summarized in Table 2 are the results from the 2000 study. Yields between row widths were similar within individual plant densities and when averaged across plant densities. Maximum yields for both plant densities were produced at 28,000 and 32,000 ppa. Results from the three years show grain moisture was not influenced by plant density or row width.

In summary, two of the three years found yield advantages (3.4%) for 30-inch rows, compared with 38-inch rows. Furthermore, increasing the plant density beyond 32,000 ppa in either row width did not seem to be beneficial.

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Table 1. Effect of row width and plant density on corn grain yield and moisture at Sutherland, IA (1998-1999).

Plant Density	1998		1999		Average	
	30-inch	38-inch	30-inch	38-inch	30-inch	38-inch
	-----Grain yield (bu./acre)-----					
28,000	167	155	179	181	173	168
32,000	169	152	187	184	178*	168
36,000	161	153	182	185	171	169
Average	166	153	183	183	174	168
	-----Grain moisture (%)-----					
28,000	17.6	17.6	14.7	14.8	16.2	16.2
32,000	17.6	17.2	14.7	14.7	16.1	15.9
36,000	17.7	17.7	15.0	15.0	16.4	16.3
Average	17.6	17.5	14.8	14.8	16.2	16.1

*Differences between bold faced yield means were statistically significant (P < 0.05).

Table 2. Effect of row width and plant density on corn grain yield and moisture in 2000 at Sutherland, IA.

Row Width	Harvest stand density (ppa)				Average
	24,000	28,000	32,000	36,000	
	Grain yield (bu./acre)				
30-inch	150	156	155	153	154
38-inch	151	154	156	153	154
	-----Grain moisture (%)-----				
30-inch	13.3	13.4	13.4	13.6	13.4
38-inch	13.5	13.4	13.5	13.7	13.5