

# Row Width and Population Effects on Roundup Ready<sup>®</sup> Soybean Yield

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## Introduction

Many Iowa soybean producers have adopted Roundup Ready<sup>®</sup> (RR) technology on their farms in recent years. Reduced weed control costs, greater flexibility in herbicide application timing, and the potential for “cleaner” soybean fields are often cited as reasons for using RR technology; however, questions remain about RR varieties’ response to row width and seeding rate. To address producer questions about RR variety response to row width and seeding rate in south central Iowa, a soybean management study was conducted at the McNay Research Farm in 1999 and 2000. Soils at the McNay Research Farm are typical of the Grundy-Haig soil association.

## Materials and Methods

An adapted, high-yield Roundup Ready<sup>®</sup> variety (relative maturity “RM” 3.0) was planted into a conservation-tilled seedbed on May 24 (1999) and May 4 (2000), using a John Deere 750 no-till drill to plant 7.5-inch rows. In 1999 15- and 30-inch plots were seeded with a modified John Deere 7200 planter equipped to plant four 30-inch or seven 15-inch rows. In 2000 a John Deere 7100 planter was used to plant 30-inch rows and 15-inch “split” rows created by “doubling back” over 30-inch rows. Four established plant population “goals” were compared for each row width: 80,000 plants per acre (PPA), 120,000 PPA, 160,000 PPA, and 200,000 PPA. The three row widths and four target populations were combined in a randomized complete block design with four replications. Established soybean populations

were estimated for all plots near physiological maturity (growth stage “R8”—from ISU Extension Publication SR53 “How a Soybean Plant Develops”). Six samples were counted from each plot to estimate plant population per acre (PPA). Plots were machine harvested on October 26 (1999) and October 12 (2000). Grain yields (adjusted to 13% moisture) and established plant population estimates are summarized in Tables 1-3.

## Results and Discussion

Averaged across populations, yield performance of soybeans planted in 15-inch rows was statistically greater ( $P < 0.05$ ) than that of soybeans planted in 7.5- or 30-inch rows in 1999 and averaged across two years (Table 1). In 2000 soybean yields were statistically similar ( $P > 0.05$ ) regardless of row width. All row widths produced excellent yields in 1999 despite persistent spring rains that delayed planting. Yields were limited in 2000 by lack of moisture during the critical seed-filling period of growth.

Regardless of row width, soybean yields were statistically similar ( $P < 0.05$ ) across a wide range of harvest populations in both years of the study (Table 2). Pre-harvest plant population estimates are summarized in Table 3.

Our results suggest that variety selection is more important than row width and plant population in determining profitability of RR soybeans. Assuming normal seed germination levels, reducing seeding rates to partially offset the higher cost of RR seed may afford producers an opportunity to reduce input costs without sacrificing yield potential. Producers are advised to review unbiased, replicated yield comparisons from multiple environments when making RR soybean variety selections.

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**Table 1. Row width effect on soybean yield in 1999 and 2000 near Chariton, IA.**

Row width	Mean yield performance		
	1999	2000	1999-2000
	------(Bushels/acre)-----		
7.5-inch	62.7 c <sup>1</sup>	42.4 a	52.5 c
15-inch	72.1 a	42.8 a	57.4 a
30-inch	66.1 b	41.8 a	54.0 b
L.S.D. (P=0.05)	1.8	NS	1.2

<sup>1</sup> Within columns, row width mean yields followed by different letters are statistically different (P<0.05).

**Table 2. Effect of row width and plant population on soybean yield in 1999 and 2000 near Chariton, IA.**

Year	Targeted harvest population	Harvested grain yield (corrected to 13% moisture)		
		7.5-inch rows	15-inch rows	30-inch rows
		------(Bushels/acre)-----		
1999	80,000	58.0	70.7*	65.9*
	120,000	63.7*	71.8*	65.1*
	160,000	64.0*	72.3*	67.8*
	200,000	65.0*	73.4*	65.7*
	LSD (P=0.05)	3.3	NS	NS
2000	80,000	39.5	42.4*	39.0
	120,000	42.8*	43.5*	1.3*
	160,000	44.1*	41.7*	43.7*
	200,000	43.2*	43.5*	43.2*
	LSD (P=0.05)	3.0	NS	4.6

<sup>1</sup> Within columns and years, yields followed by an asterisk (\*) are statistically similar (P>0.05) to the top yield.

**Table 3. Summary of row width and plant population treatments evaluated in 1999 and 2000 near Chariton, IA.**

Year	Targeted harvest population	Estimated pre-harvest plant population		
		7.5-inch rows	15-inch rows	30-inch rows
		------(Plants/acre)-----		
1999	80,000	61,000	67,000	57,000
	120,000	79,000	99,000	84,000
	160,000	115,000	151,000	109,000
	200,000	150,000	162,000	136,000
2000	80,000	122,000	99,000	82,000
	120,000	139,000	137,000	116,000
	160,000	185,000	167,000	144,000
	200,000	187,000	189,000	183,000