

Soybean Yield Response to Seeding Rate

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Objective

To determine the effects of soybean seeding rate on grain yield.

Background

	<u>Farm A</u>	<u>Farm B</u>	<u>Farm C</u>
Crop Year:	2014	2014	2014
Location:	Delta, OH	Wauseon, OH	Fayette, OH
County:	Fulton	Fulton	Fulton
Soil Type:	Rimer/Mermill	Hoytville	Colwood/Dixboro
Drainage:	Systematic	Systematic	Systematic
Previous Crop:	Corn	Corn	Corn
Tillage:	No-till	Minimum	No-till
Soil Test:		pH 7.3, P 26 ppm*, K 151 ppm	pH 6.8, P 58 ppm*, K 173 ppm
Planting Date:	May 31, 2014	May 27, 2014	May 30, 2014
Seeding Rate:	140k-200k	115k-190k	110k-210k
Variety:	Pioneer 93Y05	Beck 319	Pioneer 32T25
Harvest Date:	October 25, 2014	October 30, 2014	November 3, 2015
Rainfall (Apr-Sept):	14.64"	14.64"	10.94"
*Bray P1 Extractant			

Methods

This trial was designed with four treatments replicated three times in a randomized complete block design. Furthermore, the trial was replicated on three different farms in Fulton County, Ohio. Treatment plots were planted wide enough that a commercial combine could be used to harvest plot centers. Fertility and pesticide programs were consistent within each farm trial. Row spacing for all three farms was 15". Stand counts were taken prior to harvest by obtaining 8 counts per treatment and calculating the simple average. Yields and moistures were measured by using calibrated yield monitors and shrinking the dry yields to 13% moisture. Precipitation data was obtained from weather.com.

Results

Table 1. Soybean Yield (bu/ac) Response to Seeding Rate - Farm A

Treatment	<u>Harvest Stand</u>	<u>Moisture</u>	<u>Dry Yield</u>
140,000 seeds/ac*	106,000 plants/acre	14.1%	57.7 c
160,000 spa	116,000 ppa	14.5%	63.7 b
175,000 spa	131,000 ppa	14.2%	66.6 a
200,000 spa	164,000 ppa	14.4%	66.8 a

LSD 3.07 (p<.05), CV 2.41

*Only two replications were available for harvest.

Table 2. Soybean Yield (bu/ac) Response to Seeding Rate - Farm B

Treatment	Harvest Stand	Moisture	Dry Yield
115,000 seeds/ac	93,000 plants/acre	14.0%	49.6 a
140,000 spa	121,000 ppa	13.8%	50.0 a
165,000 spa	133,000 ppa	14.5%	50.1 a
190,000 spa	146,000 ppa	13.6%	51.1 a

LSD 5.97 (p<.05), CV 5.96

Table 3. Soybean Yield (bu/ac) Response to Seeding Rate - Farm C

Treatment	Harvest Stand	Moisture	Dry Yield
110,000 seeds/ac	84,400 plants/acre	12.2%	46.5 c
135,000 spa	109,000 ppa	12.3%	49.6 bc
160,000 spa	124,000 ppa	12.3%	46.8 c
185,000 spa	130,000 ppa	12.2%	53.3 ab
210,000 spa	153,000 ppa	12.2%	56.2 a

LSD 5.04 (p<.05), CV 5.31

Summary

Farm A

Seeding rate (x1,000)	Yield Bu/acre	Gross Revenue per acre	Seed Cost per acre	Net Revenue per acre
140	57.7	\$577.00	\$57.40	\$519.60
160	63.7	\$637.00	\$65.60	\$571.40
175	66.6	\$666.00	\$71.75	\$594.25
200	66.8	\$668.00	\$82.00	\$586.00

Farm B

Seeding rate (x1,000)	Yield Bu/acre	Gross Revenue per acre	Seed Cost per acre	Net Revenue per acre
115	49.6	\$496.00	\$47.15	\$448.85
140	50.0	\$500.00	\$57.40	\$442.60
165	50.1	\$501.00	\$67.65	\$433.35
190	51.1	\$511.00	\$77.90	\$433.10

Farm C

Seeding rate (x1,000)	Yield Bu/acre	Gross Revenue per acre	Seed Cost per acre	Net Revenue per acre
110	46.5	\$465.00	\$45.10	\$419.90
135	49.6	\$496.00	\$55.35	\$440.65
160	46.8	\$468.00	\$65.60	\$402.40
185	53.3	\$533.00	\$75.85	\$457.15
210	56.2	\$562.00	\$86.10	\$475.90

Economics: Gross income= yield x \$10.00/bu; Seed cost= \$0.41 per 1,000 seeds x seeding rate; Net revenue= Gross revenue – seed cost.

Discussion:

On Farm A, where planted populations were less than 175,000 seeds per acre, significantly lower yields were realized. Furthermore, a planted population of 175,000 seeds per acre resulted in the greatest returns per acre.

On Farm B, there was no significant difference in yield among all seeding rates. However, a planted population of 115,000 seeds per acre resulted in the greatest returns per acre due to the minimal yield increases from increased planting population.

On Farm C, the treatment planted at 210,000 seeds per acre yielded the greatest and resulted in the greatest returns per acre. This farm location received much less July and August rains than either farm A or B.

Further data in the form of multi-year replications will add to the validity of these results.

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