Soybean Yield Response to Seeding Rate

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Objective

To determine the effects of seeding rate on soybean yield and profitability.

Background

Crop Year: 2016
County: Fulton
Location: Archbold, OH
Drainage: Random
Previous Crop: Corn
Variety: Rupp 7283
Planting Date: May 23, 2016
Harvest Date: October 7, 2016
Herbicide: 2.3 oz/ac Surveil, 4 oz/ac metrobuzin, 16 oz/ac 2-4D and 48 oz/ac Glyphosate (Preplant) 32 oz RoundUp PowerMax (Post Emerge)

Soil Type: Pewamo, Blount
Tillage: Minimum fall, No-til into Cereal Rye
Soil Test (grid avg): pH 6.3
P 91 ppm (Bray-P1)
K 297 ppm
CEC 13.3 meq/100g
O.M. 3.8%
Fertility: applied in corn year with VRT
Rainfall (May-Aug): 14.0”

Methods

In this trial, five soybean seeding rates were replicated four times in a randomized complete block design. Plots were 40 feet, by 2,100 feet long, planted in 15” rows. All treatments received the same tillage and herbicide applications. The trial was planted, sprayed and harvested with commercial farm equipment. Stand counts were taken at growth stage V3 as well as prior to harvest by obtaining eight counts per treatment and calculating the simple average. Plot centers where harvested with a 35 foot grain head. Yields and moistures were obtained by using a calibrated yield monitor. Yields were adjusted to 13% moisture. Rainfall data were obtained from the collaborating farmer’s records.

Treatments:
1. 100,000 seeds per acre
2. 125,000 seeds per acre
3. 150,000 seeds per acre
4. 175,000 seeds per acre
5. 200,000 seeds per acre

Results

5a. Soybean Yield Response to Seeding Rate (All results listed per acre)

Seeding Rate (seeds)	Stand on 6/24 (plants)	Stand on 7/25 (plants)	Seed Cost* ($/ac)	Moisture (%)	Yield (bushels)		Return Minus Seed Cost* ($/ac)
100,000	76,400	76,000	$43	12.4	60.3	c	$500
125,000	95,100	93,300	$54	12.6	61.9	bc	$503
150,000	99,500	98,800	$65	12.4	64.6	ab	$517
175,000	130,000	131,400	$75	12.6	63.9	ab	$500
200,000	150,400	148,100	$86	12.4	66.0	a	$508
LSD (P<.05, CV 3.7)					3.6		

*Based on $0.43/1,000 seeds and $9.00 market price (Source: OSUE Soybean Production Budget 2016)

Discussion:
There was no statistically significant difference in agronomic yield between the 150,000 and 200,000 seeds per acre treatments. However, seeding rates of 125,000 seeds per acre or less yielded significantly lower than those seeded above 150,000 seeds per acre. Based on this trial's economic data, seeding soybeans at 150,000 seeds per acre netted the greatest economic return. Finally, this data shows that soybean fields with a stand of at least 98,800 plants per acre this year could have produced the maximum agronomic yield and economic return. Further data in the form of multi-year replications will add to the validity of these results.

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