Soybean Yield Response to Seeding Rate (2014-2016)

Eric Richer, Ohio State University Extension Educator, Fulton County

Objective

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

Background

Crop Year: 2014-2016	Soil Test (grid avg):	pH 6.6
County: Fulton		P 101 ppm (Bray P1)
Location: Archbold, OH		K 295 ppm
Drainage: Systematic, 50' laterals		CEC 14.6
Previous Crop: Corn		O.M. 3.3%
Soil Type: Fulton, Latty clay	Rainfall (April-Sept):	2016 – 19.1"
Fertility: applied in corn year with VRT		2015 – 25.6"
Tillage: Minimum		2014 – 17.8"

Methods

Five treatments of different soybean seeding rates were replicated four times in a randomized complete block design. Treatments were made with a 40 foot commercial planter with 15" rows and planter units. All treatments received the same tillage and herbicide applications. The seed variety used was determined by the farmer-collaborator. However, the variety was not the same in all years. Plot centers were harvested with a commercial combine equipped with a 35 foot grain header. Yields and moistures were obtained by using a calibrated yield monitor. Yields were adjusted to 13% moisture. Rainfall data were obtained from farm level/producer data.

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

5b. Soybean Yield Response to Seeding Rate 2014-2016

Seeding Rate	2014 Yield	2015 Yield	2016 Yield	3 Year Average Yield	3 Year Average Final Stand	Revenue Minus Seed Cost*
(seeds/ac)	bushels per acre				(plants/ac)	($/ac)
100,000	51.2 b	46.1 cd	60.3 b	52.5	75,300	$430
125,000	52.9 b	48.5 bc	61.9 ab	54.4	95,800	$436
150,000	55.5 a	51.7 ab	64.6 a	57.3	113,400	$451
175,000	54.2 ab	51.1 b	63.9 ab	56.4	132,500	$432
200,000	55.7 a	54.2 a	66.0 a	58.6	147,800	$442
LSD (p<.05)	2.49	2.98	3.6	-	-	-
County Average	51.1	51.4	TBD	51.3	-	-
Ohio Average	52.5	50.0	TBD	51.3	-	-

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

Discussion:
Generally speaking, the agronomic optimum seeding rate was 150,000 seeds per acre or more for all years in the trial, except for 2015 when the 175,000 seeds per acre rate yielded significantly lower than the top yielding treatment. Furthermore in 2016, seeding at 125,000 seeds per acre resulted in the highest statistically significant agronomic yield.

The 3 year average seeding rate with the maximum economic return was 150,000 seeds per acre, netting over $450 per acre after seed cost. Finally, it should be noted that an average final stand of 113,400 plants per acre resulted in the highest agronomic yield *and* economic return.

Acknowledgement

The author expresses appreciation to on-farm collaborators Rufenacht Farms for the planting and harvesting of this plot. Thanks to summer agronomy intern Emily Herring, Troy Grime and Ben Eggers for assistance with data collection. This project was supported by the Ohio Soybean Association Research and Education Fund.

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For more information, contact:
Eric Richer
OSU Extension –Fulton County
8770 State Route 108
Wauseon, Ohio 43567
Richer.5@osu.edu