Soybean Plant Population Rate Trials

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Objective

To determine the optimal soybean seeding rate to maximize profitability while minimizing substantial exposure to losses as a result of poor weather. This plot is in cooperation with the multi-state effort to study optimal soybean seeding rates.

Background

	Plot A	Plot B	Plot C	Plot D
Crop Year	2017	2017	2017	2017
Location	Ault Farms	Becks Hybrids	Carreher Farms	Davis Ag.
County/Town	Ross/Londonderry	Ross/Chillicothe	Highland/Hillsboro	Highland/Leesburg
Soil Type	Pike Silt Loam	Gessie Silt Loam	Clermont Silt Loam	Brookston Silt Loam
Drainage	Surface Only	Surface Only	Surface Only	Surface Only
Previous Crop	Corn	Corn	Corn	Corn
Planting Date	5/12/2017	5/31/2017	6/6/2017	5/31/2017
Variety	Asgrow 36X6	Becks 387R4	3810GRNT	Becks 387R4
Harvest Date	9/26/2017	10/16/2017	10/17/2017	9/30/2017

Methods

This was a randomized complete block design with three or four replications. Treatments for Plots A, and B consisted of three seeding rates with three replications. They were 100,000, 130,000, and 160,000 seeds per acre. Plot C used four seeding rate treatments of 80,000, 120,000, 160,000 and 200,000 seeds per acre and three replications. Plot D had three seeding rates consisting of 125,000, 150,000 and 175,000 with four replications.

Results

Analysis of the yield data showed no statistical difference in three of the four plots. Plot D had a statistical difference, however the yield difference was relatively small. The 150,000 seeding rate yielded 1.66 bushels more than the 125,000 seeding rate and 2.95 more than the 175,000 rate.

	Treatment	Emergence Population	Yield	Economic Difference
Plot A	100,000[1]	91,222	76.67	$28.40
	130,000	110,000	76.05	$11.13
	160,000	126,333	77.57	$15.14
Not Significant p=0.10				
Plot B	100,000[1]	93,778	74.30	$27.96
	130,000	130,333	73.73	$11.13
	160,000	137,667	74.39	$6.65
Not Significant p=0.10				
Plot C	80,000	63,289	58.66	$44.52
	120,000[1]	92,956	59.16	$52.78
	160,000	122,622	60.97	$19.80
	200,000	154,255	58.66	$ 8.31
Not Significant p=0.10				
Plot D	125,000	112,255	71.09[b]	$31.42
	150,000[1]	135,123	72.75[a]	$38.71
	175,000	156,276	69.80[b]	$0
Significant p=.10 LSD 1.63				

Superscripts a and b indicate significantly different yields within each plot. Superscript 1 signifies the most profitable seeding rate in these plots.

Summary

Examining the results, the 150,000 and 160,000 seeding rates resulted in the highest yield, but were not statistically significant or, more importantly, not the best economic return. In plots A, B and C the seeding rate with the greatest economic return ranged from 100,000 to 120,000 with emergent an average emergent stand of 92,652 plants per acre. This improved economic return was due to savings in seed costs without a reduction in yield when compared to higher plant population plots. Plot D was the exception with the 150,000 seed drop having the highest yield and the highest economic return with the price and costs assumptions used in this model. This is one years' worth of data at 4 locations so care should be taken in applying these results to other farms. However, there is evidence that dropping the seeding rate below 180,000 should generate better economic returns for the producer.

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