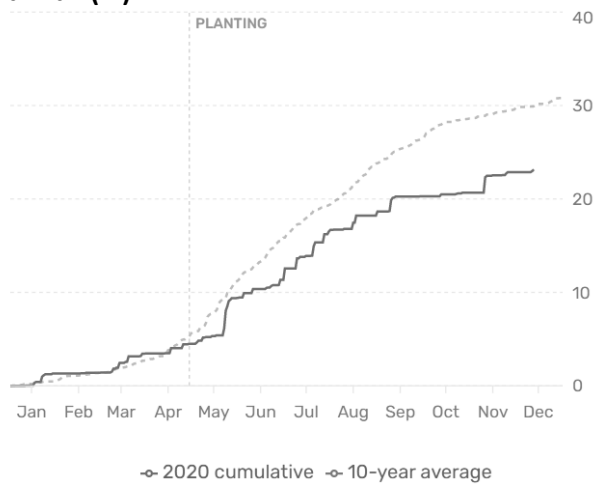
Irrigated Soybean Population Study

Study ID: 0276185202002
County: York
Soil Type: Hastings silt loam
Planting Date: 4/29/20
Harvest Date: 9/21-22/20
Row Spacing (in): 30
Hybrid: Pioneer® P27A30X
Reps: 12
Previous Crop: Corn
Tillage: Spring tillage, row cultivation, hilling
Herbicides: ***Pre:*** 5 oz/ac Sonic® at planting ***Post:*** 1.5 pt/ac Ultra Blazer®, 1.33 pt/ac Brawl™, and 26 oz/ac Durango® on 6/11/20; 6 oz/ac Targa® on 6/22/20
Seed Treatment: PPST 120+Lumisena™, EverGol® Energy, PPST 2030, Gaucho®
Foliar Insecticides: 5 oz/ac Hero® on 7/24/20
Foliar Fungicides: 5 oz/ac Top Guard® on 7/24/20
Fertilizer: 175 lb/ac MESZ on 11/20/19
Irrigation: Pivot, Total: 2"
Rainfall (in):



Soil Tests (November 2019, 2 samples were collected in the study area):

							-Ammonium Acetate-					----------DTPA----------						% Base				
Soil pH	Modified WDRF	Soluble Salts 1:1	Organic Matter	KCl Nitrate	Nitrate	M-3	K	Ca	Mg	NA	M-3 Sulfate	Zn	Fe	Mn	Cu	Sum of Cations	---Saturation---				
1:1	BpH	mmho/cm	LOI-%	ppm N	Lbs N/A	ppm P	ppm	ppm	ppm	ppm	ppm S	Ppm	Ppm	Ppm	ppm	Me/100g	H	K	Ca	Mg	Na
6.3	6.6	0.17	3.2	5.4	16	11	402	2078	306	34	9.1	2.54	39.3	12.8	.75	17.9	21	6	58	14	1
6.8		0.21	3.4	4.1	12	32	547	2912	536	44	9.0	2.33	36.0	7.8	1.16	20.6	0	7	70	22	1

Introduction: Previous on-farm research has demonstrated that soybean planting rates of 80,000 to 120,000 seeds/ac were sufficient to optimize yield and could result in higher profitability. The goal of this research was to utilize precision agriculture technology for conducting on-farm research. This study tested four soybean planting rates: 80,000 seeds/ac, 110,000 seeds/ac, 140,000 seeds/ac, and 170,000 seeds/ac. The remainder of the filed was planted at 120,000 seeds/ac and 130,000 seeds/ac. Treatments were randomized and replicated in 60' wide by 250' long blocks across the field (Figure 1). Variable-rate prescription maps were created and uploaded to the in-cab monitor to implement the study. Geospatial yield monitor data were collected at the end of the growing season and post-processed to remove errors with Yield Editor software from the USDA. The as-planted data were evaluated and only areas that achieved planting rates within 10% of the target seeding rate were included for yield analysis; 12 blocks shown in Figure 1 were used in the yield analysis. Stand counts were taken on September 14 for six of the replications.

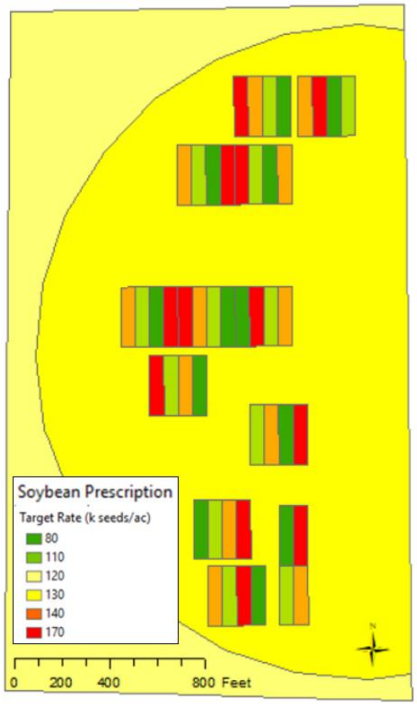


Figure 1. Soybean seeding rate prescription map for 2020 field

Results:

	Stand Count (plants/ac)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
80,000 seeds/ac	71,083 D*	87 A	793.45 A
110,000 seeds/ac	91,083 C	88 A	786.55 A
140,000 seeds/ac	121,000 B	87 A	767.23 AB
170,000 seeds/ac	137,417 A	86 A	737.82 B
P-Value	<0.0001	0.348	0.0004

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $9.50/bu soybean and $62.30/140,000 seeds.

Summary:

- Plant populations at this site ranged from 81% to 89% of the target seeding rate.
- Yield was not different among the four seeding rates evaluated.
- Net return was higher for the 80,000 and 110,000 seed/ac treatments than for the 170,000 seed/ac treatment. The 140,000 seed/ac treatment did not have a statistically different net return than the other treatments.

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