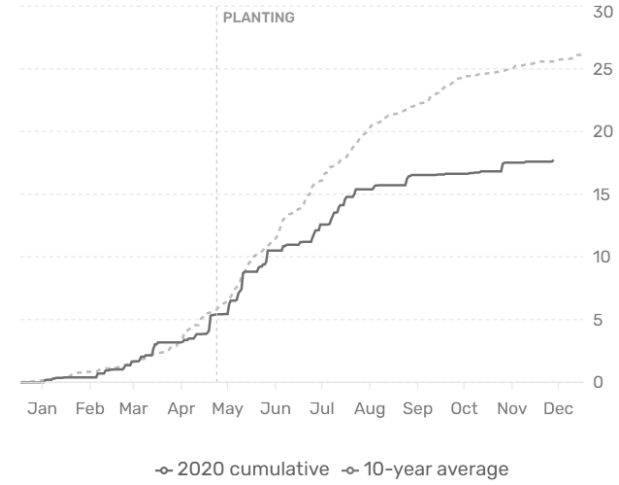
Irrigated Soybean Population Study

Study ID: 0709047202005
County: Dawson
Soil Type: Cozad silt loam; Hord silt loam; Wood River silt loam
Planting Date: 5/8/20
Harvest Date: 10/3/20
Population:
Row Spacing (in): 30
Hybrid: Pioneer® P29A25 and Channel® 2519R2X
Reps: 10
Previous Crop: Corn
Tillage: Strip-till
Herbicides: ***Pre:*** 24 oz/ac Mad Dog® 5.4#, 12.8 oz/ac Engenia®, 2.5 oz/ac Valor® XLT on 5/15/20
Post: 24 oz/ac Mad Dog® 5.4# on 6/23/20
Seed Treatment: NemaStrike™, Optimize® inoculant, Acceleron® Elite
Fertilizer: 1 gal/ac Altura™, 1 gal/ac ReaX™ Mn, 0.125 gal/ac ReaX™ Zn on 5/8/20 in-furrow starter

Irrigation: Pivot, Total: 4"
Rainfall (in):



Soil Tests (December 2019, 6 sample points from within the study area):

Soil pH 1:1	Soluble Salts 1:1 mmho/cm	Organic Matter LOI %	KCl Nitrate – N ppm N	Nitrate lb N/A	Mehlich P-III ppm P	$CaPO_4$ SO_4-S ppm	Ammonium Acetate (ppm) K	Ca	Mg	Na	Sum of Cations me/100g	DPTA (ppm) Zn	Fe	Mn	Cu
7.2	0.6	2.7	8	19	35	8	395	2826	368	51	18	1.0	17.5	6.0	0.6
7.3	0.6	2.6	6	14	25	8	425	3337	390	53	21	0.9	22.2	6.3	0.7
6.9	0.7	3.0	6	14	75	34	480	2949	413	63	20	1.5	25.7	6.5	0.7
6.9	0.5	3.4	8	19	63	6	503	2477	357	53	17	2.1	32.7	8.1	0.9
6.8	0.5	3.9	18	43	179	12	639	2997	428	45	20	4.0	35.5	9.4	1.1
7.0	0.6	3.4	17	41	101	13	594	2689	447	56	19	2.4	31.5	8.0	1.1

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 field was planted at 120,000 seeds/ac. Treatments were randomized and replicated in 90' wide by 300' long blocks across the field (Figure 1). A variable-rate prescription map was 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; 10 of the 14 originally planned blocks were used in the yield analysis (Figure 1). Stand counts were taken on June 29 and September 30 for eight of the replications. There were two varieties used in this study. There were no interactions between variety and seeding rate; therefore, seeding rate data is presented in the results table.

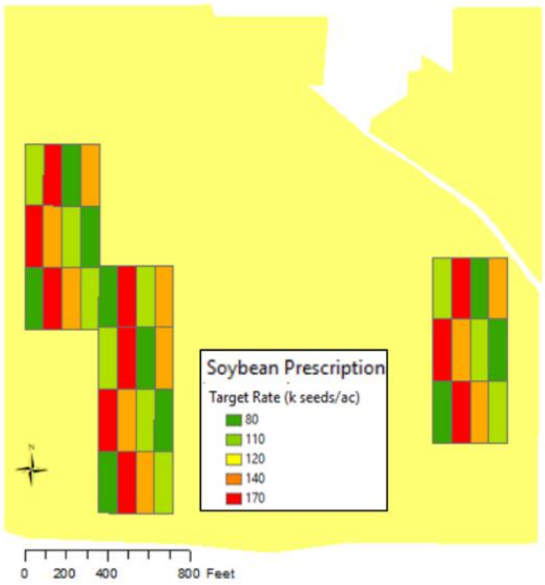


Figure 1. Soybean seeding rate prescription map for 2020 field site.

Results:

	Early Season Stand Count (plants/ac)	Harvest Stand Count (plants/ac)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
80,000 seeds/ac	67,458 D*	63,708 D	10.1 A	81 A	740.97 A
110,000 seeds/ac	93,792 C	83,458 C	9.8 A	79 A	711.72 A
140,000 seeds/ac	119,542 B	99,417 B	10.0 A	81 A	714.47 A
170,000 seeds/ac	148,500 A	123,875 A	9.9 A	82 A	718.79 A
P-Value	<0.0001	<0.0001	0.314	0.685	0.602

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $9.50/bu soybean and $50/140,000 seed unit.

Summary:

- Plant populations at this site ranged from 83% to 87% of the target seeding rate.
- Yield and net return were not statistically different among the four seeding rates evaluated.

Sponsored by: University of Nebraska Lincoln

In Partnership with: Nebraska Corn Board; Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission