

Data-Intensive Farm Management: Soybean Seeding Rate

Study ID: 0546155201902

County: Saunders

Soil Type: Yutan silty clay loam 2-6% slopes, eroded; Filbert silt loam 0-1% slope

Planting Date: 5/9/18

Harvest Date: 9/27/18

Row Spacing (in): 30

Variety: Golden Harvest® GH2788X

Reps: 9

Previous Crop: Corn

Tillage: No-Till

Herbicides: **Pre:** 7 oz/ac Authority® Supreme and 8 oz/ac 2-4,D **Post:** 36 oz/ac Flexstar® GT, 1 qt/ac Warrant®, 6 oz/ac Select Max®, and 12 oz/ac Roundup®

Seed Treatment: CruiserMaxx®

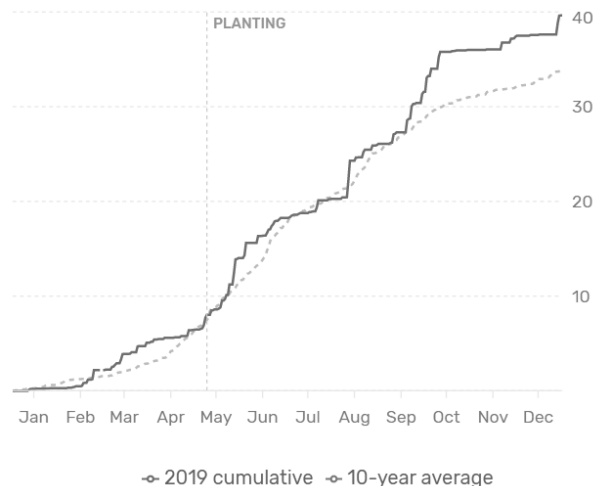
Foliar Insecticides: 5 oz/ac Brigade® at R3

Foliar Fungicides: 4 oz/ac Priaxor® at R3

Fertilizer: None

Irrigation: Pivot, Total: 2"

Rainfall (in):



Introduction: This study is part of the Data-Intensive Farm Management Project, a multi-university collaboration led by the University of Illinois at Urbana-Champaign. The goal of these research studies is 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. Treatments were randomized and replicated in 90' wide by 240' long blocks across the field (Figure 1). Variable-rate prescription maps for the study were developed and uploaded to the in-cab monitor. Row cleaners were on the planter, but were not run aggressively during planting. 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; 9 of the 11 originally planned blocks shown in Figure 1 were used in the yield analysis.

Stand counts were taken on June 11 for eight replications; these stand counts were used to determine percent emergence. There was interest in determining if soybean stem diameter was related to planting rate and if stem diameter was related to infestations of *Diuraphis* stem borer.

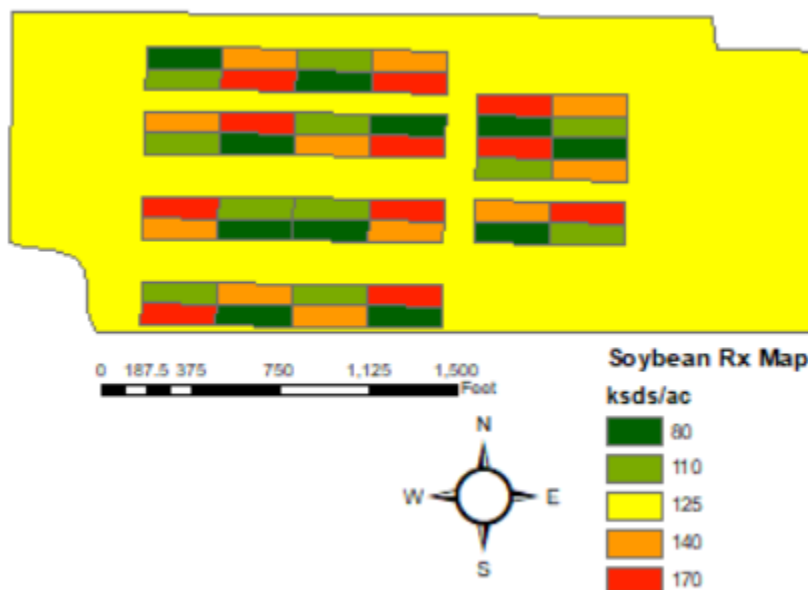


Figure 1. Soybean seeding rate prescription map.

In field measurements were made to determine stem diameter and *Decetes* stem borer infestation on September 26 for four of the replications.

Results:

Planting rate (seeds/ac)	Stand Count (plants/ac)	Emergence (%)	Stem Diameter (mm)	<i>Decetes</i> Stem Borer Infestation %	Moisture (%)	Yield (bu/ac) [†]	Marginal Net Return [‡] (\$/ac)
80,000	64,000 C*	80 A	9 A	3 A	11.8 A	83 A	635.49 A
110,000	91,750 B	83 A	7 AB	3 A	11.8 A	83 A	628.32 A
140,000	117,250 A	84 A	6 B	2 A	12.1 A	83 A	610.82 A
170,000	133,500 A	79 A	6 B	3 A	12.3 A	86 A	624.13 A
P-Value	<0.0001	0.726	0.005	0.888	0.137	0.164	0.319

*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 adjusted to 13% moisture.

[‡]Marginal net return based on \$8.10/bu soybean and \$60/unit of 140,000 seeds.

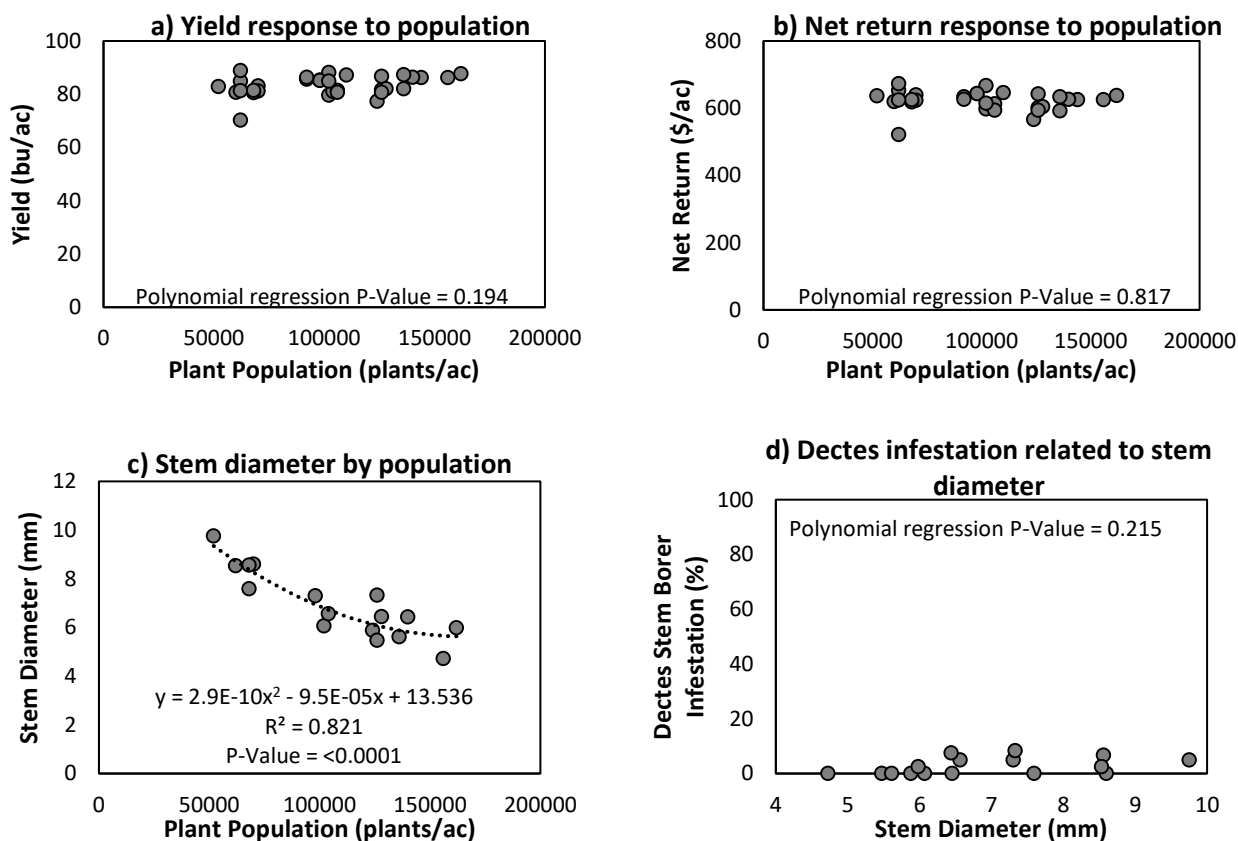


Figure 2. a) Yield response to plant population (determined by stand count), b) net return response to population (determined by stand counts), c) stem diameter by plant population (determined by stand counts), and d) *Decetes* stem borer infestation as related to stem diameter. Regression lines were fit and displayed if the relationship was statistically significant.

Summary:

- Plant populations at this site ranged from 79% to 84% of the target seeding rate.
- Stem diameter was related to seeding rate and plant population, with lower seeding rates having larger stem diameters.
- Dectes stem borer counts at this site were fairly low, with only 2% to 3.1% of plants infested. Dectes stem borer infestation was not related to stem diameter and seeding rate.
- Yield and net return was not different among the four seeding rates evaluated.

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