

Impact of Variable Rate Seeding on Non-irrigated Corn

Study ID: 0416147201905

County: Richardson

Soil Type: Monona silt loam 6-11% slopes;
Kennebec silt loam rarely flooded; Judson silt loam
2-6% slopes

Planting Date: 5/15/19

Harvest Date: 11/9/19

Row Spacing (in): 30

Variety: Pioneer® P1870

Reps: 6

Previous Crop: Soybean

Tillage: No-Till

Herbicides: *Pre:* None *Post:* 2.25 qt Keystone® NXT,
5.3 oz/ac Callisto®, 32 oz/ac glyphosate on 6/1/19

Seed Treatment: Poncho® 1250 + VOTIVO® and
Raxil®

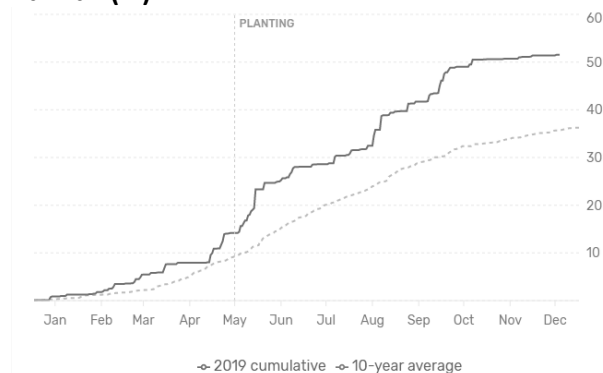
Foliar Insecticides: None

Foliar Fungicides: 10 oz/ac Headline AMP® on
7/29/19

Fertilizer: 170 lb N/ac as anhydrous ammonia on
4/10/19; 133 lb/ac 0-0-60, 179 lb/ac 11-52-0, 84
lb/ac gypsum on 4/15/19; 1.0 gal/ac CoRoN® on
7/29/19

Irrigation: None

Rainfall (in):



Introduction: Many farmers now have planters that can vary seeding rate on the go. The goal of the technology is to optimize seeding rate by within-field management zones and therefore optimize return on seed investment. Practically, there are still questions related to 1) what factors to use to delineate management zones for seeding, and 2) how to determine the optimal rate in each management zone.

Many companies offer variable rate seeding prescriptions based on proprietary algorithms or models. In this study, three seeding rate management zones were delineated with Helena® AGRIntelligence® SeedStrong® (Figure 1). The SeedStrong® tool utilized yield data files from 2003, 2005, 2007, 2009, 2011, 2015, and 2017 and grid soil samples from 2018. The rates for each management zone were assigned by the farmer. To evaluate the seeding prescription, rate blocks with all three seeding rates were placed in multiple locations in the field in both the low seeding rate zone and the medium seeding rate zone (Figure 1). Evaluation blocks were not able to be placed in the high seeding rate zones because the size and shape of these zones did not allow for blocks to fit. Stand count, grain moisture, and yield were evaluated for each of the evaluation blocks, both overall and by zone. As-planted data were examined to ensure that all areas used for yield data analysis were planted at rates within 15% of the target seeding rate.

Results:

Across all zones, there was no impact of seeding rate on yield, moisture, or marginal net return.

	Harvest Stand Count (plants/ac)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ (\$/ac)
30,000 seeds/ac	28,447 C*	18.3 A	249 A	865.94 A
33,000 seeds/ac	31,205 B	18.4 A	249 A	855.35 A
36,000 seeds/ac	33,672 A	18.4 A	254 A	866.56 A
P-Value	0.0002	0.430	0.133	0.478

*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 15.5% moisture.

‡Marginal net return based on \$3.83/bu corn and \$236.28/80,000 seeds (\$88.60/ac for 30,000 seeds/ac; \$97.47/ac for 33,000 seeds/ac; \$106.33/ac for 36,000 seeds/ac)

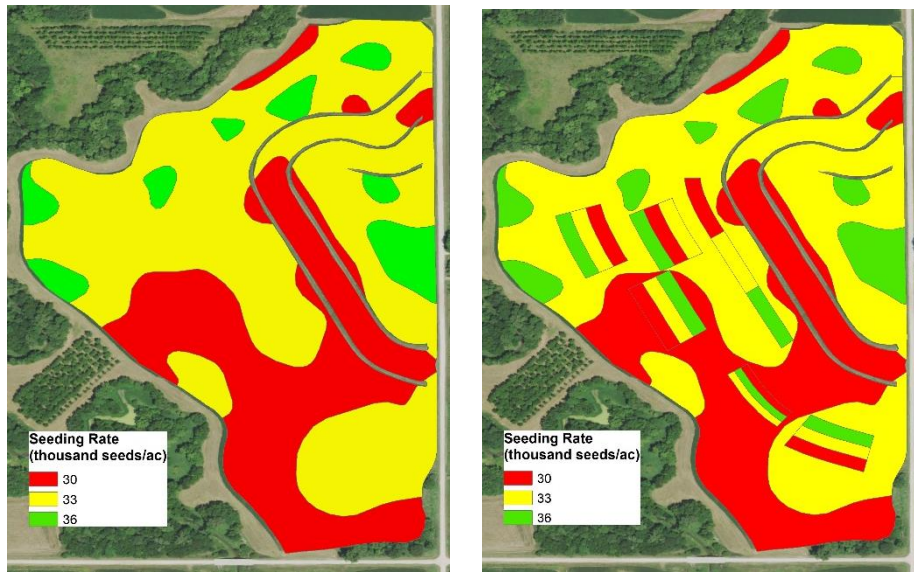


Figure 1. Three seeding rate management zones delineated with Helena® AGRIntelligence® SeedStrong® with rates assigned by the farmer (left) and seeding rate management zones with rate check blocks added to evaluate seeding rates in the low and medium zone (right).

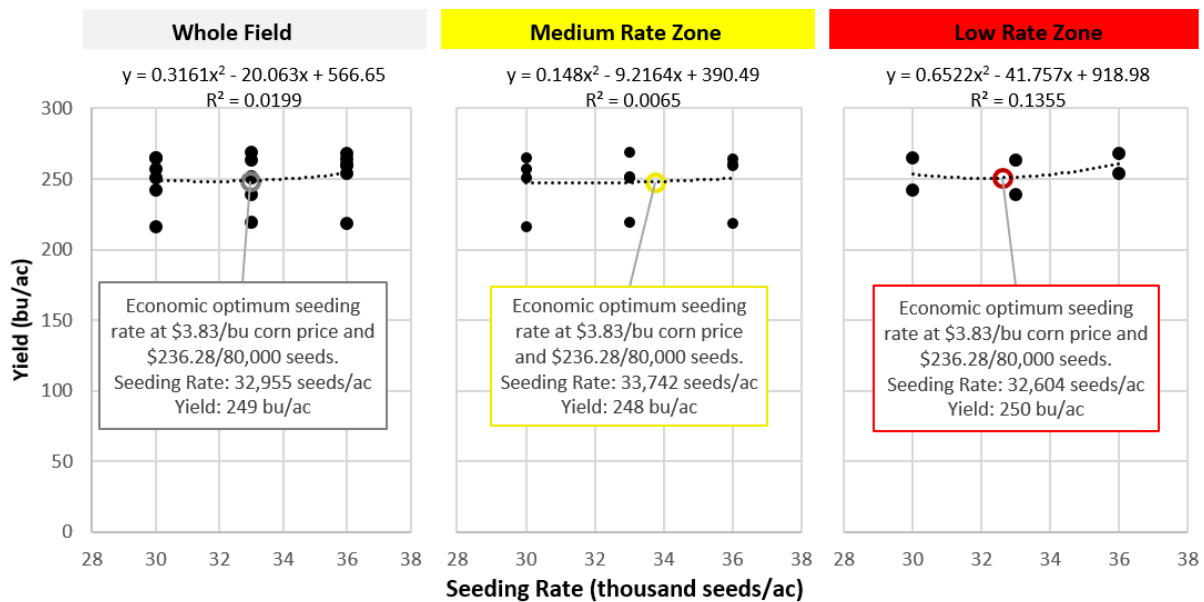


Figure 2. Economic optimum seeding rate when considering rate blocks over the whole field (left), rate blocks within the medium rate zone (middle), and rate blocks within the low rate zone (right).

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Summary:

- Harvest stand counts were significantly different, and ranged from approximately 1,600 to 2,300 plants/ac lower than the seeding rate.
- Overall, the economic optimum seeding rate was 33,000 seeds/ac (Figure 2). Economic optimum seeding rate in the medium zone was slightly higher at 33,700 seeds/ac compared to 32,600 seeds/ac in the low zone. There were not large variations in economic optimum seeding rate.
- Collecting additional data, such as electrical conductivity measurements and elevation may help refine management zones and further examine the utility of variable rate seeding in this field.

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