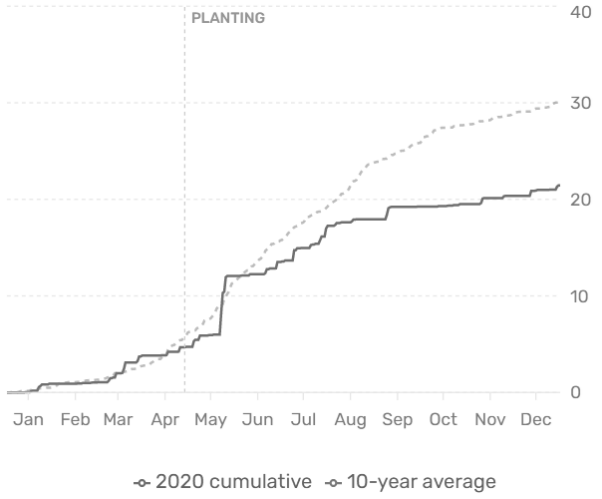
Impact of Variable-Rate Corn Seeding on Yield and Profitability

Study ID: 0908079202001
County: Hall
Soil Type: Hall silt loam sandy substratum 0-1% slope
Planting Date: 4/28/20
Harvest Date: 10/13/20
Population: Varied
Row Spacing (in): 30
Hybrid: Fontanelle Hybrids® 13D843
Reps: 7
Previous Crop: Soybean
Tillage: Strip/ridge-till; fall strip-till, strips freshened in spring. Ridges made at V10.
Herbicides: ***Pre:*** 32 oz/ac Roundup®, 64 oz/ac Degree®, 1.5 qt/ac Warrant®, 2.5 lb/ac AMS ***Post:*** 32 oz/ac Roundup®, 3 oz/ac Status®, 2.5 lb/ac AMS
Seed Treatment: Acceleron® Basic
Foliar Insecticides: None
Foliar Fungicides: None

Fertilizer: 150 lb/ac MAP in mid-March; 27 gal/ac 32-0-0 UAN in early spring; 3.5 gal/ac 10-34-0; 1 pt/ac chelated zinc 10% in-furrow while planting; 25 gal/ac 32-0-0 UAN sidedressed in mid-May
Note: Field experienced ~15% wind damage/green snap
Irrigation: Gravity, Total: ~16"
Rainfall (in):



Introduction: The objective of this study was to evaluate a variable-rate seeding prescription for corn. Passes with the variable-rate prescription were compared to passes of a single, standard flat rate (Figure 1). The portion of the field chosen for the study has higher soil textural variability and higher sand content than the majority of the field. The variable-rate seeding prescription was developed by reviewing past yield data, then delineating differing yield zones based on areas with consistently lower yields than the remainder of the field. In the variable-rate prescription, the lowest seeding rate was 22,000 seeds/ac, corresponding to the lowest yielding portion of the field (~15% lower yields than surrounding areas). The 26,000 seeds/ac rate corresponded to yields that were ~12% lower than the surrounding field; the 31,500 seeds/ac rate corresponded to yields that were ~8% lower than the surrounding field; the 34,500 seeds/ac rate corresponded to yields that were ~5% lower than the surrounding field. In the variable rate plot area, the average seeding rate for the variable-rate strips was 30,880 seeds/ac. The average seeding rate for the standard, flat-rate strips was 34,060 seeds/ac. The same planter was used for both variable-rate and flat-rate strips. Stand counts were taken in different, representative areas of variable-rate and flat-rate strips on June 8, 2020 and are shown in Figure 2.

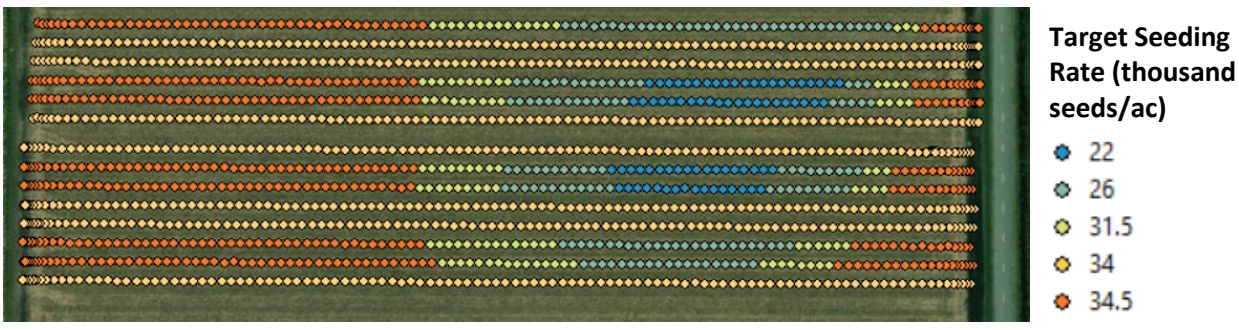


Figure 1. Variable seeding rate strips with rates ranging from 22,000 to 34,500 seed/ac compared to standard flat-rate strips of 34,000 seed/ac.

Results:

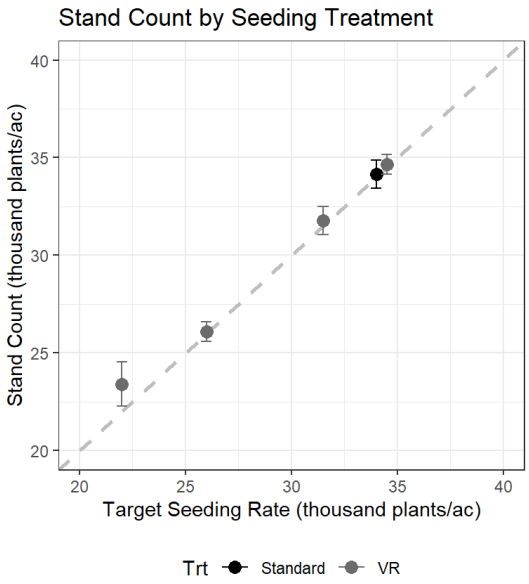


Figure 2. Mean (dots) and standard deviation (bars) for stand count versus target seeding rate for standard and variable-rate treatments. Points falling above the grey dashed line indicate stand counts were higher than the target seeding rate.

	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Standard Seeding	14.7 A*	231 A	792.89 A
VR Seeding	14.6 A	230 A	808.45 A
P-Value	0.419	0.924	0.268

*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 15.5% moisture.
‡Marginal net return based on $3.51/bu corn and $275/80,000 seeds.

	Yield by Seeding Zone Analysis†		
	Low Zone (VR: 22,000 seeds/ac vs. Standard: 34,000 seeds/ac)	Mid Zone (VR: 31,500 seeds/ac vs. Standard: 34,000 seeds/ac)	High Zone (VR: 34,500 seeds/ac vs. Standard: 34,000 seeds/ac)
Standard Seeding	164 A*	233 A	263 B
VR Seeding	165 A	228 A	266 A
P-Value	0.932	0.245	0.056

*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 15.5% moisture.

Summary:

- Overall, stand counts were close to the target seeding rates. At the lowest variable-rate target of 22,000 seeds/ac, stand counts were higher than the target rate (Figure 2).
- Overall, there was no difference in grain moisture or yield between the standard-rate and variable-rate treatments.
- Net return was not statistically different between the standard-rate and variable-rate treatments.
- Seeding rate impact on yield was also evaluated within three of the management zones. In the low and mid zones, the lower seeding rates used in the VR strips did not result in different yields than the higher seeding rates used in the standard rate strips showing an opportunity to save on seed costs. However, in the high zone, despite very similar seeding rates for the VR seeding and standard seeding (34,500 seeds/ac versus 34,000 seeds/ac) there was a yield difference. It is unknown what would have caused this yield difference.

Sponsored by: University of Nebraska Lincoln

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