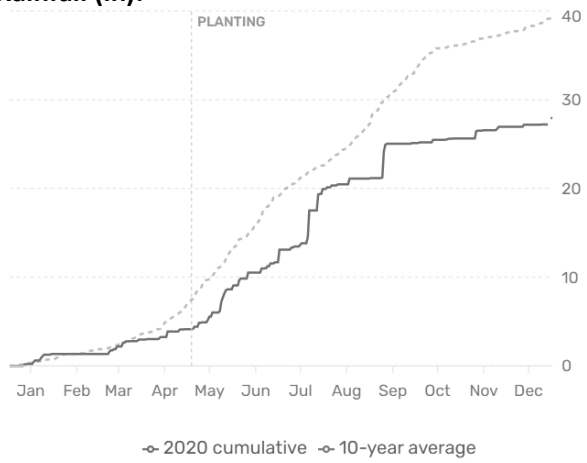
Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

Study ID: 0816025202002
County: Cass
Soil Type: Otoe silty clay loam; Wymore silty clay loam
Planting Date: 5/3/20
Harvest Date: 10/28/20
Seeding Rate: 28,000
Row Spacing (in): 30
Hybrid: Renk RK945DG VT2P RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 4/21/20 ***Post:*** 6/9/20
Foliar Insecticides: None
Foliar Fungicides: None
Fertilizer: 400 lb/ac ag lime

Irrigation: None
Rainfall (in):



Soil Samples (June 2020, minimum, maximum, and average values from zone sample):

	Soil pH			Nitrate –	Mehlich P-	Sulfate-S	Ammonium Acetate (ppm)				CEC	% Base Saturation				
	1:1	BpH	OM LOI %	N ppm N	III ppm P	ppm S	K	Ca	Mg	Na	me/100g	H	K	Ca	Mg	Na
Min	5.5	6.3	4.3	9.8*	26	7.1	155	2346	297	11	21.7	25	2	54	11	0
Max	5.8	6.4	4.6	44.9*	44	11.8	255	2901	482	13	25.4	31	3	57	16	0
Avg	5.6	6.3	4.4	23.7*	33.3	9.9	206	2601	387	12	23.6	29	2	55	13	0

*All samples are 0-8" depth except nitrate-N ppm N sampled at 0-24" depth

Introduction: A high-clearance applicator was equipped with Ag Leader® OptRx® sensors. UAN fertilizer was applied with drop nozzles as the crop canopy was sensed. This study compares crop canopy sensor-based in-season N application with the grower's standard N management.

Grower Nitrogen Treatment: The grower rate was 175 lb N/ac, applied as anhydrous ammonia on April 6, 2020.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate (prior to in-season sensing) was established with 70 lb/ac N from anhydrous ammonia on April 6, 2020. Crop canopy sensing and application occurred on June 25, 2020, at the V9 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 51 lb N/ac, applied as 28% UAN with Nitrain Bullet™ pronitridine stabilizer. The field received 0.08" of rain on June 28, 2020, and 1.74" on July 1, 2020. The average total N rate was 121 lb N/ac.

Results:

	Total N rate (lb/ac)	Yield (bu/ac)†	Partial Factor Productivity of N (lb grain/lb N)	lbs N/bu grain	Marginal Net Return‡ ($/ac)
Grower	175 A*	210 A	67 B	0.84 A	679.75 A
Project SENSE	121 B	214 A	99 A	0.57 B	706.29 A
P-Value	<0.0001	0.522	<0.0001	<0.0001	0.236

*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 $3.51/bu corn, $0.41/lb N UAN, and $0.32/lb N anhydrous ammonia.

Summary:

- The Project SENSE management N rate was 54 lb/ac lower than the grower's N management.
- There was no yield difference between the Project SENSE N management and the grower's N management.
- Project SENSE had better nitrogen use efficiency; Project SENSE N management used 0.27 lb/ac less N to produce a bushel of grain than the grower's method.
- Marginal net return was $26.54/ac greater for the Project SENSE N management than the grower's N management.

Sponsored by: University of Nebraska Lincoln

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