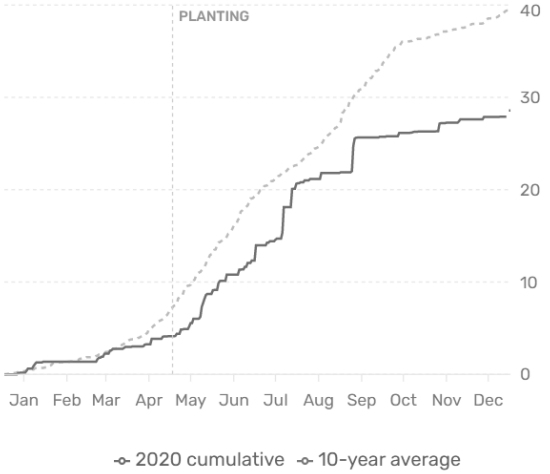
Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

Study ID: 0816025202001
County: Cass
Soil Type: Wymore silty clay loam; Judson silt loam; Yutan silty clay loam
Planting Date: 5/2/20
Harvest Date: 11/6/20
Seeding Rate: 27,000
Row Spacing (in): 30
Hybrid: DEKALB® DKC70-27 RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 4/23/20 ***Post:*** 6/11/20
Seed Treatment: Standard Treatment
Fertilizer: 310 lb/ac ag lime

Irrigation: None
Rainfall (in):



Soil Samples (November 2019, minimum, maximum, and average values from grid sample):

	Soil pH			Nitrate –	Mehlich P-	Sulfate-S	Zn	Ammonium Acetate (ppm)				CEC	% Base Saturation				
	1:1	BpH	OM LOI %	N ppm N	III ppm P	ppm S	(DPTA)	K	Ca	Mg	Na	me/100g	H	K	Ca	Mg	Na
Min	5.4	6.3	2.3	1.8	9	5	0.4	113	1580	205	11	14	0	2	44	9	0
Max	6.4	6.8	4.1	5.2	24	14	1	406	2860	627	59	74	44	6	74	24	2
Avg	5.8	6.5	2.9	3.3	14	9	0.57	197	2093	350	17	55	28	3	55	15	0.1

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 191 lb N/ac, applied as anhydrous ammonia on April 4, 2020 (contributing 161 lb/ac N) and 275 lb/ac 11-52-0 (contributing 30 lb/ac N).

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate (prior to in-season sensing) was established with anhydrous ammonia on April 4, 2020 (contributing 40 lb/ac N), and 275 lb/ac 11-52-0 (contributing 30 lb/ac N), for a total base rate of 70 lb/ac N. Crop canopy sensing and application occurred on June 25, 2020, at the V10 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 55 lb N/ac, applied as 28% UAN with Nitrain Bullet™ pronitridine stabilizer. Following the application, the field received 1.59" of rain on June 28. The average total N rate was 125 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	191 A*	212 A	62 B	0.90 A	668.30 A
Project SENSE	125 B	192 B	86 A	0.65 B	629.26 B
P-Value	<0.0001	<0.0001	0.0001	<0.0001	<0.0001

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

Summary:

- The Project SENSE management N rate was 66 lb/ac lower than the grower's N management.
- Yield for the Project SENSE N management was 20 bu/ac lower than the grower's N management.
- Project SENSE had better nitrogen use efficiency; Project SENSE N management used 0.25 lb/ac less N to produce a bushel of grain than the grower's method.
- Marginal net return was $39.05/ac lower for the Project SENSE N management than the grower's N management.

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