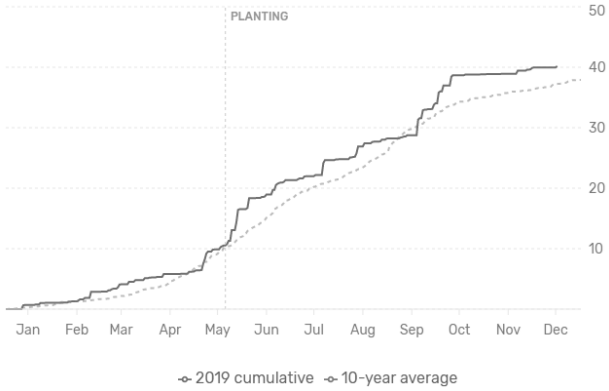
Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

Study ID: 0816025201901
County: Cass
Soil Type: Wymore silty clay loam, 0-2% slopes; Wymore silty clay loam, 3-6% slopes, eroded
Planting Date: 5/20/19
Harvest Date: 11/8/19
Seeding Rate: 27,600
Row Spacing (in): 30
Variety: DEKALB® DKC66-75 RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 16 oz/ac 2,4-D, 17lb/100/ac AMS, 2.1 qt/ac Bicep II Magnum®, 32 oz/ac Durango®, and 2 qt/ac MSO on 5/3/19 ***Post:*** 2 pt/ac Callisto®, 17 lb/100/ ac AMS, 2 qt/ac crop oil concentrate on 6/17/19
Seed Treatment: Acceleron® and ILeVO®

Foliar Insecticides: None
Foliar Fungicides: 2 oz/ac Stratego® on 6/17/19
Fertilizer: 33 lb N/ac and 156 lb P/ac as 11-52-0; 400 lb/ac ag lime
Irrigation: None
Rainfall (in):



Soil Tests (November 2018):

			Bray P1	Sulfate-S	Ammonium Acetate (ppm)					% Base Saturation			
Soil pH 1:1	Buffer pH	OM %	ppm P	ppm S	K	Ca	Mg	Zn	CEC me/100g	H	K	Ca	Mg
6.1	6.7	3.3	8	6	278	2385	263	2.1	17.2	13.9	4.1	69.3	12.7
6.2	6.7	3.6	5	8	264	2427	302	2.8	17.4	11.9	3.9	69.7	14.5
6.1	6.7	3.4	5	9	219	2039	298	2.2	15.4	14.1	3.6	66.2	16.1
6.1	6.7	3.7	8	6	213	2497	301	2.7	18.0	13.7	3.0	69.4	13.9
6.1	6.6	4.6	74	6	497	2875	344	13.8	21.5	13.9	5.9	66.9	13.3
6.6	6.9	3.7	51	7	455	2424	258	6.2	16.4	5.9	7.1	73.9	13.1
5.9	6.6	3.5	6	6	243	2332	244	5.4	17.2	16.8	3.6	67.8	11.8
6.1	6.7	3.3	4	6	222	2158	227	3.8	15.5	14.5	3.7	69.6	12.2

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 33 lb N/ac applied with 11-52-0 early spring and 176 lb N/ac applied as anhydrous ammonia on April 22, 2019.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 33 lb N/ac was applied with 11-52-0 early spring and 75 lb N/ac was applied as anhydrous ammonia on April 22, 2019. Crop canopy sensing and application occurred on July 10, 2019 at the V13 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 55 lb N/ac. The average total N rate was 163 lb N/ac.

Results:

N Management Strategy	Total N rate (lb/ac)	Moisture (%)	Yield (bu/ac)†	Partial Factor Productivity of N (lb grain/lb N)	lbs N/ bu grain	Marginal Net Return‡ ($/ac)
Grower	209 A*	15.6 A	197 A	53 B	1.06 A	687.60 A
Project SENSE	163 B	15.6 A	199 A	69 A	0.82 B	706.55 A
P-Value	<0.0001	0.796	0.659	0.0001	0.0002	0.227

*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, $0.37/ lb N as 11-52-0, $0.36/lb N as UAN, and $0.32/lb N as anhydrous.

Summary:

- The Project SENSE N management used 46 lb N/ac less than the grower's N management, and utilized split-N application while the grower's management utilized only one preplant N application.
- Yield was not different between the Project SENSE N management and the grower's N management.
- Project SENSE resulted in a higher partial factor productivity of N and used 0.24 fewer pounds of N to produce a bushel of grain.
- There was no difference in marginal net return between the two management approaches. Marginal net return only took into account the varying price of N fertilizer sources and rates; the cost of an additional in-season application for the Project SENSE N management compared to the grower's N management was not included.

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