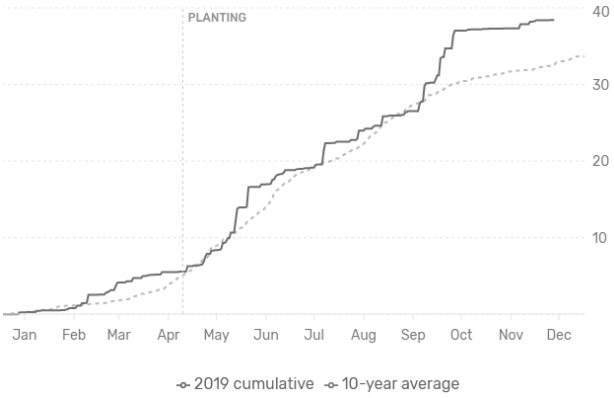
Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

Study ID: 0849155201901
County: Saunders
Soil Type: Tomek silt loam, 0-2% slopes; Yutan silty clay loam, terrace, 2-6% slopes, eroded
Planting Date: 4/24/19
Harvest Date: 10/31/19
Seeding Rate: 28,000
Row Spacing (in): 30
Variety: DEKALB® DKC60-88RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till

Irrigation: None
Rainfall (in):



Soil Tests (June 2019):

Soil pH 1:1	WDRF Buffer pH	Soluble Salts 1:1 mmho/cm	Excess Lime Rating	Organic Matter LOI %	Nitrate – N ppm N	Nitrate lb N/ac (0-8")	Mehlich P-III ppm P	Sulfate-S ppm S	Ammonium Acetate (ppm) K	Ca	Mg	Na	CEC me/100g	% Base Saturation H	K	Ca	Mg	Na
4.9	6.1	0.29	NONE	3.6	19.5	47	6	11.4	296	2367	476	20	25.5	35	3	46	16	0
5.2	6.3	0.26	NONE	3.7	20.2	49	5	13.5	216	2080	269	9	20.1	34	3	52	11	0
5.6	6.5	0.19	NONE	3.1	5.3	13	4	9.3	275	2601	493	38	22.8	21	3	57	18	1
5.5	6.4	0.22	NONE	4	12.6	30	32	12	391	2460	267	8	21.6	28	5	57	10	0
5	6	0.2	NONE	3.7	14.7	35	10	12.2	282	2040	229	8	22.9	44	3	45	8	0
5	6.1	0.28	NONE	3.4	22.7	55	11	12.4	203	2039	357	26	22.4	38	2	46	13	0
5.3	6.3	0.3	NONE	3.7	14.7	35	5	11.4	306	2786	475	8	26	28	3	54	15	0
5.5	6.5	0.32	NONE	3.6	21.7	52	23	11.3	371	2558	454	7	22.7	23	4	56	17	0
5.3	6.5	0.25	NONE	4.1	10.6	26	6	12.5	271	2677	450	7	23.2	23	3	58	16	0
5.5	6.6	0.2	NONE	3.8	7.6	18	5	11.6	206	2034	296	8	17.6	25	3	58	14	0
5.1	6.1	0.21	NONE	4.1	17.4	42	5	13.9	231	1999	267	7	21.6	41	3	46	10	0
5.1	6.1	0.25	NONE	4.4	12.7	31	5	14.6	253	2515	460	7	25.9	34	3	48	15	0
4.9	6	0.21	NONE	4	17.4	42	11	16.6	241	1719	234	6	20.9	46	3	41	9	0
5.5	6.5	0.21	NONE	3.9	11.9	29	8	13.7	238	2165	334	7	19.3	26	3	56	14	0
4.9	6.1	0.29	NONE	3.5	29.2	70	8	14.7	286	2031	259	7	22.3	41	3	46	10	0

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 140 lb N/ac applied as anhydrous ammonia on April 16, 2019.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 75 lb N/ac was applied as anhydrous ammonia on April 16, 2019. Crop canopy sensing and application occurred on July 3, 2019 at the V11 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 40 lb N/ac. The average total N rate was 115 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	140 A*	14.8 A	193 A	77 B	0.73 A	694.34 A
Project SENSE	115 B	14.7 B	190 A	92 A	0.61 B	687.16 A
P-Value	0.0001	0.049	0.246	0.001	0.0004	0.513

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre adjusted to 15.5% moisture.
‡Marginal net return based on $3.83/bu corn, $0.36/lb N as UAN, and $0.32/lb N as anhydrous ammonia.

Summary:

- The Project SENSE N management was 25 lb N/ac lower 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 had higher partial factor productivity of N and used 0.12 lb/ac less N to produce a bushel of grain.
- There was no difference in marginal net return. 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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