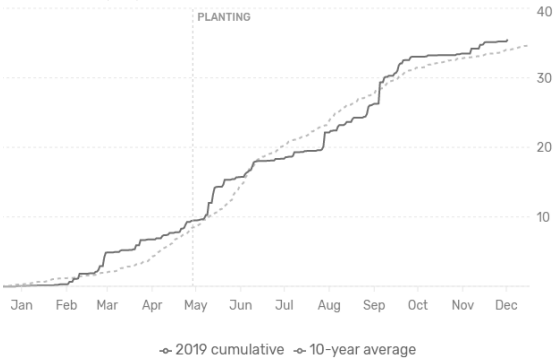
Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

Study ID: 0103053201901
County: Dodge
Soil Type: Moody silty clay loam, 2-6% slopes; Moody silty clay loam, 6-11% slopes, eroded
Planting Date: 5/13/19
Harvest Date: 10/24/19
Seeding Rate: 32,000
Row Spacing (in): 30
Variety: Fontanelle Hybrids® 10D308
Reps: 7
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
5.7	6.5	0.10	NONE	3.3	6.1	15	15	9.7	258	2679	414	10	22.4	22	3	60	15	0
5.9	6.8	0.11	NONE	3.1	4.5	11	12	6.2	216	3357	616	12	24.3	7	2	69	21	0
5.9	6.6	0.11	NONE	3.4	6.4	15	24	9.2	296	2445	291	8	19.6	21	4	62	12	0
6.0	6.7	0.12	NONE	3.5	7.2	17	18	11.5	261	2956	410	8	21.8	13.	3	68	16	0
6.0	6.5	0.16	NONE	4.0	9.7	23	77	8.6	338	2391	286	8	20.2	25	4	59	12	0
5.8	6.6	0.15	NONE	3.4	8.1	19	29	10.2	230	2657	465	10	21.7	18	3	61	18	0
5.8	6.4	0.14	NONE	3.6	8.7	21	24	12.2	265	2672	398	10	23.4	26	3	57	14	10
6.0	6.6	0.15	NONE	3.6	10.3	25	34	11.7	282	2642	376	10	20.7	17	3	64	15	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. A rye cover crop was planted in mid-October at a rate of 40 lb/ac and terminated at the end of May.

Grower Nitrogen Treatment: The grower rate was 130 lb N/ac split applied as 32% UAN on May 13, 2019 and 32% UAN on June 13, 2019.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 35 lb N/ac was applied as 32% UAN on May 13, 2019. Crop canopy sensing and application occurred on July 2, 2019 at the V10 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 94 lb N/ac. The average total N rate was 102 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	130 A*	14.6 A	262 A	113 B	0.50 A	954.70 A
Project SENSE	102 B	14.6 A	249 B	136 A	0.41 B	915.61 B
P-Value	<0.0001	0.385	0.027	0.0001	<0.0001	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 adjusted to 15.5% moisture.
‡Marginal net return based on $3.83/bu corn and $0.36/lb N as UAN.

Summary:

- The Project SENSE N management used 28 lb N/ac less than the grower's N management.
- Yield was 13 bu/ac lower for the Project SENSE N management.
- Project SENSE had a higher partial factor productivity of N and used fewer pounds of N to produce a bushel of grain.
- The grower's N management resulted in $39/ac greater profitability compared to the Project SENSE N management.

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