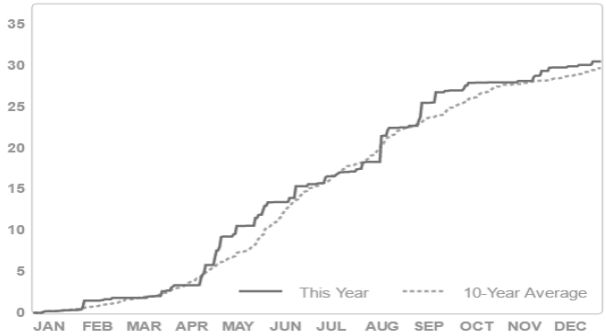
Project SENSE (Sensor-based In-season N Management)

Study ID: 622107201601
County: Knox
Soil Type: Bazile loam 2-6% slopes; Trent silt loam 0-2% slope; Thurman loamy fine sand 2-6% slopes; Ortello fine sandy loam 2-6% slopes
Planting Date: 5/5/16
Harvest Date: 11/3/16
Population: 32,000
Hybrid: Stine 9734
Reps: 4
Previous Crop: Soybean
Tillage: No-Till

Irrigation: Pivot
Rainfall (in):



Soil Sample Results: Soil samples were taken in four locations within the research study area and do not correspond to specific treatments or replications.

ID	Soil pH 1:1	WDRF Buffer pH	Soluble Salts 1:1 mmho/cm	Excess Lime Rating	Organic Matter LOI %	Nitrate – N ppm N	Nitrate lbs N/A	Mehlich P-III ppm P	Sulfate-S ppm S	Zn (ppm)	Ammonium Acetate (ppm) K	Ca	Mg	Na	CEC me/100g	% Base Saturation H	K	Ca	Mg	Na
1	6.4	6.8	0.16	NONE	3.1	6.6	16	11	12	2.66	182	2385	306	25	17.0	11	3	70	15	1
2	6.0	6.7	0.13	NONE	3.9	4.9	12	13	13	1.25	211	2319	294	19	17.6	17	3	66	14	0
3	5.9	6.6	0.21	NONE	3.3	6.6	16	23	10	0.99	182	2021	265	29	17.1	25	3	58	13	1
4	6.0	6.9	0.09	NONE	1.1	2.4	6	20	11	0.68	64	977	117	13	7.1	14	2	69	14	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 to the grower's standard N management and to the UNL N recommendation algorithm. In this study, the grower's N management was also using OptRx sensors on a dry spreader.

Grower Sensor Nitrogen Treatment: The grower initial N rate was 85 lb N/acre applied prior to planting. The grower applied sidedress on June 26, 2016 at V8 growth stage with a dry spreader. Nitrogen rates were determined using crop canopy sensors and the average rate applied was 53 lb N/acre. Total N application was 138 lb N/acre.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 85 lb N/acre was applied prior to planting. Crop canopy sensing and application occurred on June 28, 2016 at the V11 growth stage. Across all Project SENSE treatments, the average N rate applied in-season was 94 lb N/acre. Total N application was 179 lb N/acre.

UNL Algorithm Nitrogen Treatment: The rate was determined using the UNL N Algorithm. The recommended application rate was 180 lb N/acre.

Results:

	Total N rate (lb/ac)	Yield (bu/acre)†	Partial Factor Productivity of N (lb grain/lb N)	lb N/ bu grain	Marginal Net Return‡ ($/ac)
UNL Algorithm N Management	180	203 B	63 B	0.89 A	539.17 B
Grower Sensor N Management	138	209 A*	85 A	0.66 B	576.03 A
Project SENSE N Management	179	210 A	66 B	0.85 A	561.20 A
P-Value	N/A	<0.0001	0.0002	<0.0001	0.004

†Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $3.05/bu corn and $0.45/lb nitrogen fertilizer.
*Values with the same letter are not significantly different at a 95% confidence level.

Summary:
-The Project SENSE N application was 41 lb/acre higher than the grower's N application.
-The UNL N Algorithm rate was very close to the Project SENSE N rate.
-There was no yield difference between Project SENSE N management and the grower's N management.
-The grower's management had higher N use efficiency due to lower N fertilizer rates.
-Both the grower and Project SENSE N management had a higher marginal net return than the UNL algorithm.

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