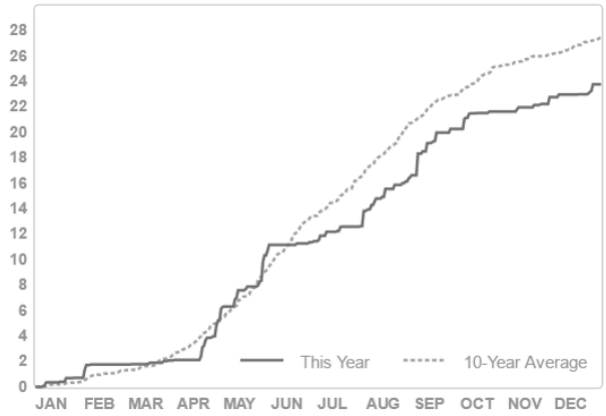
Project SENSE (Sensor-based In-season N Management)

Study ID: 617035201601
County: Clay
Soil Type: Hastings silt loam 0-1% slope; Butler silt loam 0-1% slope; Hastings silty clay loam 7-11% slopes, eroded
Planting Date: 4/24/16
Harvest Date: 10/28/16
Population: 34,000
Row Spacing (in) 30
Hybrid: Channel 217-41DGBT2PRIB
Reps: 6
Previous Crop: Soybean
Tillage: Strip Till - 4/1/16
Herbicides: 4 oz/ac Diflexx™, 20 oz/ac Durango®, 3 qt/ac Lexar® on 5/3/16
Seed Treatment: Acceleron® (Metalaxyl, Clothiandin 250, Trifloxystrobin, Ipconazole)
Foliar Insecticides: None
Foliar Fungicides: 10 oz/ac Headline AMP® on 7/21/16
Fertilizer: 13 gal/ac 30-15-0-5 and 2x2 with planter (approx. 5 lb N/acre) on 4/24/16
Irrigation: Pivot, Total: 6
Rainfall (in):



Soil Sample Results: Soil samples were taken in three 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	6.0	6.9	0.46	NONE	3.4	46	110	12	8	1.15	398	2198	224	30	15.4	9	7	71	12	1
2	6.1	6.9	0.51	NONE	3.1	45.2	108	14	12	0.88	288	2104	195	24	13.9	6	5	76	12	1
3	6.2	6.9	0.46	NONE	3.0	53.5	129	8	9	0.9	316	1968	200	20	13.7	9	6	72	12	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.

Grower Nitrogen Treatment: The grower N was applied prior to and at planting. The average total N applied was 160 lb N/acre.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 100 lb N/acre was applied prior to and at planting. Crop canopy sensing and application occurred on June 30, 2016 at V11 growth stage. Across all Project SENSE treatments, the average N rate applied in-season was 46 lb N/acre. The total N rate was 146 lb N/acre.

Results: Data were analyzed using the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC). Mean separation was performed with Fisher's LSD.

	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)
Grower N Management	160	257 A*	90 B	0.62 A	711.51 A
Project SENSE N Management	146	252 B	97 A	0.58 B	703.94 A
P-Value	N/A	0.0062	0.0003	0.0002	0.056

†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:
-Project SENSE N application was 14 lb N/acre lower than the grower's N application.
-The grower's N management resulted in 5 bu/acre yield increase compared to the Project SENSE N management.
-Project SENSE N management resulted in higher N use efficiency than the grower's N application.
-There was no difference in marginal net return between the two management strategies.

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