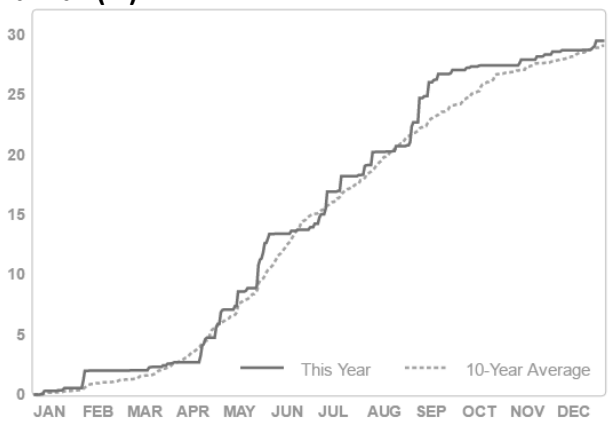
Project SENSE (Sensor-based In-season N Management)

Study ID: 073081201601
County: Hamilton
Soil Type: Hastings silt loam 0-1% slope; Crete silt loam 0-1% slope; Hastings silty clay loam 7-11% slopes, eroded
Planting Date: 5/6/16
Harvest Date: 10/11/16
Population: 33,000
Hybrid: P1105AM
Reps: 6
Previous Crop: Corn
Tillage: Reduced Tillage

Irrigation: Pivot
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
6	5.9	6.7	0.37	NONE	3.0	6.3	15	26	14	1.0	406	2658	589	36	22.0	12	5	60	22	1
14	6.0	6.7	0.21	NONE	3.2	4.3	10	30	10	2.0	473	1698	237	17	14.3	18	8	59	14	1
18	5.9	6.7	0.15	NONE	3.2	2.5	6	53	9	1.5	313	1681	241	21	14.5	22	6	57	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.

Grower Nitrogen Treatment: Starter fertilizer provided 9 lb N/acre. The initial grower N rate was 150 lb N/acre on June 24, 2016 around V8-V9. An additional 60 lb N/acre was applied. Total N applied was 219 lb N/acre.

Project SENSE Nitrogen Treatment: Starter fertilizer provided 9 lb N/acre. For the SENSE treatment strips 150 lb N/acre was applied on June 24, 2016 around V8-V9. Crop canopy sensing and application occurred on July 11, 2016 at V13 growth stage. Across all Project SENSE treatments, the average N rate applied in-season was 30 lb N/acre. The total N rate was 189 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	219	222 A*	57 B	0.99 A	577.44 A
Project SENSE N Management	189	209 B	62 A	0.91 B	551.29 B
P-Value	N/A	<0.0001	<0.0001	<0.0001	<0.0001

†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 30 lb N/acre lower than the grower's N application.
-The grower's N management resulted in a 13 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.
-The grower's N management resulted in $26/acre higher marginal net return than the Project SENSE N management.

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