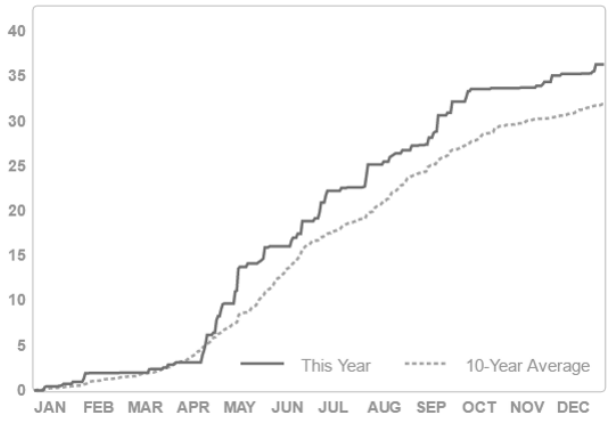
Project SENSE (Sensor-based In-season N Management)

Study ID: 211023201601
County: Butler
Soil Type: Muir silt loam 1-3% slope; Muir silt loam rarely flooded
Planting Date: 4/26/16
Harvest Date: 10/27/16
Population: 34,000
Hybrid: Mycogen 2C799
Reps: 6
Previous Crop: Soybean
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
1	6.9	7.2	0.48	LOW	3.7	14.5	35	22	13	2.31	303	4061	257	14	23.3	0	3	87	9	0
2	6.5	6.8	0.15	NONE	2.4	7.1	17	22	12	2.67	315	1525	153	9	12.1	20	7	62	11	0
3	6.6	7.2	0.15	NONE	2.3	9.8	23	19	12	2.71	218	1546	176	11	9.8	0	6	79	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 to the grower's standard N management.

Grower Nitrogen Treatment: The initial grower N rate was 67 lb N/acre at or prior to planting. A sidedress application of 143 lb N/acre was applied early June 2016 at V5. Total N applied was 210 lb N/acre.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 67 lb N/acre was applied at or prior to planting. Crop canopy sensing and application occurred on June 24, 2016 at V9 growth stage. Across all Project SENSE treatments, the average N rate applied in-season was 107 lb N/acre. The total N rate was 174 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	210	151 A*	40 B	1.39 A	366.43 B
Project SENSE N Management	174	150 A	49 A	1.16 B	380.30 A
P-Value	N/A	0.615	0.001	0.0003	0.042

†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 36 lb N/acre lower than the grower's N application.
-No visual yellowing of Project SENSE treatment strips at the time of in-season application.
-Greensnap on July 13 resulted in approximately 50% snapped plants. Plants were at VT growth stage.
-There was no yield difference between the two management strategies.
-Project SENSE had higher N use efficiency than the grower's management due to reduced N use and similar yields.
-Project SENSE had a $14/acre higher marginal net return due to decreased N use with no yield reduction.

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