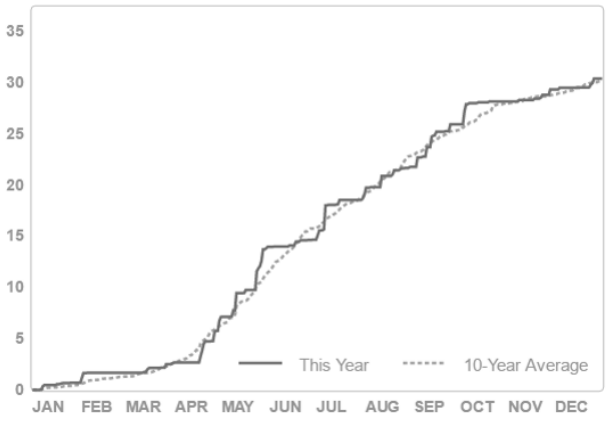
Project SENSE (Sensor-based In-season N Management)

Study ID: 618185201601
County: York
Soil Type: Hastings silt loam 0-1% slope; Fillmore silt loam frequently ponded
Planting Date: 4/22/16
Harvest Date: 10/17/16
Population: 35,000
Hybrid: CRM (days) 108
Reps: 6
Previous Crop: Soybean
Tillage: No-Till

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	6.1	6.5	0.33	NONE	3.4	40.0	96	23	10	0.75	294	1413	204	16	15.0	36	5	47	11	0
2	5.3	6.3	0.31	NONE	3.5	34.8	83	19	11	1.18	445	1679	239	14	18.9	39	6	44	11	0
3	5.7	6.4	0.20	NONE	3.4	11.0	26	16	11	0.87	291	1728	262	20	17.6	34	4	49	12	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 75 lb N/acre on March 14, 2016 as anhydrous ammonia. An additional 131 lb N/acre was applied on June 13, 2016 at V7. Total N applied was 206 lb N/acre.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 75 lb N/acre was applied on March 14, 2016 as anhydrous ammonia. Crop canopy sensing and application occurred on June 27, 2016 at V11 growth stage. Across all Project SENSE treatments, the average N rate applied in-season was 52 lb N/acre. The total N rate was 127 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	206	229 A*	62 B	0.90 A	604.29 B
Project SENSE N Management	127	225 A	99 A	0.57 B	627.80 A
P-Value	N/A	0.059	<0.0001	<0.0001	0.0044

†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 79 lb N/acre lower than the grower's N application.
-There was no yield difference between the two management strategies.
-Project SENSE N management resulted in higher N use efficiency than the grower's N application.
-Project SENSE N management resulted in $24/acre higher marginal net return than the grower's N management due to reduced N application with no yield reduction.

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