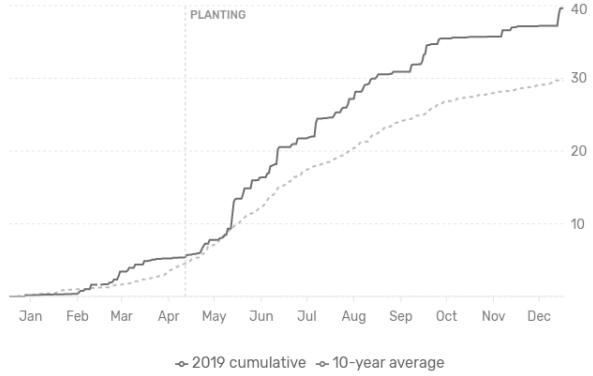
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0918185201901
County: York
Soil Type: Butler silt loam 0-1% slope; Hastings silt loam 0-1% slope; Hastings silt loam 1-3% slope; Fillmore silt loam frequently ponded
Planting Date: 4/26/19
Harvest Date: 10/25/19
Seeding Rate: 34,000
Row Spacing (in): 30
Variety: DEKALB® DKC60-88
Reps: 6
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** Staunch® II, Roundup® ***Post:*** Callisto®, atrazine, Roundup®

Seed Treatment: Acceleron®
Foliar Fungicides: Quilt Xcel®
Irrigation: Pivot
Rainfall (in):



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 with the grower's standard N management.

Grower Nitrogen Treatment: The grower rate was 95 lb N/ac applied as 32% UAN on April 26 and 99 lb N/ac applied as 32% UAN at V8. The total grower N application rate was 194 lb N/ac.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 95 lb N/ac applied as 32% UAN on April 26 to establish the base rate. Crop canopy sensing and application occurred on June 29 at the V12 growth stage. The field received 0.33" of rain on July 5. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 76 lb N/ac. The average total N rate was 171 lb N/ac.

Results:

N Management Strategy	Total N rate (lb/ac)	Yield (bu/ac)†	Partial Factor Productivity of N (lb grain/lb N)	lbs N/bu grain	Marginal Net Return‡ ($/ac)
Grower	194 A*	250 A	72 B	0.78 A	886.92 A
Project SENSE	171 B	243 B	79 A	0.71 B	867.12 B
P-Value	<0.0001	0.002	<0.0001	<0.0001	0.008

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre adjusted to 15.5% moisture.
‡Marginal net return based on $3.83/bu corn and $0.36/lb N.

Summary:

- The Project SENSE N management was 23 lb N/ac lower than the grower's N management.
- Yield for the Project SENSE N management was 7 bu/ac lower than the grower's N management.
- Project SENSE had higher partial factor productivity of N and improved nitrogen use efficiency.
- The yield loss was not offset by the lower N fertilizer costs for the Project SENSE N management; therefore, marginal net return was $19.80/ac lower for the Project SENSE N management.

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