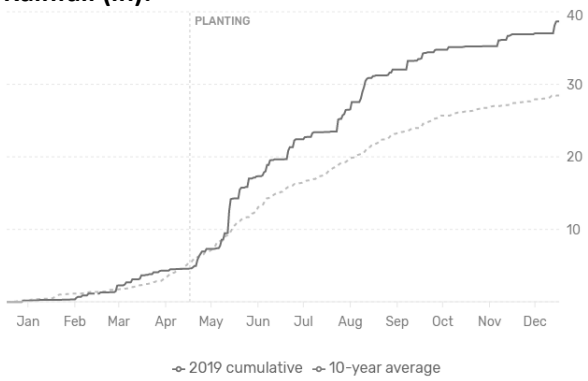
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0935035201901
County: Clay
Soil Type: Butler silt loam 0-1% slope; Crete silt loam 0-1% slope
Planting Date: 5/1/19
Harvest Date: 11/4/19
Seeding Rate: 32,500
Row Spacing (in): 30
Variety: Champion Seed 66A18 SS RIB
Reps: 6
Previous Crop: Corn
Tillage: Strip-Till
Herbicides: ***Post:*** 22 oz/ac glyphosate and 2.5 qt/ac Cadence® ATZ NXT on 5/22/19 to 6/01/19 (delays due to rain); 32 oz/ac Liberty® 280 SL on 6/15/19

Foliar Insecticides: 3 oz/ac Grizzly® Too (chemigation) on 7/22/19
Foliar Fungicides: 14 oz/ac Headline AMP® (chemigation) on 7/22/19
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. A significant hail and wind storm occurred on August 7th causing 30 to 40% defoliation and 4-6% green snap below the ear. Damage was uniform across treatments.

Grower Nitrogen Treatment: The grower rate was 106 lb N/ac applied as 32% UAN with strip-till application, 5.8 lb N/ac applied as 5 gal/ac 10-34-0 in-furrow with planting, and 106 lb N/ac applied as 32% UAN as a sidedress application at the V8 growth stage. The total grower application rate was 218 lb N/ac.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 106 lb N/ac applied as 32% UAN with strip-till application and 5.8 lb N/ac was applied as 5 gal/ac 10-34-0 in-furrow with planting for a total base rate of 112 lb N/ac. Crop canopy sensing and application occurred on June 29 at the V10 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 54 lb N/ac. The average total N rate was 166 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	218 A*	149 A	38 B	1.46 A	492.65 B
Project SENSE	166 B	151 A	51 A	1.10 B	515.44 A
P-Value	<0.0001	0.570	<0.0001	<0.0001	0.024

*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 52 lb N/ac lower than the grower's N management.
- There was no yield difference between the Project SENSE N management and the grower's N management.
- Project SENSE had higher partial factor productivity of N and used 0.36 lb N/ac less to produce a bushel of grain.
- Marginal net return was $22.79/ac greater for the Project SENSE N management than the grower's N management.

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