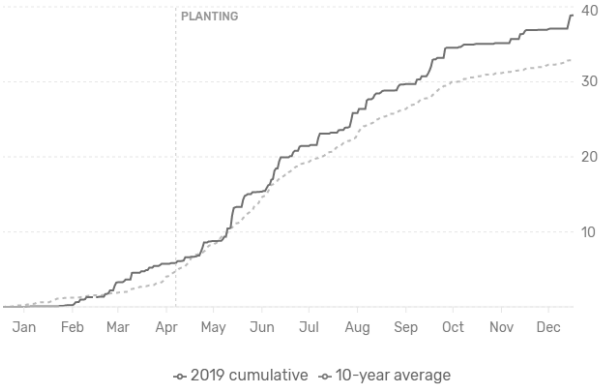
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0621023201901
County: Butler
Soil Type: Brocksburg sandy loam 0-2% slope; Muir silt loam rarely flooded; Thurman fine sandy loam 2-6% slopes; Zook silt loam 0-2% slope
Planting Date: 4/21/19
Harvest Date: 10/27/19
Seeding Rate: 33,000
Row Spacing (in): 30
Variety: Pioneer® P1563
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 2.1 qt/ac Cinch® ATZ and 1 qt/ac 2,4-D ***Post:*** 3 oz/ac Laudis® and 32 oz/ac Roundup®
Seed Treatment: Poncho® 1250 + VOTiVO®
Foliar Fungicides: 8 oz/ac Delaro®

Fertilizer: 158 lb/ac 0-0-60 was applied in February. All other fertilizer applications that contained N are described in the introduction.
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 included 13 lb N/ac applied as 116 lb/ac of 11-52-0 in February, 71 lb N/ac applied as 20 gal/ac of 32% UAN applied on April 21, 21 lb N/ac applied as 100 lb/ac 21-0-0-24 at V6, 110 lb N/ac applied as 31 gal/ac 32% UAN at V6, and 28 lb N/ac applied as 8 gal/ac 32% UAN fertigation. The total grower rate was 243 lb N/ac.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate was 133 lb N/ac and consisted of applications of 13 lb N/ac applied as 116 lb of 11-52-0 in February, 71 lb N/ac applied as 20 gal/ac of 32% UAN applied on April 21, 21 lb N/ac applied as 100 lb/ac 21-0-0-24 at V6, and 28 lb N/ac applied as 8 gal/ac 32% UAN fertigation. Crop canopy sensing and application occurred on July 1, 2019 at the V12 growth stage. The field received 0.3" of rain on July 2, 2019. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 89 lb N/ac. The average total N rate was 222 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	243 A*	242 A	56 B	1.00 A	840.60 A
Project SENSE	222 B	240 A	61 A	0.93 B	840.67 A
P-Value	0.002	0.169	0.009	0.003	0.989

*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 21 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 0.1 lb N/ac less to produce a bushel of grain.
- Marginal net return was not different between the Project SENSE N management and the grower's N management.

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