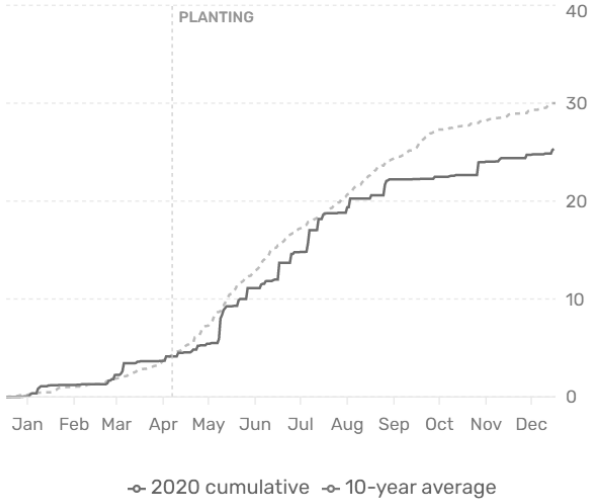
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0811185202001
County: York
Soil Type: Uly silt loam 11-30% slopes; Hastings silt loam 1-3% slope
Planting Date: 4/21/20
Harvest Date: 10/16/20
Seeding Rate: 34,000
Row Spacing (in): 30
Hybrid: Channel® 216-36 DG VT2P RIB
Reps: 6
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 2 qt/ac Lexar®, 22 oz/ac Roundup®, and 8 oz/ac 2,4-D LV on 4/20/20 ***Post:*** 3.50 pt/ac Resicore®, 1 pt/ac atrazine, and 22 oz/ac Roundup® on 6/5/20
Seed Treatment: Acceleron® B-300
Foliar Insecticides: 6.4 oz/ac Brigade® on 7/31/20
Foliar Fungicides: 13.7 oz/ac Trivapro® on 7/31/20

Note: Field had 19% green snap damage from storm on 7/9/20
Irrigation: Pivot, Total: 6.5"
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 205 lb N/ac, applied as 170 lb/ac N as anhydrous ammonia on April 4, 2020, and 35 lb/ac N fertigated.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate (prior to in-season sensing) was established with 40 lb/ac N as anhydrous ammonia on April 4, 2020, and 35 lb/ac N fertigated, for a total base rate of 75 lb/ac N. Crop canopy sensing and application occurred on June 24, 2020, at the V10 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 94 lb N/ac. The average total N rate was 169 lb N/ac.

Results:

	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	205 A*	266 A	73 B	0.77 A	848.27 B
Project SENSE	169 B	269 A	89 A	0.63 B	875.93 A
P-Value	<0.0001	0.298	0.0001	<0.0001	0.057

*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 corrected to 15.5% moisture.
‡Marginal net return based on $3.51/bu corn and $0.41/lb N.

Summary:

- The Project SENSE management N rate was 36 lb/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 better nitrogen use efficiency; Project SENSE N management used 0.15 lb/ac less N to produce a bushel of grain than the grower's method.
- Marginal net return was $27.66/ac greater for the Project SENSE N management than the grower's N management.

Sponsored by: University of Nebraska Lincoln

In Partnership with: Nebraska Corn Board; Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission