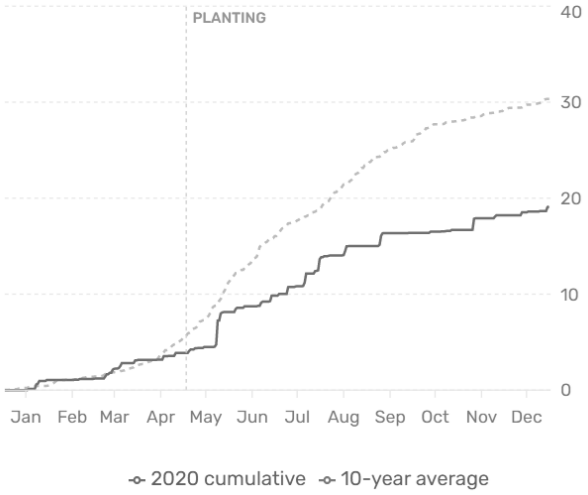
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0715035202001
County: Clay
Soil Type: Crete silt loam 0-1% slope; Fillmore silt loam frequently ponded; Hastings silt loam 1-3% slope
Planting Date: 5/2/20
Harvest Date: 10/23/20
Seeding Rate: 32,000
Row Spacing (in): 30
Hybrid: Channel® 212-48 VT2P RIB Complete
Reps: 6
Previous Crop: Sudangrass
Tillage: Strip-till
Herbicides: ***Pre:*** 2.5 qt/ac Acuron® ***Post:*** 22 oz/ac glyphosate and 16 oz/ac atrazine 4L
Seed Treatment: Poncho® 250
Foliar Insecticides: None
Foliar Fungicides: None

Irrigation: Pivot, Total: 9.1"
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 217 lb N/ac, applied as 30 gal/ac 32% UAN strip-till (contributing 106 lb/ac N), 5 gal/ac 10-34-0 in-furrow (contributing 5 lb/ac N), and 30 gal/ac 32% UAN sidedress at V8 (contributing 106 lb/ac N).

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate (prior to in-season sensing) was established with 30 gal/ac 32% UAN strip-till (contributing 106 lb/ac N) and 5 gal/ac 10-34-0 in-furrow (contributing 5 lb/ac N), for a total base rate of 111 lb/ac N. Crop canopy sensing and application occurred on June 30, 2020, at the V13 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 39 lb N/ac. The field was irrigated following sidedress application. The average total N rate was 150 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	217 A*	215 A	55 B	1.01 A	664.12 B
Project SENSE	150 B	213 A	80 A	0.71 B	686.28 A
P-Value	<0.0001	0.281	0.0001	<0.0001	0.006

*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 67 lb/ac lower than the grower's N management.
- There was no yield difference between the N management approaches evaluated.
- Project SENSE had better nitrogen use efficiency; Project SENSE N management used 0.31 lb/ac less N to produce a bushel of grain than the grower's method.
- Marginal net return was $22.16/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