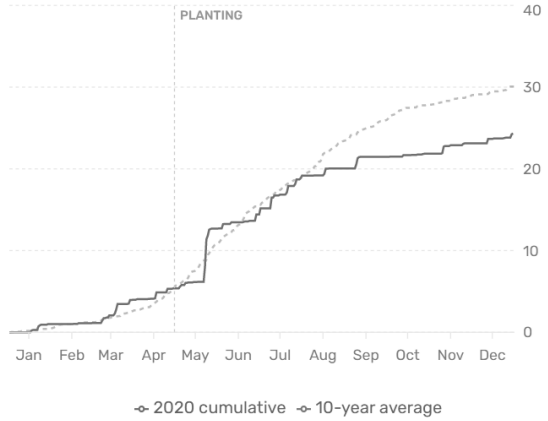
Project SENSE (Sensor-based In-season N Management) on Irrigated Corn

Study ID: 0817081202002
County: Hamilton
Soil Type: Hastings silt loam 0-1% slope; Hastings silty clay loam 3-7% slopes, eroded; Hastings silty clay loam 7-11% slopes, eroded
Planting Date: 4/30/20
Harvest Date: 10/8/20
Seeding Rate: 33,000
Row Spacing (in): 30
Hybrid: Pioneer® P1082AM
Reps: 6
Previous Crop: Soybean
Tillage: Ridge-Till
Herbicides: ***Pre:*** 12 oz/ac Verdict®, 1 qt/ac ATRA-V™ 4L, 32 oz/ac of Abundit® Edge on 4/22/20 ***Post:*** 32 oz/ac Mountaineer®, 1 qt/ac ATRA-V™ 4L, 16 oz/ac Armezon® PRO on 6/11/20

Seed Treatment: Maxim® Quattro, Lumiflex™, Lumiante™, L-2012R, Lumivia™, Lumisure™, Lumialza™
Foliar Insecticides: 5 oz/ac Hero® on 7/18/20
Foliar Fungicides: 10 oz/ac Headline AMP® on 7/18/20
Irrigation: Pivot, Total: 10"
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 210 lb N/ac, applied as 275 lb/ac 11-52-0 (contributing 30 lb/ac N), 5 gal/ac 10-34-0 in-furrow (contributing 5 lb/ac N), 10 gal/ac 32% UAN with pre-emerge herbicide (contributing 35 lb/ac N), and 140 lb/ac N as anhydrous ammonia.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, the base rate (prior to in-season sensing) was established with 275 lb/ac 11-52-0 (contributing 30 lb/ac N), 5 gal/ac 10-34-0 in-furrow (contributing 5 lb/ac N), 10 gal/ac 32% UAN with pre-emerge herbicide (contributing 35 lb/ac N), for a total base rate of 70 lb/ac N. Crop canopy sensing and application occurred on July 1, 2020, at the V12 growth stage. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 80 lb N/ac. The field received 0.3" of rain the following day, July 2, 2020. 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	210 A*	259 A	69 B	0.81 A	823.73 B
Project SENSE	150 B	257 A	96 A	0.59 B	840.37 A
P-Value	<0.0001	0.179	<0.0001	<0.0001	0.026

*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 60 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 0.23 lb/ac less N to produce a bushel of grain than the grower's method.
- Marginal net return was $16.64/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