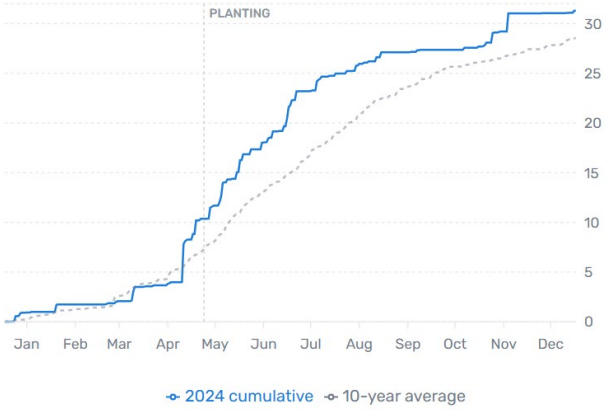
Imagery-Based Nitrogen Fertilization with Sentinel Fertigation N-Time®

Study ID: 0205079202401
County: Hall
Soil Type: Detroit silt loam; Wood River- Silt Creek silt loam
Planting Date: 5/8/24
Harvest Date: 10/15/24
Seeding Rate: 34,000
Row Spacing (in): 30”
Hybrid: Pioneer® P11742Q
Reps: 4
Previous Crop: Corn
Tillage: Strip till
Herbicides: ***Pre:*** Roundup PowerMax®, Fulltime ®, Diflexx ®, AMS ***Post:*** Acuron® GT, FullTime®, Status®, AMS, NIS
Foliar Insecticides: Bifenthrin®, Mustang Maxx®
Foliar Fungicides: Trivapro®
Rainfall (in):

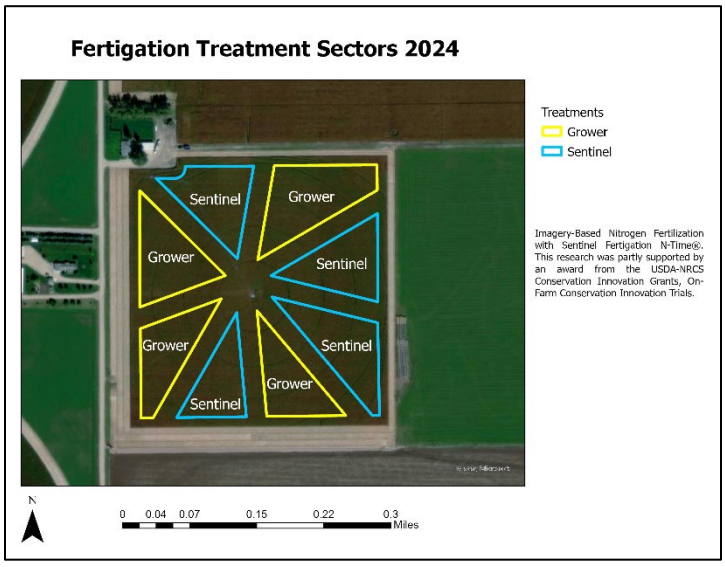


Post Season Soil Samples 0-8” (November 2024):

	pH	OM LOI %	Nitrate–N ppm N	M3–P ppm P	Sulfate–S ppm S	K ppm	Ca ppm	Mg ppm	Na ppm	CEC me/100g
Sentinel	6.4	3.08	17	18	51.7	272	1336	167	37	11.2
Grower	6.3	3.05	22.75	20.25	45.9	333	1435	201	37	11.8

Introduction: Corn nitrogen management may be improved by using sensors or imagery to detect and respond to corn N needs during the growing season. Sentinel Fertigation's N-Time® application analyzes multispectral images to deliver fertigation scheduling recommendations. Indicator blocks (small blocks established during the base N applications) with higher (+60 lb-N/ac) and lower (-30 lb-N/ac) nitrogen rates were applied in the field on 4-4-24 to monitor and determine when fertigation was needed.

If an N application was recommended by N-Time® the N (lb-N/ac) applied via fertigation (typically 30 or 60 lb-N/ac) is noted in the application table below. Note that different Sentinel sectors of the pivot may receive different recommendations throughout the growing season. This study compared the grower's standard N management to the Sentinel Fertigation N-Time® N management, with four paired sectors of each treatment (each sector was about 4 acres, buffered 60 feet internally to reduce sprinkler package overlap between sectors); the field trial layout is shown at right.



Application Table: Nitrogen applied throughout the 2024 growing season is included in the table below. N applications (in lb-N/ac) are noted by date, along with products applied at those instances. Sentinel N-Time® began monitoring and directing N fertigation applications following the 6-21-24 N application, N-Time® directed N applications are shaded in gray to the right of the double vertical lines in the table below.

N was applied using 32% UAN unless otherwise noted. Gray shaded area to the right of the striped line indicates where Sentinel Fertigation N-Time® dictated N rates. The applied values were averaged across all reps; therefore, if only one out of four replications triggered an application of 30 lb N/ac, a value of 7.5 lb N/ac is reported as the average treatment N application across reps.

	4/4	6/21	7/11	7/18	8/6	Total N Applied
Treatment	*lb N/ac applied*					
Grower N Management	60.3[a]	35.5[b]	35.5[b]	35.5[c]	35.5[c]	**202.3**
Sentinel Fertigation N-Time®	60.3 [a]	35.5[b]	29.5[b]	-	-	**125.3**

[a] Product used was Urea/ESN Blend via Strip Till, indicator block establishment

[b] Product used was 32-0-0 UAN via Fertigation

Results:

	Total N rate (lb/ac)	Moisture (%)	Yield (bu/ac)†	Partial Factor Productivity of N (lb grain/lb N)	lbs N/bu grain	Marginal Net Return‡ ($/ac)
Grower N Management	202.3	16.8 A*	251 A	69.5 B	0.806 A	990 A
Sentinel Fertigation N-Time®	125.3	16.9 A	248 A	110.7 A	0.506 B	1,014 A
P-Value	N/A	0.782	0.438	0.0146	0.0012	0.211

*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 were corrected to 15.5% moisture.
‡Marginal net return based on $4.35/bu corn and $0.5 lb/N.

Summary: The Sentinel Fertigation N-Time® management system reduced N applications by 77 lb N/ac during the growing season, which resulted in no significant difference in yield and marginal net return. Sentinel Fertigation N-Time® increased Partial Factor Productivity (PFP) by 59.3% and nitrogen use efficiency (NUE) by 37.2% compared to Grower N Management.

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