

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

Study ID: 0437-107-2024-01

County: Knox

Soil Type: Gibbon silt loam

Planting Date: 5/9/24

Harvest Date: 10/29/24

Seeding Rate: 33,000

Row Spacing (in): 30

Hybrid: DEKALB® DKC59-82

Reps: 2

Previous Crop: Soybeans

Tillage: Strip-Till

Herbicides: **Pre:** 24 oz/ac Roundup® + 8 oz/ac dicamba + 2 qt/ac Fearless Xtra® on 5/13 **Post:** 24 oz/ac Roundup® + 3 oz/ac Status® + 4 oz/ac Callisto® + 8 oz/ac atrazine on 5/30/24

Seed Treatment: None

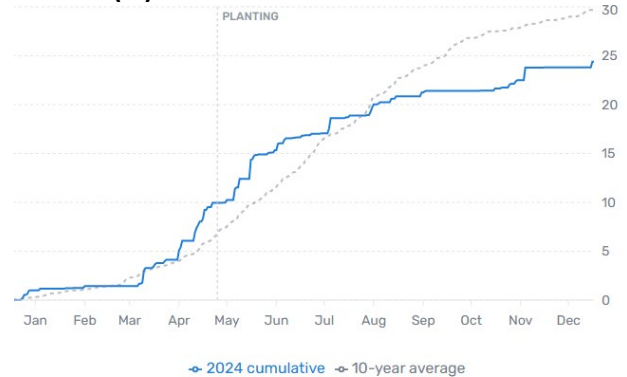
Foliar Insecticides: None

Foliar Fungicides: 13.7 oz/ac Trivapro®

Fertilizer: 142 lb/ac 11-52-0 on 4/23, 15 gal/ac 3-20-0-6.8-0.5 liquid starter on 5/9, 200 lb 40-0-0-6 on 6/11/24

Irrigation: Pivot, Total: 13"; 16.8 ppm Nitrate in well

Rainfall (in):



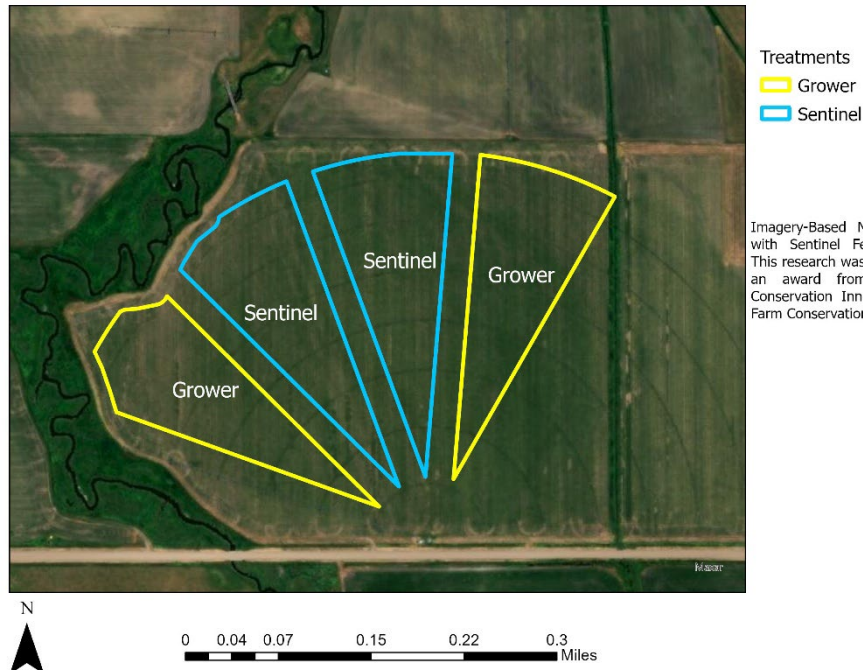
Average Baseline Soil Samples 0-8" (March 2024):

pH	OM LOI %	Nitrate-N ppm N (0-36")	Sulfate-S ppm S	K ppm	Ca ppm	Mg ppm	Na ppm	CEC me/100g
7.2	3.6	4.0	3.4	163.8	2451.7	142.6	20.3	15.0

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 June 12, 2024, 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 two paired sectors of each treatment (each sector was about 5 acres, buffered 60 feet internally to reduce sprinkler package overlap between sectors); the field trial layout is shown below

Fertigation Treatment Sectors 2024



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 July 5, 2024, 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-haded 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 two replications triggered an application of 30 lb N/ac, a value of 15 lb N/ac is reported as the average treatment N application across reps.

	6/12	7/5	7/12	Total N Applied
Treatment	-----lb N/ac applied-----			
Grower N Management	82.95 ^a	-	12.4 ^b	95.4
Sentinel Fertigation N-Time®	76.65 ^a	21.85 ^b		98.5

^a Product used was 40-0-0-6 UAN via indicator block Rx

^b Product used was 28-0-5 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	95.4	12.2	264.5	155.3	0.36	1,103
Sentinel Fertigation N-Time [®]	98.5	11.8	265.6	151.0	0.37	1,106

[†]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:

- Because there were only two replications, no statistics could be run on this study. Therefore no conclusions can be made from the data.
- The Sentinel Fertigation N-Time[®] management system called for 15.3 lb/ac additional N applications during the growing season.

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