

Evaluating Adapt-N In-Season N Management on Irrigated Corn

Study ID: 1121019202301

County: Buffalo

Soil Type: Coly silt loam; Uly silt loam; Hobbs silt loam; Holdrege silt loam

Planting Date: 4/21/23

Harvest Date: 10/31/23-11/1/23

Seeding Rate: 35,000 seeds/acre

Row Spacing (in): 30

Hybrid: Channel® 213-19 VT2PRIB

Reps: 12

Previous Crop: Corn

Tillage: Strip-till

Herbicides: *Pre:* 2 qt/ac Fultime®, 3 oz/ac

Explorer®, 1 pt/ac MSO, and 8.5 lb AMS/100 gal

Post: 2 qt/ac Degree Xtra®, 3 oz/ac mesotrione, 1% COC, and 1% UAN

Seed Treatment: Standard Channel® seed treatments

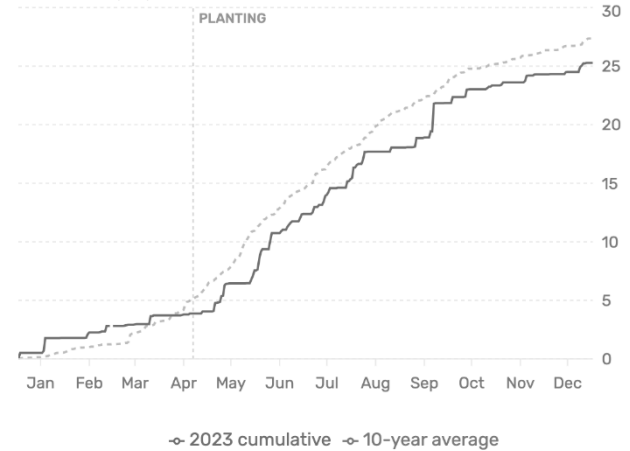
Foliar Insecticides: None

Foliar Fungicides: 10 oz/ac propaz chemigated at R1

Note: Late July and mid-August wind events resulted in leaning plants

Irrigation: Pivot

Rainfall (in):



Soil Samples 0-6" (Nitrate: 4/20/2023)

pH	BpH	OM LOI %	Melich III P - ppm	Nitrate – N ppm N	Sulfate-S ppm S	-----Melich III----- K	Ca	Mg	Na	CEC me/100g	Sand (%)	Silt (%)	Clay (%)
6.6	7.2	4.6	152	27.6	3.5	593	2008	262	14	13.8	34	47	19
6.9	7.2	3.4	80	18.4	2.2	547	2132	324	14	14.8	30	47	23
7.1	7.2	3.8	69	15.6	2.7	479	2320	355	17	15.9	30	49	21
6.9	7.2	4.1	39	7.7	2.1	502	2030	288	18	13.9	34	45	21

Introduction: Nitrogen fertilizer is a significant input in corn systems. Additionally, N losses through leaching, volatilization, and denitrification pose environmental concerns and reduce profit. There are several digital agriculture tools available to provide site-specific, variable-rate, in-season N recommendations. This study used Adapt-N from Yara International, a crop model-based N tool for in-season N application and compared it to the grower's typical N management. The whole field received:

- 1) 7.5 gal/ac 10-34-0, 0.5 gal/ac zinc, 9 gal/ac 28% UAN, 3 gal/ac S applied at strip-till (35 lb N/ac)
- 2) 4 gal/ac 10-34-0 in-furrow and 12 gal/ac 28% UAN dribbled at planting (40 lb N/ac)
- 3) 14 gal/ac 32% UAN fertigated 7/10/23 (50 lb N/ac).

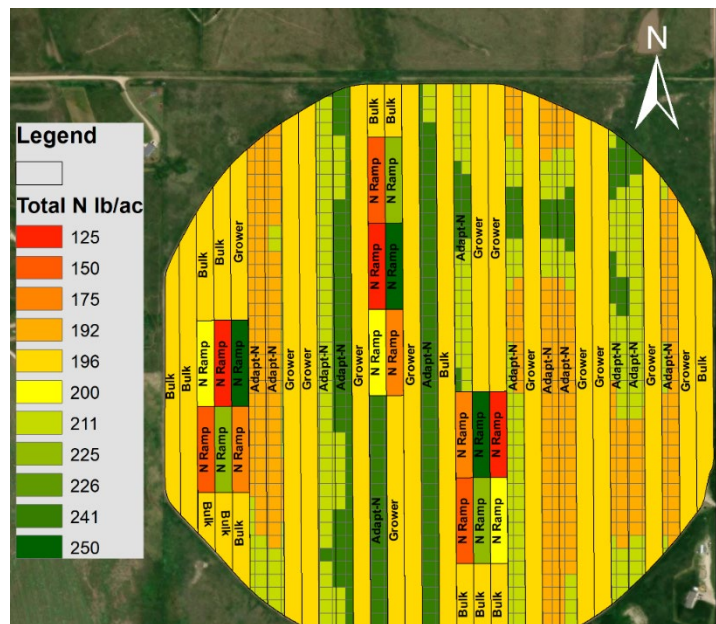


Figure 1. Sidedress prescription with total N target values.

On May 27, 32% UAN was injected via a coulter rig. The grower's rate was 70 lb N/ac and the Adapt-N variable-rate averaged 87 lb N/ac. Nitrogen rate blocks were established at rates ranging from 125-250 lb/ac for use in determining the economically optimum N rate.

Results:

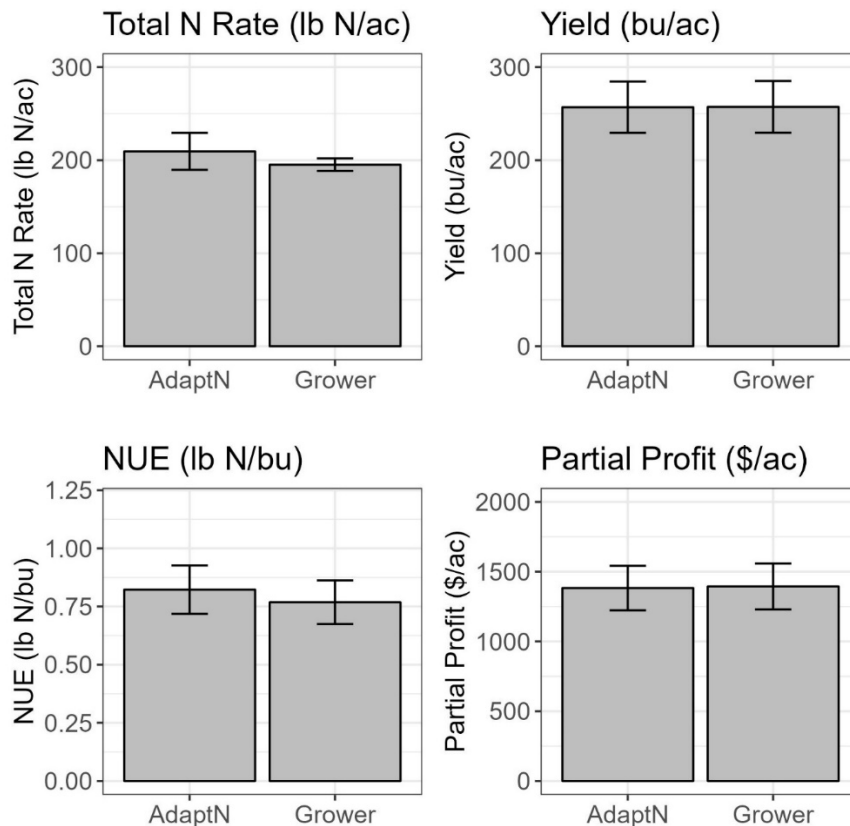


Figure 2. Total N rate, yield, nitrogen use efficiency (NUE), and partial profit for Adapt-N model and the grower's traditional management.

	Total N rate (lb/ac)	Yield (bu/ac)†	Nitrogen Efficiency (lb N/bu grain)	Marginal Net Return‡ (\$/ac)
Grower N Management	195 B	257 A	0.762 B	1,390 A
Adapt-N Management	212 A*	258 A	0.823 A	1,385 A
P-Value	0.006	0.437	0.007	0.538

*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 \$5.91/bu corn and \$0.65 lb/N.

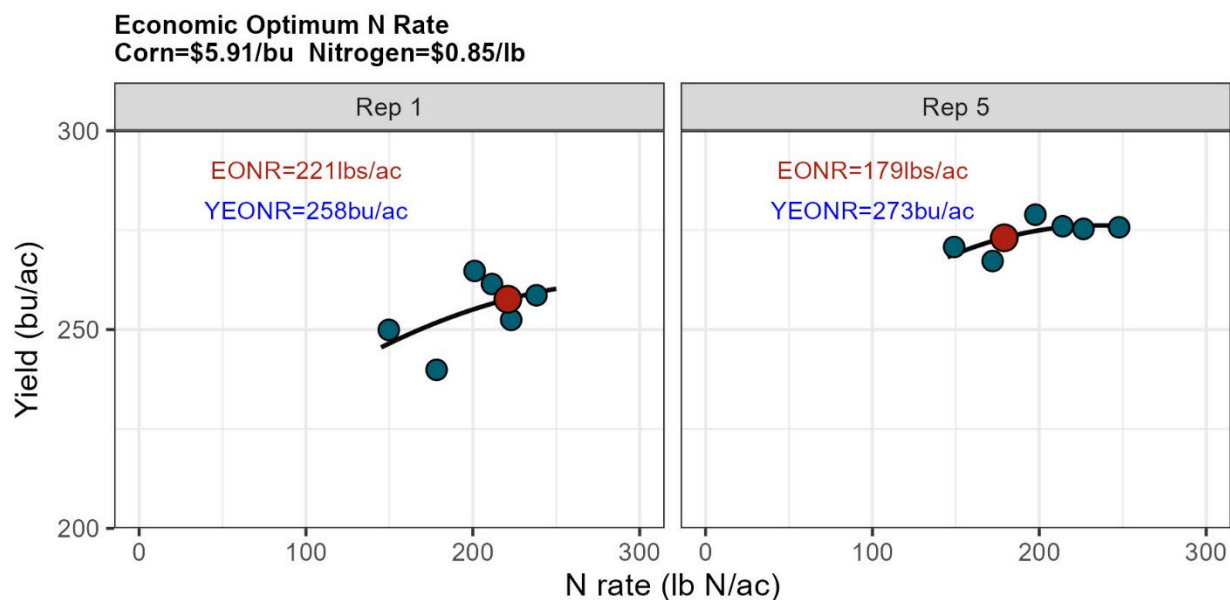


Figure 3. Economical optimum nitrogen rate (EONR) and yield at EONR (YEONR) calculated using \$5.91/bu and \$0.65/lb N.

Summary:

- The total N rate for the grower's traditional management was 17 lb/ac lower than the Adapt-N management. The higher N rate for the Adapt-N management did not result in a yield increase.
- There was no difference in marginal net return between the grower's traditional management and the Adapt-N management.
- Economically optimum N rate for two replications ranged from 179 to 221, showing potential for variable-rate N management in this field.

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