

Data Intensive Farm Management: Nitrogen Application Rates on Corn

Study ID: 0817081201801

County: Hamilton

Soil Type: Hastings silt loam 0-1% slope; Crete silt loam 0-1% slope; Fillmore silt loam 0-1% slope

Planting Date: 4/27/18

Harvest Date: 11/1/18

Population: 34,000

Row Spacing (in): 30

Hybrid: Pioneer® P1306 WHR

Reps: 21

Previous Crop: Soybean

Tillage: Ridge-Till

Irrigation: Pivot, Total: 5.5", 9.2 ppm N in irrigation water results in 11 lb N/ac (based on 2015 water test)

Rainfall (in):



Introduction: This project is part of the Data Intensive Farm Management project, a multi-university collaboration led by the University of Illinois at Urbana Champaign. The goal of these research studies is to utilize precision agriculture technology for conducting on-farm research. This study tested four nitrogen rates. Treatments were randomized and replicated in 60' wide by 280' long blocks across the entire field. Variable-rate prescription maps for the nitrogen study were developed and uploaded to the in-cab monitor. Geospatial yield monitor data were collected at the end of the growing season and post-processed to remove errors with Yield Editor Software from the USDA.

A total of 33 lb N/ac was applied to the whole field (250 lb/ac of 11-52-0 and 5 gal/ac of 10-34-0 at planting). The N treatments were established with an anhydrous ammonia application on March 30. Rates of 0, 110, 150, 190, and 220 lb N/ac were applied to equal the total treatment rates of 33, 143, 183, 223, and 253 lb N/ac respectively.

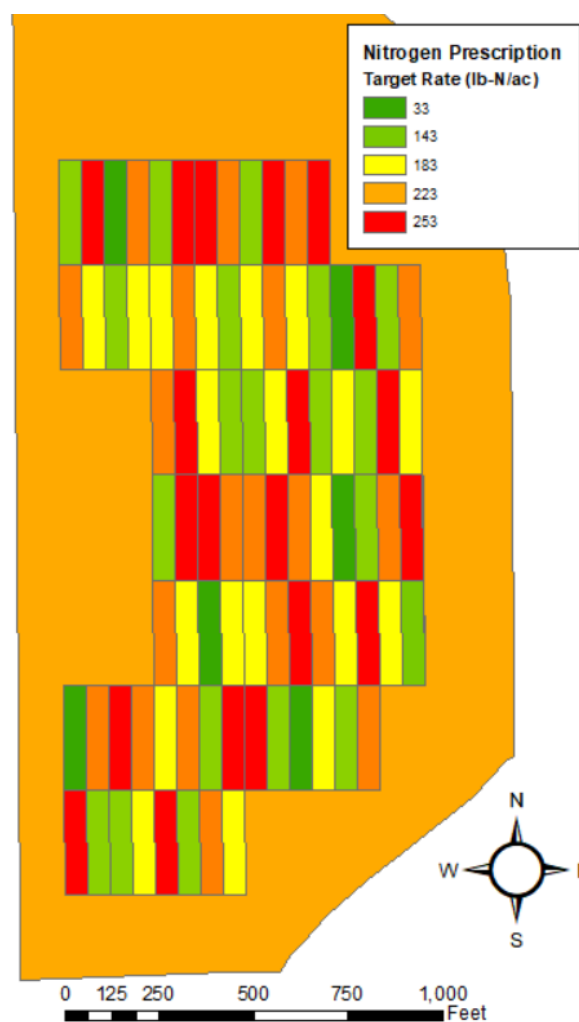


Figure 1. Nitrogen prescription map (total lb N/ac).

Results:

	Moisture (%)	Yield† (bu/ac)	Marginal Net Return‡ (\$/ac)
33 lb N/ac	14.7 B*	240 D	763.01 C
143 lb N/ac	15.1 A	279 C	850.90 A
183 lb N/ac	15.1 A	282 BC	845.66 A
223 lb N/ac	15.2 A	285 A	843.11 A
253 lb N/ac	15.2 A	284 AB	828.50 B
P-Value	<0.0001	<0.0001	<0.0001

*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 adjusted to 15.5% moisture.

‡Marginal net return based on \$3.23/bu corn and \$0.35/lb N.

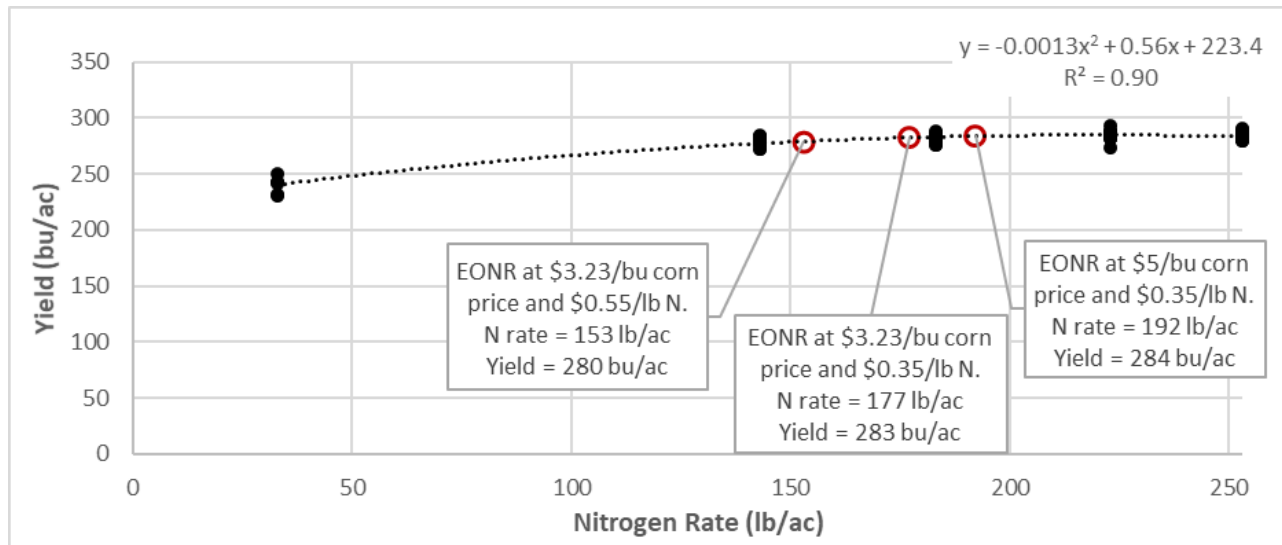


Figure 2. Yield versus nitrogen rate with economic optimum nitrogen rates (EONR) indicated.

Summary: At a corn price of \$3.23/bu and N price of \$0.35/lb (prices used in this year’s report) the EONR was 177 lb/ac. This resulted in a yield of 283 bu/ac.

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