

## Corn Nitrogen Rate

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### Objective

To determine the response of corn yield to varying nitrogen rates.

### Background

Table 1. Plot background summary.

	Plot A	Plot B
Crop Year:	2018	2018
Location:	Freedom Farms	Leaders Farms
County/Town:	Henry/Freedom	Henry/Monroe
Primary Soil Type:	Hoytville Clay	Hoytville Clay Loam
Drainage:	Systematic Tile	Systematic Tile
Previous Crop:	Wheat	Soybeans followed by Cover Crop Cereal Rye
Tillage:	No-Till	Strip Tilled
Planting Date:	5-26-2018	5-23-2018
Seeding Rate:	34,400 seeds/acre	32,000 seeds/acre
Harvest Date:	11-8-2018	10-23-2018

### Methods

This experiment utilized a randomized complete block design with four replications. Plot widths were 30 feet. Plot lengths were 1,945 ft. and 1140 ft. long for Plots A and B, respectively. Calibrated yield monitor data was utilized for collection of harvest data. Treatments consisted of the average total N applied by the cooperators, with two +/- 40 lb. deviations from that average (Table 2). The combine was calibrated in-season. Stand counts were taken at V5. Return to nitrogen value was calculated with the cost of a pound of N at \$.40 with the value of a bushel of corn at \$3.50.

### Results

Corn yield data adjusted to 15% moisture for both plots showed a significant response to nitrogen rate ( $P < 0.1$ ). The treatment with the greatest economic return over N varied between the two plots. For Plot A, 160 lbs. of N netted the greatest return above N, whereas in Plot B the greatest return was at 250 lbs. of total applied N.



Table 2. Trial results.

	Treatment (Total lbs N/Ac)	Yield (Bu/Ac)	Return Above N (\$/acre)
Plot A	120	98 <sub>c</sub>	291
	160	107 <sub>b</sub>	307
	200	109 <sub>b</sub>	298
	240	113 <sub>a</sub>	296
	280	111 <sub>ab</sub>	273
	LSD: 3.97 CV: 2.93%		
Plot B	130	181 <sub>d</sub>	582
	170	199 <sub>c</sub>	629
	210	204 <sub>b</sub>	630
	250	209 <sub>a</sub>	632
	290	208 <sub>a</sub>	612
	LSD: 2.48 CV: 0.98%		

### Summary

Corn yield showed a significant response to nitrogen rate. This data supports that nitrogen availability and growing conditions can vary within a county. For this study, it is important to note that weather and rainfall play an important role in corn yield as well. Plot A experienced drought-like soil conditions leading up to and during pollination, while Plot B received timely rainfall. Furthermore, Plot A experienced significant lodging across all treatments. In order to optimize economic returns from nitrogen applications, growers should utilize available in-season nutrient application decision aids and tools.

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