

# Corn Nitrogen Rate Trial

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## Objectives

The objective of this study was to evaluate the effect on yield of various rates of nitrogen applied to field corn. Farm Focus was one of a number of farms in Ohio that participated in this study. This report summarizes the results from the Farm Focus site only.

## Background

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Soil Type:	Hoytville clay, Hoytville silty clay loam	Herbicide:	POST(May 29): 14 oz/A Steadfast ATZ + 3 oz/A Callisto + 2 lb/A AMS + 1% v/v Crop Oil Concentrate
Drainage:	Tile- nonsystematic	Variety:	Croplan Genetics 731CL
Previous Crop:	Soybeans	Row width:	30 inch
Tillage:	fall disc/ripper; spring field cultivate(2x)	Planting Rate:	31,200 seeds/A
Soil Test (2005):	pH 6.4, P 39 ppm, K 201 ppm	Planting Date:	April 29, 2006
Fertilizer:	95 lb/A 23-16-16 2x2 banded at time of planting; Nitrogen- See Methods	Harvest Date:	November 1, 2006

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## Methods

This study was set up with four different nitrogen rates replicated four times in a randomized block design. The first replication also had one plot with no nitrogen applied to serve as a baseline untreated check plot. The total nitrogen applied for each treatment was as follows:

- 1) 50 pounds of nitrogen per acre
- 2) 100 pounds of nitrogen per acre
- 3) 150 pounds of nitrogen per acre
- 4) 200 pounds of nitrogen per acre

All treatments (with the exception of the 0 pounds nitrogen plot in the first replication) had 22 pounds of nitrogen applied in the starter fertilizer 2 inches over and 2 inches below the seed at planting. The balance of the nitrogen required to meet the total nitrogen applied for the different treatments was sidedressed on June 6 as 28% UAN at corn growth stage V4.

Plot size was 30 feet (12 rows) by 1,090 feet long. Harvest populations (November 1) were estimated by counting the number of plants on each side of a 17.5 foot section at three different locations in each plot. The average number of plants counted per 17.5 feet was converted to plants per acre. The center 6 rows of each plot were harvested with a combine equipped with a calibrated AgLeader PF 3000 yield monitor. Grain weights were measured with a weigh wagon. Grain moistures were taken from the combine yield monitor. Yields were adjusted to a 15% moisture standard.

## Results

Table 1. Corn harvest population, moisture, and yield means for each treatment<sup>1</sup>.

Treatment	Harvest Population (plants/A)	Moisture (%)	Yield (bu/A)
200 lb. nitrogen/acre	27,700	19.1	163.0
150 lb. nitrogen/acre	28,500	18.6	142.0
100 lb. nitrogen/acre	28,100	18.3	122.3
50 lb. nitrogen/acre	27,800	17.5	73.6
LSD (P=0.05)	NS	0.4	17.2
F-test	<1	38.6	76.1
CV (%)	3.1	1.5	10.3

<sup>1</sup>Means followed by the same letter in the same column are not significantly different.

NS= not significant

<sup>2</sup>0 lb. nitrogen/acre baseline check plot results were: yield= 19.8 bu/A, grain moisture= 17.8%, harvest population= 29,000 plants/A

## Summary

The results from this one year nitrogen study at Farm Focus indicate there was a significant difference in yields and moistures between the treatments. In season nitrogen costs for 28% UAN were \$225/ton which equates to \$0.40 for each additional pound of nitrogen used. Based on the yields in this study, the cost of additional nitrogen was more than offset by the bushels of corn gained for each additional 50 pounds of nitrogen added.

The yields in this study field were lower than expected across all the treatments based on the amounts of nitrogen supplied. There are a couple of possible explanations for this. The field had significant corn rootworm larvae feeding on the root systems of all the plots. Corn root lodging was evident across the entire field at the time of harvest (corn hybrid used in this study was non-transgenic and had no insecticide applied). This feeding damage is likely one of the causes for lower than expected yields for all the plots. The other likely contributor to lower than expected yields was nitrogen loss from denitrification caused by several heavy rainfall events during the growing season.

## Acknowledgement

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