

Nitrogen Rate Effect on Corn Yield

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Objective

To evaluate the effect of nitrogen rates on yield of corn.

Background

Cooperator:	Jim Eckel	Soil test:	OM-3.4%, CEC-16.2,P-90 ppm, K-372, pH- 6.8
County:	Wood	Fertilizer:	N rates below, all 28% solution
Nearest Town:	Perrysburg	Planting Date:	April 22,2006
Drainage:	Tile, well-drained	Planting Rate:	34,000 seed/acre
Soil type:	Hoytville clay loam	Row Width:	30-inch
Tillage:	conventional	Herbicides:	AAtrex, 2,4-D
Previous Crop:	wheat	Harvest Date:	9-22-06
Variety:	Pioneer 36K69		

Methods

The entries were randomly replicated 4 times , plot size was 90 x 500 feet each entry. This plot compared 5 different nitrogen rates and application. After corn planting but before emergence (May 1) , a broadcast application of liquid 28% nitrogen was applied at the following rates: 51 lb/ac actual nitrogen, 102 lb/ac, 153 lb/ac, and 204 lb/ac. The final comparison had 51 lb/ac nitrogen surface applied on May 1 followed by a sidedress surface application on June 7 with drop nozzles of 147 lb/ac nitrogen for a total of 198 lb/ac nitrogen. Soil nitrate and ammonium samples were collected at 12 inch depth on June 14, 2006. Harvest data was collected from 8 rows. Rainfall April 22 to May 31, 2006 = 7.25 in., June = 5.45 in., July = 6.0 in., August = 3.5 in. for total growing season rainfall = 22.2 inches.

Results

Nitrogen application Surface apply 28%	Corn Yield Bu/ac	Soil Nitrate NO ³ ppm	Ammonium NH ₄ ppm	\$ Value corn – cost N/ac
51 lb pre	111.6 A	15 A	15 A	\$ 426.00
102 lb pre	117.2 A	21 AB	14 A	\$ 428.00
153 lb pre	160.0 B	24 AB	15 A	\$ 578.80
204 lb pre	188.5 C	28 B	17 A	\$ 672.40
198 lb pre + sidedress	182.7 C	73 C	59 B	\$ 649.20
LSD (0.05)	15.8	10.0	8.0	

Value corn = \$4.00 / bu, cost of N = \$.40 / lb.

Supplying more nitrogen resulted in increased corn yield in this comparison. Application of sidedress Nitrogen did not result in more corn yield when compared to the same rate applied pre-emerge. The most economical return was the highest nitrogen application rate of 204 lb/ac. Use of a sprayer to apply nitrogen to corn pre-emergence may be a viable solution to quickly applying nutrients over large acreages. The amount of surface residue and type of soil tillage performed may also have an impact on the availability of broadcast applied nitrogen.

For additional information, contact:

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