

Nitrogen Response in Corn Study

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Objective

To determine the effects of nitrogen rates on corn yields and provide data for nitrogen response curves.

Background

Crop Year: 2015	Soil Test: pH 6.6, P 23 ppm M III, K 141 ppm
Location: Allen Township	Planting Date: May 8, 2015
County/Town: Darke/Bradford	Nitrogen: Varied
Soil Type: Celina Silt Loam	Seeding Rate: 33,000
Drainage: Not patterned	Harvest Date: October 2, 2015
Previous Crop: Soybeans	Rainfall: 23.28 in. - 4/15-10/2
Tillage: No-Till	

Methods

Five nitrogen rates were replicated three times in a randomized complete block design. Treatments were planted with a 12 row Kinze planter. All treatments received the same tillage and herbicide applications. Seed used was Dekalb 6067. Planting included a 2x2 application of 28% at a rate of 40 pounds of actual N. The other treatments were side-dressed with the appropriate rates of 28% to reach the treatment levels outlined below. Stand counts were taken at V6 by obtaining 2 counts per treatment and calculating the simple average. Plots were harvested with a commercial combine equipped with a 6 row corn head. Yields and moistures were obtained by using a calibrated yield monitor. Yields were verified using a grain cart. Yields were adjusted to 15.5% moisture. Precipitation data was obtained from cocorahs.org and recorded daily.

Treatments

1. Starter Fertilizer N (Solvita on REP 3) – 40 lbs N/ A *
2. Farmer-Applied Typical Rate – 200 lbs N/A
3. Tri-State Fertility Guide – 185 lbs N/A
4. Ohio State Economic Model - \$.57 N and \$3.45 corn = 147 lbs N/A (Solvita rep 1 and 2) *
5. GreenSeeker – 115 lbs N/A **

* A Solvita soil analysis was done for a side dress nitrogen recommendation for each replication. The recommendation for each replication was:

- Replication 1 – 147 lbs N/A
- Replication 2 – 147 lbs N/A
- Replication 3 – no additional N



** A GreenSeeker (chlorophyll reader) was used to get an average reading across all treatments at V8 compared to a nutrient rich strip outside the plot to make the treatment 5 recommendation.

Results

Treatment #	Nitrogen Treatment (# Actual N)	Wet Moisture %	Treatment Average Yield (Bu.)	Return over N \$ of each increment treatment of N **
1	40	18.0	108.7	
5	115	17.5	174.2	\$ 216.84
4	150	17.4	205.8	\$ 85.10
3	185	17.5	201.1	-\$58.17
2	200	17.6	206.1	-\$19.65

LSD = 12.08 (p.0.00); CV 3.57; Significant Difference in yield.

**(Increased Yield over previous treatment of N X \$3.95) – Cost of additional N

Summary

Corn yield was influenced by nitrogen rates. There was significant difference in yield of the corn as affected by the rate of nitrogen. Moisture levels at harvest increased as rates of nitrogen increased except for the starter only treatment. An economic comparison between the nitrogen rates revealed a return on additional nitrogen up to 150 pounds per acre. Assumptions were nitrogen cost of \$.56 per pound and corn at \$3.95 per bushel.

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