

Corn Yield Response to Nitrogen Rates

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Objective

To determine the response of corn yield to nitrogen rates

Background

Crop Year:	2017	Soil Test:	pH 6.8, P 21 ppm BP1, K 152 ppm, OM 2.23
Location:	Defiance, Ohio		CEC 15.6
County:	Defiance County	Planting Date:	May 18, 2017
Soil Type:	Paulding/Roselms Clay	Nitrogen:	Various rates
Drainage:	Surface & Random Subsurface	Seeding Rate:	32,000 seeds/A
Previous Crop:	Soybean	Harvest Date:	November 11, 2017
Tillage:	No till		

Methods

A nitrogen rate trial was established having five nitrogen rates with four replications in a randomized complete block design. Plots were 12 rows wide with 30 inch spacing and a field length of 660 feet. No nitrogen was applied through the planter or with pre-emergent herbicide. All nitrogen was applied at sidedress on June 20 at corn growth stage V5. The nitrogen source was 28% liquid urea ammonium nitrate (UAN) solution at rates of 0, 33, 50, 67 and 83 gallons per acre. End of season stalk nitrate samples were collect and shipped to the lab on October 2, 2017. Plots were harvested with a commercial combine with the yield record taken from the center 8 rows and the full length of each plot. Yield was determined by a calibrated yield monitor with yield adjusted to 15.5% moisture. Data were analyzed using the ANOVA procedure and means separated using LSD at $\alpha=0.05$.

Results

Nitrogen rate (pounds/acre)	End of Season Stalk Nitrate Test (Nitrate-N ppm)	Yield (bu/acre)
0	35.3 B	14.9 D
100	36.0 B	89.4 C
150	57.8 B	110.9 B
200	87.5 B	132.3 A
250	536.8 A	136.4 A
		LSD (0.05)
		17.5
		C.V. = 11.7



Summary

Crop development prior to the sidedress application treatments of nitrogen provided uniform corn stand and stage across plots. Corn yields responded to nitrogen rates for treatments 0 to 200 pounds per acre. Corn yields were not significantly different for treatments having 200 and 250 pounds of nitrogen per acre. End of season stalk nitrate test results less than 450 ppm Nitrate-N indicate a high probability that nitrogen is deficient while results from 450 to 2000 ppm Nitrate-N indicate that yields are not limited by nitrogen. Nitrate-N in stalk nitrate test greater than 2000 ppm indicates uptake exceeds requirements. Rainfall was recorded on June 23 (1.0 inch) and June 30 (1.98 inch). Rainfall was limited during the remainder of the season, but not recorded.

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