

Comparing Sources, Rates, and Crop Rotation Effects on Corn Yield Response to Nitrogen on Lakebed Soils

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Objectives

To observe yield response when 28% UAN and 82% anhydrous ammonia are supplied at different rates on lakebed soils. Observe yield response to corn-corn and soybeancorn rotations.

Background

Cooperator:	Hoytville Branch, OARDC	Fertilizer:	See Treatments
County:	Wood	Planting Date:	June 1, 2002
Nearest Town:	Hoytville	Planting Rate:	30,000 seeds/A
Drainage:	Tiled	Row Width:	30-inch
Soil type:	Hoytville clay	Herbicides:	
Tillage:	Conventional till	Soybean-Corn:	Degree Extra 3qt A, Atrazine 1 pt/A, Sterling 6oz/A, Crop oil 9.6 oz/A
Previous Crop:	See treatments	Corn-Corn:	2,4-D Ester 1pt/A, Harness 2.75 pt/A, Princep 1qt/A, Roundup 32 oz/A, POST application-Accent 14g/A
Variety:	Pioneer 34B24		
Soil test:	Soybean-Corn: pH 6.5, P 87 ppm, K 370 ppm		
	Corn-Corn: pH 6.5, P 95 ppm, 379 ppm		
		Harvest Date:	October 31, 2001

Methods

This is the fifth-year result of a multi-year nitrogen study on corn at OARDC, Hoytville. Starter nitrogen at the rate of 40 lbs. actual nitrogen per acre was applied in a 2 x 2 placement to all plots. Plot design was a randomized split block design with four replications. Main plots were the rates of nitrogen applied. Subplots were the two sources of sidedress nitrogen. Each subplot consisted of four rows 70 feet long in which the center two were harvested for grain yield.

At V5-V6 stage of corn growth, 28% urea ammonium nitrate (UAN) and 82% anhydrous ammonia was applied at 0, 20, 80, 140, and 200 pounds of N per acre to make a total nitrogen application of 40, 60, 120, 180, and 240 pounds of actual N per acre. The 28% UAN was applied with a solid stream injector behind a no-till coultter.

In 2000, a second series of plots following corn were added to the experiment to separate out the nitrogen contribution from soybeans as a previous crop. This is the second year of this addition.

Results

Table 1. 2001 Corn Yields Resulting from Nitrogen Rates by Crop Rotation.

Total Nitrogen Rate (lbs/A)	Soybeans-Corn Yield (bu/A)	Corn-Corn Yield (bu/A)
40	81.2	82.8
60	82.7	89.9
120	95.9	86
180	87.7	92.8
240	87.7	96.8
LSD (0.05)	NS	NS
F test	1.2	1.3

Table 2. Comparison in Yield from the Two Sources of Nitrogen by Crop Rotation.

Source	Soybeans-Corn Yield (bu/A)	Corn-Corn Yield (bu/A)
Anhydrous Ammonia	86.4	91.9
28% UAN	87.6	87.4
LSD (0.05)	NS	NS
F test	3.6	1.9

Summary

The drought of 2002 had a significant impact on the nitrogen plot and overshadowed any treatment effects of the nitrogen. The four-year yield average on these plots was 173 bushels for 1998-2001. The average yield this year is 87 bu/ A. Stalk nitrogen tests were taken on two replications, and the results showed very little residual N in the base of the stalk. The harvest height of the corn was less than four feet. In addition to the drought, the planting date of June 1 is a month later than normal due to wet soil conditions that occurred up to that time.

No significant differences in yield were noted with the two sources of nitrogen fertilizer in the soybean-corn plot or the corn-corn in 2002. There was no significant interaction effect for nitrogen source by nitrogen rate for either rotation.

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