Comparison of Swine Manure and UAN as Nitrogen Sources at Side-dress for Corn Yield

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Objective

To compare corn yield response to nitrogen applied at side-dress as incorporated swine finishing manure and incorporated UAN 28%.

Background

Crop Year:	2013	Soil test:	pH 6.2 P 85 ppm (170 lb/ac)
Cooperator:	Tom Harrod		K 184 ppm (368 lb/ac)
County:	Darke	Organic Mater	3.2%
Nearest Town:	Ansonia	Planting Date:	May 3, 2013
Drainage:	Tile-40 feet spacing	Row Width:	30 inch
Soil type:	Blount-Pewamo	Herbicide:	Surestart 1 qt/ac
Tillage:	No-till	Insecticide:	N/A
Previous Crop:	Soybeans	Harvest Date:	October 11, 2013

Methods

A randomized block design with two treatments and four replications was used. Plots were 16 rows (40 feet) wide and 1,150 feet long. Liquid swine manure from a finishing building was applied via incorporation using a 6,200 gallon Jamesway tanker equipped with a Dietrich toolbar. The Dietrich toolbar incorporated the swine manure at a depth of five inches using shanks with eight inch sweeps. There was damage to the corn stand in the manure treatments due to operator application error. Portions of the rows were plowed out by the manure toolbar.

The swine manure and 28% UAN were applied on the same day while the corn was in the just spiking through the soil surface. Field conditions were slightly wet at the time of application.

The 28% UAN application rate was 150 units of nitrogen per acre. All swine manure replications received 5,000 gallons per acre. Manure samples indicated 40.5 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 202 pounds of nitrogen, 107 lb./ac P_2O_5 and 133 lb./ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	40.5
Phosphorus as P2O5	21.5
Potassium as K2O	26.7

Weather conditions during the time of manure application were sunny with an ambient air temperature of 75 degrees. The plot received above average rainfall for the growing season.

Table 1Treatment Summary

Treatment	Description
Treatment 1 (T1)	57 gal/ac UAN 28%, 171#/ac of N
Treatment 2 (T2)	5,000 gal/ac incorporated liquid swine manure, 202#/ac of N

Results and Discussion

Table 2 Yield Summary

Treatments	Yield (bu/ac)
28% UAN (T1)	198.3
Incorporated manure (T2)	184.8
	LSD (0.05)

The results of this plot indicated a statistically significant difference between the treatments (LSD (0.05) = 15.72, C.V=4.66). The manure treatments received higher nitrogen amounts than the commercial fertilizer treatments and this likely accounted for the higher yields. The difference was likely due to damage to the corn stand during the manure application.

The 28% UAN cost $0.62 per pound or $93 per acre plus the cost of application. The manure was available from the farmer's swine finisher building at no cost. The manure application cost, using the Minnesota Manure Distribution Cost Analyzer spreadsheet was calculated at $20 per 1,000 gallons or $.02 per gallon. The cost of applying 5,000 gallons per acre as side-dress nitrogen was $100 per acre.

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