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

Glen Arnold, Ohio State University Extension Educator, Putnam County
Sam Custer, OSU Extension Educator, Darke County

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 6.4 P 73 ppm (146 lb/ac) K 183 ppm (366 lb/ac)
Cooperator:	Todd Schmitmeyer		
County:	Darke	Organic Mater	2.5%
Nearest Town:	Versailles	Planting Date:	May 4, 2013
Drainage:	Tile-40 feet spacing	Row Width:	30 inch
Soil type:	Blount-Pewamo	Herbicide:	Surestart 1 qt/ac
Tillage:	Conventional	Insecticide:	N/A
Previous Crop:	Soybeans	Harvest Date:	October 15, 2013

Methods

A randomized block design with two treatments and four replications was used. Plots were 12 rows (30 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 five inch sweeps. The 28%UAN was applied using a standard incorporation toolbar. The farmer also applied a half rate (75 pounds per acre of N) to the swine manure treatments.

The swine manure and 28% UAN were applied two days apart while the corn was in the V3 stage. Field conditions were firm 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 58.4 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 367 total pounds of nitrogen (292 pounds from the swine manure and 75 pounds from the UAN), 104 lb./ac P_2O_5 and 201 lb./ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	58.4
Phosphorus as P2O5	20.8
Potassium as K2O	40.2

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 swine manure+1/2 rate of UAN 367#/ac of N

Results and Discussion

Table 2 Yield Summary

Treatments	Yield (bu/ac)
28% UAN (T1)	168.1
Incorporated manure (T2)	178.1
	LSD (0.05)

The results of this plot indicated no significant difference between the treatments (LSD (0.05) = 13.43, C.V=3.45).

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.

Acknowledgement

The authors would like to thank McClure Farms for the use of manure application equipment and Todd Schmitmeyer for his swine manure and corn field.

The authors would also like to thank the Ohio Pork Producers and Ag Credit for their financial support of this research.

For more information, contact:
Glen Arnold
Field Specialist, Manure Nutrient Management Systems
Ohio State University Extension, Hancock County
7868 CR 140, Suite B
Findlay, Ohio 45840
419-422-3851
arnold.2@osu.edu

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES