Swine Finishing Manure as a Spring Top-Dress Nitrogen Source on Wheat

Glen Arnold, Ohio State University Extension Educator, Agriculture
Jason Hedrick, Ohio State University Extension Educator, Youth Development
Albert Maag, Putnam County Soil and Water Conservation District

Objectives

To compare wheat yield response to nitrogen applied at spring top-dress as swine manure and urea.
To compare wheat yield response to surface applied swine manure and incorporated swine manure.

Background

Crop Year:	2009	Soil test:	pH 6.5 P 110 ppm (220 lbs/ac)
Cooperator:	Jerry Niese		K 175 ppm (350 lbs/ac)
County:	Putnam	Organic Mater	2.95%
Nearest Town:	Leipsic	Planting Date:	September 25, 2008
Drainage:	Tile-40 ft spacing	Plot Width:	39 feet
Soil type:	Del Ray-Fulton Clay Loam	Plot length	1020 feet
Tillage:	Conservation tillage	Herbicide:	Warrior
Previous Crop:	Soybeans	Insecticide:	Quadris
Variety:	Pioneer 25R47	Harvest Date:	July 8, 2009

Methods

A randomized block design with three treatments and four replications was used. Manure plots were 39 feet wide and urea plots were 40 feet wide. All plots were 1020 feet in length. The center 30 feet of each replication was harvested. Liquid swine manure from a finishing building was applied via surface application and incorporation using a 3,000 gallon tanker equipped with a modified Pecan toolbar 13 feet in width. Urea was applied using a standard fertilizer buggy.

The urea application rate was 105 pounds of nitrogen per acre. The liquid swine manure application rate was 4,200 gallons per acre. Manure sample results indicated 53.60 pounds of available nitrogen per 1,000 gallons of swine finishing manure. Swine manure treatments received 223 pounds of nitrogen, 123 lb/ac P_2O_5 and 192 lb/ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	53.60
Phosphorus as P2O5	29.20
Potassium as K2O	45.70

Weather conditions during the time of manure application were sunny and 62 degrees. The plot received above average rainfall for the 2009 growing season. Field conditions were firm during application.

Treatment Summary	Description
Treatment 1 (T1)	urea 105 units per acre
Treatment 2 (T2)	4,200 gal/ac surface applied swine finishing manure
Treatment 3 (T3)	4,200 gal/ac incorporated swine finishing manure

Results and Discussion

Yield Summary

Treatments	Yield (bu/ac)
Average of four urea reps (T1)	128.2 A
Average of four surface applied swine finishing manure reps (T2)	127.5 A
Average of four incorporated swine finishing manure reps (T3)	125.4 A
	NS

The results of this plot indicate no statistical difference for yield between the urea treatments, the incorporated swine manure treatments, or the surface applied swine manure treatments. ($F = 2.18$, $P = 0.19$) Swine manure appears to be a satisfactory source of top-dress nitrogen for this wheat plot. Farmers utilizing manure as a spring fertilizer source for wheat should plan to utilize the excess phosphorus and potassium applied in the following crop rotation.

The urea cost was $0.65 per pound of nitrogen so the urea treatments had $68.00 dollars per acre of purchased fertilizer plus the cost of application. The manure was available from the farmer's swine finisher building at no cost. Application costs for the manure would vary depending on the farm's equipment and labor costs.

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For more information, contact:
Glen Arnold
OSU Extension, Putnam County
124 Putnam Parkway
Ottawa, OH 45875
419-523-6294
arnold.2@osu.edu

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