Comparison of Swine Manure with and without a Nitrogen Stabilizer as Spring Top-Dress Nitrogen Sources for Wheat Yield

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Objectives:

To compare soft red winter wheat yield response to spring applied liquid swine manure at two different rates with and without a microbial soil amendment nitrogen stabilizer.

Background

Crop Year:	2010	Variety:	Pioneer 33W84
County:	Putnam	Soil Test:	pH 6.8, P 78 ppm, K 252 ppm, OM 1.6%
County/Town:	Gilboa, OH		
Soil Type:	Lenawee Silty Clay Loam	Planting Date:	October 14, 2009
Drainage:	Tile-40 ft spacing	Insecticide:	Warrior
Previous Crop:	Soybeans	Fungicide:	Headline
Tillage:	Conservation tillage	Harvest Date:	July 1, 2010

Methods

A randomized complete block design with four treatments and four replications was used. Plots were 90 wide and 1,160 feet long. Liquid swine manure from a finishing building was surface applied diagonally across the field in late March using a dragline. The manure application rate was 4,500 gallons per acre on the east half of the field and 6,500 gallons per acre on the west half of the field. Accomplish was applied at a rate of six quarts per acre in four 90 wide strips approximately three hours before manure was applied. Accomplish is a microbial soil amendment nitrogen inhibitor.

Manure samples indicated 49.5 pounds of available nitrogen, 26.4 pounds of P_2O_5 and 37.2 pounds of K_2O per 1,000 gallons. The 4,500 gallon per acre swine manure treatments received 222.8 pounds of nitrogen, 118.8 lb/ac P_2O_5 and 167.4 lb/ac K_2O. The 6,500 gallon per acre swine manure treatments received 321.8 pounds of nitrogen, 171.6 lb/ac P_2O_5 and 241.8 lb/ac K_2O.

Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1st year)	49.5
Phosphorus as P_2O_5	26.4
Potassium as K_2O	37.2

Weather conditions during the time of manure application were partly sunny and ambient air temperature of 58 degrees. The plot received almost double the normal rainfall for the 2010 growing season. The high nitrogen rates resulted in lodging occurring in significant portions of the 6,500 gallon per acre replications.

Yields were negatively impacted by Fusarium Head Scab and Stagonospora nodorum Blotch across all treatments.

Table 1Treatment Summary

Treatment	Description
Treatment 1 (T1)	4,500 gal/ac liquid swine finishing manure (222# of N)
Treatment 2 (T2)	4,500 gal/ac liquid swine finishing manure + Accomplish (222# of N)
Treatment 3 (T3)	6,500 gal/ac liquid swine finishing manure (322# of N)
Treatment 3 (T4)	6,500 gal/ac liquid swine finishing manure + Accomplish (322# of N)

Results and Discussion

Table 2 Yield Summary

Treatments	Yield (bu/ac)
Average of four 4,500 gal/ac manure reps (T1)	65.1 a
Average of four 4,500 gal/ac manure reps (T2) + Accomplish @ six quarts per acre	66.5 a
Average of four 6,500 gal/ac manure reps (T3)	64.5 a
Average of four 6,500 gal/ac manure reps (T4) + Accomplish @ six quarts per acre	64.3 a

The results of this plot indicate no statistical difference for yield between any of the treatments (LSD (0.05) = 2.4). The nitrogen stabilizer did not have a yield effect. Excess nitrogen in the manure replications could have resulted in adequate nitrogen being available throughout the growing season and thus masking the effect of the stabilizer. 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.

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