

Comparison of Fall Applied Swine Finishing Manure to Urea as the Nitrogen Source for Wheat Yield

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Objective

To compare soft red winter wheat yield response to fall applied swine finishing manure compared to commercially applied fertilizer applied both in the fall and again in the spring.

Background

Crop Year:	2010-2011	Variety:	Dyna Grow 9723
Location:	Shawton, OH	Tillage:	Conservation tillage
County:	Hancock	Soil Test:	pH 5.8, P 62 ppm, K 260 ppm, OM 2.8%
Soil Type:	Hoytville Clay	Planting Date:	October 18, 2010
Drainage:	Tile-40 ft spacing	Harvest Date:	July 4, 2011
Previous Crop:	Soybeans		

Methods

A randomized complete block design with four treatments and three replications was used. The manure plots were 39 feet wide and the urea plots were 40 feet wide. All plots were 1,100 feet in length. The center 30 feet of each replication was harvested.

Liquid swine manure from a finishing building was applied to the manure treatments at rates of 5,000 and 7,000 gallons per acre. All manure was applied on October 5th approximately two weeks before the wheat was planted. Soil conditions were dry when the manure was applied. Manure was incorporated at the time of application using a Gentil toolbar attached to a 6,700 gallon tanker. The commercial fertilizer treatment received 300#/acre of 9-23-30 prior to planting and 108#/acre of urea (46-0-0) on March 28th. Two of the three manure treatments received 50#/acre of nitrogen in the spring as urea.

Table 1 Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1 st year)	51.3
Phosphorus as P ₂ O ₅	25.1
Potassium as K ₂ O	39.9

The plot received more than double the normal rainfall in the months of April and May for the 2011 growing season. Yields were negatively impacted by *Fusarium* Head Scab and *Stagonospora nodorum* Blotch across all treatments.

Table 2 Treatment Summary

Treatment	Description
Treatment 1 (T1)	7,000 gal/ac manure (359# of N per acre) No spring N application
Treatment 2 (T2)	7,000 gal/ac manure (359# of N per acre) +50#N on March 28 th
Treatment 3 (T3)	5,000 gal/ac manure (257# of N per acre) +50#N on March 28 th
Treatment 4 (T4)	300 #/ac 9-23-30 fall + 108#/ac 46-0-0 on March 28 th

Results

Table 3 Yield Summary

	Yield (bu/ac)
Average of three 7,000 gallons of manure per acre reps (T1)	61.2 _a
Average of three 7,000 gallons of manure per acre reps (T2)	59.7 _a
Average of three 5,000 gallons of manure per acre reps (T3)	57.0 _a
Average of three commercial fertilizer reps (T4)	39.1 _b

The results of this plot indicate a statistical difference between the manure treatments and the commercial fertilizer treatment (LSD (0.05) =6.17) but no significant difference between individual manure treatments. The high rate of fall applied swine manure (T1) appears to have supplied adequate nitrogen for this plot.

Summary

Farmers utilizing manure as a fertilizer source for wheat should plan to utilize the excess phosphorus and potassium applied as a credit towards the following crop rotation. In addition, farmers should note the potential for water degradation when applying large amounts of nitrogen in the fall.

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