

# Comparison of Swine Finishing Manure, Urea and ESN as Spring Top-Dress Nitrogen Sources on Wheat Yield

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## Objectives:

To compare soft red wheat yield response to nitrogen applied at spring top-dress as liquid swine finishing manure, environmentally sensitive nitrogen (ESN) and urea.

## Background

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Crop Year:	2010	Variety:	Pioneer 25R47
County:	Hancock	Soil Test:	pH 6.3, P 24 ppm, K 173 ppm, OM 2.0%
County/Town:	Shawton, OH	Planting Date:	October 12, 2009
Soil Type:	Hoytville Clay	Insecticide:	Warrior
Drainage:	Tile-40 ft spacing	Fungicide:	Quadris
Previous Crop:	Soybeans	Harvest Date:	July 2, 2010
Tillage:	Conservation tillage		

## Methods

A randomized block design with three treatments and four replications was used. The manure plots were 45 feet wide. The ESN and urea plots were 40 feet wide. All plots were 2,200 feet in length. The center 30 feet of each replication was harvested. Liquid swine manure from a finishing building was applied via surface application using a 6,700 gallon tanker. Urea and ESN was applied using a standard fertilizer buggy.

The urea application rate and the ESN application rate were 95 pounds of nitrogen per acre. The liquid swine manure application rate was 4,400 gallons per acre. Manure sample results indicated 34.1 pounds of available nitrogen per 1,000 gallons of swine finishing manure. Swine manure treatments received 150 pounds of nitrogen, 61.2 lb/ac P<sub>2</sub>O<sub>5</sub> and 124.5 lb/ac K<sub>2</sub>O.

### Swine Finishing Manure Analysis

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1 <sup>st</sup> year)	34.1
Phosphorus as P <sub>2</sub> O <sub>5</sub>	13.9
Potassium as K <sub>2</sub> O	28.3

All treatments were applied the same day during the 1<sup>st</sup> week of April. Quadris and Warrior were applied at flag leaf emergence. Weather conditions during the time of manure application were overcast and 64 degrees. Field conditions at the time of application were such that the application equipment was adequately supported resulting in no visible surface compaction or rutting of the field. The plot received almost double the normal rainfall for the 2010 growing season. Yields

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

**Table 1 Treatment Summary**

Treatment	Description
Treatment 1 (T1)	Urea at 95 units of nitrogen per acre
Treatment 2 (T2)	4,400 gal/ac surface applied swine finishing manure
Treatment 3 (T3)	ESN at 95 units of nitrogen per acre

## Results and Discussion

**Table 2 Yield Summary**

	Yield (bu/ac)
Average of four urea reps (T1)	65.4 ab
Average of four surface applied swine finishing manure reps (T2)	69.2 a
Average of four ESN reps (T3)	61.6 b

The results of this plot indicate a statistical difference between all treatments (LSD (0.05) =4.48). Swine manure appears to be a satisfactory source of top-dress nitrogen for this wheat plot. It should be noted the manure treatments received approximately 50 more pounds of nitrogen per acre than the commercial fertilizer treatments. 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 \$64.60 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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