

# Comparison of Fall Applied Swine Manure and 28% UAN as Nitrogen Sources for Corn Yield

Glen Arnold, Ohio State University Extension-Field Specialist, Manure Nutrient Management Systems

## Objective

To compare corn yield response to fall applied nitrogen as swine finishing manure and variable rates of side-dress incorporated UAN 28%.

## Background

---

Crop Year:	2014	Soil Test	pH 6.5
Cooperator:	Jeff Duling		P 46 ppm (92 lb/ac)
County:	Putnam		K 155 ppm (360 lb/ac)
Nearest Town:	Ottawa		Organic Mater 4.19%
Drainage:	Tile-40 feet spacing	Planting Date:	May 14, 2014
Soil type:	Paulding Clay	Row Width:	30 inch
Tillage:	No-till	Herbicide:	FulTime NXT 3 qt/ac
Previous Crop:	Soybeans	Insecticide:	N/A
Variety:	Pioneer 33W84	Harvest Date:	October 18, 2014

## Methods

A randomized block design with four treatments and four replications was used. Plots were 16 rows (40 feet) wide and 1,050 feet long. Liquid swine manure from a finishing building was fall applied via incorporation using a 5,250 gallon Balzer tanker equipped with a Dietrich toolbar. The Dietrich toolbar incorporated the swine manure in 30-inch rows at a depth of five inches using shanks with five inch sweeps. Covering wheels placed soil over the incorporated manure. The manure application rate was 8,000 gallons per acre. Manure samples indicated 28.4 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 229 pounds of nitrogen, 81 lb/ac P<sub>2</sub>O<sub>5</sub> and 160 lb/ac K<sub>2</sub>O per acre.

The swine manure was applied on October 23<sup>rd</sup> when the average daily temperatures were about 45 degrees. The winter resulted in cold, frozen soil conditions and cooler than normal spring temperatures.

A pre-plant soil health test submitted through Brookside Labs indicated 203 #/acre of available nitrogen in the strip rows where fall manure was applied and 123 #/acre in the areas between the manure strips. The field was planted in early May with the rows of corn planted directly on top of the fall applied manure strips. In late May 28% UAN sidedress was applied at application rates of zero, 50, 100, and 150 units of nitrogen per acre.

**Table 1. Swine Finishing Manure Analysis**

Nutrient	lbs. per 1,000 Gallons
Nitrogen (available the 1 <sup>st</sup> year)	28.6
Phosphorus as P <sub>2</sub> O <sub>5</sub>	10.1

Potassium as K <sub>2</sub> O	20.0
-------------------------------	------

The plot received well above average rainfall for the growing season.

**Table 2. Treatment Summary**

Treatment	Description
Treatment 1 (T1)	8,000 gallons per acre fall applied swine manure + 0 gal/ac of sidedress UAN 28% (0# N)
Treatment 2 (T2)	8,000 gallons per acre fall applied swine manure + 17 gal/ac of sidedress UAN 28% (50# N)
Treatment 1 (T3)	8,000 gallons per acre fall applied swine manure + 33 gal/ac of sidedress UAN 28% (100# N)
Treatment 1 (T4)	8,000 gallons per acre fall applied swine manure + 50 gal/ac of sidedress UAN 28% (150# N)

## Results and Discussion

**Table 3. Yield Summary**

Treatments	Yield (bu/ac)
(T1) Fall applied swine manure + (0# N)	107.1 <sub>c</sub>
(T2) Fall applied swine manure + (50# N)	139.6 <sub>b</sub>
(T3) Fall applied swine manure + (100# N)	163.2 <sub>ab</sub>
(T4) Fall applied swine manure + (150# N)	176.1 <sub>a</sub>

LSD (0.05)

The results of this plot indicated a statistically significant difference between the treatments (LSD (0.05) = 22.17, C.V=9.46).

The plot showed nitrogen deficiency symptoms in treatments one, two, and three. The plot could have lost nitrogen with the wet spring which delayed spring planting, or the test showing the nitrogen available for the corn crop growing season could have been incorrect. The cooler than normal growing season could have resulted in less mineralization of the organic matter in the field.

## Acknowledgement

The author would like to thank Jeff Duling for the use of manure application equipment and his corn field.

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

