

Comparison of Incorporated Swine Finishing Manure, Incorporated 28% UAN, and Anhydrous Ammonia as Nitrogen Sources at Side-dress for Corn Yield

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Objectives

To compare corn yield response to nitrogen applied at side-dress as incorporated swine finishing manure, 28% UAN, and anhydrous ammonia.

Background

| | | | |
|----------------|--------------------|----------------|--|
| Crop Year: | 2012 | Tillage: | Conventional |
| Cooperator: | Mike Schumm | Soil Test | pH 6.2, P 26 ppm, K 176 ppm OM 2.5% |
| County/Town: | Van Wert, Wilshire | Planting Date: | April 18, 2012 |
| Soil Type: | Blount silt loam | Row Width: | 30 inch |
| Drainage: | Tile, systematic | Herbicide: | Cinch 2.5qts/acre |
| Previous Crop: | Soybeans | Harvest Date: | October 21, 2012 |
| Corn Hybrid: | Pioneer 33W84 | | |

Methods

A randomized block design with three treatments and five replications was used. Plots were 12 rows (30 feet) wide and 1,200 feet long. Liquid swine manure from a finishing building was applied via incorporation using a 5,250 gallon Balzer tanker equipped with a Peecon toolbar. The Peecon opens the soil with a narrow coulter to a depth of five inches and does not cover the manure furrow. The anhydrous ammonia and 28%UAN were applied with standard toolbars.

The swine manure, 28%UAN, and anhydrous ammonia were applied on the same day while the corn was in the three leaf stage. Field conditions were dry at the time of application.

The anhydrous ammonia and 28%UAN application rates were 160 units of nitrogen per acre. All swine manure replications received 4,400 gallons per acre. Manure samples indicated 40.9 pounds of available nitrogen per 1,000 gallons. Available nitrogen is the ammonia portion of the nitrogen in the swine manure and approximately one-half of the organic portion. Swine manure treatments received 180 pounds of nitrogen, 31 lb. /ac P₂O₅ and 119 lb./ac K₂O.

Table 1. Swine Finishing Manure Analysis

| Nutrient | lbs. per 1,000 Gallons |
|---|------------------------|
| Nitrogen (available the 1 st year) | 40.9 |
| Phosphorus as P ₂ O ₅ | 7.1 |
| Potassium as K ₂ O | 27.0 |

Weather conditions during the time of manure application were sunny with an ambient air temperature of 75 degrees. The plot received well below normal rainfall for the growing season.

Table 2. Treatment Summary

| Treatment | Description |
|------------------|--|
| Treatment 1 (T1) | 160 #N/ac anhydrous ammonia |
| Treatment 2 (T2) | 160 #N/ac 28% UAN |
| Treatment 3 (T3) | 4,400 gal/ac incorporated liquid swine manure, 180 #N/ac |

Results and Discussion

Table 3. Yield Summary

| Treatments | Yield (bu/ac) |
|--------------------------|------------------|
| Anhydrous (T1) | 125.4 |
| 28% UAN (T2) | 119.1 |
| Incorporated manure (T3) | 120.2 |

LSD (0.05) = NS

The results of this plot indicated no statistically significant differences in yield (LSD (0.05) = 7.25, C.V = 4.11) between any of the treatments. The plot was in extreme drought through most of the growing season which could have masked any treatment differences.

The anhydrous ammonia cost \$0.62 per pound or \$100 per acre plus the cost of application. The manure was available from the farmer's swine finisher building at no cost. The manure application cost, using the Minnesota Manure Distribution Cost Analyzer spreadsheet, was calculated at \$20 per 1,000 gallons or \$.02 per gallon. The cost of applying 4,400 gallons per acre as sidedress nitrogen was \$88 per acre.

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