

Comparison of Swine Manure and UAN as Nitrogen Sources at Side-dress for Corn Yield

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Objective

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

Background

| | | | |
|----------------|----------------------|----------------|-----------------------|
| Crop Year: | 2014 | Soil Test: | pH 6.3 |
| Cooperator: | Kevin Schmitmeyer | | P 70 ppm (140 lb/ac) |
| County: | Darke | | K 164 ppm (328 lb/ac) |
| Nearest Town: | Versailles | | Organic Mater 2.35% |
| Drainage: | Tile-50 feet spacing | Planting Date: | April 25, 2014 |
| Soil Type: | Blount-Pewamo | Row Width: | 30 inch |
| Tillage: | Conventional | Herbicide: | Surestart 1 qt/ac |
| Previous Crop: | Corn | Insecticide: | N/A |
| Variety: | Dekalb | Harvest Date: | October 16, 2014 |

Methods

A randomized block design with three treatments and four replications was used. Plots were 16 rows (40 feet) wide and 1,250 feet long. Liquid swine manure from a finishing building was applied via incorporation using a 6,200 gallon Jamesway tanker equipped with a Dietrich toolbar. The Dietrich toolbar incorporated the swine manure at a depth of five inches using shanks with eight inch sweeps.

The swine manure and 28% UAN were applied on the same day while the corn was in the V2 stage. Field conditions were firm at the time of application.

The 28% UAN application rate was 180 units of nitrogen per acre. Swine manure replications received 5,000 or 9,000 gallons per acre. Manure samples indicated 42.4 pounds of available nitrogen per 1,000 gallons.

Table 1. Swine Finishing Manure Analysis

| Nutrient | lbs. per 1,000 Gallons |
|---|------------------------|
| Nitrogen (available the 1 st year) | 42.4 |
| Phosphorus as P ₂ O ₅ | 14.2 |
| Potassium as K ₂ O | 25.5 |

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

In the weeks following the manure and 28%UAN treatments the plot received very heavy rainfall resulting in some stand reductions in downed spots, especially in Treatment #2.

Table 2. Treatment Summary

| Treatment | Description |
|------------------|---|
| Treatment 1 (T1) | 50 gal/ac UAN 28%, 150#/ac of N |
| Treatment 2 (T2) | 5,000 gal/ac incorporated liquid swine manure, 212#/ac of N |
| Treatment 3 (T3) | 9,000 gal/ac incorporated liquid swine manure, 382#/ac of N |

Results and Discussion

Table 3. Yield Summary

| Treatments | Yield (bu/ac) |
|--------------------------|--------------------|
| 28% UAN (T1) | 215.8 _a |
| Incorporated manure (T2) | 203.8 _b |
| Incorporated manure (T3) | 214.0 _a |

LSD (0.05)

The results of this plot indicated a statistically significant difference between the treatments (LSD (0.05) = 9.07, C.V=2.60). The lower than expected yield in treatment 2 was likely due to stand damage during the manure application process and some drowned out spots in the field.

The 28% UAN cost \$0.58 per pound or \$87 per acre plus the cost of application. Based on the OSU Extension 2014 Ohio Farm Custom Rate Survey, the cost of applying the 28%UAN is approximately \$9.50 per acre.

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 5,000 gallons per acre as side-dress nitrogen was \$100 per acre. The cost of applying 9,000 gallons per acre as side-dress nitrogen was \$180 per acre.

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