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: 2013     Soil test: pH 6.6
P 85 ppm (170 lb/ac)  
K 184 ppm (368 lb/ac)
Cooperator: Rick Alig      Nearest Town: Coldwater
County: Mercer     Planting Date: May 6, 2013
Organic Matter 3.2%     Row Width: 30 inch
Nearest Town: Coldwater     Herbicide: Surestart 1 qt/ac
Drainage: Tile-40 feet spacing     Insecticide: N/A
Soil type: Blount-Pewamo     Harvest Date: October 12, 2013
Tillage: No-till
Previous Crop: Soybeans

Methods
A randomized block design with two 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 five inch sweeps.

The swine manure and 28% UAN were applied on the same day while the corn was in the V3 stage. Field conditions were firm at the time of application.

The 28% UAN application rate was 171 units of nitrogen per acre. All swine manure replications received 5,000 gallons per acre. Manure samples indicated 41.6 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 230 pounds of available nitrogen, 196 lb./ac P₂O₅ and 146 lb./ac K₂O.

Swine Finishing Manure Analysis

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>lbs. per 1,000 Gallons</th>
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</thead>
<tbody>
<tr>
<td>Nitrogen (available the 1st year)</td>
<td>46.1</td>
</tr>
<tr>
<td>Phosphorus as P₂O₅</td>
<td>39.2</td>
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<tr>
<td>Potassium as K₂O</td>
<td>29.3</td>
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Weather conditions during the time of manure application were sunny with an ambient air temperature of 75 degrees. The plot received above average rainfall for the growing season.
Table 1 Treatment Summary

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
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<tbody>
<tr>
<td>Treatment 1 (T1)</td>
<td>57 gal/ac UAN 28%, 171#/ac of N</td>
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<tr>
<td>Treatment 2 (T2)</td>
<td>5,000 gal/ac incorporated liquid swine manure, 230#/ac of N</td>
</tr>
</tbody>
</table>

Results and Discussion

Table 2 Yield Summary

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Yield (bu/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28% UAN (T1)</td>
<td>200.3&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Incorporated manure (T2)</td>
<td>214.5&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

LSD (0.05)

The results of this plot indicated a statistically significant difference between the treatments (LSD (0.05) = 13.84, C.V=2.96). The manure treatments received higher nitrogen amounts than the commercial fertilizer treatments and this likely accounted for the higher yields.

The 28% UAN cost $0.62 per pound or $93 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 6,000 gallons per acre as side-dress nitrogen was $120 per acre.

Acknowledgement

The authors would like to thank McClure Farms for the use of manure application equipment and Rick Alig for the manure and the use of his corn field.

The authors would also like to thank the Ohio Pork Producers and Ag Credit for their financial support of this research.

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