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

Glen Arnold, Ohio State University Extension, Field Specialist-Manure Nutrient Management Systems
Dennis Reitman, County Educator, OSU Extension, Mercer County

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
Cooperator: Floyd Bergman
County: Mercer
Nearest Town: Fort Recovery
Drainage: Tile-40 feet spacing
Soil Type: Blount-Pewamo
Tillage: Conventional
Previous Crop: Soybeans
Variety: Pioneer 0212
Soil Test: pH 6.9
P 154 ppm (308 lb/ac)
K 133 ppm (266 lb/ac)
Organic Mater 3.3%
Planting Date: May 10, 2014
Row Width: 30 inch
Harvest Date: October 18, 2014

Methods
A randomized block design with two treatments and four replications was used. Plots were 12 rows (30 feet) wide and 1475 feet long. Liquid swine manure from a finisher 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 corn was in the V2 stage. Field conditions were firm at the time of application.

The 28% UAN application rate was 105 units of nitrogen per acre. All swine manure replications received 3,400 gallons per acre. Manure samples indicated 41.5 pounds of available nitrogen per 1,000 gallons. Swine manure treatments received 141.1 lb/ac of nitrogen, 195.2 lb/ac P2O5 and 165.6 lb/ac K2O.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>lbs. per 1,000 Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen (available the 1st year)</td>
<td>41.5</td>
</tr>
<tr>
<td>Phosphorus as P2O5</td>
<td>57.4</td>
</tr>
<tr>
<td>Potassium as K2O</td>
<td>48.7</td>
</tr>
</tbody>
</table>

Weather conditions during the time of manure application were sunny with an ambient air temperature of 77 degrees. The plot received above average rainfall for the growing season.
Table 2. Treatment Summary

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment 1 (T1)</td>
<td>35 gal/ac UAN 28%, 105#/ac of N</td>
</tr>
<tr>
<td>Treatment 2 (T2)</td>
<td>3,400 gal/ac incorporated liquid swine manure, 141#/ac of N</td>
</tr>
</tbody>
</table>

Results and Discussion

Table 3. Yield Summary

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Yield (bu/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28% UAN (T1)</td>
<td>198.5&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Incorporated manure (T2)</td>
<td>198.8&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

LSD (0.05)

The results of this plot indicated no significant difference between the treatments (LSD (0.05) = 11.95, C.V=2.53). The regular rainfall throughout the growing season probably resulted in mineralization of soil organic matter and the ongoing release of nitrogen to the corn crop. Soils this high in phosphorus should not use manure as a nitrogen sidedress.

The 28% UAN cost $0.52 per pound or $54.60 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 3,400 gallons per acre as side-dress nitrogen was $68 per acre.

Acknowledgement

The authors would like to thank McClure Farms for the use of manure application equipment and Floyd Bergman for the swine finishing manure and the use of his field.

The authors would also like to thank the Ohio Pork Producers and the Ohio Environmental Education Fund for their financial support.

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
419-422-3851
arnold.2@osu.edu

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES