Swine Finishing Manure as a Top-Dress Nitrogen Source on Wheat

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Objectives:
- To compare wheat yield response to nitrogen applied at top-dress as swine manure and UREA.
- To compare wheat yield response to surface applied swine manure and incorporated swine manure.
- To compare wheat yield response to surface applied manure, using a dragline, to surface applied manure using a tanker.

Background
Crop Year: 2008
Cooperator: Dennis Niese
County: Putnam
Nearest Town: Leipsic
Drainage: Tile-40 ft spacing
Soil type: Del Ray-Fulton clay loam
Tillage: Conversation tillage
Previous Crop: Soybeans
Variety: Hopewell

Soil test: pH 6.4, P 38 ppm, K 123 ppm, OM 2.35%
Planting Date: October 20, 2007
Row Width: 7.5 in.
Herbicides: n/a
Insecticide: n/a
Harvest Date: July 13, 2008
PSNT test: n/a

Methods
A randomized block design with four treatments and four replications was used. Manure plots were 39 feet wide and UREA plots were 40 feet wide. All plots were 1020 feet in length. The center 30 feet of each replication was harvested. Liquid swine manure from a finishing building was applied via surface application and incorporation using a 3,000 gallon tanker equipped with a modified Pecan toolbar 13 feet in width. Manure was also surface applied with a dragline utilizing a six inch hose. UREA was applied using a standard fertilizer buggy.

The UREA application rate was 100 pounds of nitrogen per acre. The liquid swine manure application rate was 4,200 gallons per acre. Manure sample results indicated 40 pounds of available nitrogen per 1,000 gallons of swine finishing manure. Swine manure treatments received 168 pounds of nitrogen, 102 lb/ac P2O5 and 147 lb/ac K2O.

Swine Finishing Manure Analysis
<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>39.98</td>
</tr>
<tr>
<td>Phosphorus as P2O5</td>
<td>24.26</td>
</tr>
<tr>
<td>Potassium as K2O</td>
<td>35.04</td>
</tr>
</tbody>
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Weather conditions during the time of manure application were sunny and 75 degrees. Because of the wet spring, the wheat was approximately five inches tall (Feekes growth stage 4) at the time the treatments were applied on April 18th. Substantial amounts of wheat were flattened, especially by the manure tanker. The plot received above average rainfall for the 2008 growing season. Field conditions were firm during application.

<table>
<thead>
<tr>
<th>Treatment Summary</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Treatment 1 (T1)</td>
<td>UREA 100 units per acre</td>
</tr>
<tr>
<td>Treatment 2 (T2)</td>
<td>4200 gal/ac surface applied swine finishing manure</td>
</tr>
<tr>
<td>Treatment 3 (T3)</td>
<td>4,200 gal/ac incorporated swine finishing manure</td>
</tr>
<tr>
<td>Treatment 4 (T4)</td>
<td>4,200 gal/ac swine finishing manure surface applied via dragline</td>
</tr>
</tbody>
</table>

**Results and Discussion**

**Yield Summary**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Yield (bu/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of four UREA reps (T1)</td>
<td>62.9 a</td>
</tr>
<tr>
<td>Average of four surface applied swine finishing manure reps (T2)</td>
<td>63.1 a</td>
</tr>
<tr>
<td>Average of four incorporated swine finishing manure reps (T3)</td>
<td>61.4 a</td>
</tr>
<tr>
<td>Average of four swine finishing manure surface applied dragline reps (T4)</td>
<td>62.1 a</td>
</tr>
</tbody>
</table>

LSD (0.05) NS

The results of this plot indicate no statistical difference for yield between treatments. Swine manure appears to be a satisfactory source of top-dress nitrogen for wheat.

The UREA cost was $0.75 per pound so the UREA treatments had $75.00 dollars per acre of purchased fertilizer plus the cost of application. The manure was available from the farmer’s swine finisher building at no cost. Cost to custom apply the dragline manure was $0.008/gal or $33.60 per acre ($0.008/gal x 4,200 gal/ac). Application costs for the manure would vary depending on the farm’s equipment and labor costs.

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