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

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Objectives
To compare wheat yield response to nitrogen applied at spring top-dress as swine manure and urea.
To compare wheat yield response to surface applied swine manure and incorporated swine manure.

Background
Crop Year: 2009
Soil test: pH 6.5
P 110 ppm (220 lbs/ac)
K 175 ppm (350 lbs/ac)
Cooperator: Jerry Niese
County: Putnam
Organic Mater 2.95%
Nearest Town: Leipsic
Planting Date: September 25, 2008
Drainage: Tile-40 ft spacing
Plot Width: 39 feet
Soil type: Del Ray-Fulton Clay Loam
Plot length 1020 feet
Tillage: Conservation tillage
Herbicide: Warrior
Previous Crop: Soybeans
Insecticide: Quadris
Variety: Pioneer 25R47
Harvest Date: July 8, 2009

Methods
A randomized block design with three 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. Urea was applied using a standard fertilizer buggy.

The urea application rate was 105 pounds of nitrogen per acre. The liquid swine manure application rate was 4,200 gallons per acre. Manure sample results indicated 53.60 pounds of available nitrogen per 1,000 gallons of swine finishing manure. Swine manure treatments received 223 pounds of nitrogen, 123 lb/ac P\textsubscript{2}O\textsubscript{5} and 192 lb/ac K\textsubscript{2}O.

Swine Finishing Manure Analysis

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>lbs. per 1,000 Gallons</th>
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<tbody>
<tr>
<td>Nitrogen (available the 1\textsuperscript{st} year)</td>
<td>53.60</td>
</tr>
<tr>
<td>Phosphorus as P\textsubscript{2}O\textsubscript{5}</td>
<td>29.20</td>
</tr>
<tr>
<td>Potassium as K\textsubscript{2}O</td>
<td>45.70</td>
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</tbody>
</table>
Weather conditions during the time of manure application were sunny and 62 degrees. The plot received above average rainfall for the 2009 growing season. Field conditions were firm during application.

<table>
<thead>
<tr>
<th>Treatment Summary</th>
<th>Description</th>
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<tbody>
<tr>
<td>Treatment 1 (T1)</td>
<td>urea 105 units per acre</td>
</tr>
<tr>
<td>Treatment 2 (T2)</td>
<td>4,200 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>
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**Results and Discussion**

**Yield Summary**

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Yield (bu/ac)</th>
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<tbody>
<tr>
<td>Average of four urea reps (T1)</td>
<td>128.2 A</td>
</tr>
<tr>
<td>Average of four surface applied swine finishing manure reps (T2)</td>
<td>127.5 A</td>
</tr>
<tr>
<td>Average of four incorporated swine finishing manure reps (T3)</td>
<td>125.4 A</td>
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The results of this plot indicate no statistical difference for yield between the urea treatments, the incorporated swine manure treatments, or the surface applied swine manure treatments. \( F = 2.18, P = 0.19 \) Swine manure appears to be a satisfactory source of top-dress nitrogen for this wheat plot. Farmers utilizing manure as a spring fertilizer source for wheat should plan to utilize the excess phosphorus and potassium applied in the following crop rotation.

The urea cost was $0.65 per pound of nitrogen so the urea treatments had $68.00 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. Application costs for the manure would vary depending on the farm’s equipment and labor costs.

**Acknowledgments:**

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