Drainage and Tillage Effect on Corn Production

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Objective

To evaluate the effect of soil drainage and tillage on corn production.

Background

Cooperator: O.A.R.D.C. NW Branch  
County: Wood  
Nearest Town: Hoytville  
Drainage: see below  
Soil type: Hoytville, clay  
Tillage: see below  
Previous Crop: soybean  
Variety: Becks 5354HXR  
Soil test:  
Fertilizer: 200 # 10-26-26, sidedress 28% N @ 33 Gal/ac  
Planting Date: 6-4-11  
Planting Rate: 30,000  
Row Width: 30 in  
Herbicides: Cinch, Prequel, Honcho, 2,4-D, Roundup Weathermax  
Harvest Date: 12-12-11

Methods

The entries were replicated eight times in a randomized complete block design. Plot size- 10 feet x 60 feet each entry. Harvest data collected from center rows. The same crop was planted on all treatments on the same day, using the same variety, fertility, and herbicide.

Drained plots have subsurface tile drainage spaced 20 feet apart compared to undrained plots which do not have subsurface drainage. Both sets of drainage plots contain four identical tillage treatments.

1. Continuous no-till  
2. Fall Strip Tillage – a 6 in deep mole knife with mounding coulters  
3. Fall Zone Tillage – a 12 to 18 inch deep straight shank subsoiler, no further tillage  
4. Fall chisel plow – followed by fall roterra finish tillage

Rainfall at this location:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Long Term Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>1.40 in</td>
<td>3.6 in</td>
</tr>
<tr>
<td>July</td>
<td>4.29 in</td>
<td>3.8 in</td>
</tr>
<tr>
<td>August</td>
<td>3.74 in</td>
<td>3.0 in</td>
</tr>
<tr>
<td>Total</td>
<td>9.43 in</td>
<td>10.4 in</td>
</tr>
</tbody>
</table>
## RESULTS

**2011 Corn Yields bushels / acre**

<table>
<thead>
<tr>
<th>Drainage</th>
<th>Tillage</th>
<th>Yield</th>
<th>Significance</th>
<th>LSD (.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drained</td>
<td>No-till</td>
<td>169.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undrained</td>
<td>No-Till</td>
<td>162.9</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Drained</td>
<td>Strip-till</td>
<td>167.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undrained</td>
<td>Strip-till</td>
<td>165.3</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Drained</td>
<td>Zone-till</td>
<td>166.0</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Undrained</td>
<td>Zone-till</td>
<td>161.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drained</td>
<td>Chisel Plow</td>
<td>141.1</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>Undrained</td>
<td>Chisel Plow</td>
<td>168.7</td>
<td>B</td>
<td>(13.4)</td>
</tr>
</tbody>
</table>

### Summary

The chisel plow treatment was the only significant difference in yield due to drainage. All other treatments did not show any difference in yield due to drainage.

Because of an extremely wet May, corn was planted later than usual (June 4) and the soil moisture was essentially at field capacity below planting depth. Then rainfall during June was 2.2 inches below normal. A drier growing season tends to negate the usual yield advantage resulting from good subsurface drainage.

### Acknowledgement

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