V. Weed Removal and Nitrogen Rate in Organic Corn

Yield Response to Weed Removal and Sidedress Nitrogen in Organic Corn

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Plot Plan:

<table>
<thead>
<tr>
<th>Plot</th>
<th>Block A Weeded</th>
<th>Block B Control</th>
<th>Block C Weeded</th>
<th>Block D Control</th>
<th>Block E Weeded</th>
<th>Block F Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plot 1</td>
<td>0 N</td>
<td>100 N</td>
<td>50 N</td>
<td>0 N</td>
<td>0 N</td>
<td>150 N</td>
</tr>
<tr>
<td>Plot 2</td>
<td>50 N</td>
<td>150 N</td>
<td>150 N</td>
<td>100 N</td>
<td>50 N</td>
<td>0 N</td>
</tr>
<tr>
<td>Plot 3</td>
<td>150 N</td>
<td>0 N</td>
<td>100 N</td>
<td>150 N</td>
<td>100 N</td>
<td>100 N</td>
</tr>
<tr>
<td>Plot 4</td>
<td>100 N</td>
<td>50 N</td>
<td>0 N</td>
<td>50 N</td>
<td>150 N</td>
<td>50 N</td>
</tr>
</tbody>
</table>

Plots are 4 rows wide, 20 feet long

Background: Mr. Henley has over 400 acres in a cash grain/soybean organic production system. Nitrogen deficiency and crop competition from weeds have been identified as two factors that are limiting corn yields. This plot evaluated the effects of eliminating weeds and increasing nitrogen rates on corn yields. Poultry litter was applied preplant at a rate of 2 tons per acre.

Treatments: Weeds: Blocks A, C, E were weeded by hand by the farmer at sidedress time. The farmer’s “normal” tillage-based weed control had been applied to all plots previously (rotary harrow and row cultivation). All pulled weeds, which represented a notable amount of biomass, were removed from the experimental area. Note that a dramatic defoliation of jimsonweed, the dominant weed in the plots, by huge numbers of three-striped potato beetle significantly reduced weed pressure in these plots and the entire field in the month following sidedress.

Sidedress N Rates: Four rates (0, 50, 100, 150 pounds per acre of nitrogen) were randomly assigned within blocks. See the plot plan above. Nitrogen was applied and incorporated simultaneously using a garden hand seeder by walking back and forth along both sides of each row until the measured material was spread. Soil was loose due to recent row cultivation and incorporation was easy. Renaissance feather meal 11-0-0 at 8.5 ounces per 20 feet of row provides just over 50 pounds per acre of nitrogen. Release characteristics of nitrogen were sought from manufacturer, but no information was available.

Data Collected:

1. Stand counts were taken the day of sidedressing. Plants were counted for the entire 20-foot length of the center two rows in each plot.

2. PSNT sample taken from the test and the reading was 15.7 ppm.

3. Ear leaf samples for nitrogen analysis (A&L labs) at silking – composite for each of 8 treatments were taken.

4. Hand harvest of ears from middle two rows of each plot. Only the middle 10 feet of each of the two rows was harvested – marked with a 10-foot stick. The number of ears from each plot was noted, but the number of plants in the harvested area was not. All harvested ears were shelled by hand. A sub-sample was tested for moisture with a field tester, and the entire sample was weighed with a kitchen scale.

Discussion: The graph below summarizes yields. Both weed competition and nitrogen deficiency affected yields, but nitrogen deficiency seemed to have a more dramatic impact on yields in this plot. Irrigation might help overcome somewhat the effects of the weeds. In addition, biological control of jimsonweed and pigweed by leaf-feeding insects also helped reduce...
the effects of the weeds. We obtained a very good yield response to the sidedress nitrogen in both the weeded and unweeded plots. In an organic system, increasing nitrogen rates can probably be done economically by one of two ways: increasing the use of legumes, such as crimson clover or hairy vetch, or increasing poultry litter rates. Weed control presents more of a challenge.