The Effect of Urea on Soybean Yield at R1.2
Steve Prochaska, Agriculture and Natural Resources Extension Agent

Objective

It has been theorized that soybeans would benefit from supplemental nitrogen applications during early reproductive growth states. The objective of this study was to examine soybean yield response to supplemental nitrogen applied during early reproductive stages.

Background

Cooperator: OSU Unger Farm  
County: Crawford  
Soil Type: Pewamo  
Drainage: Systematic  
Tillage: Spring cultivate (2x)  
Previous Crop: Pumpkins  
Soil Test: pH 7.3, P 16 ppm, K 88 ppm  
Fertilizer: 27-69-60 (fall 1997)  
Herbicide: Roundup Ultra (1 qt/A)  
Variety: Pioneer 9333  
Planting Date: May 14, 1998  
Planting Rate: 63 lbs/A  
Harvest Date: September 25, 1998

Methods

Urea @ 107.5 lbs/acre was applied in 30' swaths (used only one boom) with Ag Chem air machine in three random strips across soybeans at growth stage R1.2. Rainfall occurred July 7, 1998, thus lessening nitrogen volatilization losses. The center 22 feet of the strip plots were harvested to measure treatment effect. Individual harvested plot size was 0.17 acre. Experiment design was completely randomized with three replications for each treatment.

Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (bu/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urea</td>
<td>63.07</td>
</tr>
<tr>
<td>No Urea</td>
<td>65.93</td>
</tr>
</tbody>
</table>

F = 2.06 Not significant at P = 0.05 CV = 3.8%

Summary and Notes

Each bushel of soybeans contains from 3.0 to 3.5 pounds of nitrogen. Thus, a 60-bushel-per-acre yield of soybeans requires 180 to 210 pounds of nitrogen. Soybeans, being legumes, have a symbiotic relationship with Rhizobium bacteria. These bacteria have the ability to fix 200 pounds of nitrogen or more per acre. However, there are reproductive stages in the growth of soybeans where nitrogen deficiency may occur. In this study, there was no significant difference between treatments. These results are consistent with previous studies on this topic.

For additional information, contact: Steve Prochaska  
The Ohio State University Extension  
prochaska.1@osu.edu