Soybean Population Study

Samuel G. Custer, Ohio State University Extension Educator, Darke County

Objective
To determine the effects of soybean seeding rate on soybean yields and provide data for soybean population response curves.

Background
Crop Year: 2015
Location: Adams Township
County/Town: Darke/Bradford
Soil Type: Celina Silt Loam
Brookston Silty Loam
Drainage: Not patterned
Previous Crop: Corn

Tillage: No-Till
Soil Test: pH 6.3, P 24 ppm BP1, K 129 ppm
Planting Date: May 23, 2015
Nitrogen: None
Seeding Rate: Varied
Harvest Date: October 8, 2015

Methods
Six soybean populations were replicated three times in a randomized complete block design. Treatments were planted with a 12 row Kinze planter with split row units (resulting in 15 inch row spacing) 300 feet in length. All treatments received the same tillage and herbicide applications. Variety used was Asgrow 3634. Stand counts were taken at V4 and R7 by obtaining 2 counts per treatment and calculating the simple average. Plots were harvested with a commercial combine equipped with a 30 foot grain header. Yields and moistures were obtained by using a calibrated yield monitor. Yields were verified using a grain cart. Yields were adjusted to 13% moisture. Precipitation data can be viewed at cocorahs.org.

Results

<table>
<thead>
<tr>
<th>No.</th>
<th>Population Planted</th>
<th>V4 Stand Count</th>
<th>R7 Stand Count</th>
<th>Wet Moisture</th>
<th>Treatment Average (bu./acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60,000</td>
<td>57,000</td>
<td>62,000</td>
<td>13.7</td>
<td>51.0</td>
</tr>
<tr>
<td>2</td>
<td>95,000</td>
<td>70,000</td>
<td>68,000</td>
<td>14.0</td>
<td>57.4</td>
</tr>
<tr>
<td>3</td>
<td>130,000</td>
<td>105,000</td>
<td>104,000</td>
<td>14.0</td>
<td>57.7</td>
</tr>
<tr>
<td>4</td>
<td>165,000</td>
<td>117,000</td>
<td>128,000</td>
<td>14.2</td>
<td>58.2</td>
</tr>
<tr>
<td>5</td>
<td>200,000</td>
<td>173,000</td>
<td>145,000</td>
<td>14.2</td>
<td>57.8</td>
</tr>
<tr>
<td>6</td>
<td>235,000</td>
<td>158,000</td>
<td>157,000</td>
<td>14.1</td>
<td>60.1</td>
</tr>
</tbody>
</table>

LSD = 7.50 (p<.22); CV 7.23; Significant difference.
Summary
As expected from previous research which has shown that the soybean is adaptive in relation to planted population, soybean yield was not influenced by planting population on populations between 95,000 and 200,000 but there was a significant difference with the populations of 60,000 and 235,000. An economic comparison between the planting populations of 60,000 and 235,000 revealed a $5.51 per acre advantage for the 60,000 treatment over seed costs. Assumptions were soybean seed cost $ 0.41/1000 and cash beans cost $8.49/bushel.

Acknowledgement
The author expresses appreciation to on-farm collaborators Overholser Farms for the land use, planting and harvesting of this plot.