Starter Fertilizer Response in Corn Study, Darke County

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

Objective
To determine the effects of starter fertilizer, sulfur and zinc on corn yields and provide data for nitrogen and phosphorous response curves.

Background
Crop Year: 2018
Location: Allen Township
County/Town: Darke/Bradford
Soil Type: Celina Silt Loam
Drainage: Not patterned
Previous Crop: Soybeans
Tillage: No-Till

Soil Test: pH 6.6, P 15 ppm M3, K 155 ppm
Planting Date: April 30, 2018
Nitrogen: 200 units per acre
Seeding Rate: 33,000 seeds per acre
Harvest Date: September 18, 2018
Rainfall: 24.82 - 4/15-9/15

Methods
Five starter fertilizer treatments were replicated three times in a randomized complete block design. Treatments were planted with a 12 row Kinze planter. All treatments received the same tillage and herbicide applications. Seed used was Becks 5140. Treatments were made at planting as a 2x2 fertilizer application. Nitrogen levels were balanced at sidedress with appropriate rates of 28% to equal 200 units per acre total N applied. Stand counts were taken at V6 by obtaining two counts per treatment and calculating the simple average. Plots were harvested with a commercial combine equipped with a six row corn head. Yields and moistures were obtained by using a calibrated yield monitor. Yields were verified using a grain cart. Yields were adjusted to 15.5% moisture. Precipitation data was obtained from cocorahs.org and recorded daily.

Treatments:
1. 28% only – 43lb Actual N/acre
2. Starter fertilizer (10-34-0 and 28%) with 43lb N and 23lbP2O5/acre
3. Starter fertilizer (10-34-0 and 28%) with 2 gallons sulfur per acre
4. Starter fertilizer (10-34-0 and 28%) with 2 gallons sulfur and 1 quart zinc per acre
5. No starter fertilizer
Results

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Moisture (%)</th>
<th>Yield (bu/acre)</th>
<th>Return over No Starter/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>No starter</td>
<td>20.1 d</td>
<td>242 a</td>
<td></td>
</tr>
<tr>
<td>28 only</td>
<td>19.6 ac</td>
<td>245 abc</td>
<td>$10.12</td>
</tr>
<tr>
<td>28 &amp; P</td>
<td>19.4 a</td>
<td>248 c</td>
<td>$16.28</td>
</tr>
<tr>
<td>28, P and Sulfur</td>
<td>19.8 c</td>
<td>242 ab</td>
<td>-$7.61</td>
</tr>
<tr>
<td>28, P, Sulfur and Zinc</td>
<td>19.5 a</td>
<td>246 ab</td>
<td>$0.62</td>
</tr>
</tbody>
</table>

Treatment Means with the same letter are not significantly different according to Fisher’s Protected Least Significant Differences (LSD) test at alpha = 0.1.

LSD: 0.29 CV: 0.97%  LSD: 4.01 CV: 1.09%

Summary
Corn moisture and yield showed some statistical difference by the addition of starter fertilizer but there was no statistical difference between 28 only and 28 & P. The highest yield and most economical return on investment was the Starter fertilizer (10-34-0 and 28%) with 43lb N and 23lb P₂O₅/acre.

Acknowledgement
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For more information, contact:
Sam Custer
OSU Extension, Darke County
603 Wagner Avenue
Greenville, Ohio 45331
custer.2@osu.edu