EFFECTS OF NITROGEN APPLICATION STRATEGY ON CORN

TRIAL OVERVIEW

- Farmers are constantly looking for information on how to be more efficient with farm inputs.
- Nitrogen (N) is an input that provides many options relating to application strategy that can affect the efficient use of the material.
- The use of irrigation systems to apply N can be a very cost effective application method, because it allows for a delay in N investment.

RESEARCH OBJECTIVE

- The research was set up to determine what effects the N application strategy had on corn.
- Specifically, whether higher yields result from putting N on before planting, with split applications between planting and irrigation, or applying all of the N through irrigation.

SITE NOTES:

- The trial was set up as a randomized complete block with 3 replications of 4 treatments.
- All treatments had a strip-till base application of 40 lbs/acre of phosphorus (P) as 10-34-0 which also supplied 12 lbs/acre nitrogen (N) on April 14, 2016.
- At this time the 60 and 120 lb/acre of preplant N treatments were also applied with the strip-tiller.
- The site was irrigated with subsurface drip irrigation and in-season fertilizer was applied through drip irrigation.
- Nitrogen application through irrigation started 6 to 10 days before the corn required irrigation for water purposes.
- Soil test results determined nitrate level was 101 lbs/acre, organic matter was 4%, and soil pH 6.7 with a cation exchange capacity of 18.2.

UNDERSTANDING THE RESULTS

Table 1. Nitrogen treatments: timing and rates at planting and through irrigation.

<table>
<thead>
<tr>
<th>No.</th>
<th>Treatment</th>
<th>At Planting Application</th>
<th>Nitrogen Applications Through Irrigation</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>June 9</td>
<td>July 13</td>
</tr>
<tr>
<td>1</td>
<td>120 lb/acre N at planting</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>120 lb/acre N through irrigation</td>
<td>April 14</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>60 lb/acre N at planting 60 lb/acre N through irrigation</td>
<td>April 14</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>60 lb/acre N planting with starter 60 lb/acre N through irrigation</td>
<td>April 14</td>
<td>-</td>
</tr>
</tbody>
</table>

- The corn had improved stalk diameter because it had more vigorous early-season growth when the majority of N was applied at the beginning of the growing season. The growth effect did not significantly influence yield even in treatments when all the N applications were delayed to growing season applications (Figures 1 and 2).
- Treatments with N applications after planting had less vigorous early-season growth.

WHAT DOES THIS MEAN FOR YOUR FARM?

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Nitrogen applications through irrigation are an effective tool to manage N. These N applications did not lead to greater yields in this study, but they did provide yields that were similar to applying all of the fertilizer at planting.

Applying all of the N at or near planting can be risky because excessive rainfall could result in leaching. Nitrogen losses result in costly reapplication and rescue treatments required to meet corn needs later in the growing season.

If corn is N stressed early in the growing season continue to monitor the field and consider management with sidedress or rescue treatments.

In this study, corn reached yield potential similar to the greatest-yielding treatment. This was true even for the first N applications in the late vegetative stage of corn development.

Figure 2. Stalk Diameters and Differences at the P=0.10 Level.

Figure 3. Late-season nitrogen stress in Treatment #1 where all of the nitrogen was applied at planting.

Figure 4. Corn with less late-season nitrogen stress (leaf chlorosis and necrosis) was shown at the end of the season when all the nitrogen was applied later through irrigation.

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- Applying all of the N at or near planting can be risky because excessive rainfall could result in leaching. Nitrogen losses result in costly reapplication and rescue treatments required to meet corn needs later in the growing season.
- If corn is N stressed early in the growing season continue to monitor the field and consider management with sidedress or rescue treatments.
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