Twin Row Conservation Tillage Corn Production


1Department of Agronomy and Soils, Auburn University, Auburn, AL 36849
2USDA-ARS Soil Dynamics Research Unit, Auburn, AL 36832

ABSTRACT
Corn (Zea mays L.) seeded in narrow row patterns can increase yield and accelerate canopy closure; however, costly equipment modifications may make narrow rows impractical. Twin row patterns are a compromise to enhance the benefit of narrow rows with fewer equipment modifications. We compared yield, soil water content, and leaf area index (LAI) for a conventional and a glyphosate-tolerant hybrid across three plant populations (low 39000-44000; medium 64000-69000; high 79000-84000 plants ha⁻¹) in two row patterns (single vs. twin) at four locations during the 2005 growing season. The experimental design was a RCB (r = 4) with a split-split plot restriction on row pattern × population interactions for grain yield were significantly different for two locations.

MATERIALS AND METHODS

Objectives
- Examine the effect of hybrid and plant population on grain yield, leaf area index, and soil moisture across twin and single row patterns.
- Compare yield, soil water content, and LAI for a conventional and a glyphosate-tolerant hybrid across three plant populations (low 39000-44000; medium 64000-69000; high 79000-84000 plants ha⁻¹) in two row patterns (single vs. twin) at four locations during the 2005 growing season.

Table 1. Average grain yield means observed for two hybrids and three plant populations across four locations during the 2005 growing season.

<table>
<thead>
<tr>
<th>Hybrid Population</th>
<th>Jay, FL</th>
<th>Headland, AL</th>
<th>Fairhope, AL</th>
<th>Belle Mina, AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN</td>
<td>7520</td>
<td>7500</td>
<td>7530</td>
<td>7520</td>
</tr>
<tr>
<td>GT</td>
<td>7090</td>
<td>7220</td>
<td>7220</td>
<td>7060</td>
</tr>
<tr>
<td>CN Low</td>
<td>7520</td>
<td>7500</td>
<td>7530</td>
<td>7520</td>
</tr>
<tr>
<td>CN Medium</td>
<td>6560</td>
<td>6570</td>
<td>6510</td>
<td>6540</td>
</tr>
<tr>
<td>CN High</td>
<td>6270</td>
<td>6240</td>
<td>6210</td>
<td>6230</td>
</tr>
<tr>
<td>GT Low</td>
<td>7050</td>
<td>7070</td>
<td>7080</td>
<td>7060</td>
</tr>
<tr>
<td>GT Medium</td>
<td>6570</td>
<td>6580</td>
<td>6550</td>
<td>6580</td>
</tr>
<tr>
<td>GT High</td>
<td>6360</td>
<td>6350</td>
<td>6370</td>
<td>6380</td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSION
- When grain yield comparisons were made between hybrids at different populations a significant difference was observed at three locations. The CN hybrid yielded higher than the GT hybrid in medium populations at all three locations; however, the GT hybrid was higher than the CN hybrid in high populations at two locations (Table 1).
- Row pattern × population interactions for grain yield were significantly different at two locations. At Headland the twin rows yielded higher than the single rows in the low and high hybrid populations (Figure 1). At Jay the single rows yielded higher than the twin rows at the high hybrid population (Figure 2).
- Twin rows produced a higher leaf area index than single rows when averaged across hybrids and populations for two of the locations (Figure 3).
- Two locations had significant row pattern × population differences for soil moisture. At Headland, twin rows had lower moisture than the single rows at a high population (Figure 4). At Jay, single rows had lower moisture than the twin rows at a high population (Figure 5).

CONCLUSIONS
- The CN hybrid appeared to yield as well or higher than the GT hybrid at low and medium populations; however high populations may better support GT hybrids.
- Seeding in twin row patterns can increase leaf area index; however, increased grain yield appeared inconsistent.
- Effective use of moisture may increase grain yields at higher plant populations; however, results were inconsistent on effective uptake between twin and single row patterns.
- Twin rows could be practiced in rotation with other crops already utilizing twin row configurations, without significant conversion cost or loss of yield; however, converting to twin rows to increase grain yield could be uneconomical.

REFERENCES