Effect of Varietal Selection and Planting Date on Tarnished Plant Bug Levels in Cotton

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RESEARCH PROBLEM

Applying recommended insecticides for tarnished plant bug (TPB) when they reach treatment threshold is the most commonly used option to manage this pest in cotton in Arkansas (Studebaker, 2012). However, increasing levels of resistance to insecticides are beginning to make some chemistries less effective. Therefore, it is important to evaluate other options for TPB management, such as host-plant resistance. Planting date can also have an effect on TPB populations in cotton. Typically, earlier planting dates tend to sustain less damage. Coupling resistance with an early planting date could be an effective tool in managing TPB in cotton.

BACKGROUND INFORMATION

Tarnished plant bug is one of the most important pests of cotton in Arkansas. From 2003 to 2012 it caused more yield losses than any other pest averaging a loss of over 50,000 bales in Arkansas (Williams, 2012). Recent data from small plot studies has indicated that some commercially grown cultivars may be less attractive or exhibit some level of resistance to TPB. A large block study was conducted in 2012 to evaluate the resistance of several early- and late-maturing cultivars that exhibited low damage from TPB in small plot studies in previous years.

RESEARCH DESCRIPTION

Trials were conducted at the Northeast Research and Extension Center, Keiser, Ark. Plots were 24-rows by 80-ft long arranged in a 3-factor factorial design with 4 replications. Early and late maturing cultivars showing low damage in small plots as well as early- and late-maturing cultivars showing high damage in small plots were used to conduct the study (Table 1). Each cultivar had two TPB treatment regimes: an untreated control and treated when TPB numbers reached 3/5 row-ft. Cultivars also had two planting dates: early and late. Plots were sampled weekly with a drop cloth. When TPB reached the treatment level of 3 bugs per

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5-row feet, treatments were applied with a high clearance sprayer calibrated to deliver 10 gal/acre-through two hollow cone nozzles per row. Acephate at 0.75 lb ai/acre was applied when threshold was reached. Plots did not reach treatment level until after the start of flowering. Yields were taken from the center 4 rows of each plot at the end of the season. All data were analyzed using ARM version 8 software (Gylling Data Management, Inc., Brookings, S.D.). Treatment means were separated at the $P = 0.05$ alpha level.

**RESULTS AND DISCUSSION**

The two susceptible cultivars, University of Arkansas (UA) 48 and Phytogen (PHY) 375WRF, reached treatment threshold more often than the resistant cultivars regardless of planting date (Fig. 1). Planting date did have an effect on TPB treatments in three cultivars with the later planting date requiring more TPB applications (Fig. 1). Planting date did not have any effect on TPB treatments in PHY 375WRF (Fig. 1). The level of yield increase over the untreated control in each cultivar by planting date is reported in Fig. 2. Therefore, the bars shown in Fig. 2 represent the level of yield loss caused by TPB in each cultivar. Resistant cultivars suffered less yield loss from TPB than susceptible cultivars. Planting date also had little effect on yield in resistant cultivars. Cultivar UA48, a highly susceptible variety, had the highest overall yield loss from TPB. Planting date also had the greatest effect on this cultivar with the highest yield loss in the late planting date.

**PRACTICAL APPLICATION**

Utilizing resistant cultivars to manage TPB in cotton is a viable option for growers in Arkansas. While these cultivars are not completely immune to TPB damage, they did require fewer insecticide applications and also suffered less yield loss from this pest than susceptible cultivars. By utilizing these cultivars, growers should be able to reduce insecticide applications for TPB and delay the development of insecticide resistance in this pest.

**LITERATURE CITED**

Table 1. Tarnished plant bug (TPB) resistance level and relative maturity of selected cultivars.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>TPB Resistance</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST5288B2RF</td>
<td>High</td>
<td>Mid to Late</td>
</tr>
<tr>
<td>UA222</td>
<td>High</td>
<td>Early</td>
</tr>
<tr>
<td>PHY375WRF</td>
<td>Low</td>
<td>Mid to Late</td>
</tr>
<tr>
<td>UA48</td>
<td>Low</td>
<td>Early</td>
</tr>
</tbody>
</table>

Fig. 1. Frequency of tarnished plant bug treatments in early and late planting dates in different cultivars in 2012.

Fig. 2. Average lint yield increase (lb/acre) over untreated in early- and late-planting dates in 2012.