Varietal Selection as a Management Tool for Tarnished Plant Bugs 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, 2010). 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.

BACKGROUND INFORMATION

The TPB is one of the most important pests of cotton in Arkansas. From 2003 to 2009 it caused more yield losses than any other pest averaging a loss of over 50,000 bales in Arkansas (Williams, 2009). Recent data from small plot studies has indicated that some commercially grown varieties may be less attractive or exhibit some level of resistance to TPB. A large block study was conducted in 2010 to evaluate the resistance of several varieties 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 90-ft long arranged in a randomized complete block design with 3 replications. Varieties showing low damage in small plots that were evaluated included; ST4554B2RF, ST5458B2RF, ST4498B2RF, PHY-375WRF and DP0935B2RF. One variety exhibiting high damage in small plots, FM1740B2RF, was also evaluated as a control. Each variety had two treatment regimes; an untreated control and treated when TPB numbers reached 3/5 row-ft. Plots were sampled weekly. When TPB reached the treatment level of 3 bugs per 5-row feet, treatments were applied with a high clearance sprayer calibrated to

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deliver 10 gal/acre through two hollow cone nozzles per row. Acephate at 0.75 lbs ai/acre was applied when threshold was reached. Plots did not reach treatment level until after bloom. Yields were taken from the center 4-rows of each plot at the end of the season. All data were analyzed using Agriculture Research Manager (ARM) version 8 software (Gylling Data Management, Inc., Brookings, S.D., 2009). Treatment means were separated at the $P = 0.05$ alpha level.

RESULTS AND DISCUSSION

The TPB numbers throughout the season are shown in Fig. 1. The number of times each variety reached a treatment threshold of 3 TPB/5 row-ft are shown in Fig. 2. Yields from treated and untreated plots are shown in Fig. 3. Differences in TPB populations were detected between varieties in large plots (Fig. 1). These differences in TPB densities did correlate with previous years’ small plot measurements (Fig. 4). Five of the varieties tested exhibited lower TPB damage to blooms in 2009 and also had lower populations in the large plot study in 2010. The variety with the highest amount of damage in 2009 also had higher levels of TPB earlier in the season in 2010. This variety also reached the treatment threshold of 3 TPB per 5 row-ft 4 times in 2010, while the other varieties reached threshold 1 to 2 times (Fig. 2).

PRACTICAL APPLICATION

Reduced TPB populations in certain varieties implies that they are less attractive to this pest until very late in the season. The small plot data correlates well with the large plot studies. This should also translate to the field, giving growers and pest managers another option for managing TPB. By utilizing these varieties, growers could potentially reduce insecticide applications for TPB in half.

LITERATURE CITED


Fig. 1. Tarnished plant bug density in untreated plots throughout 2010 growing season.
Fig. 2. Frequency of reaching tarnished plant bug treatment threshold of 3 TPB per 5 row-ft.

Fig. 3. Lint yield for each variety in 2010.
Fig. 4. Percent tarnished plant bug damaged blooms in 2-row plots in 2009.