TARNISHED PLANT BUG INJURY AND BEHAVIOR RESPONSES TO A NEW BT TRAIT IN COTTON

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Abstract

The tarnished plant bug, *Lygus lineolaris*, is the key insect pest of cotton in Tennessee. In 2016, this pest accounted for nearly 50% of the bales of cotton lost to insect pests. The tarnished plant bug has become increasingly difficult to manage with foliar insecticides due to growing resistance to several classes of insecticides across the Mid-South and a lack new effective modes of action for control. Recently, Monsanto has been developing a Bt trait for the control of tarnished plant bug. This Bt trait expresses the toxin Cry51Aa2. During 2016 and 2017, trials were conducted in Tennessee at the West Tennessee Research in Jackson and at the Research and Education Center in Milan to determine the benefits of this new trait for the management of thrips and tarnished plant bugs. The first part of this presentation focused on field trials evaluating the effects of this trait on tarnished plant bug only. Trials were designed as a spilt-plot design with three main factors. Factor A was level of tarnished plant bug (TPB) control: untreated control, insecticide applications made on TPB populations, and weekly automatic applications. Factor B was the trait: Bt vs. non-Bt. Factor C was the level of thrips control: IST + foliar application vs. untreated control (thrips data not presented). The Bt trait significantly increased square retention in untreated plots during the first three weeks of squaring. The trait also significantly reduced the total number of tarnished plant bugs, especially large nymphs. Based on current treatment thresholds, the Bt trait required an average of 1.2 fewer insecticide applications for tarnished plant bug than non-Bt cotton. The trait also increased yield compared with non-Bt cotton not sprayed with an insecticides for tarnished plant bug by over 440 pounds of seed cotton per acre. However, insecticide applications for TPB increased yield on both the Bt and non-Bt cotton. The second part of this presentation presented data from tarnished plant bug behavior studies conducted at the West Tennessee Research and Education Center in 2017. In a cage study, there was no difference in the total number of TPB eggs laid in Bt cotton compared to non-Bt cotton. In a field trial of cotton untreated with insecticides after first bloom, there were significantly more damages (dirty) squares, dirty blooms, and tarnished plant bugs found in non-Bt cotton compared with Bt cotton. Similarly, there was significantly more damage to 1-inch bolls sampled in non-Bt cotton compared with Bt cotton. When harvested, the Bt cotton had significantly higher yield than the non-Bt cotton.