CONTROLLING TARNISHED PLANT BUG (LYGUS LINEOLARIS L.) IN COTTON (GOSSYPIUM HIRSUTUM L.) THROUGH A TRANSGENIC APPROACH John Cameron Corbin Angus Catchot Jeff Gore Don Cook Darrin Dodds Chris Daves Mississippi State University

Starkville, MS

<u>Abstract</u>

Tarnished plant bug, Lygus lineolaris (Palisot de Beauvois), is a major pest of cotton, Gossypium hirsutum L., in the midsouthern United States. It is exclusively controlled with foliar insecticide applications, many of which, resistance has already been confirmed. A new Bacillus thuringiensis (Bt) trait has been introduced in cotton that will be used to control hemipteran and thysanopteran pest species. The objective of this research was to conduct experiments to determine the impact of this new transgenic variety of cotton on tarnished plant bug populations and to assess future treatment thresholds in these varieties. Experiments were conducted throughout 2016 and 2017 in Sidon, MS and in Stoneville, MS. Experiments were designed to compare the interactions between the Bt traited plots and non-traited plots and the insecticide spray treatments, which consisted of different thresholds comparing early season (pre-flowering) and mid-late season (flowering) applications. In 2016 at the Sidon location, there were significantly lower tarnished plant bug nymph numbers in the traited plots versus the non-traited plots, as well as significant differences in the treatments. In 2016 at the Stoneville location there were significant differences between treatments, but not traited plots versus non-traited plots. There were significant differences in yield when comparing traited plots versus non-traited plots in the current threshold, late season, double threshold, and untreated control treatments at the Sidon location in 2016. Significant differences in yield were observed between traited plots and non-traited plots in the early season, late season, double threshold, quadruple threshold, and untreated control treatments at the Stoneville location in 2016. In both locations in 2016 traited treatments yielded higher than nontraited treatments. In 2017 at the Stoneville location, traited plots in the early season, late season, double threshold, and untreated control treatments yielded significantly higher than the non-traited plots. In 2017 at the Sidon location, there was no significant yield difference in the threshold, double threshold, early season, and late season plots. The non-traited weekly plots yielded significantly higher than the traited weekly plots. By implementing this transgenic approach, the number of insecticide applications necessary to effectively control tarnished plant bugs will be reduced compared to non-transgenic isolines.