# STRATEGIES FOR MANAGING PEST COMPLEXES IN THE MIDSOUTHERN U. S.

Scott Stewart
Sandy Steckel
The University of Tennessee, West Tennessee Research and Education Center
Jackson, TN
Gus Lorenz
University of Arkansas, Department of Entomology
Lonoke, AR
Jeff Gore
Mississippi State University, Delta Research and Extension Center
Stoneville, MS
Angus Catchot
Mississippi State University, Department of Biochemistry, Mol. Biology, Entomology and Plant Pathology
Mississippi State, MS

## Abstract

The dominant pest in the midsouthern U. S. is the tarnished plant bug. However, management of this pest with foliar insecticide applications and the concurrent infestations of occasional pests often make the proper selection of insecticides very important. The relative efficacy of most insecticides used for control of tarnished plant bug has been well documented (Figs. 1-3, Lorenz et al. 2011). One important strategy to manage pest complexes and prevent secondary pest outbreaks is to avoid the unnecessary use of insecticides. Another strategy is to choose insecticides, combinations or rotations that provide control of target pest populations and are less likely to create secondary pest outbreaks. For example, utilizing tank mixed or pre-mixed insecticide products can provide important control of both tarnished plant bug and stink bugs, whereas some products applied alone may leave yield in the field (Figs.4-12). Conversely, choosing the wrong insecticide or tank mix partner can lead to secondary pest outbreaks of aphids (Fig. 7) or spider mites (Fig. 13). Tanks mixes for bollworm control in Bt or non-Bt cotton will often be necessary to preserve yield when other pests are present (Figs. 14, 15). Relatively new insecticides such as novaluron (Diamond) or sulfoxaflor (Transform) provide excellent control of tarnished plant bugs but still provide inadequate control of stink bugs, bollworm and some other pests. Thus, tank mixes or rotations will provide better overall pest management, particularly during mid to late season when more than one pest is commonly present.

## References

Lorenz, G., S. Akin, G. Studebaker, S. Stewart B. R. Leonard, K. Tindall, A. Catchot, J. Gore, D. Cook and F. Musser. 2011. Report on Midsouth regional plant bug efficacy trial, 2009-2010. Pp. 1199 in Proceedings Beltwide Cotton Conf.

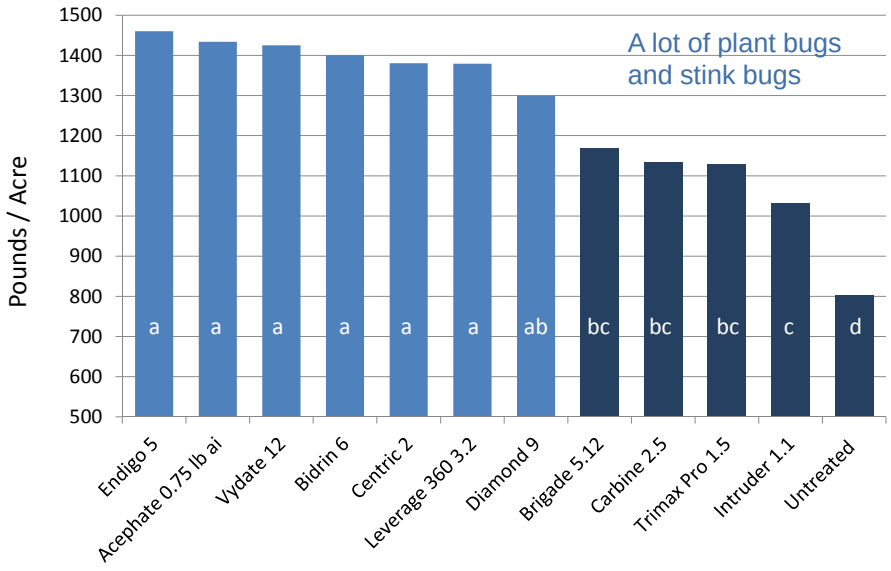


Figure 1. Lint yield response of Bt cotton to season long management with various insecticides primarily targeting tarnished plant bug. A total of four applications were made at the rates (oz/acre) indicated on the x axis. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

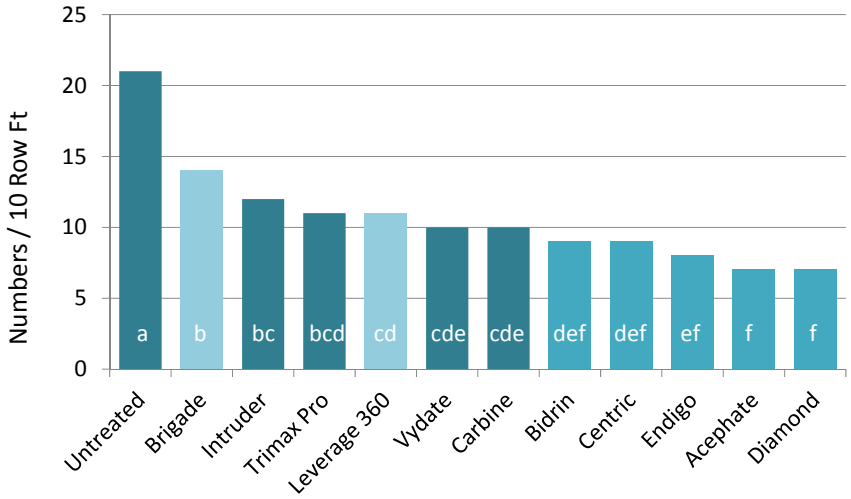


Figure 2. Numbers of tarnished plant bugs in Bt cotton treated with various insecticides. Average data at 5-10 days after two applications are shown across seven locations in the Midsouth. Insecticide rates are those indicated in Fig. 1. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

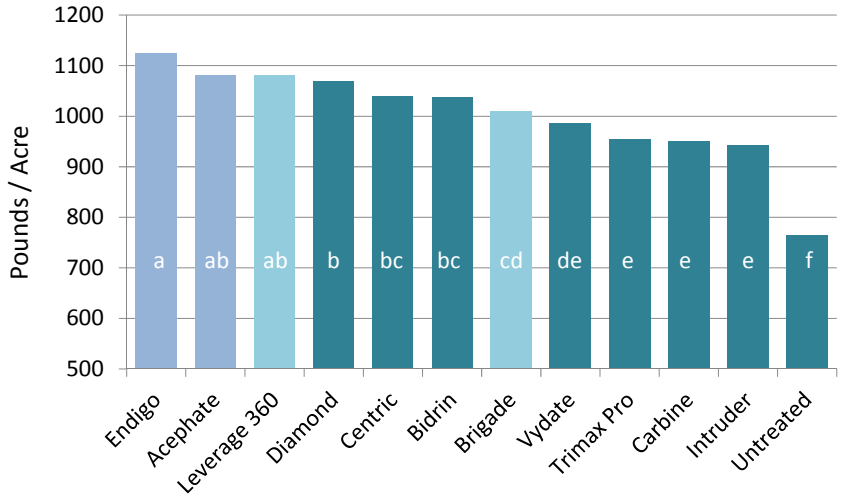


Figure 3. Lint yield response of Bt cotton to season long management with various insecticides primarily targeting tarnished plant bug. Average data are shown across nine locations in the Midsouth. Insecticide rates are those indicated in Fig. 1. Letters on bars indicate statistically significant differences ($P < 0.05$, LSD).

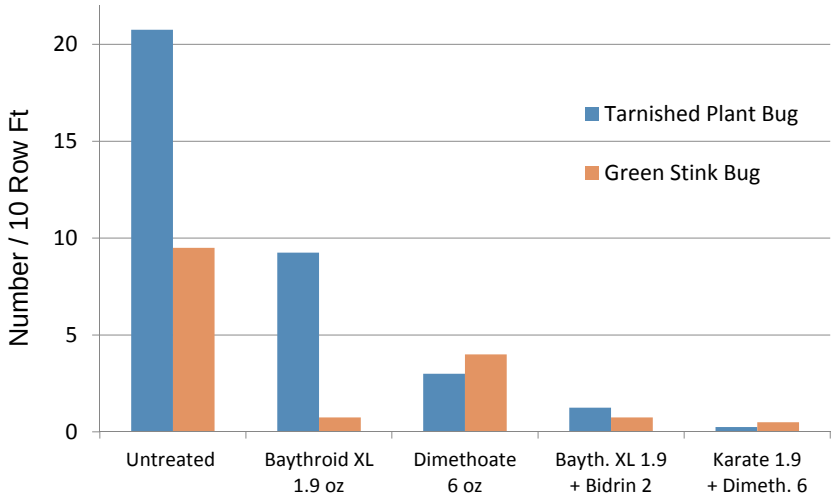


Figure 4. Numbers of tarnished plant bugs and green stink bugs six days after a second application of various insecticide treatments showing how tank mixes can be used to manage pest complexes. Rates (oz/acre) are shown on the x axis.

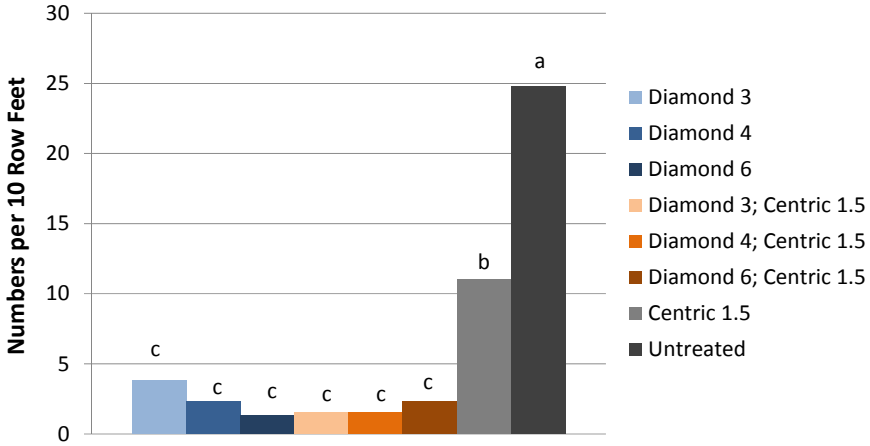


Figure 5. Cumulative numbers of tarnished plant bugs over the last three rating dates for various insecticide treatments. A total of four applications were made at the rates (oz/acre) indicated in the legend. Letters on bars indicate statistically significant differences ($P < 0.05$, LSD).

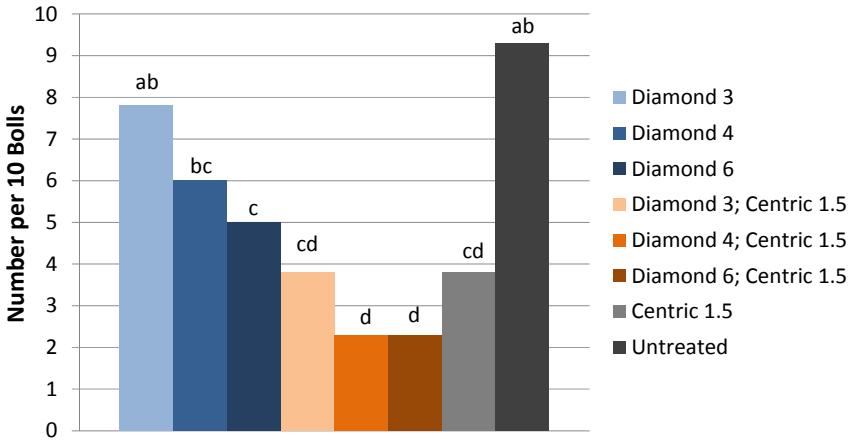


Figure 6. Numbers of bolls with stink bug injury six days after the fourth applications of various insecticide treatments. Rates (oz/acre) are indicated in the legend. Letters on bars indicate statistically significant differences ($P < 0.05$, LSD).

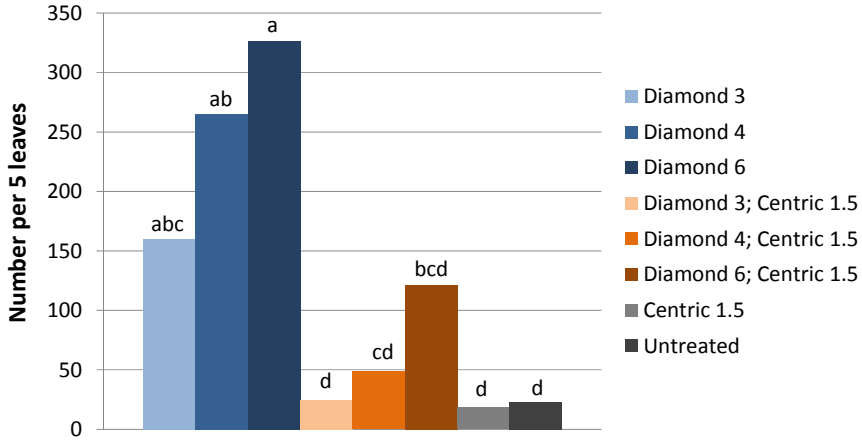

Figure 7. Numbers of cotton aphids at 12 days after a second application of various insecticide treatments, showing how Diamond applied alone flared aphid populations. Rates (oz/acre) are indicated in the legend. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

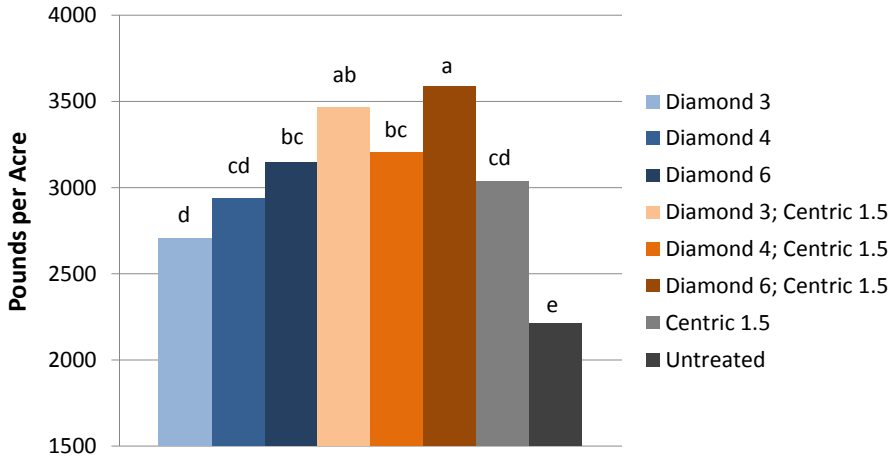


Figure 8. Lint yield following four applications of various insecticide treatments showing how tank mixes improved yield compared with insecticides applied alone. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

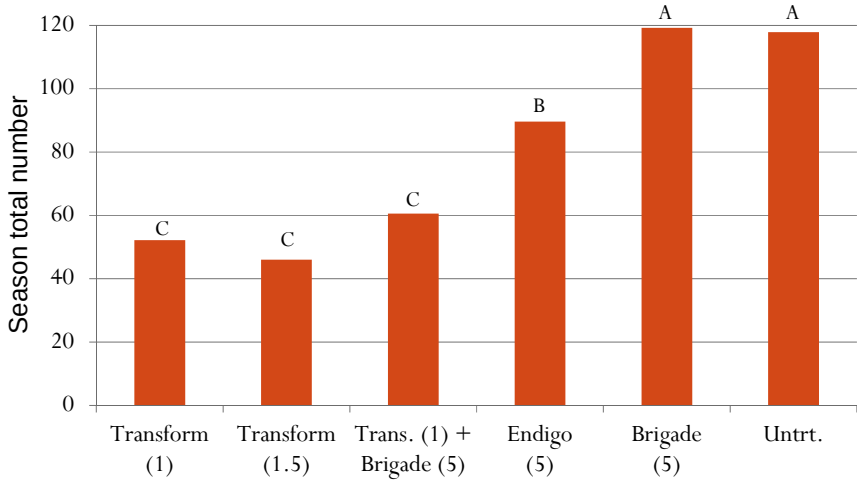


Figure 9. Cumulative numbers of tarnished plant bugs across all rating dates for various insecticide treatments. A total of three applications were made at the rates (oz/acre) indicated on the x axis. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

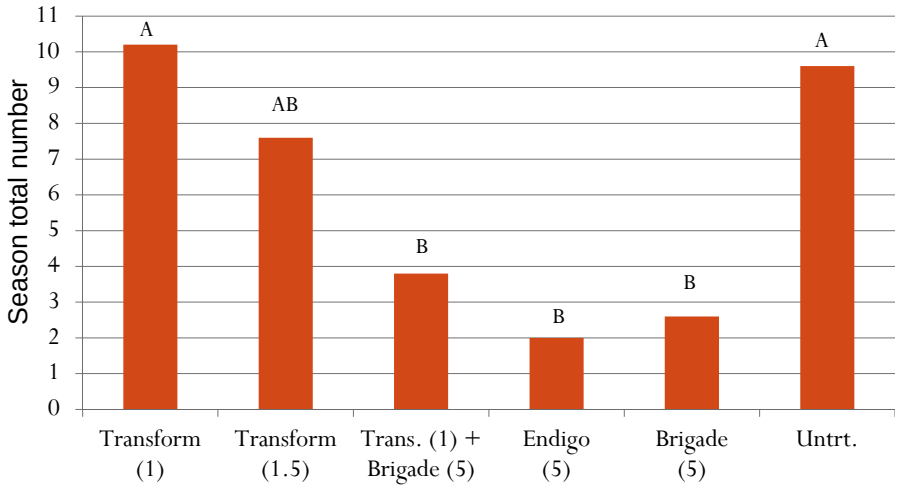


Figure 10. Cumulative numbers of stink bugs across all rating dates for various insecticide treatments. A total of three applications were made at the rates (oz/acre) indicated on the x axis. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

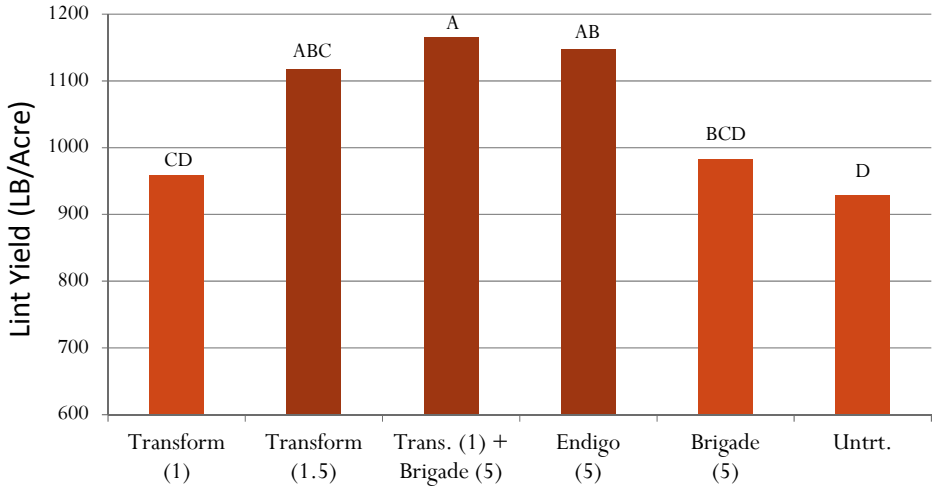


Figure 11. Lint yield responses of Bt cotton following three applications made at the rates (oz/acre) indicated on the x axis. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

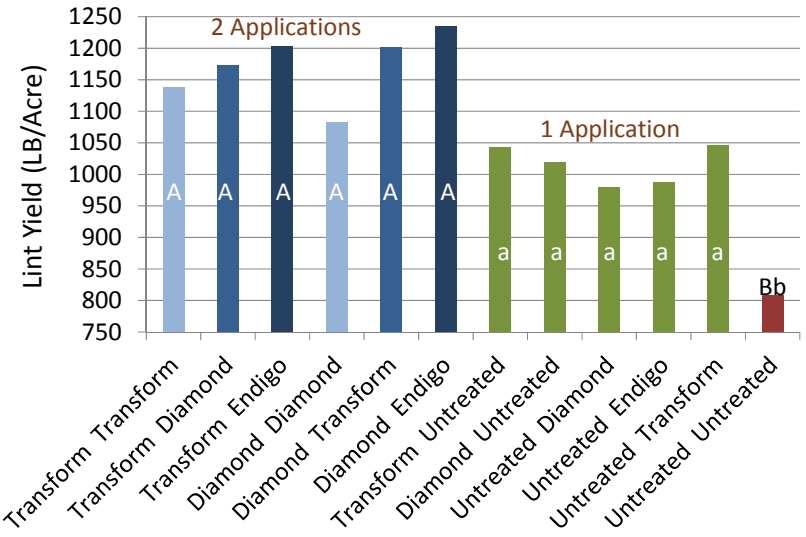


Figure 12. Lint yield response of Bt cotton to applications of insecticides when rotated as indicated on the x-axis. Transform 50WG, Diamond 0.83EC and Endigo ZC were applied at 1.5, 9 or 5 oz/acre, respectively. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

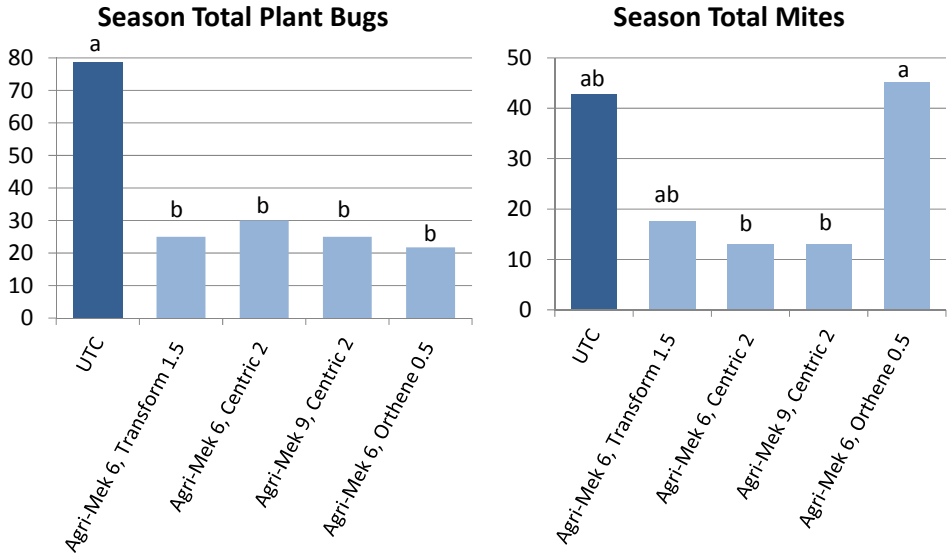


Figure 13. Season total number of tarnished plant bugs and spider mites following multiple applications of avermectin (Agri-Mek, 6 oz/acre) when tank-mixed with various insecticides, showing how acephate (Orthene 97SP, 0.5 lb/acre) flared populations of spider mites compared with alternative treatments. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

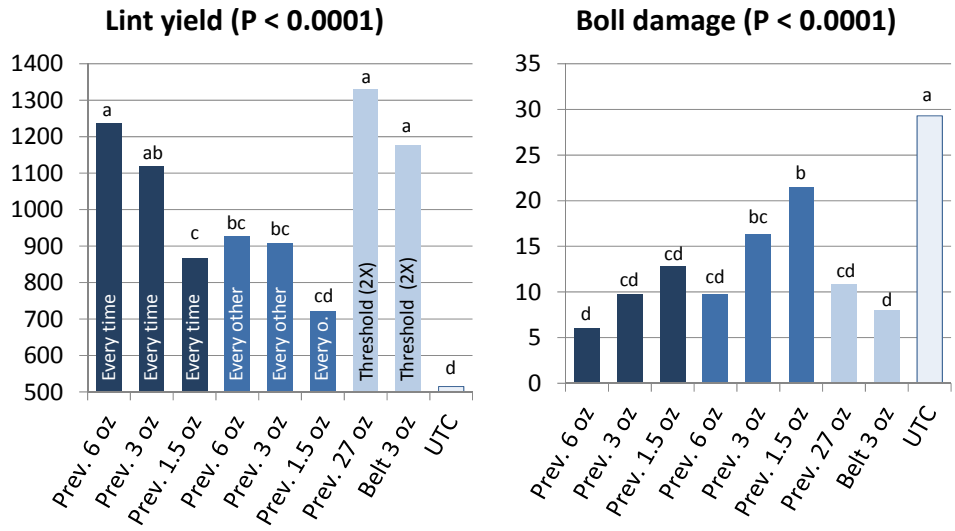


Figure 14. Lint yield response and bollworm injury on non-Bt cotton (DP 174RF) following various insecticide treatments. Treatments of Prevathon 0.43SC at various rates or Belt SC (3 oz/acre) were applied in a tank mix with insecticide applications for tarnished plant bug. Prevathon or Belt SC was tank mixed with insecticides targeting plant bugs at every insecticide application, every other application, or as needed based on current threshold recommendations. Letters on bars indicate statistically significant differences (P < 0.05, LSD).

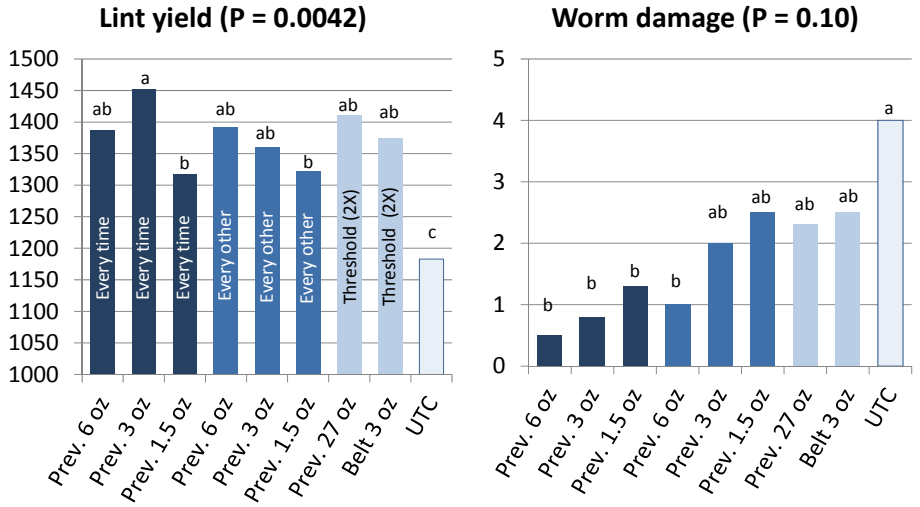


Figure 15. Lint yield response and bollworm injury of Bt cotton (DP 0912 B2RF) following various insecticide treatments. Treatments of Prevathon 0.43SC at various rates or Belt SC (3 oz/acre) were applied in a tank mix with insecticide applications for tarnished plant bug. Prevathon or Belt SC was tank mixed with insecticides targeting plant bugs at every insecticide application, every other application, or as needed based on current threshold recommendations. Letters on bars indicate statistically significant differences (P < 0.05, LSD).