

# Impacts of Insect Growth Regulators on Tarnished Plant Bug Management

## Introduction

Mainly due to insecticide resistance, the tarnished plant bug (TPB, *Lygus lineolaris*) has become the most economically damaging pest of cotton in Arkansas, Mississippi, Louisiana, Tennessee, and Missouri. Depending on the year and location, insecticide treatments targeting TPB may range from two to five applications but have been upwards of seven or eight in certain situations. Currently, novaluron (Diamond Insecticide) is the only registered insect growth regulator (IGR) with activity against TPB. Previous research has shown the utilization of Diamond at the third week of square or at peak adult migration has aided in tarnished plant bug control often resulting in increased yields. Diamond does not cause mortality to adults; therefore, properly timed applications of Diamond may also require an insecticide with adulticidal activity.

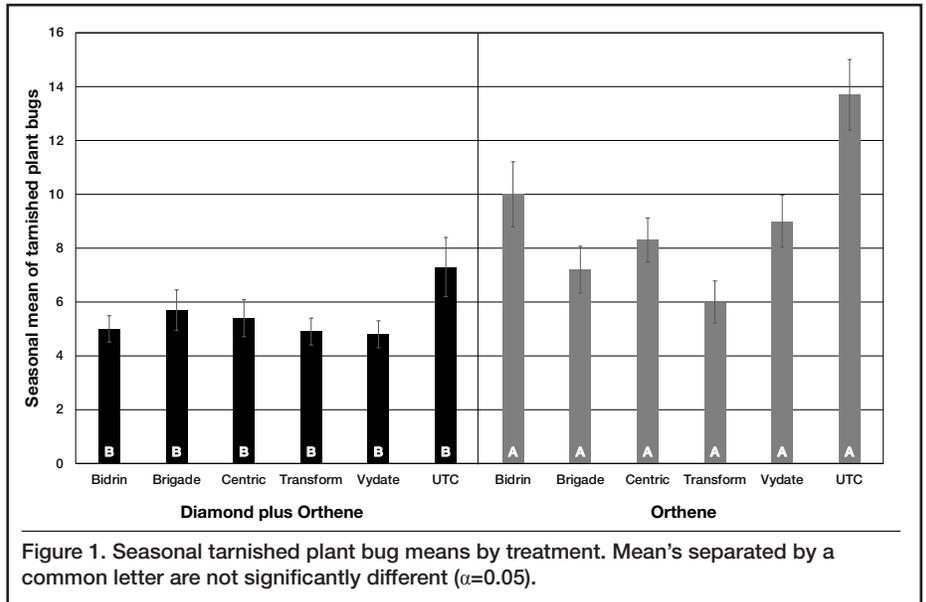
The objective of this study was to evaluate the residual activity of Diamond and determine the impact of subsequent insecticides on tarnished plant bug efficacy in the Midsouth.

## Methods

In 2019, field studies were conducted in Jackson, Tennessee; Lonoke, Arkansas; Glendora, Mississippi; Sidon, Mississippi; and Stoneville, Mississippi. In 2020, studies were conducted in same Mississippi locations.

## Treatments

Application of Diamond (6 fluid ounces) plus Orthene (0.77 pound) and Orthene (0.77 pound) were made to large blocks of cotton at the third week of squaring. Seven to 10 days later, applications of Bidrin (6.4 fluid ounces), Transform (1.5 ounces), Brigade (6.4 fluid ounces), Centric (2 ounces), and Vydate (11 fluid ounces) were made to smaller blocks within the larger block that had been treated with Diamond plus Orthene or Orthene alone.



## Results

The untreated control treated with Diamond plus Orthene had fewer tarnished plant bugs at the third week of square compared with the untreated control treated with Orthene only.

Fewer tarnished plant bugs were present in the Diamond plus Orthene treatment than the Orthene only regardless of the insecticide treatment that followed (Figure 1).

Overall, yields were higher in Diamond plus Orthene treated plots compared to those treated with Orthene alone (Figure 2).

## Conclusion

Shortly after the initial registration of the IGR Diamond in cotton, this insecticide was generally considered an add-on treatment that increased input costs. However, research has shown that Diamond applied during times of peak adult migration provides a yield benefit above that observed with an adulticide alone. Peak migration can vary among locations and years, but it generally occurs from the third week of square to early bloom. Diamond does not cause mortality of adult tarnished plant bugs, but previous research has shown that it can affect reproduction when adults are exposed.

Overall, the added residual control combined with good activity against young nymphs and lower reproductive capacity makes

Diamond an important component of IPM programs in the Midsouth. Also, the benefits of Diamond use in cotton tend to be greatest where there are high levels of resistance to other classes of insecticides. This research project confirmed the benefits of using and IGR such as Diamond in cotton, but it also demonstrated the importance of mixing an adulticide with it.

Funding for the research was provided by Cotton Incorporated – Managing Cotton Insects in Mississippi. This publication is based on the thesis chapter, “Residual effects of novaluron and efficacy of subsequent applications to effectively control midsouth tarnished plant bug populations” in the thesis *Seasonal management strategies for tarnished plant bug in Midsouth cotton production system* by Ryan Mann et al., 2021.

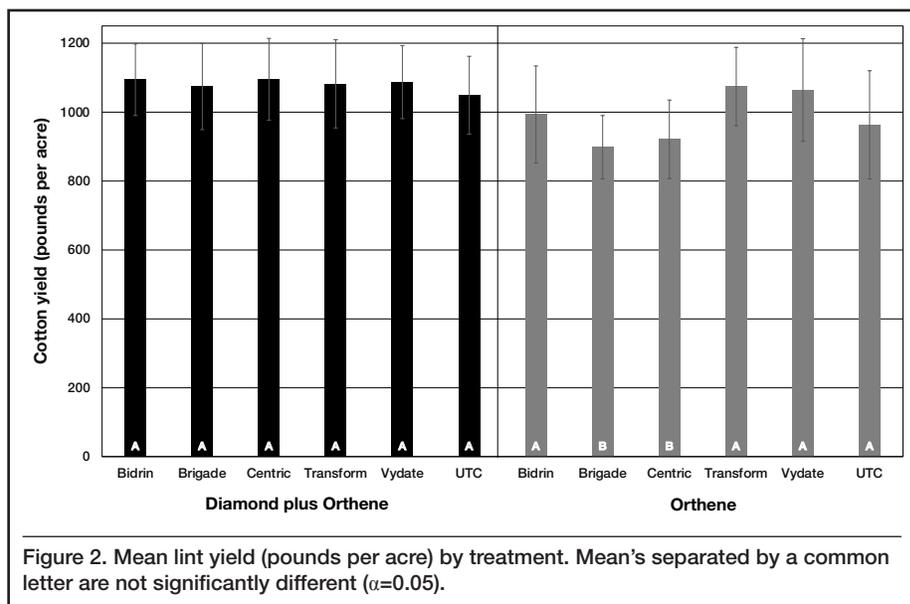


Figure 2. Mean lint yield (pounds per acre) by treatment. Mean's separated by a common letter are not significantly different ( $\alpha=0.05$ ).



Publication 3756 (POD-04-22)

By **Whitney D. Crow**, PhD, Assistant Professor, Delta Research and Extension Center; **Ryan Mann**, Graduate Research Assistant, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology; **Don Cook**, PhD, Associate Research Professor, Biochemistry, Molecular Biology, Entomology, and Plant Pathology; **Jeff Gore**, PhD, Interim Head, Delta R&E Center; **Angus Catchot**, PhD, Professor, Biochemistry, Molecular Biology, Entomology, and Plant Pathology; **Scott D. Stewart**, University of Tennessee; and **Ben Thrash** and **Nick Bateman**, University of Arkansas.

Copyright 2022 by Mississippi State University. All rights reserved. This publication may be copied and distributed without alteration for nonprofit educational purposes provided that credit is given to the Mississippi State University Extension Service.

Produced by Agricultural Communications.

Mississippi State University is an equal opportunity institution. Discrimination in university employment, programs, or activities based on race, color, ethnicity, sex, pregnancy, religion, national origin, disability, age, sexual orientation, gender identity, genetic information, status as a U.S. veteran, or any other status protected by applicable law is prohibited.

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. GARY B. JACKSON, Director

