

# 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 the same Mississippi locations.

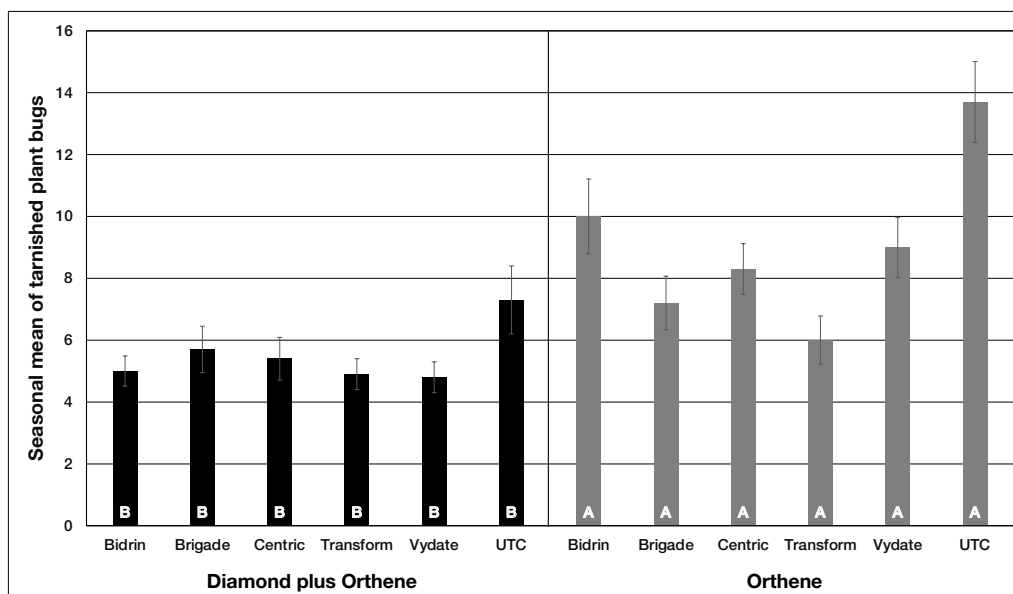
## Treatments

Application of Diamond (6 fluid ounces) plus Orthene (0.77 pound) and Orthene (0.77 pound) was 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.

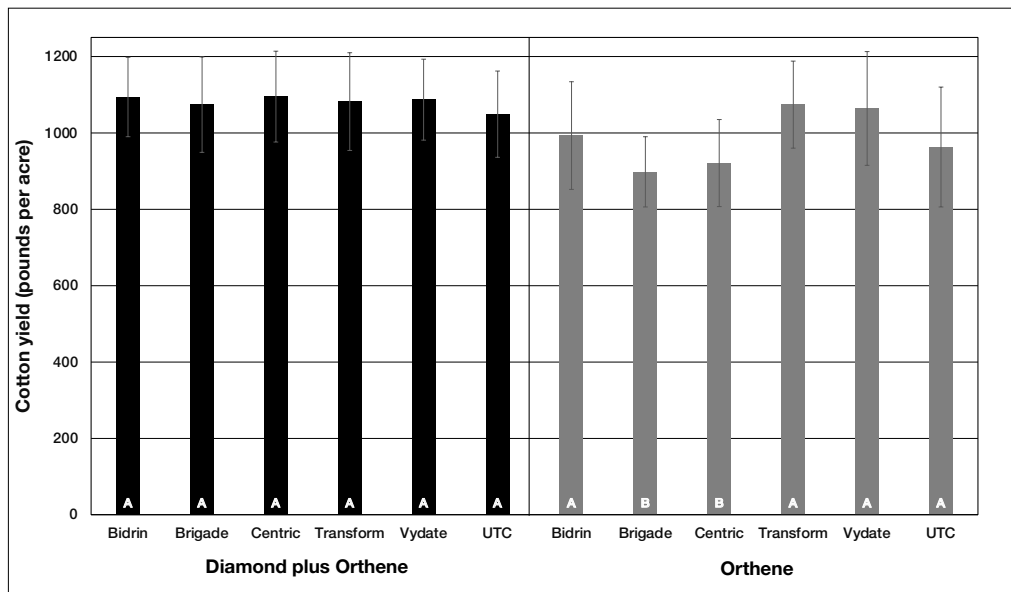
## Results

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).



**Figure 1.** Seasonal tarnished plant bug means by treatment. Mean's separated by a common letter are not significantly different ( $\alpha=0.05$ ).



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

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 an IGR such as Diamond in cotton, but it also demonstrated the importance of mixing an adulticide with it.

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