### IMPACT OF FOLIAR INSECTICIDE APPLICATION ON CONVENTIONAL AND DUAL GENE COTTON IN ARKANSAS, 2014 N. Taillon G. Lorenz A. Plummer M. Chaney B. Thrash University of Arkansas Lonoke, AR

# Abstract

In 2014 a trial was conducted in Arkansas to evaluate the impact and efficacy of foliar oversprays on conventional and dual-gene cottons, specifically Bollgard II, WideStrike, WideStrike III and Twinlink, for control of cotton bollworm, *Helicoverpa zea*. The foliar insecticide used was Prevathon (rynaxapyr or chlorantraniliprole).

#### **Introduction**

While plant bugs are considered the number one pest in Arkansas cotton, caterpillar pests can be equally or even more devastating to the bottom line for our producers. In 2014, 97% of the cotton acreage in Arkansas was planted with dual gene *B.t.* cultivars and every acre was infested by the bollworm, *Helicoverpa zea (Williams, et. al.,* 2015) New technologies such as Twinlink became available in 2013 and Widestrike 3 was available on a limited basis in 2014. When bollworm populations are high in cotton, dual gene *Bacillus thuringiensis (Bt)* cotton may not provide adequate protection to maintain potential yield. In those situations, supplemental foliar applications may be required to provide additional yield protection. Growers treated 65 % of total acres for lepidopteran pest, 57% of which was for the bollworm, and lost over \$4 million.

The objective of this study was to evaluate the impact and efficacy of foliar oversprays on conventional and dual-gene cottons, specifically Bollgard II, WideStrike, WideStrike III and Twinlink, for control of cotton bollworm, *Helicoverpa zea*.

### **Materials and Methods**

This trial, part of a regional MSEWG study, was located in Pine Bluff, Arkansas. Plot size was 12.5 ft by 40 ft in a randomized complete block split design with 4 replications (Fig. 1) Plots consisted of Conventional, cultivar DP174; Twinlink, cultivar ST 5289GLT; Bollgard II, cultivar DP1311; WideStrike, cultivar PHY499; and WideStrike III, cultivar PHY495. Treatments included an untreated control and foliar applications of Prevathon (20 fl. oz. /a). Foliar applications were made using a Mudmaster sprayer. The boom was fitted with TX8 hollow cone nozzles at 19in. nozzle spacing. Spray volume was 10 gal/a, at 40 psi. Foliar applications were applied on August 4<sup>th</sup> and August 26<sup>th</sup>. Damage ratings were taken 3 (terminals and squares only), 11, and 17 days after first application; and, 3 and 9 days after 2<sup>nd</sup> application by sampling 25 terminals, squares, blooms, and bolls per plot. Plots were machine harvested using a John Deere two row plot picker. Data were processed using Agriculture Research Manager Version 9 and Duncan's New Multiple Range Test (P=0.10) to separate means.

Fig. 1 Overhead view of Conventional and Transgenic Variety Sprayed vs. Unsprayed, 2014 test with plots labeled to show obvious differences between sprayed and unsprayed environments.



### **Results and Discussion**

In the unsprayed portion of the test, as expected, cumulative damage in the Conventional cultivar was high compared to the unsprayed transgenics (Fig. 2). WideStrike had more damage compared to Bollgard II and WideStrike III, but was similar to Twinlink. WideStrike III had less damage compared to Twinlink.



Fig. 2. Cumulative damage of fruit (25 squares, blooms, and bolls when present) on untreated plots.

In the sprayed portion of the test, cumulative damage was higher in the Conventional cultivar than Twinlink, Bollgard II, and Widestrike III (Fig. 3). No difference in damage was observed between Widestrike and conventional. There was less damage in Bollgard II and Widestrike III.



Fig. 3. Cumulative damage of fruit (25 squares, blooms, and bolls) on plots treated with Prevathon 20 oz/acre, August 4 and 26.

Foliar applications reduced cumulative damage in all treatments except for Widestrike III (Figs. 2 and 3). No differences in damaged fruit numbers were observed for Widestrike III whether it was sprayed or not; all other treatments had less damage when sprayed. This would indicate that the third gene enhanced bollworm control. Conventional unsprayed had more total damaged fruit (%) than all other treatments (Fig. 4). However, 2 applications of Prevathon (20 oz/acre) reduced damage for the Conventional cultivar similar to the unsprayed transgenics. Supplemental foliar applications to Twinlink, BG II, WideStrike III reduced damaged compared to the conventional sprayed cultivar but WideStrike was not different.



Fig. 4. Season Total damage rating % of 25 squares, blooms, and bolls after two applications, August 4 and 26.

Yield data indicated that all transgenics had higher yield compared to the Conventional cultivar, whether sprayed or unsprayed (Fig. 5). Twinlink and Widestrike III had similar yields and were higher than the yield of Bollgard II. These differences may have been due to agronomic issues with those varieties rather than control of caterpillar pests.

Fig. 5. Control of Thrips with Insecticide Seed Treatments in Arkansas



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## **References**

Williams, M. R., et. al. 2014. Cotton Insect Losses 2014. In: Proceedings Beltwide Cotton Conference 2015.