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HELIOTHINE CONTROL WITH WIDESTRIKE COTTON IN ARKANSAS, 2004

G. M. Lorenz and J. Hardke
Univ. of Arkansas CES
Little Rock, AR
J. K. Greene and C. Capps
Univ. of Arkansas SEREC
Monticello, AR
K. Colwell
Little Rock, AR
G. Studebaker
Univ. of Ark.- NEREC
Keiser, AR

Abstract

WideStrike cotton was evaluated for control of cotton bollworm in a strip plot trial. Treatments included Phytogen 440 WR (Widestrike) with 0,1, and 2 foliar applications of Prolex and Phytogen 410 R (conventional cotton) treated 0 or 3 times. Results indicated that Widestrike untreated was similar to conventional cotton treated three times.

Introduction

WideStrikecotton (*Gossypium hirsutum* (L.)) containing the Cry1Ac and Cry 1F endotoxin of *Bacillus thuringiensis*, will become commercially available to cotton producers in 2005. It is anticipated that WideStrike will provide cotton producers with effective control of heliothines, tobacco budworm, *Heliothis virescens* F. and *Helicoverpa zea*, and other lepidopterous pests of cotton in Arkansas. The first transgenic, Bollgard, gave excellent control of tobacco budworm but control of bollworm, *Helicoverpa zea* (Boddie), and various other lepidopterous pest has achieved less reliable control and depended more on foliar insecticide treatments in conjunction with Bt variety (Lorenz et. al 2002).

WideStrike was developed to give additional control of lepidopterous pests and decrease the probability of population resistance of targeted pests with the additional toxin Cry1F. The only other transgenic with two endotoxins is Bollgard II, which contains Cry1 Ac and Cry2 Ab. Previously conducted studies have shown Bollgard® II to be effective in controlling bollworm, tobacco budworm and soybean looper (Allen et. al 2000; Stewart et. al 2000; Ridge et. al 2000). The purpose of this study was the examine the efficacy of WideStrike, sprayed and unsprayed, to conventional cotton, sprayed and unsprayed, for cotton for control of lepidopterous pests. Additional observations were made to compare agronomic characteristics of these varieties.

Materials and Methods

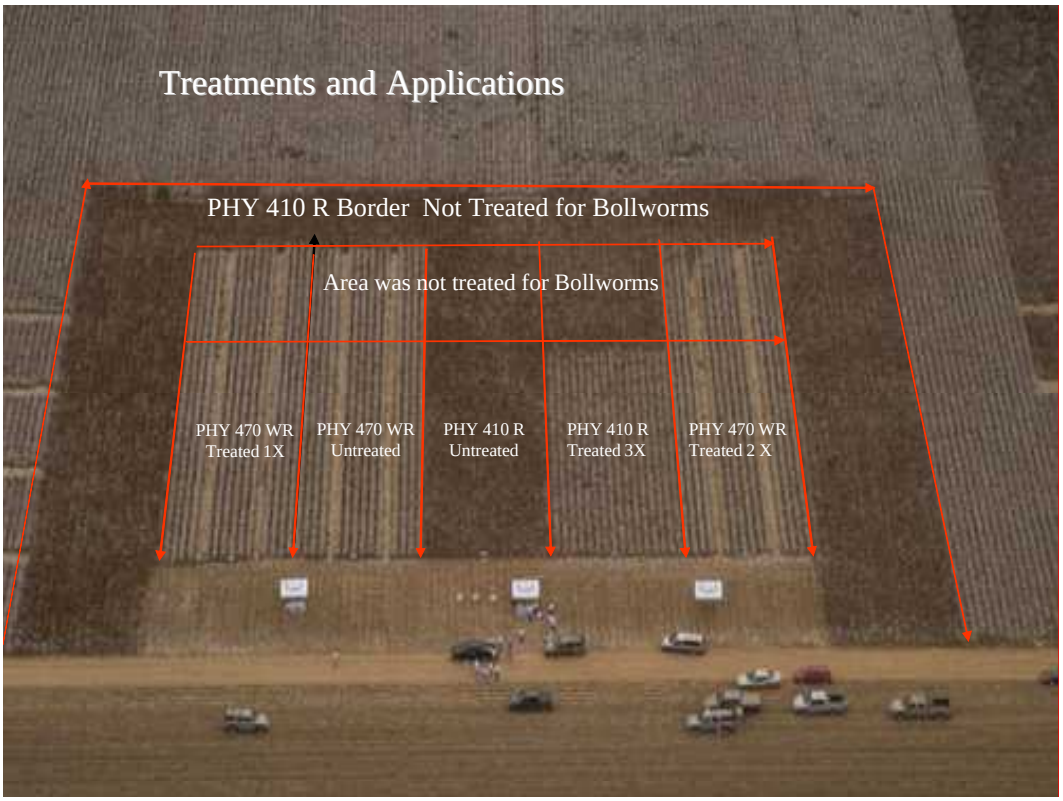
The trial was conducted at Hooker Farms in Jefferson County, AR in 2004. The treatments utilized in the trial were Widestrike Sprayed and unsprayed and Conventional sprayed and unsprayed. PHY 470 WR was planted May 10, 2004 along with the conventional PHY 410 R. The field was planted and subdivided into 16 row plots using 38 inch row spacing and 150 feet length. Foliar treatments of Prolex (0.016 ai/A) were made as needed according to statewide threshold recommendation. This resulted in 3 applications to conventional cotton in the sprayed regimen WideStrike plots received either 0, 1, or 2 foliar applications (see Fig. 1). Treatments were applied with a John Deere Hi-Cycle 6500 using a compressed air delivery system using an 8 row boom with 19 inch nozzle spacing. The nozzles used for application were Tee-Jet TXVS 6. Operating pressure was 45 pounds per square inch and 9.17 gallons per acre of volume. Treatments were foliar applied on July 8, July 13, July 20, 2004. Observations were conducted on July 12, July 16, July 19, July 23, July 26, and July 29, 2004. Data was collected from random samples of 25 terminals, 25 squares, 10 blooms, and 10 bolls. Plots were machine picked on October 25, 2004.

Results and Discussion

Trap counts were extremely low for budworm and larval collections indicated field populations were cotton bollworm only. In the first three weeks of July cotton bollworm pressure was extremely high and the conventional

plot was treated weekly during this period for three applications. Widestrike plots were treated July 13 (1X) and July 20 (2X). However, resulting data showed that little difference occurred in the Widestrike plots regardless of whether they were sprayed once or twice and therefore the data was merged as a single unit for reporting purposes. Seasonal percent damage (Fig. 2) indicated extremely high damage in the unsprayed portion of the plot compared to sprayed conventional and Widestrike sprayed or unsprayed. Damage to conventional sprayed was close to that of Widestrike unsprayed. However, Widestrike sprayed had the least damage of all treatments. During the entire sampling period only 3 bollworms were observed and collected in the Widestrike unsprayed plot, the same was found in Widestrike sprayed. This compared to 52 bollworm larvae in the unsprayed conventional and 9 bollworms

Fig. 1. Test design and observable worm damage in untreated areas.



in the sprayed conventional plots. Harvest data indicated the best yield of 1,321 lb/ A with the Widestike sprayed plot, this compared to Widestrike unsprayed which yielded 936 lb/ A indicating supplemental foliar applications may be very effective when needed. The conventional sprayed plot yielded 1236 lb/ A which would be considered close to that of the Widestrike sprayed plot. The untreated conventional, as seasonal damage indicated, was severely affected by worm damage and yielded only 472 lb/ A. These data indicate that Widestrike does show good protection to cotton bollworm. More research is needed to determine efficacy on other lepidopterous pests in Arkansas and how this new transgenic can best benefit cotton growers in Arkansas.

Acknowledgments

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Fig. 2. Seasonal percent damage for various treatments.

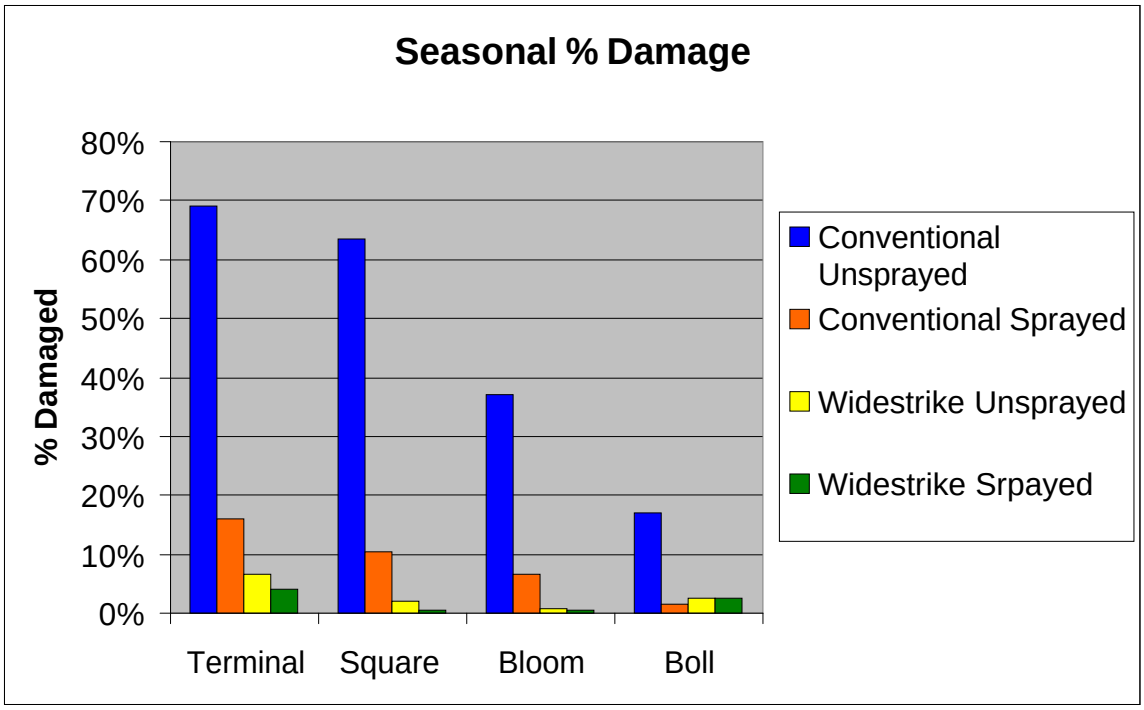
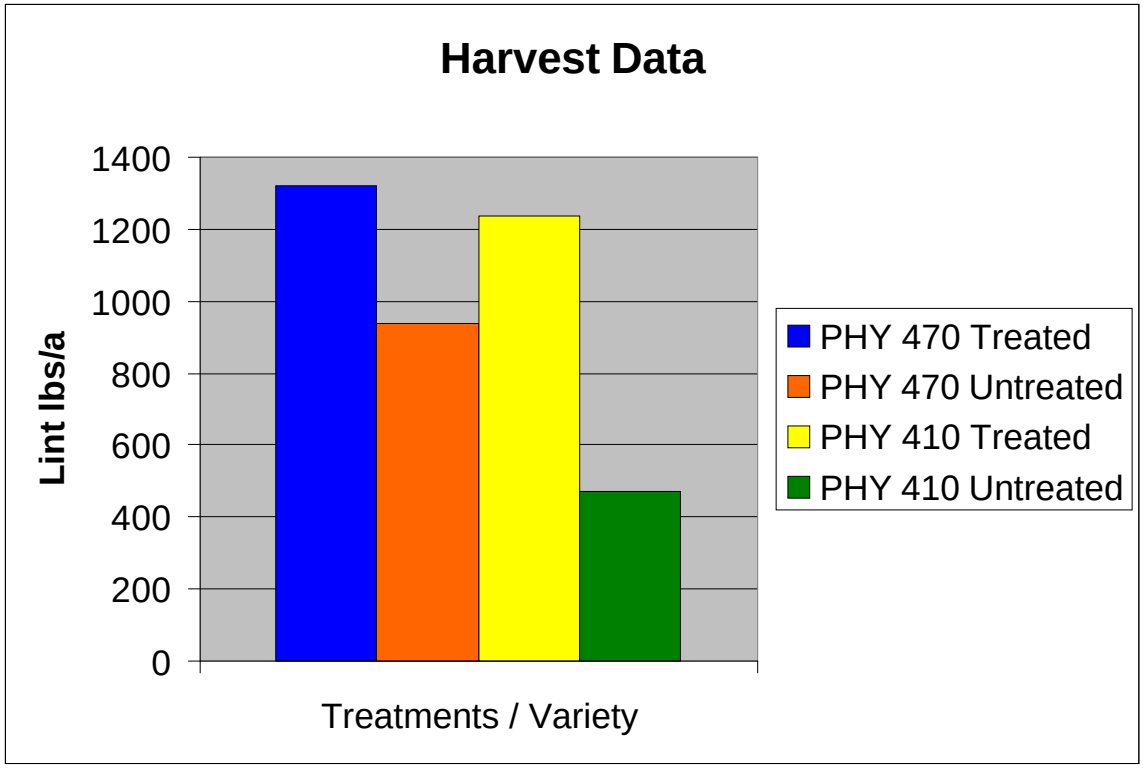


Fig. 3. Harvest data for Widestrike and conventional cotton treatments


Harvest Data
1400
1200
1000
800
600
400
200
0
Lint lbs/a
Treatments / Variety
PHY 470 Treated
PHY 470 Untreated
PHY 410 Treated
PHY 410 Untreated

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