IMPACT OF FOLIAR HERBICIDE APPLICATION ON COTTON WITH SELECTED INSECTICIDE SEED TREATMENTS

D.L. Clarkson G.M. Lorenz L.T. Barber N.M. Taillon University of Arkansas Extension Lonoke, AR J.E. Howard Rowher Extension Center Rowher, AR B.C. Thrash W.A. Plummer M.E. Everett L.R. Orellana University of Arkansas Extension Lonoke, AR

Abstract

Tank mixes of herbicides and insecticides may alter the efficacy of either product, or may have an impact on cotton plant development. The extent of these interactions may change on transgenic cultivars (e.g., Round-up Ready or Liberty Link). Preliminary studies conducted in 2011 indicated that little injury was apparent to small cotton in both Liberty Link and Round-up Ready flex systems with various insecticide/herbicide tank mixtures. However, these studies evaluated the non-selective herbicides applied over healthy cotton; under optimal growing conditions. The objective of this research study was to continue this work using insecticide-treated seed to examine efficacy changes after herbicide application. One preliminary trial was planted on June 7th. Various rates of Gaucho and Cruiser seed treatments were tested. Foliar application of Dual Magnum herbicide was made on 2-4 leaf cotton. Thrips densities, both before and after herbicide applications, were counted. Plant height and stand counts were monitored 5-7 days post treatment. Plant injury (necrosis or chlorosis) was also recorded at this time. After these data were collected, all trials were treated identically for pests the remainder of the season. Nodes above white flower counts were made once just prior to cutout to determine differences in maturity, and yield was not taken due to late planting date. Efficacy of seed treatments was disrupted by application of an over-the-top herbicide. Gaucho and Cruiser seed treatments showed differences in control before and after herbicide application, with Gaucho treatments having a greater loss in efficacy after herbicide application but greater control before herbicide application. Future evaluation of this disruption will be expanded through experiments with different herbicides at various application rates and multiple seed treatments.

Introduction

Thrips are one of the most important pest species in the early growing season of cotton in the Mid-south portion of the United States cotton belt. In most years it is not uncommon to over spray 20-30% of cotton acres for thrips (Catchot 2012). However, within the last two years, thrips pressure has increased. In 2011 and 2012 more than 70% of cotton acreage was over sprayed for thrips control, independent of insecticide seed treatments. In this early development stage of cotton, the first application of an herbicide system is also being applied. With insecticide seed treatments not working as well as they have in the past, many growers have questions about seed treatment efficacy. A preliminary trial was conducted to evaluate how early season foliar herbicide applications may effect insecticide seed treatments.

Methods

A preliminary trial was conducted in Marianna, AR during the 2012 growing season. Plot sizes were 12.5 ft. (4 rows) by 50 ft. (replicated complete blocks). Treated seed was planted late on June 7, 2012. Herbicide application of Dual Magnum was applied one time at 2-4 leaf stage with a Mud Master fitted TXVS-6 hollow cone nozzles. Spray volume was 10 GPA at 40 psi. Thrips counts were made twice, once 5 days before and once 5 days after herbicide application. Five randomly selected plants per treatment were clipped at ground level, placed into jars filled with 70% alcohol, and then taken back to the lab to be counted under microscopes. Plant height and stand counts were

taken 7 days after herbicide application. Five randomly selected plants per treatment were measured from the ground surface to the terminal. Stand counts were estimated by placing a 10 ft. pole randomly in each treatment and counting the number of plants within the section. Injury ratings were taken 5-7 days after herbicide application. Injury was split into two categories (chlorosis and necrosis). A scale of 0-100% was used with 0= no damage and 100= total loss. Nodes above white flower counts were made once near physiological cut-out to determine differences in maturity. All plots were then treated identically for the remainder of the growing season, with insects kept at threshold and weeds removed by hand. Yield was not taken due to late planting date. There were 7 different treatments (Table 1).

Table 1. Treatments used.	
1	UTC
2	Gaucho 600 FS 0.375 mg AI/seed
3	Gaucho 600 FS 0.51 mg AI/seed
4	Cruiser 0.375 mg AI/seed
5	Cruiser 0.51 AI/seed
6	Cruiser 0.375 mg + Gaucho 600 FS 0.375 mg AI/seed
7	Cruiser 0.375 + Orthene (Foliar)

Results

No significant differences were observed in stand counts, plant height, chlorosis damage, or nodes above white flower. Thrips populations increased after the application of Dual Magnum herbicide in all treatments. Both rates of Gaucho seed treatments showed better control before application of the herbicide. However, after application of the herbicide, Gaucho treatments resulted in thrips populations increasing the most, spiking at 474% and 415% compared with the first thrips count before application. Cruiser seed treatment at 0.51 mg AI/seed showed less control both before and after herbicide application (Figure 1).



Figure 1. Correlation of Thrips counts before and after herbicide application.

Higher populations of thrips were supported in treatments with greater necrosis. All treatments showed significant differences in necrosis damage. Untreated check showed no necrosis, while both Gaucho treatments exhibited the most damage at 8.7% and 6.3% (Figure 2).



Figure 2. Necrosis in cotton plants according to insecticide combination

Discussion

The results suggested that thrips populations increase after the application of Dual Magnum herbicide, and that there may be some interaction between the insecticide seed treatment and herbicide application. Gaucho seed treatments exhibited greater control vs. Cruiser seed treatments before the application of Dual Magnum herbicide, but showed the largest jump in thrips numbers after the application. The combination of Cruiser and Gaucho treatments together exhibited no greater control than either product used alone. Necrosis seemed to correlate with larger thrips populations. There are many different factors that can cause this increase in thrips populations such as planting date, weather patterns, loss of active ingredient, herbicide injury, plant stress, as well as antagonism. In order to make conclusions on efficacy changes of seed treatments after the application of an herbicide, more tests must be conducted. Trials will be planted and observed in the 2013 growing season. Different insecticide seed treatments as well as different herbicide systems will be tested.

Acknowledgements

The authors would like to thank Cotton inc., Cotton State Support Committee, Syngenta, Bayer Crop Science, for making this project possible.

References

Catchot, Angus. (2013, January). *Beltwide Insect Round Table*. Speech presented at Marriott Riverwalk Hotel, San Antonio, TX.