IMPACT OF SEASON LONG CONTROL OF HIGH POPULATIONS OF TARNISHED PLANT BUG IN COTTON

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Abstract

A trail was conducted to evaluate insecticide control based on select timings of tarnish plant bug (TPB), *Lygus lineolaris* in cotton. Treatments were sprayed weekly for up to 5 weeks. Applications made at 2 and 3 weeks showed sufficient control, but as weeks progressed more applications were needed to maintain control. Migrating TPB tended to be attracted to weeks 2, 3, and some extent week 4 because of the healthier fruit compared to the untreated check and due to the loss of insecticide efficacy as season progressed. This loss correlates with the obvious trend toward an increase in yield as the longer control of TPB was maintained.

Introduction

The Tarnished Plant Bug (Lygus lineolaris) (TPB) is the most damaging insect pest in cotton. It causes yield loss by feeding on squares, blooms, and young bolls. In 2013 and 2014 growers in Arkansas made 6 insecticide applications per growing season for the control of TPB alone (Williams, 2013). In 2014 the TPB cost growers $78.14/acre in treatments and yield loss, and was responsible for 79% of Arkansas' cotton yield loss by insect (Williams, 2014). A trial was conducted to determine when insecticide applications can be terminated while still giving growers season long control.

Materials and Methods

A trial was conducted at the Lon Mann Cotton Branch Experiment Station, Marianna, Ark. during the 2015 growing season. Plot size was 12.5 ft. (4 rows) by 40 ft. with a 2 row buffer between plots, in a randomized complete block with 4 replications. Insecticide treatments were applied with a Mud Master fitted with 80-02 dual flat fan nozzles at 19.5 inch spacings. Spray volume was 10 gal/a, at 40 psi. Applications were made weekly starting at bloom using the spray schedule in Figure 1.

Figure 1: Insecticide Timing, Regional Cotton Plant Bug

Applications	Treatments
Week 1	Transform 2.25 oz/acre
Week 2	Orthene 97 1 lb/acre + Bifenthrin 6.4 oz/acre
Week 3	Bidrin 5 oz/acre + Bifenthrin 5 oz/acre
Week 4	Transform 2.25 oz/acre
Week 5	Orthene 97 1 lb/acre + Bifenthrin 6.4 oz/acre

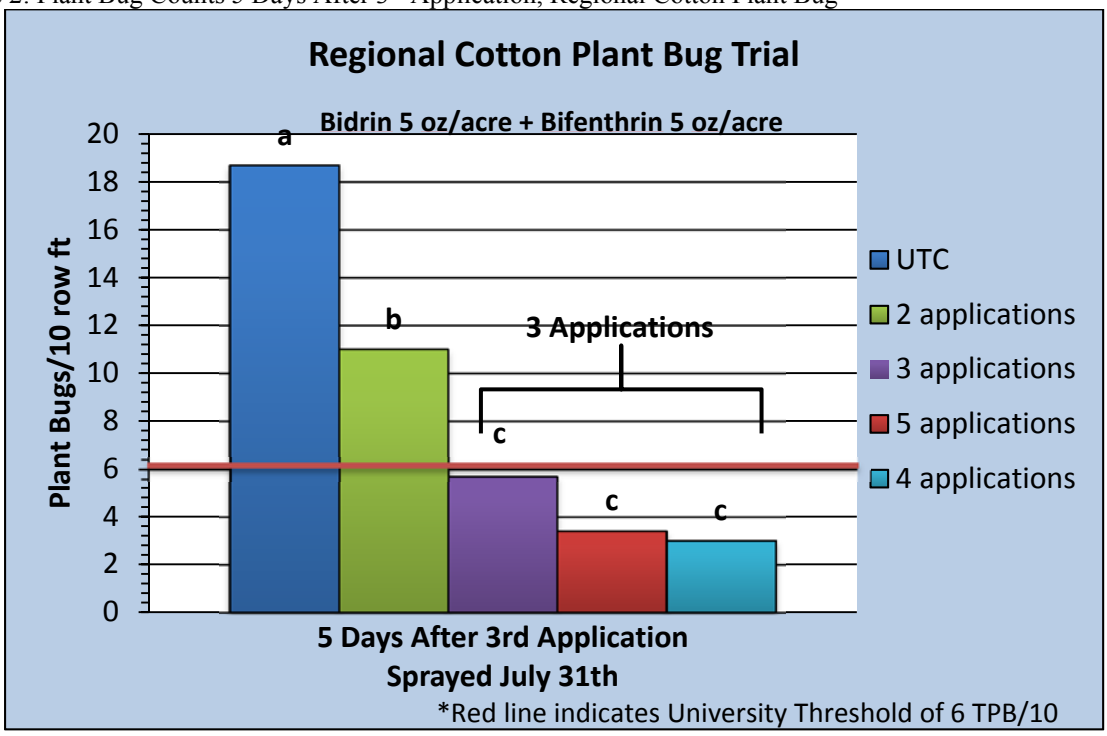
Treatments included an untreated check (UTC), all other treatments were sprayed with Transform at 2.25 oz/a the first week of bloom followed by Orthene 97 at 1 lb/a + Bifenthrin at 6.4 oz/a the second week of bloom. Treatments 3, 4, and 5 were sprayed with Bidrin at 5 oz/a + Bifenthrin at 5 oz/a the third week of bloom. Treatments 4 and 5 were sprayed with Transform at 2.25 oz/a the fourth week of bloom. Treatment 5 was sprayed with Orthene 97 at 1 lb/a + Bifenthrin at 6.4 oz/a the fifth week of bloom. Plant bug numbers were determined by taking 2 shakes per plot with a 2.5 ft. drop cloth, for a total of 10 row ft. The data was processed using Agriculture Research Manager V.9 (Gylling Data Management, Inc., Brookings, S.D.) and Duncan's New Multiple Range Test (P=0.10) to separate means.

Results and Discussion

All treatments were lower than the UTC the first and second application. At 5 DAT3 (days after treatment three) all treatments were lower than the UTC, while all other treatments were lower than Treatment 2 (Figure 2). At 7 DAT4,

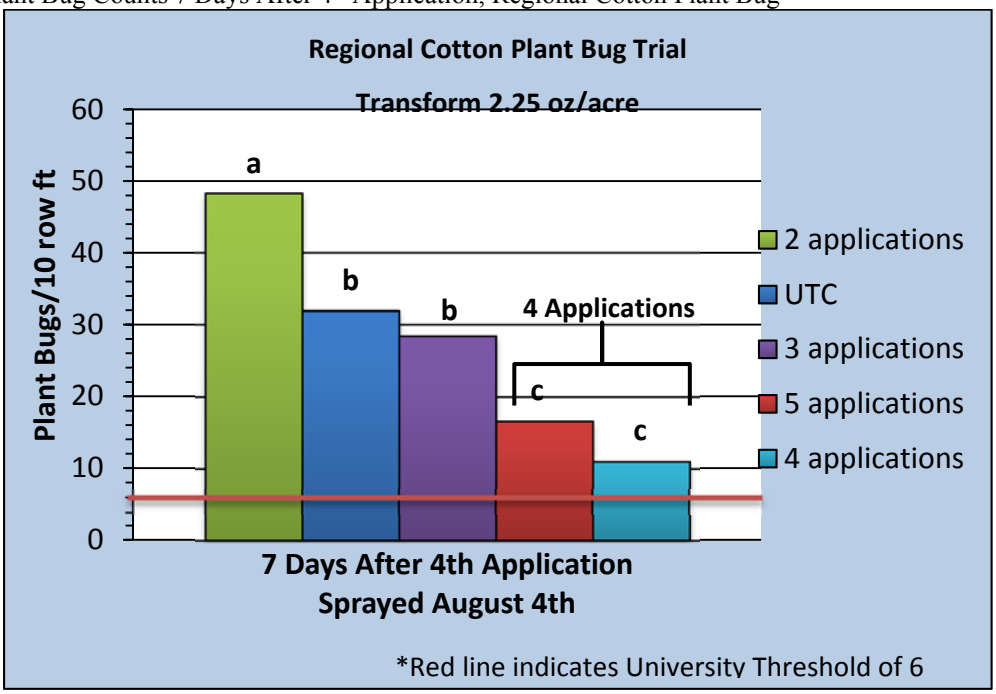
when compared to the UTC, Treatment 2 was higher; Treatment 3 was no different, while Treatments 4 and 5 were lower (Figure 3). At 7 DAT5, when compared to the UTC, Treatments 2 and 3 were higher and Treatments 4 and 5 were lower. Treatment 5 was lower than Treatment 4 (Figure 4). Season totals indicated Treatments 2 and 3, and the UTC showed no differences, while Treatment 4 was lower than the UTC and Treatment 5 was lower than Treatment 4 (Figure 5). The UTC and Treatment 2 had no differences in yield (Figure 6). Treatments 2, 3, and 4 had no differences in yield, while Treatment 5 had a higher yield than Treatment 2. Treatments 3, 4, and 5 had higher yield than the UTC.

Figure 2: Plant Bug Counts 5 Days After 3rd Application, Regional Cotton Plant Bug



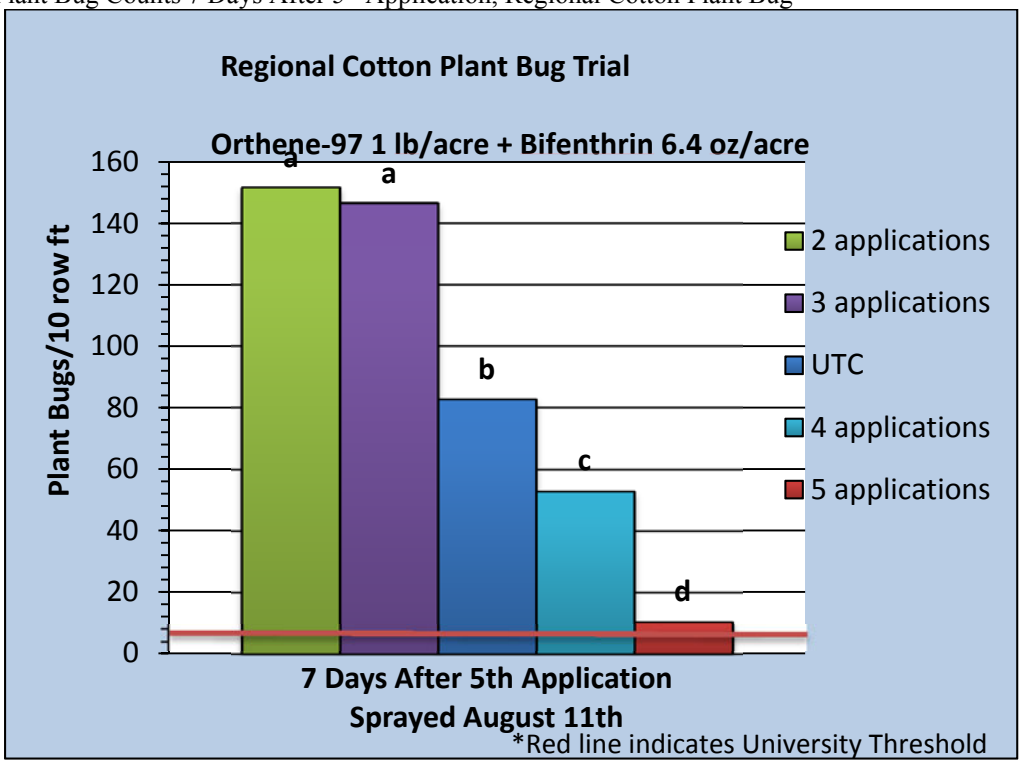
Means followed by same letter do not significantly differ (P=.10, DNMRT) Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

Figure 3: Plant Bug Counts 7 Days After 4th Application, Regional Cotton Plant Bug



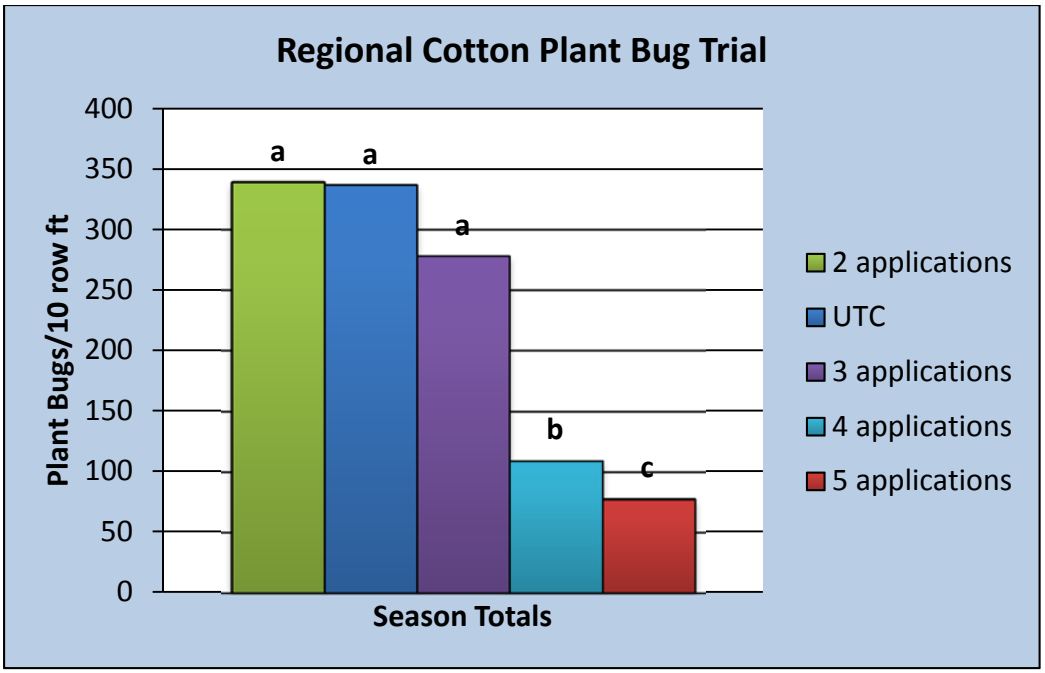
Means followed by same letter do not significantly differ (P=.10, DNMRT) Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

Figure 4: Plant Bug Counts 7 Days After 5th Application, Regional Cotton Plant Bug



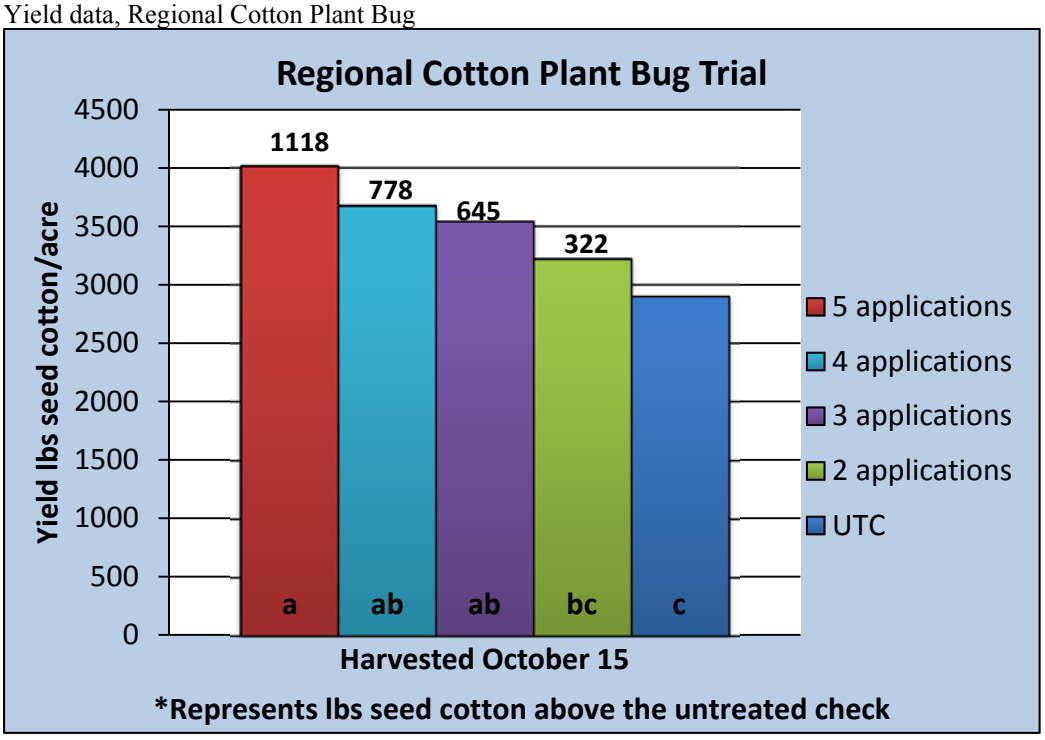
Means followed by same letter do not significantly differ (P=.10, DNMRT) Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

Figure 5: Plant Bug Season Totals, Regional Cotton Plant Bug



Means followed by same letter do not significantly differ (P=.10, DNMRT) Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

Figure 6: Yield data, Regional Cotton Plant Bug



Means followed by same letter do not significantly differ (P=.10, DNMRT) Mean comparisons performed only when AOV Treatment P (F) is significant at mean comparison OSL.

Early in the season, 2 or 3 applications were sufficient for control. As the season progressed more applications were required to maintain control due to the constant influx of TPB to the testing area from surrounding crops and wild hosts. These migrating TPB tended to be attracted to the healthier fruit of the treated plots over the UTC, and were able to remain in Treatments 2, 3, and to some extent, 4, due to the loss of insecticide efficacy as the season progressed.

This loss of efficacy correlates directly with the obvious trend toward an increase in yield as longer control was maintained. However, more research is needed to determine when growers can stop spraying for TPB without impacting yield.

Acknowledgment

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References

Williams, M.R., et. Al. 2014. Cotton Insect Losses 2014. *In: Proceedings Beltwide Cotton Conference 2014.*

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