EFFECTS OF INSECTICIDE APPLICATIONS MADE ON COTTON HAVING 10-15 MAIN STEM NODES

G. R. Wilson
County Agent
Mississippi State University Extension Service
G. L. Andrews
Entomologist
Mississippi State University Extension Service
J. B. Phelps
Area Specialized Agent respectively
Mississippi State University Extension Service

Abstract

A replicated small plot test using various insecticide treatments was conducted on cotton *Gossypium hirsutum.* Insecticides or insecticide mixtures were applied to cotton plots when the cotton plants were approximately 11 nodes tall. Insect populations were very low and the fruit set on the top five nodes of the cotton was above 90 per cent. Differences were observed in the cotton aphid populations, *Aphis gossypii* Glover, among the plots with different insecticide treatment.

Introduction

Most producers in the Mississippi delta apply pinhead square applications for boll weevil, *Anthonomus grandis* Bohemian, or tarnished plantbugs, *Lygus lineolaris* (Palisot de Beauvois). These pinhead applications are generally applied near the time when the cotton plant has 7-8 mainstem nodes. The time when the cotton plant grows nodes 10 to 15 is generally considered the period between pinhead square application and first bloom. Typically, cotton plants begin blooming when mainstem node 13 is the terminal node. During this period, the pest insects are generally low and few insecticide applications are needed. However, bollworms and plantbugs at times require treatment with insecticides as the plants grow these 5 nodes. Beneficial arthropod populations are increasing in cotton fields at this time. Most insecticides applied during this time for plantbugs and bollworm reduce beneficial arthropod populations, which allows cotton aphid, *Aphis gossypii* Glover, populations to increase. This experiment was designed to examine the effects of insecticides applied to cotton as it grew from 10 to 15 nodes tall on the cotton plants and pest insects. The subsequent effects of the insecticide applications on beneficial arthropods and cotton aphid populations were also examined.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 2:991-992 (2000)
National Cotton Council, Memphis TN

Materials and Methods

All cotton plots were planted on April 19, 1999 at Tribbett, MS with DPL5409 cottonseed and 3 lbs. Temik 15G applied in furrow. The test was designed as a randomized complete block design having 4 treatments and 4 replications. Each plot consisted of 12, 40 inch rows of cotton approximately 450 feet long. All plots were treated on 21 May 1999 with Karate 1EC applied at 2 oz per acre on a 20-inch spray band. On 4 June 1999, all plots were sprayed by airplane with Baythroid 2 plus Provado 1.6 at the rate of 2 oz and 3.76 oz respectively. On 10 June 1999 when the plants in the plots were approximately 11 node tall (see Table 1), the 4 insecticide treatments were applied to the plots. The insecticide treatments were: 1. Leverage at 1 gal-34 acres (0.032 lb Ai/acre Baythroid plus 0.047 lb Ai/acre Provado), 2. Tracer at 0.067 lb Ai/acre, 3. Capture at 0.033 lb Ai/acre, and 4. an untreated check. Some of the plots were treated incorrectly. The treatments were not applied in complete blocks so the test was analyzed as a completely random design (Proc. ANOV (SAS 7.0 for Windows 1999).

Results and Discussion

There were no statistical differences among the data collected on node height of the plants in the plots (Table 1). These data do give a reference to the chronological and well as physiological time frame for the test.

Other than 11 June, only 2 other heliothine larvae were observed in the sweep net samples during the entire sample period (Table 2). Two adult plantbugs were observed in the sweep net samples in all sweep net samples taken. These data showed that insect pest populations that would effect square set were low through the test period. The square set data show that little damage was done to squares during the test period (Table 3).

The one insect, which did appear during this test, was the cotton aphid. The average number of cotton aphids per leaf for three sample dates after the insecticide application was applied is shown in Table 4. On 18 June there was a statistical difference between cotton aphids sampled in the Leverage treatment and the untreated check. The numerical trend was the same for all three sample dates. The Leverage and Tracer treated plots remained numerically lower that the Capture and untreated plots for all sample dates. On 16 June, there were statistical differences in ladybird beetles among the insecticide treatments(Table5). Tracer had significantly more ladybird beetles in the sweep net samples on 16 June than did plots treated with Leverage or Capture. Very little correlation between the number of ladybird beetles present in a treatment can be seen. Plots treated with Leverage maintained the lowest lever of aphids and had few ladybird beetles in the plots. Capture treated plots had low ladybird beetle numbers but maintained relatively high aphid numbers. Tracer maintained ladybird beetle numbers similar to the untreated check but had numerically fewer aphid numbers on all sample dates than did the untreated plots. There seems to be some control of aphids by the insecticide in addition to aphid mortality from beneficial arthropods.

Conclusion

Data collection over more weather and insect scenarios are needed to identify which insecticide to chose between pinhead square applications and when the first blooms are seen in cotton. The data from this test show that insect complexes are different behind application of different insecticides. Insecticide choices made for applications between the pinhead-square and the first bloom stages of cotton could mean difference between retreating and further damaging the beneficial arthropod complex, or being able to use beneficial insects to help with July bollworms.

References

SAS System for Microsoft Windows. Release 7.0. 1999. SAS Institute, Cary, NC.

Table 1. Average mainstem nodes of cotton plants in plots treated in 1999 with indicated insecticide treatments on indicated sample dates.[1]

Treatment	7 June	11 June	16 June	21 June
Leverage gal-34	9.4	11.05	12.2	13.55
Tracer gal-60	9.5	10.9	12.1	13.65
Capture gal-33	9.25	11.05	11.45	12.85
Untreated	9.35	10.65	12.05	13.7

[1]Means followed by the same letter or no letter is not significantly different at the 0.05 level of probability.

Table 2. Average number of heliothine larvae per 100 sweeps on 11 June 1999. [1]

Treatment	11-June
Leverage gal-34	0.5
Tracer gal-60	1.0
Capture gal-33	0.0
Untreated	0.5

[1]Means followed by the same letter or no letter is not significantly different at the 0.05 level of probability.

Table 3. Percent set on first position fruiting sites on fruiting branches arising from top five fruiting branches on 21 June 1999. [1]

Treatment	21 June
Leverage gal-34	93.50
Tracer gal-60	91.67
Capture gal-33	93.50
Untreated	92.00

[1]Means followed by the same letter or no letter is not significantly different at the 0.05 level of probability.

Table 4. Average number of cotton aphids per leaf present on sample date in 1999.[1]

Treatment	14 June	18 June	25 June
Leverage gal-34	0.50	1.75 b	9.33
Tracer gal-60	0.85	3.75 ab	13.85
Capture gal-33	1.30	9.13 ab	19.25
Untreated	1.23	9.68 a	15.00

[1]Means followed by the same letter or no letters is not different at the 0.05 level of probability.

Table 5. Average number of ladybird beetle larvae (L) or larvae+Adults (L+A) in 100 sweeps on indicated sample dates. [1]

Treatment	7 June L	11 June L+A	16 June L+A	21 June L+A
Leverage gal-34	0.5	0.0	2.0 bc	4.0
Tracer gal-60	2.5	2.5	5.5a	11.0
Capture gal-33	0.0	3.0	0.0 c	6.5
Untreated	1.5	3.5	3.5 ab	8.0

[1]Means followed by the same letter or no letter is not significantly different at the 0.05 level of probability.