MANAGING COTTON INSECT PESTS IN THE MID-SOUTH COTTON BELT WITH NATURALYTE INSECT CONTROL IN 1995

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Abstract

During the 1995 growing season several studies examining the efficacy and rate structure of Tracer® for control of cotton lepidopterous pests were conducted across the mid-South (Mississippi, Arkansas, Louisiana, Tennessee and Missouri). Results of these studies indicate Tracer, when used at labeled rates, provides equivalent or superior control for control of cotton bollworm, resistant tobacco budworm, armyworm and looper when compared to current control products. The use of Tracer for control of lepidopterous pests on cotton will provide the grower the opportunity to explore the use of IPM without a reduction in yield.

Introduction

In the mid-South, in part to encourage the rotation of products, university and extension researchers have defined three windows of application for the control of Lepidopterous pests on cotton. From June to mid-July when treatments are warranted, Bt and Bt/ovicide tank mixes are recommended. In mid- July when larger populations of Bollworm are being recommended when the population begins to include resistant budworm and pyrethroids alone are no longer effective. From August until the crop no longer requires protection, carbamates and OP's are used. It is at this time that armyworm and looper, as well as heavy populations of resistant budworm, may be pre-sent. Studies were conducted to determine the benefits of Tracer as a founda-tion product in each of these window. Our hypothesis was if Tracer was used during the first and third window the grower would require fewer applications to control bollworm/budworm and might require fewer applications for secondary pests due to conservation of beneficial. If Tracer was used during the second window the producer would require fewer applications for secondary pests through the conservation of beneficials and might see fewer applications for control of bollworm/budworm populations. Aerial rate refinement studies as well as small plot efficacy studies were also conducted.

Materials and Methods

Large Plot Studies

Two types of large plot studies were conducted. The first involved plots of up to 30 acres each and was conducted to determine how well Tracer fit into the current rotation pattern used in the mid-South. Fields were divided into three plots. Treatments in each plot were as follows: 1: Tracer in the first window, the grower's standard (a pyrethroid or pyrethroid tank mix) in the second window, Tracer in the third window; 2. The grower's standard (a Bt or Bt/ovicide tank mix) in the first window, Tracer in the second window, the grower's standard (a carbamate, OP or tank mix) during the third window) 3. the grower's standard control program. Tracer was applied at 0.0669 lbs ai/A (75 g ai/ ha), the grower's standard material(s) was applied at the state recommended rates for that timing. Applications were made only when treatment thresholds were reached in each plot. Two studies were conducted in Mississippi and one in Louisiana.

The second type of study was a commercial EUP. Fields were divided into two sections. Up to six consecutive applications of Tracer could be made if threshold levels of target pests were present. Tracer was applied across treatment windows at 0.0625 lbs ai/ A (70 g ai/ha). Tracer applications were compared to the grower's standard control program.

In both studies, data collected included: the number of bollworm/budworm per terminal and per square; the number of bollworm/budworm damaged terminals/ 100 terminals and damaged squares/ 100 squares; the number of secondary pests and any applications required for their control; and yield. Studies were conducted in all states in the mid-south.

Aerial Rate Refinement Studies

The lowest labeled rate of Tracer, 0.0446 lbs ai/ A (50 g ai/ ha), was applied in three gallons of water by air to 5 plots up to 30 acres in size across the mid-south. Up to 2 consecutive applications could be made when populations reached treatment thresholds. Data collected included: the number of boll worm/budworm per terminal and per square; the number of bollworm/ budworm damaged terminals/ 100 terminals and damaged squares/ 100 squares; and the number of secondary lepidopterous pests per three feet of row. Results for the Tracer plot were compared to the grower's standard (pyrethroid, OP, or carbamate application).

Small Plot Efficacy Studies

Rates of 0.0446 - 0.0892 lbs ai/ A (50 - 100 g ai/ha) of Tracer were included in university small plot efficacy studies. Standard data were collected for each plot.

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Results and Discussion

Large Plot Studies

When Tracer was applied during the third window of application, circumstances did not allow for testing of a first and third window application, and resistant budworm was present, the number of applications required for control was reduced by one. Where yield was taken all rotations that included Tracer provided a yield advantage over the grower's standard program (Figure 1). The lack of secondary pests and the low numbers of bollworm/budworm did not allow for adequate testing of the effect of using Tracer during the second window of application. This study will be repeated during the 1996 growing season.

The Commercial EUP studies verified yield advantages for Tracer plots, particularly where resistant budworm populations were prevalent. In Arkansas, Missouri and Tennessee yield increases between 15 to 62 additional pounds of lint cotton per acre were evident (Table 2). In Mississippi, yield estimates indicated increases of up to 269 lbs of lint cotton per acre in Tracer plots (Table 2).

Aerial Rate Refinement Studies

Results from aerial trials indicates that the low labeled rate of Tracer, 0.0446 lbs ai/ A, will provide equivalent control to growers' standards (pyrethroids) when low to moderate populations of bollworm are present and the cotton canopy is not closed. Results of one trial conducted on extremely high populations of resistant budworm in Mississippi indicate that two applications of Tracer at the lowest labeled rate will outperform current products. At this site all other products were applied in 10 gallons of water by ground equipment. (Tracer was applied in 3 gallons of water by air). After one application across all treatments control ranged from 27-52% with Tracer giving 34% control (Table 2). After 2 applications, Tracer provided 69% control of all larvae and 74% control of small larvae (Table 2). Another study site, also in Mississippi, allowed for the collection of efficacy data on both looper and armyworm. Tracer provided excellent control of these species at the low labeled rate (Table 3). These studies also indicate with an aerial application rates of 0.0625 -0.0714 lbs ai/ A of Tracer should be recommended when the population is moderate to heavy or the canopy is closed in order to reduce the population below the treatment threshold.

Small Plot Efficacy Tests

Several rates of Tracer encompassing the entire labeled rate range were included in small plot University efficacy studies in Mississippi, Arkansas, and Louisiana. In all trials, Tracer provided equivalent or superior control of lepidopterous pests. Where yield was taken, Tracer provided significant yield advantages over the untreated check. Tracer plots out-yielded plots treated with other products with the higher rates of Tracer providing higher yields.

Summary

Although results of only one years research is available, several general conclusions can be made. Tracer when applied at current labeled rates provides equivalent to superior control of bollworm, budworm, armyworm and looper. When heavy populations of resistant budworm are present, Tracer will outperform conventional control products. Tracer also has the potential to reduce the number of applications required for bollworm/ budworm control.

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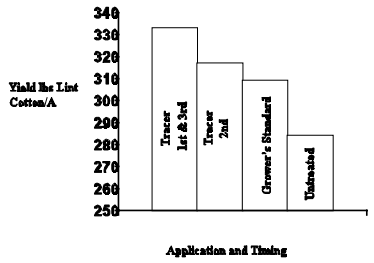

Figure 1. Yield comparison for Tracer rotation study Burdette, MS 1995.

Table 1. Yield comparison of Tracer (0.0635 lbs ai/A), grower's standard and untreated check plots from commercial EUP studies conducted in the mid-South, 1995.

Location	Program	Yield (lbs Lint Cotton/A)
Portageville, MO	Spinosad	620
	Standard	605
	Untreated	390
Halls, TN	Spinosad	742
	Standard	711
	Untreated	321
Marion, AR	Spinosad	575
	Standard	513
	Untreated	438
Benoit, MS	Spinosad	1514
	Standard	1245
	Untreated	1031
Itta Bena, MS	Spinosad	929
	Standard	721
	Untreated	650
Tchula, MS	Spinosad	1057
	Standard	909
	Untreated	804

Table 2. Comparison of percent control of resistant Tobacco Budworm between aerial applications of 50 g ai/ ha application of Tracer in 3 gallons of water and commercially available products applied in 10 gallons of water by ground equipment, Benton, MS, 1995.

	Rate	Percent Control		
Product	**lbs ai/ A**	**5DAA1**	**4DAA2[1]**	**4DAA2[2]**
Tracer	0.0446	34	69	74
Fury + Larvin	0.0375 + 0.4	27	---	---
Fury + Curacron[3]	0.0375 + 0.5	---	23	-35
Pirate	0.325	52	---	---
Pirate + Lannate	0.325 +0.225	47	---	---
Pirate + Curacron[4]	0.325 + 0.5	---	55	56

[1] All larvae

[2] Only larvae less than 6 days old included

[3] Applied to plots previously treated with Lannate (0.45 lbs ai /A) + Condor (1.5 pints or 3.0 pints)

[4] Applied to plots previously treated with Pirate (0.325 lbs ai/A)

Table 3. Comparison of efficacy of 0.0446 lbs ai/ A aerial application Tracer against Loopers (Noctuidae spp.) and Beet Armyworm (*Spodoptera exigua* (Hübner)) to Larvin 0.8 lbs ai/A, Morgan City, MS, 1995.

	Rate		Mean Number per 3 ft of Row			
Treatment	**lbs ai/A**	**Pest**	**4DAA1**	**7DAA1**	**4DAA2**	**11DAA2**
Tracer	0.0446	Loopers	---	2.2	0	2
		Beet Army-worm	10.6	9	2.6	0
Larvin	0.8	Loopers	---	10.4	4.6	5.2
		Beet Army-worm	37.4	64.6	5.0	0.8