ALDICARB APPLIED IN-SEASON FOR TARNISHED PLANT BUG MANAGEMENT

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Abstract

Trials were conducted during 2010 to evaluate side dress applications of Temik to field borders for tarnished plant bug management. During 2010, trends for lower plant bug numbers were observed for plots that received Temik. There were trend for higher yields observed at some sample locations within the Temik treated plots. Across all sample locations within plots, there were trends for higher yields in the Temik treated plots.

Introduction

The tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois), has become a major pest of cotton within the Mid-South region over the last several years. The tarnished plant bug has become the target of more insecticide applications than any other insect the Mid-South (Williams 2008) with some growers making up to 15 foliar insecticide applications for plant bug control. Furthermore, tarnished plant bug is becoming resistant to many of the products currently used for control, with few if any replacements expected in the near future (Hollingsworth et al. 1997, Holloway et al. 1998, Snodgrass and Scott 1988, Snodgrass 1994, Snodgrass and Elzen 1995, Snodgrass 2006). Because current plant bug management practices are not sustainable, additional management alternatives need to be examined.

The tarnished plant bug is a highly polyphagous insect, feeding on over 300 wild and cultivated host plants (Snodgrass et al. 1984). It feeds primarily when plants are flowering, so movement between host plants is common. One of the major plant bug hosts just prior to cotton flowering is field corn. With changing economics, corn has become a more prominent crop in the Mid-South, so the number of cotton-corn interfaces has greatly increased over the last several years. A common observation of these corn-cotton interfaces is that plant bug damage to cotton plants is often more severe in areas adjacent to corn fields compared to cotton plants farther from this interface. While some of this effect may be due to poor insecticide coverage at the field margin, there is evidence that tarnished plant bug abundance is naturally higher at this edge. If corn is a major source of plant bugs that infest

cotton, it may be possible to reduce injury throughout the cotton field by treating only the field border immediately adjacent to the corn field. Even if overall tarnished plant bug suppression is not realized, localized treatments to the cotton field border may increase yields in these areas enough to justify the extra cost. This project was conducted to examine the impact of side-dress applications of aldicarb (Temik 15G) along corn-cotton interfaces on tarnished plant bug infestations, crop injury, and cotton yield, and also to explore the critical width of the border treatment.

Materials and Methods

Across LA, AR, MS, TN, and MO nine trials were conducted during 2010 to evaluate the impact of in-season application of aldicarb on tarnished plant bug infestations and yield. Selected sites were fields with a corn-cotton interface with cotton rows running parallel to the corn. Corn and cotton fields were not separated by more than 40 feet of uncultivated land (turn-row, ditch, etc.). The trials included 2 treatments (Temik 15G and a non-treated control) that were applied in addition to all normal production practices. Temik was applied to the first 32 rows from the edge of the field next to corn at 10 lb form. /acre as a side-band when plants in the adjacent corn field were at the green silk stage or the cotton had reached the match-head square stage. When the Temik was applied, the applicator was passed through the non-treated plots so that any root pruning that occurred during application would be uniform across plots for both treatments. Plots were at least 100 ft. long, with a minimum of three replications. All of the plots within a trial were ordered along the corn–cotton interface using a randomized complete block design. With the exception of the Temik applications, the fields were managed according to the growers' standard production practices, including insecticide applications over the entire field.

Sampling for tarnished plant bugs was initiated at the time of Temik application and collected weekly for 4-6 weeks. Sweep net sampling was used throughout the trial to monitor plant bug densities. Drop cloth sampling was also conducted to monitor the level of reproduction in the trial area. Four samples were collected within each plot at regular distances from the edge of the field. Plots were divided into 8 row sections (rows 1-8, 9-16, 17-24, and 25-32) and the center two rows of each section was sampled. Sampled areas were marked so that the same areas could be re-sampled each week. In addition, at least two samples per plot were collected; one was within 4 rows of the plot (35-36 rows from the edge of the field) and the other was at least 150 ft (ca. row 80) out from the edge of the plots to evaluate the width of the elevated TPB density edge. Each sample consisted of 2 sets of 25 sweeps and 2 drop cloth samples (10 row ft). Yield was estimated by harvesting at-least two rows from each set of 8 rows of each plot (4 yield measurements per plot). Also, yield was estimated within the first six rows adjacent to each plot and at 150 ft from the edge of each plot. Data were combined across locations and subjected to ANOVA procedures using the SAS mixed procedure, with means separated according to Fisher's Protected LSD.

Results

During 2010, trends for lower total tarnished plant bug densities using sweep net sampling were observed in the Temik treated plots at sample locations rows 1-8, rows 9-16, and rows 25-32 during the first three weeks after application (Table 1). Across all rows, trends for lower plant bug densities were observed in the Temik treated plots compared to the non-treated plots during weeks 1, 2, and 3 (Table 2).

Trends for lower numbers of total tarnished plant bugs were observed in the Temik treated plots at sampling locations rows 1-8, rows 9-16, rows 17-24, and rows 25-32 during weeks two through five after application using drop cloth sampling, with two exceptions (Table 3). Across all rows, trends for lower plant bug densities were observed in the Temik treated plots compared to the non-treated plots during weeks 3, 4, and 5 (Table 4).

At sample locations rows 1-8 and rows 9-16, trends for higher yields were observed in the Temik treated plots compared to the non-treated plots (Table 5). Also, trends for higher yields were observed for sample locations 150 ft outside of the Temik plots compared the same sample locations adjacent to the non-treated plots. Across all rows there were trends for higher yields in the Temik treated plots compared to the non-treated plots (Figure 1).

Table 1. Impact of side dress application of Temik 15G on tarnished plant bug densities sampled by sweep net during 2010.

	Total Tarnished Plant Bugs[1]/50 Sweeps				
Rows/Treatment	Week 1[2]	Week 2[2]	Week 3[2]	Week 4[2]	Week 5[2]
Rows 1-8[3]					
Temik	2.9	4.9	7.1	12.1	5.9
Non-Treated	3.0	5.2	9.2	12.0	5.5
P>F	0.68	0.65	0.31	0.69	0.59
Rows 9-16[4]					
Temik	3.6	4.6	6.1	7.5	5.1
Non-Treated	3.9	5.0	6.2	7.0	4.6
P>F	0.99	0.27	0.48	0.39	0.63
Rows 17-24[5]					
Temik	2.4	5.4	6.5	6.6	4.6
Non-Treated	2.4	3.5	4.7	9.2	4.1
P>F	0.82	0.14	0.15	0.10	0.94
Rows 25-32[6]					
Temik	2.4	4.5	5.2	6.3	4.4
Non-Treated	3.2	6.2	11.1	6.6	4.2
P>F	0.13	0.16	0.22	0.97	0.60
3 Rows Outside[7]					
Temik	2.4	4.9	7.6	7.2	3.5
Non-Treated	2.3	4.4	7.8	8.0	3.6
P>F	0.89	0.90	0.93	0.40	0.77
150 ft Outside[8]					
Temik	1.5	2.8	4.1	5.3	4.8
Non-Treated	1.4	2.6	5.6	5.1	3.2
P>F	0.86	0.85	0.17	0.61	0.17

Means with a common letter are not significantly different (FPLSD, *P*=0.05).
[1]Adults plus nymphs.
[2]Weeks after application.
[3]Rows 1-8 from interface with corn.
[4]Rows 9-16 from interface with corn.
[5]Rows 17-24 from interface with corn.
[6]Rows 25-32 from interface with corn.
[7]3 rows outside of and adjacent to the treated and non-treated plots.
[8]150 feet outside of and adjacent to the treated and non-treated plots.

Table 2. Impact of side dress application of Temik 15G on tarnished plant bug densities across rows sampled by sweep net during 2010.

	Total Tarnished Plant Bugs[1]/50 Sweeps				
Rows/Treatment	Week 1[2]	Week 2[2]	Week 3[2]	Week 4[2]	Week 5[2]
Temik	2.8	4.8	6.2	8.1	5.0
Non-Treated	3.1	5.0	7.8	8.7	4.6
P>F	0.80	0.58	0.23	0.94	0.56

Means with a common letter are not significantly different (FPLSD, *P*=0.05).
[1]Adults plus nymphs.
[2]Weeks after application.

Table 3. Impact of side dress application of Temik 15G on tarnished plant bug densities sampled by drop cloth during 2010.

	Total Tarnished Plant Bugs[1]/10 row feet				
Rows/Treatment	Week 1[2]	Week 2[2]	Week 3[2]	Week 4[2]	Week 5[2]
Rows 1-8[3]					
Temik	-	0.9	4.5	4.5	5.4
Non-Treated	-	1.6	5.3	5.3	5.6
P>F	-	0.13	0.34	0.48	0.86
Rows 9-16[4]					
Temik	-	2.3	3.9	5.5	4.8
Non-Treated	-	2.6	5.2	7.3	6.6
P>F	-	0.94	0.17	0.15	0.33
Rows 17-24[5]					
Temik	-	1.7	4.6	4.5	5.7
Non-Treated	-	1.9	4.5	5.0	7.2
P>F	-	0.73	0.48	0.66	0.07
Rows 25-32[6]					
Temik	-	2.3	3.5	3.5b	4.9
Non-Treated	-	1.3	4.3	5.2a	6.1
P>F	-	0.16	0.40	0.01	0.28
3 Rows Outside[7]					
Temik	-	2.1	4.8	6.4	5.7
Non-Treated	-	2.5	4.6	5.0	6.3
P>F	-	0.60	0.94	0.36	0.49
150 ft Outside[8]	-				
Temik	-	2.7	2.2	4.6	7.8
Non-Treated	-	2.9	3.5	3.8	5.3
P>F	-	0.88	0.20	0.23	0.31

Means with a common letter are not significantly different (FPLSD, *P*=0.05).
[1]Adults plus nymphs.
[2]Weeks after application.
[3]Rows 1-8 from interface with corn.
[4]Rows 9-16 from interface with corn.
[5]Rows 17-24 from interface with corn.
[6]Rows 25-32 from interface with corn.
[7]3 rows outside of and adjacent to the treated and non-treated plots.
[8]150 feet outside of and adjacent to the treated and non-treated plots.

Table 4. Impact of side dress application of Temik 15G on tarnished plant bug densities across rows sampled by drop cloth during 2010.

	Total Tarnished Plant Bugs[1]/10 row ft				
Rows/Treatment	Week 1[2]	Week 2[2]	Week 3[2]	Week 4[2]	Week 5[2]
Temik	-	1.9	4.1	4.5a	5.2
Non-Treated	-	1.8	4.8	5.7b	6.4
P>F	-	0.84	0.07	0.02	0.08

Means with a common letter are not significantly different (FPLSD, *P*=0.05).
[1]Adults plus nymphs.
[2]Weeks after application.

Table 5. Impact of side dress application of Temik 15G on lint yield during 2010.

	Yield (lb lint/acre)					
Treatment	Rows 1-8[1]	Rows 9-16[2]	Rows 17-24[3]	Rows 25-32[4]	6 Rows Outside[5]	150 ft Outside[6]
Temik	1,300	1,199	1,100	1,132	1,068	1,208
Non-Treated	1,169	1,106	1,107	1,171	1,139	1,148
P>*F*	0.09	0.06	0.90	0.41	0.22	0.32

Means with a common letter are not significantly different (FPLSD, *P*=0.05).
[1]Rows 1-8 from interface with corn.
[2]Rows 9-16 from interface with corn.
[3]Rows 17-24 from interface with corn.
[4]Rows 25-32 from interface with corn.
[5]6 rows outside of and adjacent to the treated and non-treated plots.
[6]150 feet outside of and adjacent to the treated and non-treated plots.

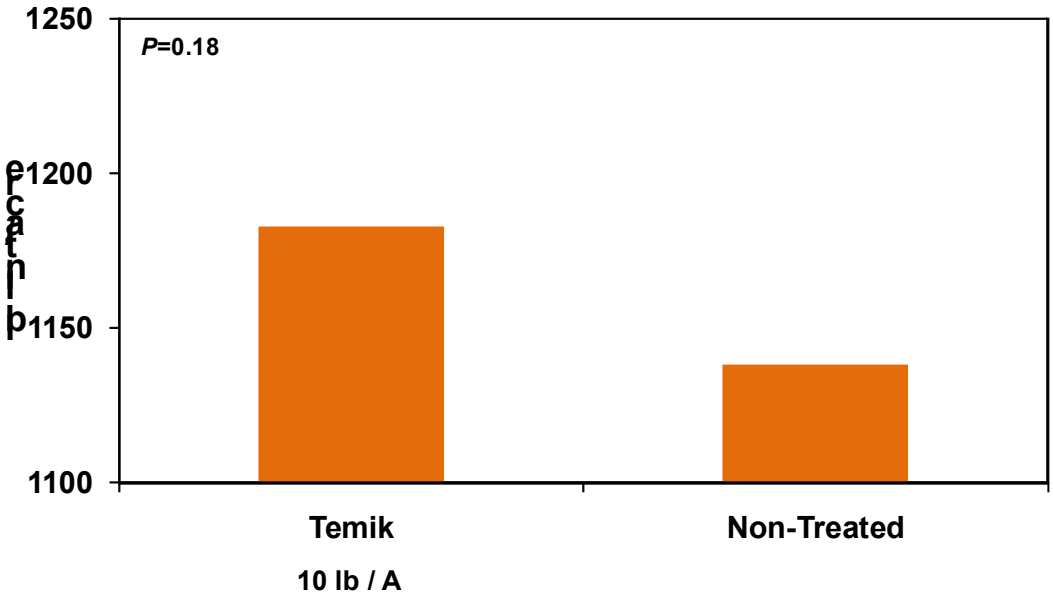

Figure 1. Impact of side dress application of Temik 15G on lint yield across rows during 2010.

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