THRIPS MANAGEMENT IN MID-SOUTH COTTON

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Abstract

Thrips are one of the first insect pests to infest cotton following seedling emergence, with tobacco thrips, *Frankliniella fusca* Hinds, being the predominate species in the Mid-South. With the loss of Temik (aldicarb), thrips management has been almost exclusively accomplished with seed treatments and supplemental foliar treatments. Currently there are two seed treatment insecticides commonly used for thrips management in cotton and include Gaucho (imidacloprid) and Cruiser (thiamethoxam). Generally, the seed treatments have provided satisfactory control. However, recently less than satisfactory control of tobacco thrips has been observed with Cruiser (thiamethoxam). During 2014 studies were conducted in Arkansas, Louisiana, Mississippi, and Tennessee to evaluate the performance of Cruiser and Gaucho seed treatments alone and in combination with their respective companion nematicide products (Aeris and Avicta), as well as, acephate seed treatment alone and in combination with Cruiser. Acephate provided thrips control that was similar to or better than Cruiser depending on rate and growth stage. Acephate (6.4 oz/cwt) resulted in yields that were statistically comparable to the best yielding treatment, Gaucho. The addition of Acephate to Cruiser did enhance thrips control, but did not improve yields compared to Cruiser alone.

Introduction

Thrips are one of the first insect pests to infest cotton following seedling emergence. There are several species of thrips that infest cotton seedlings, but the tobacco thrips, *Frankliniella fusca* Hinds, is the predominate species in the Mid-South (Stewart et al. 2013). Thrips have historically been managed with at-planting insecticides, either as in-furrow applications or seed treatments. With the loss of Temik (aldicarb), thrips management has been almost

exclusively accomplished with seed treatments and supplemental foliar treatments. Currently there are two seed treatment insecticides commonly used for thrips management in cotton and include Gaucho (imidacloprid) and Cruiser (thiamethoxam). Generally, the seed treatments have provided satisfactory control. However, recently less than satisfactory control of tobacco thrips has been observed with Cruiser (thiamethoxam). During 2014 studies were conducted in Arkansas, Louisiana, Mississippi, and Tennessee to evaluate the performance of Cruiser and Gaucho seed treatments alone and in combination with their respective companion nematicide products (Aeris and Avicta), as well as, acephate seed treatment alone and in combination with Cruiser.

Materials and Methods

Studies were conducted during 2014 in Arkansas, Louisiana, Mississippi, and Tennessee to evaluate the performance of selected insecticide seed treatments against thrips in cotton. Treatments were arranged in a randomized complete block design with four replications. Phytogen 333 WRF cotton seed was used in all trials. Cotton seed were treated by Dr. Gus Lorenz and received a common fungicide seed treatment (Trilex Advanced 300FS, 1.6 oz/cwt). Due to wet conditions planting dates varied among locations from 1 May to 22 May. Thrips densities were determined by sampling 5-10 plants per plot at the 1, 2, 3, and 4 leaf stage using a modified whole plant washing procedure. Also, plant damage was also estimated at these timing using a 1 – 5 scale, with a rating of 1 = no damage and 5 = severe damage. Lint yield data was also collected. Data were subjected to ANOVA procedures, with means separated according to Fisher's Protected LSD.

Results

Significant differences among treatments were observed for numbers of thrips adults at the 1 leaf growth stage (Table 1). Only Acephate (24 oz/cwt), Cruiser + Acephate (both rates), and Aeris significantly reduced thrips adult densities below those for the fungicide only treated plots. At the 1 leaf growth stage, all of the insecticide treatments significantly reduced thrips immatures and total thrips compare to the fungicide only treatment. Also, plots treated with Acephate (24 oz/cwt), Cruiser + Acephate (both rates), Avicta Duo, Aeris, or Gaucho had significantly fewer thrips immatures and total thrips than plots treated with Cruiser. All of the insecticide seed treatments, except Cruiser, resulted in significantly lower damage rating compared to the fungicide only treatment. Plots treated with Acephate (both rates), Cruiser + Acephate (24 oz/cwt), or Gaucho had significantly lower damage ratings than plots treated with Avicta Duo.

Table 1. Impact of selected seed treatments on densities of thrips adults, immatures, and total thrips and thrips damage at the 1 leaf growth stage.

		Thrips / 5 Plants			
Treatment	Rate	Adults	Immatures	Total	Damage Rating
Fungicide only	-	10.2a	43.7a	53.9a	2.6a
Acephate	6.4[1]	7.3abcd	11.0bc	18.4bc	1.6d
Acephate	24.0[1]	5.0bcd	6.5c	11.8c	1.6d
Cruiser	0.375[2]	9.2a	19.5b	28.7b	1.3ab
Cruiser + Acephate	0.375[2] + 6.4[1]	6.0bcd	7.1c	13.0c	1.9c
Cruiser + Acephate	0.375[2] + 24.0[1]	4.7d	5.4c	10.2c	1.5d
Avicta Duo	0.525[3]	7.7abc	8.8c	16.5c	2.1bc
Gaucho	0.375[2]	7.8ab	5.2c	13.1c	1.6d
Aeris	0.75[3]	4.9cd	4.9c	9.8c	1.8cd
P>F		<0.01	<0.01	<0.01	<0.01

Means within a column followed by a common letter are not significantly different (FPLSD 0.05).
[1]oz product / cwt.
[2]mg AI / seed.
[3]mg AI / seed. Avicta Duo and Aeris applied at the listed rates contain 0.375 mg AI, thiamethoxam (Cruiser) and imidacloprid (Gaucho), respectively.

There were no significant differences among treatments for densities of thrips adults at the 2 leaf growth stage (Table 2). All of the insecticide treatments, except Cruiser, significantly reduced densities of thrips immatures compared to

the fungicide only treatment at the 2 leaf growth stage. All of the insecticide treatments, except Cruiser, significantly reduced the number of total thrips compared to the fungicide only treatment. Only plots treated with Acephate (24 oz/cwt), Cruiser + Acephate (24 oz/cwt), Aeris, or Gaucho had significantly lower damage ratings compared to plots treated with the fungicide.

Table 2. Impact of selected seed treatments on densities of thrips adults, immatures, and total thrips and thrips damage at the 2 leaf growth stage.

		Thrips / 5 Plants			
Treatment	Rate	Adults	Immatures	Total	Damage Rating
Fungicide only	-	6.9	66.1a	73.0a	3.1a
Acephate	6.4[1]	10.9	20.9bc	31.8b	2.9a
Acephate	24.0[1]	8.1	19.5bc	27.6b	2.3bc
Cruiser	0.375[2]	7.0	50.2a	57.2a	2.6ab
Cruiser + Acephate	0.375[2] + 6.4[1]	7.7	20.6bc	28.3b	2.5ab
Cruiser + Acephate	0.375[2] + 24.0[1]	7.7	15.3c	23.0b	2.2bc
Avicta Duo	0.525[3]	7.2	32.8b	39.9b	2.8ab
Gaucho	0.375[2]	7.3	22.9bc	29.9b	1.9c
Aeris	0.75[3]	6.3	26.5bc	32.7b	1.7c
P>F		0.35	<0.01	<0.01	<0.01

Means within a column followed by a common letter are not significantly different (FPLSD 0.05).
[1]oz product / cwt.
[2]mg AI / seed.
[3]mg AI / seed. Avicta Duo and Aeris applied at the listed rates contain 0.375 mg AI, thiamethoxam (Cruiser) and imidacloprid (Gaucho), respectively.

There were no significant differences among treatments observed for thrips adults at the 3 leaf growth stage (Table 3). All of the insecticide treatments significantly reduced densities of thrips immatures compared to the fungicide only treatment. All of the insecticide treatments, except Cruiser + Acephate (6.4 oz/cwt) significantly reduced total thrips compared to the fungicide only treatment Also, all of the insecticide treatments, except Cruiser, resulted in significantly lower damage ratings compared to the fungicide only treatment. The Cruiser treatment resulted in a higher damage rating than any of the other insecticide treatments.

Table 3. Impact of selected seed treatments on densities of thrips adults, immatures, and total thrips and thrips damage at the 3 leaf growth stage.

		Thrips / 5 Plants			
Treatment	Rate	Adults	Immatures	Total	Damage Rating
Fungicide only	-	2.3	29.4a	31.8a	3.9a
Acephate	6.4[1]	4.7	14.6bc	19.3bc	2.6bc
Acephate	24.0[1]	1.8	8.8c	10.5c	2.4bc
Cruiser	0.375[2]	2.8	16.8bc	19.7bc	3.6a
Cruiser + Acephate	0.375[2] + 6.4[1]	4.3	18.2b	22.4ab	2.8b
Cruiser + Acephate	0.375[2] + 24.0[1]	2.8	10.4bc	13.2bc	2.6bc
Avicta Duo	0.525[3]	2.6	12.2bc	14.8bc	2.7b
Gaucho	0.375[2]	2.6	12.9bc	15.5bc	2.1cd
Aeris	0.75[3]	1.5	9.8bc	11.3c	1.7d
P>F		0.46	<0.01	<0.01	<0.01

Means within a column followed by a common letter are not significantly different (FPLSD 0.05).
[1]oz product / cwt.
[2]mg AI / seed.
[3]mg AI / seed. Avicta Duo and Aeris applied at the listed rates contain 0.375 mg AI, thiamethoxam (Cruiser) and imidacloprid (Gaucho), respectively.

All treatments, except Acephate (6.4 oz/cwt), resulted in significantly fewer thrips adults than Avicta Duo (Table 4). There were no significant differences among treatments for numbers of thrips immatures at the 4 leaf growth stage. All treatments, except Acephate (6.4 oz/cwt), Cruiser, and Cruiser + Acephate (6.4 oz/cwt) resulted in significantly fewer total thrips compared to Avicta Duo. All of the insecticide treatments resulted in significantly lower damage ratings compared to the fungicide only treatment. Plots treated with Aeris, Gaucho, or Acephate (24 oz/cwt) had significantly lower damage ratings compared to plots that received any of the other insecticide treatments.

Table 4. Impact of selected seed treatments on densities of thrips adults, immatures, and total thrips and thrips damage at the 4 leaf growth stage.

		Thrips / 5 Plants			
Treatment	Rate	Adults	Immatures	Total	Damage Rating
Fungicide only	-	8.4bc	36.0	44.1bc	3.6a
Acephate	6.4[1]	11.7ab	37.6	49.3ab	2.3cd
Acephate	24.0[1]	9.3bc	30.1	39.3bc	1.8e
Cruiser	0.375[2]	8.9bc	37.6	47.5abc	3.0b
Cruiser + Acephate	0.375[2] + 6.4[1]	10.1bc	38.3	48.6ab	2.3cd
Cruiser + Acephate	0.375[2] + 24.0[1]	9.4bc	26.7	36.2c	2.1de
Avicta Duo	0.525[3]	15.6a	41.0	56.6a	2.5c
Gaucho	0.375[2]	7.4c	28.1	36.4c	1.8e
Aeris	0.75[3]	10.0bc	32.3	42.3bc	1.8e
P>F		<0.01	0.06	0.02	<0.01

Means within a column followed by a common letter are not significantly different (FPLSD 0.05).
[1]oz product / cwt.
[2]mg AI / seed.
[3]mg AI / seed. Avicta Duo and Aeris applied at the listed rates contain 0.375 mg AI, thiamethoxam (Cruiser) and imidacloprid (Gaucho), respectively.

Significant differences among treatments were observed for yield (Table 5). All of the insecticide treatments resulted in significantly higher yields compared to the fungicide only treatment. Plots treated with Gaucho had significantly higher yields compared to plots treated with Acephate (24 oz/cwt), Cruiser, Cruiser + Acephate (6.4 oz/cwt), or Avicta Duo.

Table 5. Impact of selected seed treatments on cotton yield.

Treatment	Rate	lb Lint / Acre
Fungicide only	-	1,160.8c
Acephate	6.4[1]	1,406.5ab
Acephate	24.0[1]	1,327.9b
Cruiser	0.375[2]	1,330.9b
Cruiser + Acephate	0.375[2] + 6.4[1]	1,353.0b
Cruiser + Acephate	0.375[2] + 24.0[1]	1,377.5ab
Avicta Duo	0.525[3]	1,343.1b
Gaucho	0.375[2]	1,466.9a
Aeris	0.75[3]	1,428.9ab
P>F		<0.01

Means within a column followed by a common letter are not significantly different (FPLSD 0.05).
[1]oz product / cwt.
[2]mg AI / seed.
[3]mg AI / seed. Avicta Duo and Aeris applied at the listed rates contain 0.375 mg AI, thiamethoxam (Cruiser) and imidacloprid (Gaucho), respectively.

With respect to thrips densities and thrips damage Acephate performed similar to or better than Cruiser depending on rate and growth stage. The Acephate (6.4 oz/cwt), Cruiser + Acephate (24 oz/cwt), and Aeris treatments resulted in yields that were statistically comparable to Gaucho, which was the best yielding treatment. The addition of Acephate

to Cruiser did enhance thrips control and resulted in lower thrips densities and lower damage ratings, especially when Acephate was applied at the higher rate. However, this did not improve yields compared to Cruiser alone.

Acknowledgements

The authors wish to thank the technicians and summer employees at the participation institutions for their assistance with these studies, and Cotton Incorporated for financial support.

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