

# INSECTICIDES FOR THRIPS CONTROL

*Charles T. Allen, Marwan S. Kharboutli, Terry L. Kirkpatrick, and Gus M. Lorenz<sup>1</sup>*

## RESEARCH PROBLEM

The development of new insecticides for thrips control and the presence of nematodes in Arkansas cotton fields highlight the need for studies of early-season insecticides and nematicides for this pest complex.

## BACKGROUND INFORMATION

Thrips are annual pests of seedling cotton, causing stunted growth, and delayed maturity. Under heavy infestations, the growing point of seedlings may be destroyed causing plant death. Traditionally, Temik has been used for thrips control on cotton. In recent years, new insecticides have become available for thrips control. Thus, information comparing product effectiveness is needed. Root-knot and reniform nematodes occur in many Arkansas cotton fields. Temik has been used to suppress nematode populations and improve cotton yields. Growers need information on the effects of at-planting insecticides and insecticide/nematicides on cotton yields in root-knot and reniform nematode infested fields.

## METHODS AND MATERIALS

During the 1999 growing season, thrips control tests were conducted at the Southeast Branch Experiment Station near Rohwer (Test I), on the Mike Bryant Farm in Jefferson County (Test II), and on the Mike Richardson Farm in Monroe County (Test III). In Test I, NuCotn 33B was planted on 13 May 1999 into a field that had low root-knot and reniform nematode levels. In Tests II and III, Paymaster 1560 BG was planted on 10 May. Test II was planted in a field in which 568, 454, and 6,761 root-knot nematodes per pint of soil were present in the untreated check plots on 4 May, 28 June, and 21 September, respectively. Test III was planted in a field in which 1,903, 2,955, and 19,886 reniform nematodes per pint of soil in the untreated check plots were present on 12 May, 29 June, and 26 October, respectively.

Plots were 40 ft long in Test I and 50 ft long in Tests II and III, consisting of four rows arranged in a randomized complete-block design with four replications at all locations. Seed treatments, applied by the dealers were evaluated. In-furrow treatments were applied at planting. Foliar treatments were applied on 24 May, 1 and 6 June (Test I);

---

<sup>1</sup> Extension Entomologist and Extension Associate (Pest Management), Southeast Research and Extension Center, Monticello; Professor, Southwest Research and Extension Center, Hope; and Extension Entomologist and IPM Coordinator, Little Rock.

26 May, 1 and 7 June (Test II); and on 28 May, 3 and 10 June (Test III). Combination treatments were also evaluated; some including side dress treatments either 26 d after planting or at pinhead square. The in-furrow granular insecticides were dropped using the granular applicator on the John Deere Max-emerge planter. Foliar treatments were applied using a high clearance sprayer in Test I or a backpack sprayer in Tests II and III. Stand counts were made by counting all plants in 6 row feet per plot on 3, 7, and 8 June 1999 in Tests I, II, and III, respectively. Damage due to thrips injury was visually evaluated on 6, 1, and 3 June 1999 in Tests I, II, and III, respectively. Each plot was rated for plant height, vigor, and foliage distortion. Thrips samples were taken on 27 May, 4 and 9 June (Test I); 24 May, 1 and 7 June (Test II); and on 28 May, 2 and 8 June (Test III). Ten plants per plot were cut an inch above the soil line, washed with soapy water and alcohol. Thrips were then collected onto filter paper, sorted (adults versus immature stages), and counted under a microscope. Plots were harvested on 4 October (Test I), 5 October (Test II), and 26 October (Test III). Data were processed using the Agriculture Research Manager (ARM) and CoStat. Analysis of variance and least significant difference were run to determine differences and separate the treatment means.

## **RESULTS**

Treated plots generally had fewer thrips than the untreated check plots (Tables 1, 2, and 3). In Test I (Table 1), all treatments controlled thrips, but Temik, Admire, and Adage were most effective on the first two sampling dates. Thrips damage was low in the Adage and Admire (high rate) plots. Yields were not statistically different, but numerically high in the Temik (low rate) and Admire (high rate) plots.

In Test II (Table 2), thrips were controlled by all treatments except the biological, a treatment reported to control only nematode, on all sampling dates (Orthene foliar had not been applied on the first sample date). All treatments except the biological and Orthene provided significant protection from thrips damage. In this root-knot nematode infested field, Temik in-furrow at 0.75 lb ai/acre followed by Temik side-dress at 0.75 lb ai/acre 26 days after planting, Admire, Gaucho + Nema-cur, and Di-Syston provided yields statistically higher than those in the untreated check.

In Test III, thrips were controlled by all treatments except for the biological treatment (Orthene foliar had not been applied on the first sample date). Gaucho ST, Gaucho combinations, and Admire significantly reduced thrips counts on 28 May and 2 June 1999 compared to the check treatment but had thrips counts similar to those in the check on 8 June 1999. All treatments except the biological and Orthene foliar provided thrips damage protection statistically better than that in the untreated check. In this reniform nematode infested field, all treatments except the biological provided yield increases above that seen in the check.

## **PRACTICAL APPLICATION**

Admire, Adage, Temik, and Gaucho provided high levels of thrips protection in these tests. Thrips were apparently a more important component of yield loss in these tests than nematodes since the non-nematicidal insecticides alone did not suffer impor-

tant yield losses. Orthene foliar treatments generally did not protect cotton seedlings as well as the in-furrow treatments.

### **ACKNOWLEDGMENTS**

The authors wish to thank Sheila Willis, Cary Russell, Amy Gibson, Fran Tomerlin, Melinda Greer, Brad Allen, Ashley Lucas, and Cori Treat for their work on this project. Also, we wish to thank our cooperators, Mike Bryant, Mike Richardson, and the staff of the Southeast Branch Experiment Station for assisting with this work and allowing it to be done on their property. Finally, we wish to thank Bayer, Gustafson, Novartis, Rhone Poulenc, and Valent for providing products, application equipment, and grant support of this work.

**Table 1. Test I; thrips counts, stand counts, thrips damage and lint yield, SEBES, Desha Co. AR.**

Treatment/ formulation	Rate lb ai/acre	Thrips Count <sup>z</sup>			Stand Counts 3 June 1999	Thrips Damage Rating <sup>y</sup> 6 June 1999	Lint Yield 4 Oct 1999 lb/acre
		27 May 1999	4 June 1999	9 June 1999			
Check	-	4.9 a <sup>x</sup>	15.9 a	0.6 a	58,462 a	5.0 a	1,114.4 a
Gaucho ST	6 <sup>w</sup>	2.0 b	5.0 b	0.5 a	65,913 a	2.0 cd	1,267.0 a
Orthene 90S <sup>y</sup>	0.25	1.1 c	6.7 b	0.2 a	62,474 a	3.6 b	1,264.2 a
Admire 2F <sup>u</sup>	0.1	0.9 c	0.6 b	0.1 a	60,755 a	1.5 d	1,308.1 a
Admire 2F <sup>u</sup>	.05	0.8 c	3.1 b	0.4 a	65,913 a	2.0 cd	1,278.9 a
Temik 15G <sup>v</sup>	1.05	0.7 c	0.4 b	0.7 a	59,608 a	2.8 bc	1,105.3 a
Adage ST	-	0.6 c	3.4 b	0.6 a	55,023 a	1.4 d	1,225.0 a
Temik 15G <sup>v</sup>	0.75	0.5 c	2.0 b	0.5 a	58,462 a	3.1 bc	1,221.3 a
Temik 15G <sup>v</sup> + Temik 15G	0.75 + 0.75	0.4 c	0.9 b	0.5 a	61,901 a	2.8 bc	1,195.7 a
Temik 15G <sup>v</sup>	0.53	0.3 c	0.9 b	0.2 a	60,755 a	2.5 bcd	1,328.2 a

<sup>z</sup> Adult and immature thrips.

<sup>y</sup> Damage rating 1 to 5 where 1 = no damage and 5 = severe damage and dead plants.

<sup>x</sup> Means in columns followed by the same letter are not statistically different (LSD, P = 0.05).

<sup>w</sup> Fluid oz. / CWT seed.

<sup>v</sup> Orthene treatments applied on May 24, Jun 1 and 6, 1999.

<sup>u</sup> In furrow at planting.

<sup>t</sup> In furrow at planting + sidedress at pre-bloom.

Table 2. Test II; thrips counts, stand counts, thrips damage, and lint yield, producer field, Moscow, Jefferson County, AR, 1999.

Treatment/ formulation	Rate lb ai/acre	Thrips Count <sup>z</sup>		Stand Counts		Thrips Damage Rating <sup>y</sup>		Lint Yield 5 Oct
		24 May	1 June	7 June	7 June	1 June	1 June	
Orthene 90S	0.25	11.8 a <sup>x</sup>	5.8 b	0.5 b	45,853 a	3.8 b	3.8 b	1,007.8 ab
Biological 1% <sup>w</sup>	-	10.9 a	24.7 a	5.6 b	46,426 a	3.6 b	3.6 b	844.2 ab
Check	-	9.2 a	32.2 a	17.3 a	35,536 a	4.6 a	4.6 a	635.1 b
GaUCHO ST	8 <sup>v</sup>	1.9 b	1.7 b	4.6 b	46,999 a	1.6 cde	1.6 cde	935.2 ab
Admire 2F <sup>w</sup>	0.05	1.8 b	1.7 b	1.9 b	36,682 a	0.9 e	0.9 e	1,141.1 a
GaUCHO ST + Temik 15G <sup>u</sup>	8 <sup>v</sup> + 0.75	1.8 b	2.5 b	2.4 b	48,718 a	2.2 c	2.2 c	915.1 ab
DiSyston 15G <sup>w</sup>	0.98	1.8 b	0.7 b	0.4 b	45,279 a	2.0 cd	2.0 cd	1,070.2 a
GaUCHO ST + Nemacur 3 <sup>u</sup>	8 <sup>v</sup> + 1.5	1.2 b	3.0 b	2.4 b	49,292 a	1.6 cde	1.6 cde	1,077.5 a
Admire 2F + Nemacur 3 <sup>w</sup>	0.0375 + 0.75	1.1 b	1.0 b	1.5 b	42,987 a	2.0 cd	2.0 cd	1,010.3 ab
Temik 15G <sup>w</sup>	0.53	1.1 b	1.0 b	1.2 b	38,402 a	1.6 cde	1.6 cde	1,011.7 ab
Temik 15G <sup>v</sup>	0.75	0.8 b	0.5 b	0.9 b	42,987 a	1.3 cde	1.3 cde	809.4 ab
Temik 15G + Temik 15G <sup>t</sup>	0.75 + 0.75	0.8 b	0.6	2.1 b	37,255 a	1.4 cde	1.4 cde	1,015.4 ab
Temik 15G <sup>w</sup>	1.05	0.7 b	0.5 b	0.8 b	49,292 a	1.2 cde	1.2 cde	858.0 ab
Temik 15G + Temik 15G <sup>s</sup>	0.75 + 0.75	0.6 b	0.4 b	1.8 b	45,279 a	1.1 de	1.1 de	1,166.6 a

<sup>z</sup> Adult and immature thrips.

<sup>y</sup> Damage rating 1 to 5 where 1 = no damage and 5 = severe damage and dead plants.

<sup>x</sup> Means in columns followed by the same letter are not statistically different (LSD, P = 0.05).

<sup>w</sup> In furrow at planting.

<sup>v</sup> Fluid oz / CWT seed.

<sup>u</sup> Sidedress at pinhead square.

<sup>t</sup> In furrow at planting + sidedress at pinhead square.

<sup>s</sup> In furrow at planting + sidedress at 26 days after planting.

**Table 3. Test III; thrips counts, stand counts, thrips damage and lint yield, producer field, Holly Grove, Monroe County, AR, 1999.**

Treatment/ formulation	Rate lb ai/acre	Thrips Count <sup>z</sup>			No./acre	Stand Counts		Thrips Damage Rating <sup>y</sup>	Lint Yield 26 Oct
		28 May	2 June	8 June		8 June	3 June		
Biological 1% <sup>x</sup>	-	23.7 a <sup>w</sup>	15.0 a	7.0 ab	36,109 a	5.0 a	402.4 b		
Check	-	18.1 b	11.9 a	10.2 a	33,816 a	4.6 a	381.3 b		
Orthene 90S	0.25	17.2 b	4.3 b	0.2 b	44,707 a	4.3 a	573.4 a		
Gaucho ST	8 <sup>v</sup>	5.4 c	1.7 b	6.9 ab	40,121 a	3.3 b	720.2 a		
Gaucho ST + Temik 15G <sup>u</sup>	8 <sup>v</sup> + 0.75	4.6 c	4.0 b	9.5 a	43,560 a	2.9 b	685.7 a		
Gaucho ST + Nemacur 3 <sup>v</sup>	8 <sup>v</sup> + 1.5	4.4 c	1.7 b	8.4 a	37,255 a	3.3 b	624.7 a		
Admire 2F <sup>x</sup>	0.05	4.0 c	0.7 b	5.1 ab	38,402 a	2.5 bc	742.3 a		
DiSyston 15G <sup>x</sup>	0.98	2.1 c	0.8 b	0.8 b	46,426 a	3.1 b	636.3 a		
Temik 15G <sup>x</sup>	0.75	2.0 c	0.3 b	1.7 b	41,267 a	1.4 d	677.6 a		
Admire 2F + Nemacur 3 <sup>x</sup>	0.0375 + 0.75	2.0 c	0.4 b	1.0 b	40,121 a	2.4 bc	672.6 a		
Temik 15G <sup>x</sup> + Temik 15G	0.75 + 0.75	1.1 c	4.5 b	0.7 b	39,548 a	1.0 d	615.7 a		
Temik 15G <sup>x</sup>	1.05	0.9 c	0.2 b	0.1 b	42,414 a	1.8 cd	734.2 a		
Temik 15G <sup>x</sup>	0.53	0.7 c	0.8 b	0.2 b	38,975 a	1.8 cd	741.7 a		
Temik 15G <sup>x</sup> + Temik 15G	0.75 + 0.75	0.7 c	0.1 b	0.2 b	36,109 a	1.6 cd	786.1 a		

<sup>z</sup> Adult and immature thrips.

<sup>y</sup> Damage rating 1 to 5 where 1 = no damage and 5 = severe damage and dead plants.

<sup>x</sup> In furrow at planting.

<sup>w</sup> Means in columns followed by the same letter are not statistically different (LSD, P = 0.05).

<sup>v</sup> Fluid oz / CWT seed.

<sup>u</sup> Sidedress at pinhead square.

<sup>t</sup> In furrow at planting + sidedress at pinhead square.

<sup>s</sup> In furrow at planting + sidedress at 26 days after planting.