ROOT-KNOT AND RENIFORM NEMATODE SUPPRESSION WITH SIDEDRESS APPLICATIONS OF ALDICARB IN ARKANSAS

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Abstract

Large plot studies were conducted on typical grower farms, with root-knot nematode, reniform nematode or no nematodes to evaluate the impact of Temik sidedress applications over a three-year period. Results indicated a significant yield increase in 1998 and 1999 for sidedressed plots compared to the untreated plots even in the absence of nematodes on some fields. However, in 2000 there was only one location with a significant yield increase attributed to sidedress applications.

Introduction

Root-knot nematode (RKN), *Meloidogyne incognita*, and reniform nematode, *Rotylenchulus reniformis*, severity in Arkansas has been increasing throughout the state in recent years. Cotton yields were reduced throughout much of the state due to environmental stress and nematodes have made a bad situation worse for many growers. The objectives of these studies were to evaluate various rates and timings of selected nematicides for suppression of root-knot and reniform nematode in typical grower fields.

Materials and Methods

Large Block Study

Eight large block studies were conducted in five counties to evaluate the effect of Temik (aldicarb) sidedressed to cotton. Of the eight locations the Cornerstone #1 (Jefferson Co.), Crittenden, Jefferson, and Mississipi Co. fields were known to have root-knot nematode infestations. The Cornerstone #2 field (Jefferson Co.) represented the only field with a reniform infestation. Desha #1 and Desha #2 as well as the Poinsett Co. fields had no nematode infestation. Fields designated as non-nematode fields all had in-furrow applications of Temik at 3.5 lb of product per acre. All nematode infested fields had an in-furrow application application of Temik at 5.0 lb of product per acre. At pinhead to match head square stage plots were set out in a simple paired comparison design with treated plots receiving 7.5 lb of product per acre on non-nematode fields and 5.0 lb of product per acre on nematode fields. Each location had four replications of treated and untreated plots. Each plot was sampled for nematodes prior to application, 2-4 weeks post application and at harvest. Each plot was machine harvested for yield comparisons. Yields were subjected to analysis and mean separation for each location. All locations were then pooled and analyzed.

Results

Large Block Study

In 1998 both trials resulted in numerical yield increases resulted with a Temik sidedress compared to the untreated check. However, only the Pulaski County location was significantly higher (Table 1).

In 1999, of the eight locations, Cornerstone #2 (reniform), Crittenden (RKN), Desha #2, Mississippi (RKN), and Poinsett (no nematodes) showed significant yield increases at various confidence intervals with a sidedress application of Temik (Table 2). The Cornerstone #1 (RKN), Desha #2 (no nematodes), and the Jefferson (RKN) locations indicated no significant yield difference between the treated and untreated plots. When all locations were pooled the treated plots averaged 911.5 lb of lint cotton per acre compared to the untreated plots which averaged 869.6 lb of lint cotton per acre, resulting in a significant yield increase of 41.9 lb of lint per acre for the sidedress treatment.

In 2000, only the Chicot County location had significantly higher yields with the addition of a sidedress Temik application. No differences were indicated by the different rates (Table 3). When all locations were pooled untreated plots averaged 892 lb of lint cotton per acre compared to 887, 950, and 891 lbs of lint per acre for 5, 7, and 10 lb of Temik sidedressed per acre, respectively.

Discussion

In both 1998 and 1999, Temik sidedress applications were shown to increase yields over an untreated check. However, in 2000 only one location out of seven had significantly higher yields with an additional application of temik. These studies indicate that more work is needed to refine and define the situations and timing of applications to elicit a significant yield response with sidedress applications of a nematicide.

Table 1. Large block study of Temik sidedressed at pinhead to match head square. AR. 1998.

Location/ Nematode[1]	Treatment[2]	Yield (SC lb/A)
Lonoke (RKN)	7.5 lb/ A	2014 a
	Untreated	1745 a
Pulaski (RKN)	7.5 lb/A	1857 a
	Untreated	1641 b

[1]RKN=root-knot nematode
[2]All fields were treated with Temik at 3.5 lb/ A in-furrow at planting and an additional application of 7.5 lb/A at pinhead to match head square stage.
[3]Means within a location and column followed by the same letter are not significantly different (LSD=0.05)

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Table 2. Large block study of Temik sidedressed at pinhead to match head square. AR. 1999.

Location/ Nematode[1]		Treatment[2]	Lint Yield[3]	LSD	∝ Level
Cornerstone #1	(RKN)	Treated	927.8 a	110.45	ns[4]
		Untreated	899.8 a		
Cornerstone #2	(RNF)	Treated	1011.5 a	13.36	0.20
		Untreated	993.5 b		
Crittenden	(RKN)	Treated	577.2 a	86.86	0.10
		Untreated	487.9 b		
Desha #1	(None)	Treated	1142.8 a	71.67	0.20
		Untreated	1069.2 b		
Desha #2	(None)	Treated	1228.8 a	97.49	ns[4]
		Untreated	1234.9 a		
Jefferson	(RKN)	Treated	1064.9 a	37.81	ns[4]
		Untreated	1079.2 a		
Mississippi	(RKN)	Treated	846.9 a	84.53	0.20
		Untreated	751.9 b		
Poinsett	(None)	Treated	492.3 a	28.70	0.05
		Untreated	440.3 b		
Mean for all locations		Treated	911.5 a	23.61	0.05
		Untreated	869.6 b		

[1]RKN=root-knot nematode; RNF=reniform nematode; none=no nematodes.
[2]All fields with nematodes received 5.0 lb of Temik in-furrow at planting and treated plots received a sidedress application of an additional 5.0 lb of Temik at pinhead to match head square stage. Fields with no nematodes were treated with Temik at 3.5 lb/ A in-furrow at planting and an additional application of 6.5 lb/A at pinhead to match head square stage.
[3]Means within a location and column followed by the same letter are not significantly different at ∝ levels of 0.05, 0.1, and 0.2.
[4]ns=means not significantly different at all alpha (∝) levels tested.

Table 3. Large block study of Temik sidedressed at pinhead to match head square. AR. 2000.

Location/ Nematode[1]	Treatment[2]	Lint Yield[3]
Chicot (RKN)	UTC	871 b
	5 lb	958 a
	7 lb	948 a
	10 lb	938 a
Crittenden (RKN)	UTC	998 a
	7 lb	1026 a
Desha (None)	UTC	781 a
	5 lb	810 a
	10 lb	822 a
Jefferson (RKN)	UTC	1069 a
	5 lb	1020 a
	10 lb	1039 a
Lonoke #1 (RKN)	UTC	876 a
	5 lb	875 a
	10 lb	883 a
Lonoke #2 (RKN)	UTC	874 a
	7 lb	874 a
Poinsett (None)	UTC	778 a
	5 lb	773 a
	10 lb	774 a
Average	UTC	892 a
	5 lb	887 a
	7 lb	950 a
	10 lb	891 a

[1]RKN=root-knot nematode; RNF=reniform nematode; none=no nematodes.
[2]All fields with nematodes received 5.0 lb of Temik in-furrow at planting and treated plots received a sidedress application of an additional 5.0 lb of Temik at pinhead to match head square stage. Fields with no nematodes were treated with Temik at 3.5 lb/ A in-furrow at planting and an additional application of 7 and/or 10 lb/A at pinhead to match head square stage.
[3]Means within a location and column followed by the same letter are not significantly different at LSD=(0.05).