CONTROL OF RENIFORM NEMATODES IN NORTH ALABAMA FIELD STUDIES

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Abstract

Large on-farm replicated cotton tests were conducted in northern Alabama in 1995, 1996 and 1997 to determine rates and timing of nematicides needed to suppress damage by reniform nematodes. Results of the seven tests indicate that Temik 15G rates of 5 to 7 lb/A in-furrow are effective in reducing early season nematode damage on soil types in northern Alabama. These Temik rates increased seed-cotton yields between 300 to 500 lb/A compared to no nematicide. The foliar Vydate C-LV and sidedress Temik applications in combination with in-furrow Temik may also provide a way to extend nematode suppression later into the season. The Vydate and sidedressed Temik treatments generally increased cotton yields compared to Temik alone in-furrow. Rates and application methods for Vydate and sidedressed Temik should be studied more closely.

Introduction

The first indication that reniform nematodes had spread to the silty clay soils in north Alabama was found during a nematode soil survey in 1991 (Gazaway, 1991). In 1994 several farmers complained of lower than normal cotton yields in fields in northwest Alabama. Nematode soil samples indicated that many of these fields had high levels of reniform nematodes. At that time these fields had been farmed in cotton for many years and no nematicide was applied at planting for the last two or three years. Rates of nematicide needed for reniform nematode control on these soil types was unknown.

Materials and Methods

In 1994, on-farm studies were initiated to investigate possible nematicide treatments to suppress the reniform nematodes. These studies were large plot areas, eight to ten row wide, and at least 500 feet in length. All treatments were replicated four times across the fields. In these studies Temik 15G was evaluated as an in-furrow treatment at planting and also as a sidedress treatment at early cotton squaring. Vydate C-LV was evaluated as a foliar treatment to be used in combination with the in-furrow Temik application. Since these areas were planted with the farmer's equipment, normal cultural and management practices could be used by the farmer.

The farmer's planter was calibrated and Temik 15G rates (5 and 7 lb/A) were applied at planting. Vydate C-LV treatments were applied broadcast at a rate of 0.25 lb ai/acre at early squaring and then again 10 to 14 days later. A positive displacement applicator was used to apply Temik 15G rates (6 to 10 lb/A) as a sidedress treatment.

Soil nematode samples were taken from each plot area at planting. Individual nematode samples were taken from each plot just before the first foliar Vydate spray, again approximately two weeks after the last Vydate spray, and just prior to harvest.

One test area was harvested in 1994 and three test areas were harvested in 1996 and 1997. In all cases the whole plot area was harvested with grower equipment and weighed on scales under a boll buggy.

Results

Tests were conducted on the Underwood farm all three seasons and produced very consistent results. The cotton variety planted was DPL 5409 in 1995 and DPL 33B in 1996 and 1997. Cotton was planted in a 30 inch row spacing and Temik applied in-furrow at 7 lb/A increased average seed-cotton yields by over 500 lb/A compared to no nematicide (Table 1). The 7 lb/A in-furrow Temik treatment plus two foliar Vydate C-LV sprays increased seed-cotton yields by 780 lb/A compared to the no nematicide treatment. Sidedressed Temik application at 10 lb/A applied at early squaring produced a similar yield increase as the Temik plus Vydate combination. Reniform nematode levels were consistently lowered by the 7 lb/A in-furrow Temik rate each season (Table 2). In 1995 and 1997 the Temik plus Vydate treatment and the Temik sidedress treatment had significantly lowered reniform nematode levels at harvest than Temik alone in-furrow.

The Isbell farm test was conducted in 1996 and 1997 and was irrigated both seasons. Cotton was planted in a 38 inch row spacing in 1996 and a 30 inch row spacing in 1997. The cotton variety DPL 33B was planted both seasons. Although cotton yield increases were not as consistent as in the Underwood field, the yield responses were similar (Table 3). The 5 lb/A rate of Temik increased average seed-cotton yields 300 lb/A compared to no nematicide. The 5 lb/A in-furrow Temik treatment plus two foliar Vydate sprays increased seed-cotton yields by 600 lb/A compared to no nematicide. There was a trend for higher cotton yields with 7.0 lb/A of Temik compared to 5.0 lb/A of Temik especially

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in the 30 inch row spacing in 1997. Nematode soil samples in this field was highly variable both years. No consistent trend in reniform nematode control could be determined (Table 4). Irrigation with a traveling gun may have caused some of this variability. Reniform nematode levels also increased dramatically at harvest at this site in 1997 which again may be due to irrigation providing ideal condition for nematode growth.

The Jennings farm test produced poor yields both in 1996 and 1997. The test area was found to have a severe verticillum wilt problem as well as reniform nematodes. The wilt severely limited yields and affected our yield responses to nematicides (Table 5). The farmer planted SG 125, a non-Bt resistant cotton variety each season. The test was planted in a 38 inch row spacing and 5 lb/A of Temik increase seed-cotton yields by over 400 lb/A compared to no nematicide. Increasing the Temik in-furrow rate from 5 to 7 lb/A did not further increase yield in this test. A sidedress Temik application of 6 lb/A in 1997, however, showed a trend toward higher yields compared to in-furrow Temik treatments alone. The foliar Vydate treatments were not applied in 1997 because of increased budworm pressure following application in 1996. Because of budworm damage the Temik plus Vydate treatments did not increase yields compared to no nematicide in 1996.

We believe most of the cotton yield response to the nematicide treatments are due to reniform nematode suppression. Insects, especially plant bugs were monitored closely in the plot areas. Insecticide controls were used whenever plant bug numbers reached damaging levels.

Discussion

The results of these tests indicate that Temik 15G applied in-furrow at rates of 5 to 7 lb/A is effective in reducing early season reniform nematode damage on soil types in northern Alabama. The higher Temik rate will probably be needed as farmers move from 38 to 30 inch row spacing due to the dilution factor in-furrow on more closely spaced rows.

The foliar Vydate C-LV treatment and sidedress Temik application may also provide a way to extend reniform nematode suppression later into the season. The Vydate treatments are especially attractive because of their economics and control of early season plant bugs. Early season Vydate treatments on Bt cotton varieties should minimize any concerns about creating bollworm or budworm problems. The sidedress Temik treatment, although more expensive, should also be looked at more closely. Rate and application method in applying the Temik sidedress should be studied more closely.

References

Gazaway, W.S., Cotton Nematode Survey of Alabama. Alabama Cotton Pest Management Newsletter. 1991, ACES.

Table 1. Effect of reniform nematode controls on seed cotton yields, Underwood Farm, 1995-1997.

Treatments Rate (lb/A) and Timing	Seed Cotton Yields (lb/A)			
	1995	1996	1997	Avg.
Check	1060	3160	1780	2000
Temik 7.0 INF	1620	3600	2380	2530
Temik 7.0 INF + Vydate ES+MS	1820	3800	2720	2780
Temik 7.0 INF + Temik 10.0 ES	1870	3830	--	--
LSD (0.10)	232	205	167	--

Check treatment was Di-Syston (6.6 lb/A) in 1995 and Gaucho treated seed in 1996 and 1997.
INF indicates in-furrow application.
ES, MS indicates early and mid square.

Table 2. Effect of reniform nematode controls on reniform populations, Underwood Farm, 1995-1997.

Treatments Rate (lb/A) and Timing	Reniform Nematodes per 100cc Soil					
	1995		1996		1997	
	June	Sept	June	Sept	June	Oct
Check	840	1870	1030	690	2280	5480
Temik 7.0 INF	320	1330	480	220	520	3240
Temik 7.0 INF+Vydate ES+MS	160	500	150	480	510	1800
Temik 7.0 INF+Temik 10.0 ES	170	260	400	70	--	--
LSD (0.10)	267	553	414	560	1055	1170

Check treatment was Di-Syston (6.6 lb/A) in 1995 and Gaucho treated seed in 1996 and 1997.
INF indicates in-furrow application.
ES, MS indicates early and mid-square.

Table 3. Effect of reniform nematode controls on seed cotton yields, Isbell Farm, 1996-1997.

Treatments Rate (lb/A) and Timing	Seed Cotton (lb/A)		
	1996	1997	Avg.
Check	1730	2100	1920
Temik 5.0 INF	2030	2410	2220
Temik 5.0 INF + Vydate ES+MS	2130	2910	2520
Temik 7.0 INF	2170	2780	2480
LSD (0.10)	473	468	--

Check treatment was Di-Syston (6.6 lb/A) in 1996 and Gaucho treated seed in 1997.
Cotton was planted in 38 inch row spacing in 1996 and 30 inch row spacing in 1997.
INF indicates in-furrow application.
ES, MS indicates early and mid square.

Table 4. Effect of reniform nematode controls on reniform populations, Isbell Farm, 1996 and 1997.

Treatments Rate (lb/A) and Timing	Reniform Nematodes per 100cc Soil			
	1996		1997	
	June	Sept	June	Oct.
Check	160	940	430	11,360
Temik 5.0 INF	100	670	90	9,790
Temik 5.0 INF+ Vydate ES+MS	50	630	240	10,140
Temik 7.0 INF	60	420	230	9,760
LSD (0.10)	157	459	235	6,960

Check treatment was Di-syston (6.6 lb/A) in 1996 and Gaucho treated seed in 1997.
INF indicates in-furrow application.
ES, MS indicates early and mid square.

Table 5. Effect of reniform nematode controls on seed cotton yields, Jennings Farm, 1996-1997.

Treatment Rate (lb/A) and Timing	Seed Cotton Yields (lb/A)		
	1996	1997	Avg.
Check	1480	930	1210
Temik 5.0 INF	1840	1460	1650
Temik 7.0 INF	1720	1410	1570
Temik 7.0 INF + Vydate ES+MS	1550	--	--
Temik 5.0 INF+ Temik 6.0 (ES)	--	1610	--
LSD (0.10)	119	184	--

Check treatment was Gaucho treated seed each year.
INF indicates in-furrow application.
ES, MS indicates early and mid square.

Table 6. Effect of reniform nematode controls on reniform populations, Jennings Farm 1996 - 1997.

Treatments Rate (lb/A) and Timing	Reniform Nematodes per 100cc Soil			
	1996		1997	
	June	Sept	June	Oct.
Check	950	2,910	1030	5,980
Temik 15G 5.0 INF	510	2,020	680	1,660
Temik 7.0 INF	410	1,900	530	2,180
Temik 7.0 INF + Vydate ES+MS	500	1,340	--	--
Temik 5.0 INF+ Temik 6.0 ES	--	--	910	810
LSD 0.10	359	921	406	2251

Check treatment was Gaucho treated seed each year.
INF indicates in-furrow application.
ES, MS indicates early and mid square.