

Project Report

Field Evaluation of Treatments for Reniform Nematode Control in Cotton

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Introduction

Reniform nematodes continue to spread rapidly across Alabama's cotton fields. Crop loss estimates for Alabama suggests that reniform nematodes reduced Alabama cotton yields by 8.5 percent in 2004. Reports of poor control of this pest with preplant treatments have been increasing, especially in northern Alabama. Many cotton farmers have also switched away from in-furrow nematicide treatment, for the convenience of seed treatments which control thrips, but have no activity on nematodes. Studies to evaluate current treatments and a new nematicide seed treatment (Avicta), needs to be evaluated in on-farm tests. This should provide researchers and farmers more information about controlling reniform nematodes in Alabama cotton fields.

Materials and Methods

Cotton fields were sampled for reniform nematodes across north and central Alabama from early March through early April. These preplant reniform counts were used to select nine fields for on-farm evaluations. Fields were selected to provide a range of reniform populations. At planting three treatments were applied; 1) Temik 15G @ 5 lb/A, 2) Cruiser treated seed, 3) Avicta treated seed. All treatments were replicated three times across the field with plot widths of four to 12 rows and rows lengths were at least 1,000 feet. All plots were sampled for reniform nematodes at planting, in June, July and at harvest. Yields were determined by weighing the seed cotton produced in the plot area in a boll buggy.

Results and Discussion

Average reniform nematode counts per 500cc of soil (\approx 1 pint) are listed in Table 1. These samples show the wide variability in reniform nematode counts through the season. Preplant, counts were extremely high at the Whitehead and Leavelle sites which were both sandy textured soils. By planting, however, counts at both sites decreased greatly and never reach preplant reniform levels during the season. The Shaw site, however, had moderate reniform numbers preplant but reniform levels increase by over four fold by planting. It was hoped that these preplant numbers could be used to predict reniform damage. However this data shows no indication that preplant counts will be useful in predicting reniform levels at planting or during the season.

It seems the wide fluctuation in reniform populations must be tied to the reniform life cycle, with the high populations associated with soil sampling closely following a reniform hatch-out.

Cotton yields were measured and are reported in Table 2. In the Hamilton and Whitehead sites, cotton yields were very low. Hamilton's low yields were mainly due to extremely dry weather in August and September and a month's delay in emergence after planting. The Whitehead site cut-out shortly after hurricane Katrina and didn't develop a top crop at all. The lack of response to nematicide treatment at both sites was greatly affected by the environment.

The Leavelle and Shaw site also had lower yields and very little yield differences. This was particularly disappointing in the Shaw test which was irrigated. In the Shaw site the Temik treatment was noticeably inferior to both Cruiser and Avicta treatments. There appears to be degradation of Temik or some other problem at the Shaw site. The high reniform population at planting and through the season indicates that crop rotation may be needed at the Shaw location. The Leavelle site produced similar result with the seven pound per acre rate of Temik and Avicta treatment not increasing cotton yield compared to the Cruiser check plot.

The remaining five sites produced higher yield and generally bigger differences between treatments. The Murphy and Jennings sites both produced about a 200 pound seed cotton increase with Temik or Avicta treatments compared to the Cruiser check. The Thornton and Hargrave sites showed a slight advantage to Temik compared to the Avicta seed treatment. Cotton treated with Temik at the Thornton site was noticeably taller than cotton treated with Cruiser or Avicta and had significantly lower reniform populations in July. Spider mite populations were much higher on the Cruiser and Avicta cotton in early June, which may account for some of the height differences at the Thornton site. The Hargrave site was irrigated but boll rot late in the season reduced yields in all treatments. The Lee site had the lowest reniform population and showed a slight advantage to the Avicta seed treatment compared to Temik. The Lee site also had the highest yield of all the tests.

When yields were averaged across all tests, Temik and Avicta treatments produced 4.7 and 6.6 percent more cotton compared to the Cruiser check.

Table 1. Average reniform nematode counts in on-farm tests by sampling dates, 2005.

Reniform nematodes per 500 cc soil 2005 on-Farm Tests									
	Lawrence	Limestone	Limestone	Lawrence	Lawrence	Cherokee	Limestone	Fayette	Tusca.
	ST5599	ST5599	DP444	ST5599	DP444	DP444	DP444	ST 5599	ST5599
	no-till	tillage	tillage	no-till	no-till	no-till	tillage	no-till	tillage
	Lee	Hargrave	Shaw	Thorton	Hamilton	Jenning	Murphy	Whitehead	Leavelle
TRT#	preplant								
1	700	4400	4600	6700	5100	4600	5700	10800	20600
2	700	4400	4600	6700	5100	4600	5700	10800	20600
3	700	4400	4600	6700	5100	4600	5700	10800	20600
	Planting								
1	2380	5850	23740	25800	5760	6110	5680	5760	2750
2	9370	14790	18060	17630	2920	8400	4640	4900	5250
3	1290	9460	18580	16770	2580	4300	3870	3180	4730
	June								
1	455	6690	12520	7800	3540	5350	6090	770	3260
2	850	7370	13030	5320	3770	4670	11460	710	3690
3	570	8400	11320	8400	5230	6630	18430	2710	5830
	July								
1	1080	5920	5830	4290	4370	5310	770	4030	7970
2	4200	6860	4800	6600	6690	10630	710	2230	4970
3	510	9690	6770	9690	5570	6170	2710	5400	6000
	Harvest								
1	740	9060	14600	3370	5000	2510	3090	770	6170
2	1890	4830	15580	1430	5230	5740	4000	460	5490
3	50	5000	8740	1830	4750	4630	1400	910	5970

Note: Treatment #1 was 5 pounds of Temik 15G except in the Leavelle where 7 pounds was used. Treatment #2 was Cruiser treated seed and treatment #3 was Avicta treated seed. All seed received Dynasty as a seed treatment and the Avicta treatment included Cruiser.

Table 2. Average Seed-cotton yields in on-farm reniform nematode tests, 2005			
	Treatment Yields lb/A		
Farmer Field	Temik	Cruiser	Avicta
Shaw	1537	1773	1803
Murphy	2490	2260	2473
Hargrave	2270	1917	2083
Thornton	2103	1910	2010
Hamilton	1300	1270	1360
Lee	2650	2540	2850
Jenning	2247	2000	2267
Leavelle	1727	1660	1683
Whitehead	1437	1633	1563
AVG	1973	1884	2010
% Yield	104.7	100.0	106.6