

**PERFORMANCE OF STONEVILLE 5599BR COTTON VARIETY IN THE  
PRESENCE OF ROOT KNOT NEMATODES (*MELOIDOGYNE INCOGNITA*)**

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**Abstract**

The cotton variety Stoneville 5599BR was tested in a highly infested root-knot nematode (*Meloidogyne incognita*) field to determine the performance of the variety. The treatments were Stoneville 5599BR planted with and without the soil fumigant Telone II (1,3-dichloropropene) to see how the variety would perform in a greatly reduced nematode population area as well as in the highly populated area. Nematode samples taken at cotton emergence, first square, bloom, and first harvest showed that the nematode population increased significantly at the post harvest sampling period. Yields in the Telone II treated plots were significantly higher than the non-treated areas. These two results lead to the conclusion that Stoneville 5599BR is not totally resistant to root-knot nematodes. However, the non-Telone II treated plots yielded well in the 31 variety test in which the plots were embedded, indicating that at least a fair degree of tolerance is present in Stoneville 5599BR to root-knot nematodes.

**Introduction**

Ashley County is located in southeast Arkansas with the cotton producing area of the county located in the eastern one-third. From 40,000-55,000 acres of cotton are grown annually in the Mississippi River alluvial part of the county. The presence of root-knot nematodes in the county has been documented and has been recognized for many years as a growing problem in cotton production. As reported at the Beltwide Cotton Conference in 2003, field surveys conducted in 2000 showed that 56% of the cotton fields in the county were infested with root-knot and 47% were above the established treatment threshold. Grower estimates of yield losses in various years have ranged from 0-500 pounds of lint per acre. Rotations with crops such as root-knot resistant soybeans and grain sorghum have met with only very limited success due to market prices and low income from the rotation crop.

Telone II has been used effectively by some growers for several years for root-knot nematode control. While fumigation with Telone II has been very successful in controlling nematodes within the growing season, field treatment on an annual basis is a major production expense and the time and labor associated with its application is relatively high. A nematode resistant, high yielding, cotton variety would be of great benefit. The cotton variety Stoneville 5599BR has been reported as having at least a moderate level of root-knot resistance. A study was established on the Bruce Bond farm near Portland, AR to determine how well the variety performs in a field known to have high numbers of root-knot nematodes.

**Materials and Methods**

A field study was established on the Bond Farm (May 8, 2003) in a field with a high root-knot nematode population density and a history of severe root-knot damage in previous years. The plots were field length strips 4 rows wide by approximately 2,600 ft. long, and treatments were replicated 4 times. Treatments were Stoneville 5599BR with no Telone II and with 3 gallons of Telone II applied on April 14, 2003. The plots not treated with Telone II were ripped and hipped with the same equipment used to apply the Telone II in the other plots, but with no material applied. No Temik (aldicarb) was applied to any of the plots, but the insecticide Orthene (acephate) was applied for thrips control as an in-furrow spray in all plots. Nematode samples were taken from the center 2 rows of each strip to a depth of 10 inches at cotton emergence, first square, first bloom, and post harvest. Yields were measured by harvesting (October 24, 2003) the entire plot and weighing the seed cotton on a boll buggy equipped with scales. Lint turnout was obtained from a laboratory gin without the use of lint cleaner. The test was embedded in a transgenic cotton variety test being conducted in the field. A total of 31 commercial transgenic cotton cultivars were included in the test.

**Results**

Nematode sample results showed the typical pattern of Telone II suppressing the population of root-knot nematodes until first bloom with a return to very high populations by the time of harvest. Samples taken in the plots with no Telone II applied

showed a suppression of root-knot nematodes until first bloom in the two reps with relatively low populations of root-knot nematodes. The two reps with high populations at cotton emergence had much higher populations of root-knot nematode at both the first square and first bloom sampling periods. All 4 reps with no Telone II applied returned to very high levels of nematode infestation at the post harvest sampling time with no significant difference between Telone II treated and non-treated at post harvest (Tables 1 & 2).

Yield results showed a large increase in 3 of the 4 reps of the Telone II treatment plots over the non-treated with the 4<sup>th</sup> rep slightly less than the non-treated plot. The average of the 4 reps showed the Telone II treatment yielded a non-significant 156# lint/acre more than the non-treated areas (Tables 3 & 4). Since rep 3 was totally out of line with the other three reps, it was decided to see the results with rep 3 removed. With rep 3 removed, the Telone II treated plots yielded a significant 219# lint/acre increase over the Check (Table 5). Yields of the Telone II treated plots ranked third in the overall variety test in which the plots were embedded. The non-treated plots ranked sixth.

### Discussion

Since the Telone II treated plots yielded significantly higher than the non-treated plots and post harvest nematode population increased, the conclusion can be reached that Stoneville 5599BR is not totally resistant to root-knot nematodes. However, yields for both treatments were very good compared to the other 30 commercial transgenic cotton varieties in which the test was embedded. Since all the other varieties in the test were treated with Telone II, this leads to the conclusion that at least a fair degree of tolerance to root-knot nematode was present in the Stoneville 5599BR cotton variety.

Table 1. Nematodes/pint of soil, 0-10" sample, 4 reps.

Rep	Treatment	Cotton Emergence	First Square	First Bloom	Post Harvest
Rep 1	Telone II	227	0	2727	4318
	No Telone II	682	0	0	7955
Rep 2	Telone II	227	0	227	5682
	No Telone II	227	227	0	3636
Rep 3	Telone II	682	0	455	9545
	No Telone II	2955	909	2045	9318
Rep 4	Telone II	455	0	455	6136
	No Telone II	3182	455	2500	8636

Table 2. ST5599BR-Nematodes/pint of soil, average.

Treatment	Emergence	First Square	First Bloom	Post Harvest
Telone II	398 a	0 a	966 a	6420 a
No Telone II	1762 a	398 a	1136 a	7386 a

Table 3. Pounds lint/acre, 4 reps.

Rep	Treatment	Lint/Acre	Difference from No Telone II
Rep 1	Telone II	1703	160
	No Telone II	1543	-
Rep 2	Telone II	1710	257
	No Telone II	1453	-
Rep 3	Telone II	1735	-34
	No Telone II	1769	-
Rep 4	Telone II	1844	241
	No Telone II	1603	-

Table 4. Pounds lint/acre, average of 4 reps.

Treatment	Pounds Lint/Acre	Difference From Check
Telone II	1748 a	156
No Telone II	1532 a	-

Table 5. Pounds lint/acre, average of reps 1, 2, & 4.

<b>Treatment</b>	<b>Pounds Lint/Acre</b>	<b>Difference from Check</b>
Telone II	1752 a	219
No Telone II	1533 b	--