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Rates and Timing of Telone II Application in Cotton¹

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Introduction

Upland cotton (*Gossypium hirsutum* L.) is a major agronomic crop in the northern tier of counties in Florida with production in 2001 of 125,000 acres. As acreage of cotton has increased so have nematode problems, particularly damage from the southern root-knot nematode and the reniform nematode. Resistant cultivars are not available, so nematodes are managed by crop rotation and nematicides. Peanut, commonly grown in north Florida, is a non-host of both southern root-knot and reniform nematodes and is a useful crop in cotton rotation systems. Peanut, however, has a limited acreage. Corn is a non-host of reniform nematodes but plantings have been reduced in recent years because of low prices and inadequate rainfall. Thus, growers have tended to grow cotton after cotton due to relatively high prices for this commodity. Without rotation, the remaining option for nematode-infested fields is the use of nematicides.

Trials

Two north Florida fields, one naturally infested with southern root-knot nematodes in Santa Rosa County and one infested with reniform nematodes in Gadsden County, were used for replicated field trials. Soil at both sites was a sandy loam. The sites were prepared in late February by moldboard plowing then

double-discing. Prior to treatment, population densities of nematodes were determined by sampling each plot. Initial populations of root-knot nematodes averaged 327/100 cm³ soil while reniform nematodes averaged 1234/100 cm³ soil.

Telone II was placed 12 inches deep with a single chisel beneath the row in all plots. Application rates of 1.5, 3.0, 4.5, and 6.0 gals/acre were made at 92, 63, 36, and 2 days before planting (DBP) Delta Pine 458BR cotton on June 3 at the root-knot nematode site, and at 69, 37, 12, and 0 DBP on May 13 at the reniform site. Cotton was grown under nonirrigated conditions.

Plots were mechanically harvested on October 29 and October 16 at the root-knot and reniform nematode sites, respectively. Seed cotton was harvested from entire plots and subsamples ginned to determine lint yield. Nematode samples were collected within two weeks of harvest and processed.

Pretreatment soil populations of root-knot nematode infective juveniles (J2) were high and ranged from 308 to 363/100 cm³ soil among treatments. The highest yield was produced with the 4.5 gals/acre treatment applied two days before planting while the lowest yield was produced in the control (Table 1). Yield data among the Telone II

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treatments alone were not significant, indicating that an optimal rate X timing treatment could not be determined. All fumigant treatments regardless of rates and timing reduced J2 soil population density levels below that recovered from the non-treated control. Analyses of these nematode data among the Telone II treatments alone did not indicate a significant rate X timing interaction.

Initial population densities of Reniform nematodes were high and population densities were expected to cause damage. All Telone II treatments, except 1.5 gals/acre at 69 DBP, improved yield over the control, and no yield differences were found among these fumigant treatments (Table 2). Only Telone II at 4.5 gals./acre at 0 DBP reduced post-harvest reniform nematode population densities. When application dates were compared, yield was not any different among those dates (Table 3). A comparison of Telone II rates showed that the 1.5 gals/acre rate yielded lower than the 3.0 and 4.5 gals/acre rates. Post-harvest reniform nematode population densities showed little differences among treatments and the control. For over two months after planting, the weather was unusually hot and dry at both sites. Thus, cotton yields were lower than normal in these tests.

Conclusions

Data from these two tests indicate that Telone II can be applied productively up to three months prior to planting cotton. Early applications and those closer to planting (0 and 2 DBP) would allow growers more flexibility under conditions that match farm operation schedules and appropriate moisture conditions.

At-planting applications of Telone II are not presently labeled for use on cotton and caution is urged because phytotoxicity may occur in heavier soil types or under cooler soil temperatures than were present in these tests.

The post-harvest populations of root-knot nematode J2 were reduced with the Telone II treatments. This is consistent with previous tests using Telone II. Conversely, post-harvest reductions are seldom found in reniform nematode populations after using Telone II. This is possibly due to a quick re-infestation of the treated soil because of the high

numbers of nematodes usually encountered in reniform-infested cotton fields.

The rates of Telone II used in these tests were effective and are in line with current recommendations of 3.0 to 4.5 gals/acre. Data from these and other tests indicate the acceptability of 3.0 gals/acre of Telone II to manage reniform nematodes and rates of 3.0 gals/acre and higher to manage damaging populations of root-knot nematodes.

Table 1. Cotton lint yield and post-harvest soil population densities of southern root-knot nematode in soil treated with Telone II at varying time intervals prior to planting.

Treatment ^y gals/acre	Days prior to planting	Lint lbs/acre	Root-knot/ 100 cm ³ soil
1.5	2	454 abc ^z	170 bc
1.5	36	447 abc	182 bc
1.5	63	444 abc	140 bc
1.5	92	394 abc	163 bc
3.0	2	529 ab	250 bc
3.0	36	417 abc	105 bc
3.0	63	379 bc	75 bc
3.0	92	429 abc	125 bc
4.5	2	548 a	73 c
4.5	36	432 abc	116 bc
4.5	63	419 abc	15 c
4.5	92	500 ab	28 c
not treated	—	311 c	460 a

^yTelone II was applied by single-chisel injection 12 inches under the row; data are averages of six replicates.
^zColumn means followed by the same letters are not significantly different according to the Duncans Multiple Range test ($P < 0.05$).

Table 2. Cotton lint yield and post-harvest soil population densities of reniform nematodes in soil treated with Telone II at varying time intervals prior to and at planting.

Treatment gals/acre ^y	Days prior to planting	Lint lbs/acre	Reniform/ 100 cm ³ soil
1.5	0	399 a ^z	2617 bc
1.5	12	394 a	2938 abc
1.5	37	410 a	3540 ab
1.5	69	323 b	3531 ab
3.0	0	394 a	1895 cd
3.0	12	439 a	3237 ab
3.0	37	421 a	2778 abc
3.0	69	392 a	2960 abc
4.5	0	417 a	1404 d
4.5	12	419 a	3263 ab
4.5	37	395 a	3852 a
4.5	69	412 a	3636 ab
not treated	—	315 b	3048 abc

^yTelone II was applied by single chisel injection 12 inches under the row; data are averages of six replicates.
^zColumn means followed by the same letter are not significantly different ($P \leq 0.05$) according to the Least Significant Difference test.

Table 3. Lint yield and reniform nematode post-harvest soil population densities as influenced by date of application and rate of Telone II in cotton.

Treatment	Lint lbs/acre	Nematodes/ 100 cm ³ soil
Days before planting ^z		
69	375 a ^z	3431 a
37	409 a	3557 a
12	418 a	3202 a
0	401 a	1972 b
Rate (gals/acre)		
1.5	382 b	3239 a
3.0	412 a	2842 a
4.5	409 a	3040 a
^z Column means followed by the same letter are not significantly different ($P \leq 0.05$) according to the Least Significant Difference test.		