Management of Reniform Nematodes in Strip Till Cotton Treated with Temik 15G and Telone II, Including Use of Telone II at Planting

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INTRODUCTION

Conservation tillage systems have been shown to have little short- to medium-term impact on plant-parasitic nematode populations (Dickson and Gallaher, 1989; McSorley and Gallaher, 1994). Effects of long-term conservation tillage systems where organic matter may be accumulated have not been studied extensively. These tillage systems, however, may impact nematode development and management due to weed growth and reduced efficacy of nematicides. Many weeds serve as hosts of the plant-parasitic nematodes and can increase populations before, during, and after the crop cycle. Good agronomic practices in any tillage system generally reduce this potential problem. The action of nematicides, however, may be influenced by tillage systems due to increased organic matter and its sorptive potential (Smelt and Leistra, 1992).

The objectives of the present studies, using strip tillage, were to determine: 1) relative efficacy and effective rates of two commonly used nematicides, Temik 15G, and Telone 11, and 2) a preliminary test of at planting Telone II applications in cotton *(Gossypium hirsutum* L.).

MATERIALS AND METHODS

Test 1

A field trial was conducted on a fine sand soil (80% sand, 8% silt, 12% clay) infested with the reniform nematode *(Rotylenchulus reniformis* Linford and Oliveira). The test site was at the IFAS North Florida Research and Education Center, Quincy, FL. The field was previously planted to soybean *(Glycine max* [L.] Merr.) and weed fallowed over the winter. Soil was prepared by subsoiling and striptilling to 18 in. wide one wk prior to nematicide application. Telone II treatments were made on 22 April with a single in the row chisel to 10 in deep and immediately after application, rows were rototilled to seal the fumigant. Temik 15G and Thimet 15G were applied infurrow at planting on 8 May 1995 with a Gandy applicator. Thimet 15G was applied to the control and Telone I1 plots at planting to reduce thrips damage *(Frankliniella* spp.), since Temik has activity on these pests. Cotton cv. 'Chembrand 407' was planted 2-3 in. apart in the 36 inch-wide-rows. Plots were 2 rows wide x 25 ft. long, and the experiment was placed in a randomized complete block design containing six replications.

Cotton was managed utilizing normal cultural practices and irrigated as needed. The crop was harvested by hand from all plants in the two-row plots on 15 December 1995. Lint yield of cotton was calculated by multiplying seed cotton yield by 0.40, and yield was converted to lb lint/a. Cotton stalk weight was taken from 3 ft. of each plot row and converted to lb./a. Six soil cores (1 in. diam., 10 in. deep) were taken from each plot on 20 December 1995, combined and a 100-cm^3 soil sample was processed by the centrifugation-sugar flotation technique (Jenkins, 1964) and nematodes counted Data were analysed using ANOVA and Fisher's LSD test ($F < 0.05$).

Test 2

Soil in a site adjacent to test 1, grown previously in cotton, was subsoiled and strip tilled to 18 in. wide one wk prior to Telone I1 treatment. Preplant application rates of Telone I1 were made with a single in the row chisel to 10 in. on 9 May . At planting applications of Telone I1 or Furadan were made at planting on 22 May, and cotton' DP 5415' was planted as in test 1. Similar plot sizes and replications were used as in test 1. Cotton was observed for phytotoxicity and on 1 July, plants were counted from 3 ft of each plot row. Additionally, heights of 10 plants were measured from each plot

RESULTS AND DISCUSSION

Cotton yield was increased by all Telone I1 treatments with the 6.0 gal/a producing highest yield (Table 1). With the exception of Telone II at 1.5 gal/a, both yield and stalk weights were hgher using Telone II compared to Temik 15G treatments. All Telone I1 treatments produced significantly higher stalk weights than the control. The Temik treatment of 12 lb/a

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produced both lowest lintyield and stalk weights of all the chemical treatments. The number of reniform nematodes were high at the end of the season and did not differ among treatments and the control.

Telone II at 3 to 6 gal/a appeared to be optimal rates under conditions of this test (Table 2), and these rates are similar to those recommended in conventional systems (Dunn, 1996) Nematode numbers were initially low at the beginning of this test, thus yield increase due to chemical treatment was less than if higher initial populations were present. Higher stalk weights in the Telone I1 test complimented field observations that this chemical stimulated vegetative growth of cotton. This may have reduced lint yield, and application of a growih regulator would have been useful in the Telone I1 treatments.

Data from the 9 and 12 lb/a rates of Temik 15G may be confounded due to early season stunting. At high use rates, a modified in-furrow application is necessary to avoid phytotoxicity in cotton. The study did not include Telone II plus Temik 15 G treatment, but low rates of each in combination may be useful to include in further tests.

No phytotoxicity of cotton was observed among preplant or at planting treatments of Telone 11, Furadan, or the control. Plant stand did not differ among treatments and plant heights were similar. The data, however, are preliminary and growersare not encouraged to utilize the practice. Heavier soil types, cool soils, and excessive moisture can result in increased fumigant retention which can result in plant injury.

CONCLUSIONS

Under normal conditions in north Florida, use and rates of nematicides in reduced tillage systems should be similar to conventional tillage. Data from this test indicated nematicide efficacy and use rates at comparable levels to conventional tillage. A possible exception in either system would be presence of large quantities of organic matter that would prevent proper movement of nematicides.

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Table 1. Yield and stalk weight of cotton cv. Chembrand 407 and number of reniform nematode juveniles at harvest in a field nematicide test, 1995.[1]

Treatment[2]	Lint yield (lb/a)	stalk wt. (lb/a)	No. nematodes/ 100 cm^3 soil
Telone II 6.0 gal	599	6490	5369
Telone II 4.5 gal	565	6006	4507
Telone II 3.0 lb	564	6236	4452
Temik 15 G 3.0 lb	550	5397	4763
Temik 15 G 9.0 lb	549	5312	4348
Temik 15 G 6.0 lb	517	4985	4607
Telone II 1.5 gal	516	6152	4073
Temik 15 G 12.0 lb	514	4922	5411
Control (Thimet 15G)	460	4518	3781
LSD ($P \leq 0.05$)	180	1557	2148

[1] Data are an average of six replicates.
[2] Application of Telone II was by single chisel injection to 12 in. deep. Temik 15G and Thimet 15G applications were made in-furrow at planting. Thimet 15G was applied to the control and Telone II treatments.

Table 2. Plant stand and height of cotton 40 days after at-planting treatment with three Telone II rates.[1]

Treatment	Rate (gal/a)	Plant stand	Plant height (in.)
Control	--	13	10.6
Telone II	1.5	13	11.4
Telone II	3.0	12	11.0
Telone II	4.5	13	11.7
Telone II	1.5	12	11.3
Telone II	3.0	11	10.7
Telone II	4.5	12	10.3
Furadan	0.25	11	11.7
Furadan	0.50	12	12.1
Furadan	0.75	12	10.9

[1] Data are average of 6 ft. of row in each plot.