

**VAPAM (SODIUM METHYLDITHIOCARBAMATE) AND TELONE II
(1,3-DICHLOROPROPENE) FOR CONTROL OF ROOT KNOT NEMATODE
(*MELOIDOGYNE INCOGNITA*) IN COTTON IN ASHLEY COUNTY, ARKANSAS**

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Abstract

Vapam (sodium methyldithiocarbamate) is being considered as an alternative to Telone II (1,3-dichloropropene) for control of root-knot nematodes (*Meloidogyne incognita*) in cotton. Two separate test plots were established to compare Vapam and Telone II for nematode control and cotton yield. Vapam was applied at the manufacturer recommended rate of 6 gallons per acre; Telone II was applied at 3 gallons per acre. An untreated check was provided. There were four replications in each field. Both Telone II and Vapam resulted in lower numbers of root-knot nematodes. Yields were increased by both the Vapam and Telone II with no significant difference between the two.

Introduction

Cotton producers in Ashley County, Arkansas would like a cheaper alternative to fumigation than Telone II for control of root-knot nematodes. Sodium methyldithiocarbamate (Vapam; metam-sodium) has been used successfully for many years for nematode control in horticultural crops. Tests were established on two fields in southeastern Arkansas during 2003 to determine if Vapam might be an effective and less costly alternative to Telone II for root-knot nematode control in cotton.

Materials and Methods

Two fields with a history of root-knot nematode problems in Ashley Co., AR were selected for the study. The fields (Braxton and Highway) were on the Jim Johnson farm near Wilnot, Arkansas. Vapam was applied on March 18, 2003 and Telone II was applied on March 17, 2003 using a ripper-hipper fitted with an injector system to place the materials approximately 12 inches below the soil surface under each bed. Untreated checks received the ripper-hipper treatment without the application of the fumigants. Four replications of each treatment were included in each site. Vapam (6 gallons/acre) was applied in a total water-fumigant volume of 12 gallons per acre, and the Telone II was applied at the rate of 3 gallons per acre in all sites. The Highway field was planted on April 22, 2003. The Braxton field was planted on April 27, 2003. Temik (aldicarb) was applied at 3.5 lb/acre for thrips control. The Highway plots were 6 row wide strips and approximately 2,640 feet long. The Braxton plots were 6 rows wide and approximately 1,320 feet long. The cotton variety for the Highway field was DPL451BR and the Braxton field was ST4691B.

Nematode samples were taken to a depth of 10"; the previous fall, at cotton emergence (May 2, Highway and May 5, Braxton 2003), at first square (June 3, 2003), at cotton first bloom (July 8, 2003), and at post harvest (October 20, 2003). Yields were measured from all plots by harvesting the entire plot and weighing the seed cotton plots on a boll buggy fitted with weight scales. Lint yields were established by ginning the plot samples with a hand gin.

Results

Previous fall root-knot nematode densities were relatively high in both fields (Tables 1-4). Low numbers of nematodes were found at cotton emergence in all plots including the unfumigated checks. In both the Highway and Braxton plots, nematode numbers were still low with both Telone II and Vapam at first square. By first bloom on the Braxton plots, the Telone II continued to hold the nematode numbers down, while the nematode numbers in the Vapam plots increased significantly by first bloom. Results from the Highway field showed both the Vapam and Telone II numbers to be low up to first bloom. By harvest, samples showed that nematode numbers in all plots (Vapam, Telone II and Check) were very high in both fields (Tables 1-4). Yields on the Highway field were taken on October 14, 2003 (Tables 5-6). Highway field yields showed a large yield increase on three of the 4 reps of both the Vapam and Telone II plots and was significant on the average for the reps. No significant difference was shown between the Vapam and Telone II yields. The Braxton plot showed a large yield increase over the Check on only one of the 4 reps with both Telone II and Vapam (Tables 7-8). In rep 1, a small numerical increase was seen with both Vapam and Telone II. The Braxton field average for all reps showed a numerical increase over the Check by both Telone II and Vapam but not statistically different. Averaging both fields together resulted in a significant yield increase by both Vapam and Telone II over the Check (Table 9).

Discussion and Conclusions

Vapam and Telone II showed no significant difference in these plots in 2003. Vapam is a little cheaper than Telone II and therefore in the plots on this year, the Vapam would have been a good alternative to Telone II. It should be noted that through the year, the Telone II plots had a much more uniform look in terms of size and plant growth than Vapam. Also, rainfall and temperatures in the area were almost ideal for cotton production in 2003 resulting in very little pressure on the plants due to stress from dry and hot conditions. Even under these conditions both the Vapam and Telone II gave yield increases over the untreated Checks. In the Highway plots these increases were significant. Further work needs to be done over years to determine the capabilities of Vapam under varying environmental conditions. Telone II has been tested for several years in the area and shown to consistently increase yields in fields with significant populations of root-knot nematodes. The variability of the population of root-knot nematode and difficulty of relating these numbers to yield are problems that are under investigation.

Table 1: Highway Field-Nematodes per pint of soil,0-10" sample, 4 reps.

Rep	Treatment	Emergence	1 st Square	Bloom	Post Harvest
Rep 1	Vapam	455	682	0	1591
	Telone II	0	0	227	455
	Check	682	455	2955	3409
Rep 2	Vapam	227	0	682	909
	Telone II	227	0	0	682
	Check	455	1818	455	2273
Rep 3	Vapam	227	455	227	3864
	Telone II	0	0	0	2727
	Check	455	227	5682	2273
Rep 4	Vapam	0	909	227	2727
	Telone II	0	455	227	4318
	Check	1364	1136	1818	1364

Table 2: Highway Field-Nematodes per pint of soil, average.

Treatment	Previous Fall	Emergence	1 st Square	Bloom	Post Harvest
Vapam	2727 a	227 b	512 a	284 b	2273 a
Telone II	2529 a	57 b	114 a	114 b	2046 a
Check	1960 a	739 a	909 a	2728 a	2330 a

Table 3: Braxton Field-Nematodes per pint of soil, 0-10" sample,4 reps.

Rep	Treatment	Emergence	1 st Square	Bloom	Post Harvest
Rep 1	Vapam	227	0	909	0
	Telone II	227	227	227	455
	Check	227	682	682	682
Rep 2	Vapam	0	227	2045	1364
	Telone II	0	682	455	1364
	Check	682	227	2727	1364
Rep 3	Vapam	0	682	1364	1591
	Telone II	0	455	909	682
	Check	227	909	909	1136
Rep 4	Vapam	227	909	4773	455
	Telone II	0	0	0	1136
	Check	455	682	2273	682

Table 4: Braxton Field-Nematodes per pint of soil, average.

Treatment	Previous Fall	Emergence	1 st Square	Bloom	Post Harvest
Vapam	1251 a	114 ab	455 a	2273 a	853 a
Telone II	398 a	57 a	341 a	398 b	909 a
Check	995 a	398 b	625 a	1648 ab	966 a

Table 5: Highway Field-Pounds lint/acre, 4 reps

Rep	Treatment	Lint/Acre	Difference from Check
Rep 1	Vapam	1498	146
	Telone II	1460	108
	Check	1352	--
Rep 2	Vapam	1485	122
	Telone II	1526	163
	Check	1363	--
Rep 3	Vapam	1542	95
	Telone II	1471	24
	Check	1447	--
Rep 4	Vapam	1386	-24
	Telone II	1468	58
	Check	1410	--

Table 6: Highway Field-Pounds lint/acre, average.

Treatment	Lint/Acre	Difference from Check
Vapam	1478 a	85
Telone II	1481 a	88
Check	1393 b	--

Table 7: Braxton Field-Pounds lint/acre, 4 reps.

Rep	Treatment	Lint/Acre	Difference from Check
Rep 1	Vapam	1424	30
	Telone II	1442	51
	Check	1391	--
Rep 2	Vapam	1489	3
	Telone II	1468	-18
	Check	1486	--
Rep 3	Vapam	1531	157
	Telone II	1497	123
	Check	1374	--
Rep 4	Vapam	1460	-10
	Telone II	1470	0
	Check	1470	--

Table 8: Braxton Field -Pounds lint/acre, average.

Treatment	Lint/Acre	Difference from Check
Vapam	1476 a	46
Telone II	1469 a	39
Check	1430 a	--

Table 9: Average of Braxton & Highway Fields-Pounds lint/acre

Treatment	Lint/Acre	Difference from Check
Vapam	1477 a	65
Telone II	1475 a	63
Check	1412 b	--