

**TELONE II (1,3-dichloropropene) VS VAPAM (Sodium methyldithiocarbamate)  
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 in cotton. Three separate test plots were established to compare Vapam and Telone II for nematode control and cotton yield. The Vapam was applied at the manufacturer recommended rate of 6 gallons per acre; the Telone II was applied at 3 gallons per acre. An untreated check was provided. There were four replications of each plot in each field. Nematode numbers were similar at all sampling dates within each site. Telone II resulted in lower numbers of root-knot nematodes at the time of first bloom in two of the three locations, and at harvest in one location. Vapam resulted in lower nematode numbers at harvest in one location. Lint yields were only improved by fumigation in one of the locations.

**Introduction**

Cotton producers in Ashley County, Arkansas would like a cheaper alternative to fumigation for 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 three farms in southeastern Arkansas during 2002 to determine if Vapam might be an effective and less costly alternative to Telone II for root knot nematode control in cotton.

**Material and Methods**

Three fields with a history of root-knot nematode problems in Ashley Co., AR were selected for the study. Two of the fields (Braxton and Highway) were on the Jim Johnson farm near Wilmot, Arkansas. The third was on the Steve Clement farm near Parkdale, Arkansas. Both Vapam and Telone II were applied (Johnson March 28, 2002; Clement March 27, 2002) in all sites 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. Seed for each site was treated with the insecticide Gaucho to help with control of thrips (Highway plots; April 28, 2002, Braxton plots; May 3, 2002, Clement plots; April 23, 2002). In addition, Temik was applied at 3.0 lb/acre to the Braxton plots. The Highway plots were 6 rows wide strips approximately 2,640 feet long. The Braxton plots were 6 rows wide and approximately 1,320 feet long, and the Clement plots were 4 rows wide by 1,980 feet long. The cotton variety for both the Highway and the Braxton sites was Phytogen 355, and the variety for the Clement site was DPL 451BR.

Nematode samples were taken to a depth of 12" prior to fumigant application (March 28, 2002), at cotton emergence (May 6, 2002), at cotton first bloom (July 8, 2002), and at crop maturity (November 11, 2002). 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 assuming a 35% lint turnout.

**Results**

Pre-fumigation root-knot nematode densities were relatively high in all three sites (Tables 1-3). Low numbers of nematodes were found at cotton emergence in all plots including the unfumigated checks. At both first bloom and cotton maturity, root-knot numbers after Telone II were lower than with Vapam in the Braxton field (Table 1). Lower nematode numbers were seen at first bloom after Telone II than in the check in the Highway field (Table 2). At cotton maturity, nematode numbers were lowest after Vapam treatment, and the crop matured slightly earlier in this site after Vapam (Table 3). Analysis of variance across sites indicated no interaction between treatment and location, so data were combined for analysis. There were no differences among treatments either in nematode numbers when the data were combined (Table 4).

Lint yields were not improved by fumigation with either Vapam or Telone II in either the Braxton (harvested October 16, 2002), (Table 5) or the Highway (harvested October 16, 2002), (Table 6) sites. Fumigation with Telone II resulted in a significant improvement in lint yield relative to Vapam application in the Clement field (harvested October 15, 2002),

(Table 7). Combined analysis across the sites indicated a significant treatment by location interaction, so a combined analysis was not conducted. The average yield across the sites, however, is shown in Table 8 for perspective.

### Summary, Conclusions and Discussion

Results from these trials were somewhat puzzling. Grower experience in the area indicates that fumigation with Telone II generally results in a significant improvement in yield where nematode population densities similar to those seen in these fields occur. Also, nematode numbers after Telone II usually remain low until mid- to late season, but in all three of these sites nematode numbers increased rapidly from the time of cotton emergence until first bloom. Based on these data, it is possible that the fumigants were not delivered through the applicators at the rate expected, although the machinery was calibrated carefully before each trial was conducted. While the yield results in the Clement plots showed a significant improvement, yield was unaffected by either material in the two other sites. During the 2002 crop season, rainfall was above average and temperatures were slightly below average for the area. It is possible that relatively low environmental stress during the 2002 growing season may have allowed the crop to perform well even in the presence of high levels of root knot nematodes. More investigation will be necessary before the efficacy of Vapam can be fully evaluated.

Table 1. Jim Johnson – Braxton-Nematodes/pint of Soil, 0-12” Sample 4 Reps.

<b>Time of Application</b>	<b>Prior to Application</b>	<b>Cotton Emergence</b>	<b>First Bloom</b>	<b>Cotton Maturity</b>	<b>NAWF 5</b>
Vapam	824 a	85 a	767 a	1251 a	92.25 a
Telone II	852 a	28 a	285 b	398 b	91 a
Check	938 a	142 a	626 ab	995 ab	90.5 a

Table 2. Jim Johnson-Highway Nematodes/pint of Soil, 0-12” Sample 4 Reps.

<b>Time of Application</b>	<b>Prior to Application</b>	<b>Cotton Emergence</b>	<b>First Bloom</b>	<b>Cotton Maturity</b>	<b>Days to NAWF 5</b>
Vapam	852 a	29 a	2103 ab	2727 a	94.75 a
Telone II	1619 a	57 a	1506 b	2529 a	93.75 a
Check	1307 a	171 a	2926 a	1960 a	96.75 a

Table 3. Steve Clement Farm Nematodes/pint of Soil, 0-12” Sample 4 Reps.

<b>Time of Application</b>	<b>Prior to Application</b>	<b>Cotton Emergence</b>	<b>First Bloom</b>	<b>Cotton Maturity</b>	<b>Days to NAWF 5</b>
Vapam	767 a	0 a	1023 a	1193 b	85.75 b
Telone II	284 a	0 a	1563 a	2040 a	88.0 a
Check	426 a	0 a	2160 a	1592 ab	89.75 ab

Table 4. Average of 3 Tests Nematodes/pint of Soil, 0-12” Sample 4 Reps.

<b>Time of Application</b>	<b>Prior to Application</b>	<b>Cotton Emergence</b>	<b>First Bloom</b>	<b>Cotton Maturity</b>	<b>Days to NAWF 5</b>
Vapam	814	38	1298	1724	90.9
Telone II	918	28	1118	1656	90.9
Check	890	104	1904	1516	92.3

Table 5. Jim Johnson-Braxton Lint Yield Per Acre 4 Reps.

<b>Treatment</b>	<b>Rep 1</b>	<b>Rep 2</b>	<b>Rep 3</b>	<b>Rep 4</b>	<b>Average</b>
Vapam	1303	1171	1215	1178	1217 a
Telone II	1192	1214	1218	1195	1205 a
Check	1192	1216	1225	1181	1204 a

Table 6. Jim Johnson – Highway Lint Yield Per Acre 4 Reps.

<b>Treatment</b>	<b>Rep 1</b>	<b>Rep 2</b>	<b>Rep 3</b>	<b>Rep 4</b>	<b>Average</b>
Vapam	1255	1107	1153	1091	1152 a
Telone II	1175	1107	1105	1141	1132 a
Check	1140	1107	1089	1092	1107 a

Table 7. Clement Lint Yield Per Acre 4 Reps.

<b>Treatment</b>	<b>Rep 1</b>	<b>Rep 2</b>	<b>Rep 3</b>	<b>Rep 4</b>	<b>Average</b>
Vapam	909	965	962	895	933 a
Telone II	1061	1045	1061	932	1025 a
Check	987	969	982	1002	985 a

Table 8. Telone II/Vapam Test Average of 3 Test Lint Yield per Acre 4 Reps.

<b>Treatment</b>	<b>Clement</b>	<b>Braxton</b>	<b>Highway</b>	<b>Average</b>	<b>Difference</b>
Vapam	933	1217	1152	1101	- 20
Telone II	1025	1205	1132	1121	-
Check	985	1204	1107	1099	- 22