# SITE-SPECIFIC NEMATODE MANAGEMENT WITH TELONE® II FUMIGANT IN MISSISSIPPI T.W. Allen P.J. English Delta Research and Extension Center – Mississippi State University Stoneville, MS J.L. Willers **USDA-ARS** Starkville, MS **R.A.** Haygood Dow AgroSciences LLC K.B. Hood **Kenneth Hood Farms** Gunnison, MS **D.** Dodds Mississippi State University Mississippi State, MS

#### **Abstract**

A trial using Telone<sup>®</sup> II fumigant to manage nematodes was conducted in a cotton field where cotton was cropped almost continuously since the 1980s. Management zones were created utilizing 24-row treatment zones, consisting of Telone-treated and nontreated verification zones which were arranged on the northern edge of the field. Nematodes were sampled prior to Telone application, 8-weeks post treatment, and at the end of the growing season. High populations of lance and root-knot were present prior to Telone application in May; however, nematode numbers were significantly lower, by 99% compared with pretreatment numbers, in July post-planting in the Telone-treated plots compared to nontreated plots. Nematode populations were higher at the end of the season in nontreated plots compared with low numbers in Telone-treated plots, generally speaking by 99% on average. Yield analyses are still being conducted, but preliminarily, treatment with Telone significantly increased seed cotton yields.

#### **Introduction**

Site-specific pest management (insect, nematode) has proven to be an effective management practice in cotton throughout the Mid-southern United States (Burris et al., 2010; Willers and Riggins, 2010). Soil zone classification using one of many available techniques or some combination of techniques (e.g. digital elevation modeling (DEM), electrical conductivity (EC), normalized difference vegetative index (NDVI), old yield maps) coupled with nematode sampling have been used to effectively create management zones in fields with a history of long-term cotton production in AR, GA, and LA. Nematicide application is then conducted within each specific zone based on nematode numbers to produce a positive effect on cotton yield. Verification strips that do not receive the nematicide and are composed of a similar zone structure serve as controls.

#### **Materials and Methods**

A field (approximately 70 acres in size) was selected based on historical cotton production near Perthshire, MS. Prior to Telone II application; zones were created in ArcMap based on NDVI and DEMs to break the field into 18 categorical zones. Ten soil sampling locations were overlayed in a field shape file within each 24 row treatment block and staggered so as each sampling location was placed in the middle of a picker pass. In all, 6 treated blocks and 6 non-treated blocks were implemented on the northern edge of the field (Figure 1). Soil samples, consisting of a composite sample of 15 to 20 soil cores were collected prior to Telone application (May), approximately 8 weeks following Telone application (July), and following harvest (November) to determine the numbers and specific nematodes present. Root gall ratings were recorded for 10 plants in each treatment zone approximately 8 weeks post-planting.





Telone was applied using a 4-row Yetter coulter (Yetter Manufacturing, Colchester, IL) at 3 gallons/Acre at an approximate speed of 5 mph and approximate depth of 15 inches. Two weeks following application, PHY 367 WRF, a root-knot nematode tolerant variety was planted. Cotton was harvested at the end of the season and at present overall yield determination is still being conducted.

Preliminarily, yield data were analyzed using PROC GLIMMIX; however, not all of the data from harvest was used so additional analyses are required. Two different analyses were performed, one where the yield data were analyzed as an entire block regardless of specific zone properties and one where soil zones were selected and considered the covariate in the analysis process (Milliken et al., 2010). Additional statistical analyses will be conducted over the winter to determine more specific interactions between insect management and Telone application as well as the potential interaction between management zones by Telone.

### **Results and Discussion**

The most predominant nematode species present were lance, reniform, and root-knot (Table 1 & 2, Fig. 3A-C) for each of the three sampling periods. In addition, less than threshold populations of dagger, lesion, ring, spiral, stubby root, and stunt were also detected throughout the season (data not presented). Root-knot nematode numbers were present in greater numbers during the first sampling period (prior to Telone application) than the second sampling (8 weeks post-treatment) in the Telone-treated locations, on average a 99.7% decrease in root-knot nematodes (Figure 2 A & B). The significant decrease in root-knot nematodes allowed cotton plants to get an early stand and deep root growth in the Telone-treated plots. Even though PHY 367 WRF is a root-knot resistant variety, there were still some differences in gall ratings between treated and untreated plots (data not presented). Reducing overall galling allowed for more vigorous plant growth throughout the season. By the end of the season, increases in root-knot nematode populations occurred between the  $2^{nd}$  and  $3^{rd}$  nematode sampling (8 weeks post-treatment vs. following harvest) in the non-treated locations, which on average, represented a 99.8% increase (Fig. 3). For the purposes of graphical presentation the nematode values were scaled to make figure bars reasonable (3A, values × 0.1; 3B, values + 1; 3C, values × 0.1).

Table 1. Reniform nematode numbers from each of three sampling periods presented as a minimum to maximum range and an average based on all points within each treatment.

		Reniform (nematodes/pint of soil)		
Treatment	May	July	November	
Telone	0-32	0-63	0-87	
	Avg. 3	Avg. 2	Avg. 12	
Nontreated	0-32	0-16	0	
	Avg. 1	Avg. 1	Avg. 0	

Table 2. Lance nematode numbers from each of three sampling periods presented as a minimum to maximum and

average based on all points within each treatment.						
	Lance (nematodes/pint of soil)					
Treatment	May	July	November			
Telone	0-32	0-63	0-87			
	Avg.3	Avg. 2	Avg. 12			
Nontreated	0-32	0-16	0			
	Avg. 1	Avg. 1	Avg. 0			



Figure 2. Root-knot nematode populations (#/pint of soil) from each of 3 soil sampling periods representing A) prior to Telone-application, B) 8 weeks post-application, and C) post-harvest.

Preliminarily, yield analysis indicates a 6% increase in lbs of seed cotton/A in the Telone-treated vs. nontreated plots when soil zone is used as a covariate (data not presented).

## **References**

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