

RENIFORM NEMATODE AND COTTON PRODUCTION IN MISSISSIPPI

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Abstract

Tests were conducted in 1995 to examine the effects of the reniform nematode (*Rotylenchulus reniformis*) on cotton plant development and the benefits of including a nematicide (Temik 15G and Vydate C-LV) in the production system. Nematode population development was followed by sampling plots monthly. Cotton plant development was determined by mapping at harvest. Treatments included Temik 15G applied in the seed furrow and Vydate C-LV as a foliar spray. Cotton plants grown in the treated plots produced more bolls per plant with a greater boll weight. Fruiting position of the first cotton boll was produced on a significantly lower node in the nematicide treated plots.

Introduction

The reniform nematode, *Rotylenchulus reniformis* is a serious pest to cotton production in Mississippi. It was first identified on cotton in Mississippi in 1980. This nematode has now been identified in 53 counties including all the cotton producing counties of the state. The reniform nematode was found in 49.5 percent of 1,263 cotton nematode soil samples submitted for nematode analysis submitted by cotton producers and consultants in 1995 (5). Cotton yield losses attributed to the reniform nematode have averaged 26.4 percent since 1990 in Mississippi (3). The reniform nematode is currently considered the most damaging nematode to cotton production in Mississippi (2).

Reniform nematode management techniques, available to Mississippi cotton producers are limited. Therefore, most producers rely on the use of nematicides to reduce nematode numbers at planting. The use of the insecticide/nematicide Temik 15G has become an important component of cotton production and is used by a large number of cotton producers in Mississippi. The purpose of these tests were 1) to examine the benefits of including Temik 15G at three formulation rates in a cotton production system and 2) examine the effects of including

Vydate C-LV as a foliar application on nematode management in a cotton production system.

Materials and Methods

Tests were conducted in 1995 to examine the effects of the reniform nematode (*Rotylenchulus reniformis*) Linford and Oliveira on cotton growth and development. The experiments were conducted in a field naturally infested with the reniform nematode and continuously cultured with cotton in Tallachatchie County, Mississippi. The soil was a sandy silt loam (38% sand, 52% silt, 9.2% clay, 5.4 pH, and 0.3% OM). An average reniform population density of 5,127 reniform nematodes/250 cc of soil was recovered from the plots prior to planting.

Temik 15G was applied at planting on May 10, 1995 in the seed furrow with a Case 900 Early Rise Planter equipped with a granular chemical applicator. In test 1, Temik 15G was applied at 3.5, 5.0, 7.0 lb formulated product/acre. In test 2, Temik 15G was applied at 3.5 lb formulated product/acre. Vydate C-LV was applied as a foliar spray at 4, 8, or 16 oz ai/acre at pinhead square and 21 days later. Disyston was included in both tests to serve as a second control. In both tests, the experimental design was a randomized complete block with five replication. Plots consisted of four rows 40 feet long with a 40 inch row spacing. Replications were separated by a 15 foot border. Each row was planted with 160 Suregrow 125 cotton seed. Cotton seeds were commercially treated with Captan and Vitavax plus Apron at the manufacturers recommended rates. All plots were maintained with standard production practices recommended by the Mississippi Cooperative Extension Service commonly used in the area. Plots were irrigated once on July 28, 1995 using an in-furrow flood system.

Reniform nematode population development was determined at planting and at monthly intervals. Ten soil cores, 1-inch in diameter and 8-inches deep were collected from the two center rows of each plot in a randomized systematic sampling pattern. Nematodes were extracted using a combination of gravity screening and sucrose centrifugation (1).

Cotton plant growth and yield was determined at harvest by mapping plants from 3 feet of row. Plant height, nodes per plant, position of boll, boll number and boll weights were recorded. All plots were hand harvested on October 7, 1995.

Results and Discussion

Test 1

Reniform nematode numbers were high at planting with an average population density of 4,939 nematodes per 250 cc of soils. Nematode numbers decreases for the first 35 days after planting (Figure 1). Nematode numbers continued to

increase in all plots for the remainder of the growing season. At 79 days nematode numbers were lower in all treated plots compared with the control. This trend continued until harvest 148 days later. Reniform nematode numbers averaged across the growing season were significantly lower in all treated plots compared with the untreated control.

At harvest, cotton plants were mapped for cotton boll position, boll number, boll weights and fruiting position. A greater number of bolls were produced in the first, second, and third positions in the Temik 15G treated plots compared with the untreated control (Figure 2). Cotton plants in the Temik 15G treated plots averaged 14.8 more bolls compared with the untreated control. Boll weights were also greater in the Temik 15G treated plots. Total boll weights averaged 72.6 grams per plant greater in the Temik 15G treated plots compared with the control.

Test 2

Reniform nematode numbers at-plant averaged 5,314 nematodes per 250cc of soil. Nematode numbers decreased for the first 35 days (Figure 4). At 79 days after planting, nematode numbers were lower in all treated plots and remained lower for the duration of the growing season. Nematode numbers in the plots which received the foliar application of Vydate C-LV were numerically lower than in the Temik 15G and control plots. At harvest a greater number of bolls were produced in the first, second, and third position in all treated plots compared with the untreated control (Figure 5). The addition of Vydate C-LV as a foliar spray resulted in an average increase of 7 bolls per plant compared with Temik 15G alone. Boll weights were greater in the treated plots compared with the untreated control. Total boll weights averaged 73.3 grams greater in the treated plots compared with the control. Boll weights in the Vydate C-LV treated plots averaged 6.9 grams per plant greater than those in the Temik 15G alone treatment. Cotton fruiting position was produced significantly lower on the plant in the treated plots compared with the untreated control. The first cotton bolls were produced on node 5 compared with node 11 in the untreated control.

Seed cotton yields were significantly greater in the treated plots compared with the control. Yields ranged from 619 to 1,330 lbs of seed cotton per acre in the control and the Vydate C-LV 16 oz treatments respectively (Figure 7). Seed cotton yields were improved by 708.7 lbs per acre when Vydate C-LV was applied as a foliar spray.

Disclaimer

The interpretation of data presented may change with additional experimentation. Information is not to be construed as a recommendation for use or as an endorsement of a specific product by Mississippi State University or the Mississippi Agricultural and Forestry Experiment Station.

References

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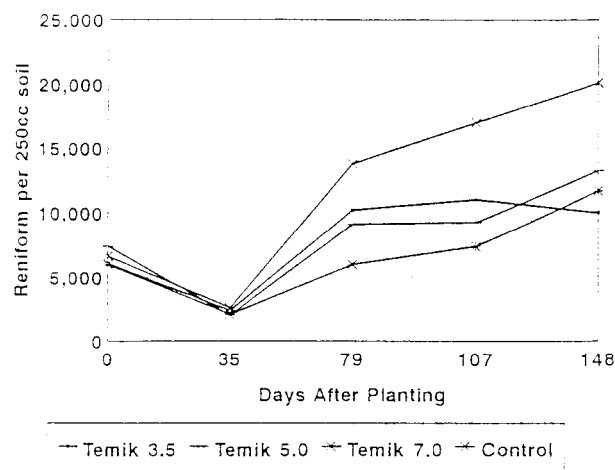


Figure 1. Reniform Nematode Population Development

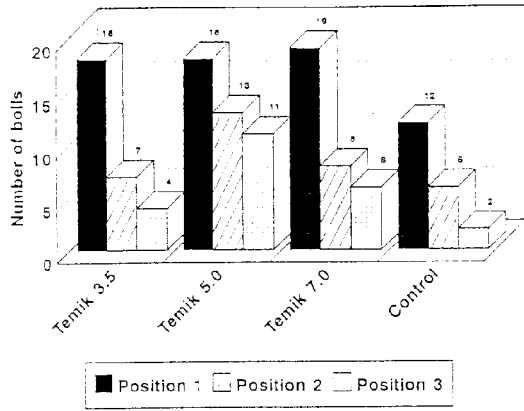


Figure 2. Effect of Reniform Nematode on Boll Position.

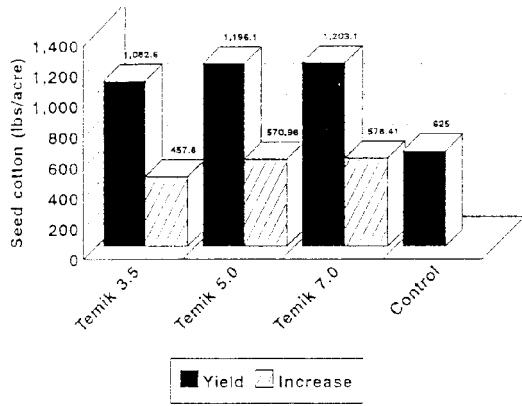


Figure 3. Effect of Temik 15G on Seed Cotton Yield.

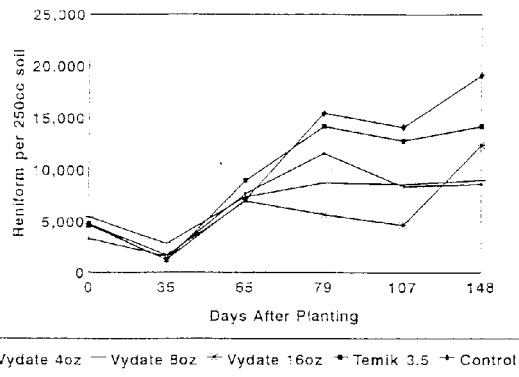


Figure 4. Reniform Nematode Population Development.

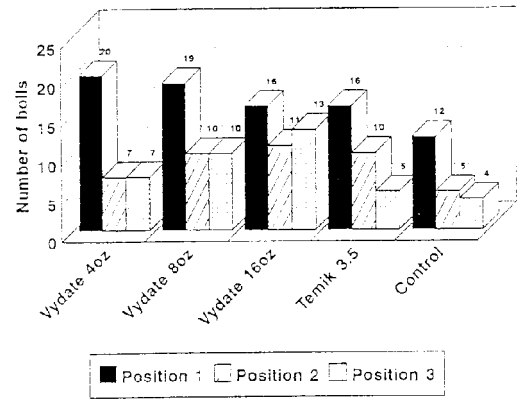


Figure 5. Effect of Reniform Nematode on Boll Position.

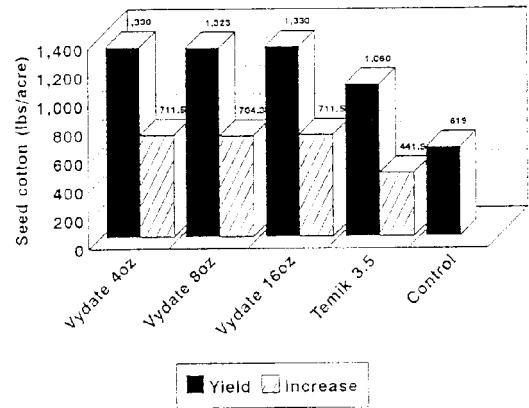


Figure 6. Effect of Vydate C-LV on Seed Cotton Yield.