INTEGRATED MANAGEMENT OF SOUTHERN ROOT-KNOT NEMATODE WITH RESISTANT COTTON VARIETIES AND NEMATICIDES IN APPLING COUNTY, GEORGIA

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Introduction

Southern root-knot nematode (*Meloidogyne incognita*) is the most widespread nematode affecting cotton in Georgia and is a significant problem in Appling County. With the loss of Temik, growers require new options to manage nematodes. This large-plot, on-farm study was conducted with objectives of assessing fumigation with 1,3-dichloropropene (Telone II) and use of multiple varieties, to include Phytogen 367 WRF, which has partial resistance to *M. incognita*.

Appling County lies in the Coastal Plain of southeastern Georgia. Cotton is an important crop for growers in this county, and management of plant-parasitic nematodes is especially important as soils in the county are typically very sandy. *Meloidogyne incognita*, the southern root-knot nematode, is the most important nematode affecting cotton in this region. Growers have historically used aldicarb, Temik 15G, to manage both thrips and nematodes; however, the loss of Temik 15G early in 2011 necessitated additional field trials to determine refined opportunities for control of nematodes in Appling County.

The objective of this study was to compare the performance of a cotton variety with known partial-resistance to the root-knot nematode (PHY 367WRF) to popular varieties without resistance (PHY 375WRF, PHY 499WRF, DP 1050, DP 1048). Additionally, plots planted to each variety and fumigated with Telone II (3 gal/A) were compared to non-fumigated plots. It was hoped that the results from this study would give growers in eastern Georgia a better idea of strategies to integrate nematode resistance and nematicides into their cotton production practices.

Methods

A replicated field trial with two tests was established on the Jeff Deen farm in Appling County, Georgia. The field had a history of losses to *M. incognita*.

The experimental design was a factorial randomized complete block with three replications for both tests. In Test 1, varieties planted were Phytogen 367 WRF, Phytogen 375 WRF, and Phytogen 499 WRF. Seed of each variety was already treated with Avicta (abamectin) seed treatment. The test consisted of 3 replications of each variety with and without the soil being fumigated with Telone II (1,3-dichloropropene, 3 gal/A).

Varieties in Test 2 were DPL 1048 B2RF, DPL 1050 B2RF, and Phytogen 499 WRF. As in Test 1, the seed of each variety was already treated with Avicta and the test consisted of 3 replications of each variety with and without the soil being fumigated with Telone II.

Fumigated plots were done so weeks prior to planting. Both tests and all plots were planted on 14 May 2014 and harvested on 3 Dec. 2014. Data collected included soil sampling to determine nematode populations, end-of-season root-damage ratings, and yield.

Results

From nematode samples collected after harvest it is clear that the populations of root-knot nematodes in the field far exceeded the economic threshold established for Georgia (100 juveniles/100cc soil) (Figures 1and 2) .

Plots fumigated with Telone II had significantly greater early-season growth and vigor. Pre-season fumigation of soil with Telone II (3 gal/A) resulted in a reduction in the populations of *M. incognita* at the end of the season across varieties, to include the "resistant" PHY 367. Such a reduction in end-of-season populations is not often seen, but was very interesting here and will be important to cotton growers in eastern Georgia.

End-of season populations of *M. incognita* were lower where the resistant PHY 367 was planted as opposed to PHY 375 or PHY 499 (Figure 1). The benefits of planting 367 versus 375 or 499 remains (a) reduced galling and (b) reduced nematode populations for the following season.

Most importantly, use of Telone II improved yields for all but one variety in this study (PHY 367). In this study, PHY 499, though not resistant, still out-yielded the more-resistant PHY 367 with and without use of Telone II (Figure 3).

In Test 1, pre-season fumigation with Telone II had season-long impact for the reduction in nematode populations for all varieties. Use of Telone II increased yields by 112, 127, and 12 lbs/A for PHY 499, PHY 375, and PHY 367, respectively.

Impact of Telone II was less obvious here for end-of-season gall ratings, likely because the populations of nematodes were low. In Test 2 (Figure 2), use of Telone II generally reduced both final root gall ratings and final nematode counts for all varieties. Use of Telone II increased yields by 440, 222, and 148 lbs/A for PHY 499, DPL 1050, and DPL 1048, respectively (Figure 4).

Use of resistant variety or Telone II tends to reduce final season nematode populations and damage from the nematodes.

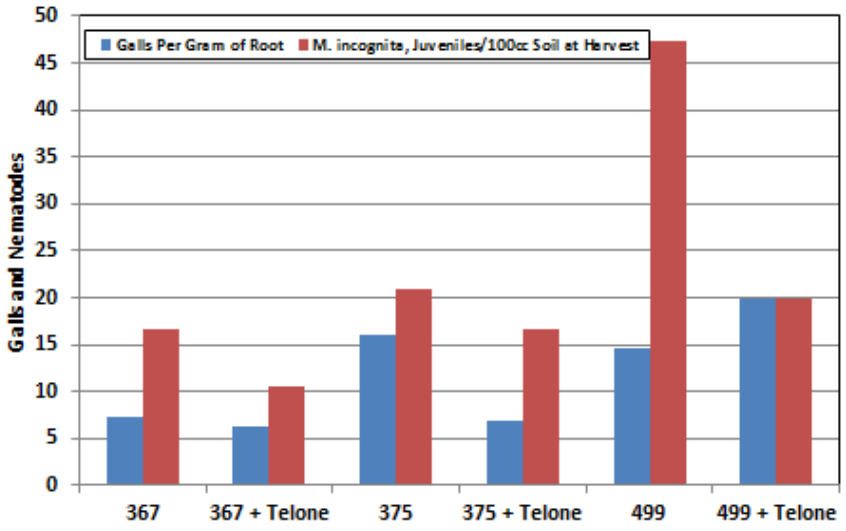

Figure 1. M. incognita, Juveniles/100 cc Soil at Harvest and Galls Per Gram of Root

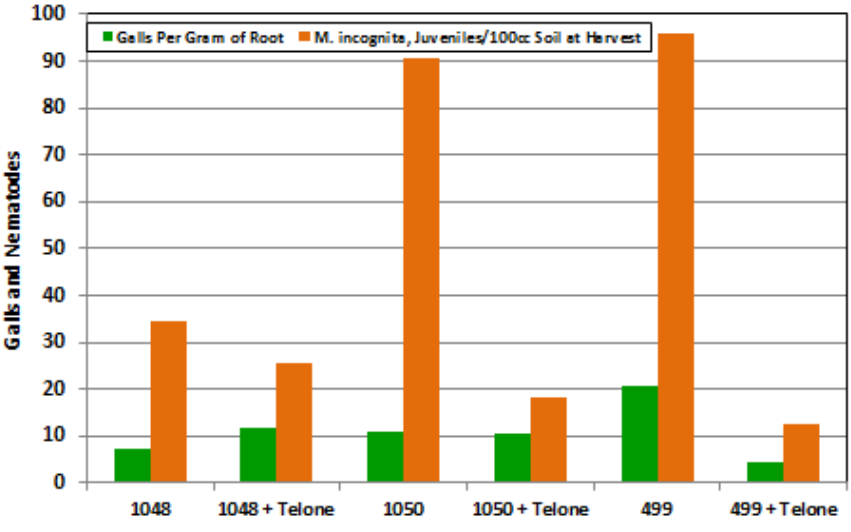

Figure 2. M. incognita, Juveniles/100 cc Soil at Harvest and Galls Per Gram of Root

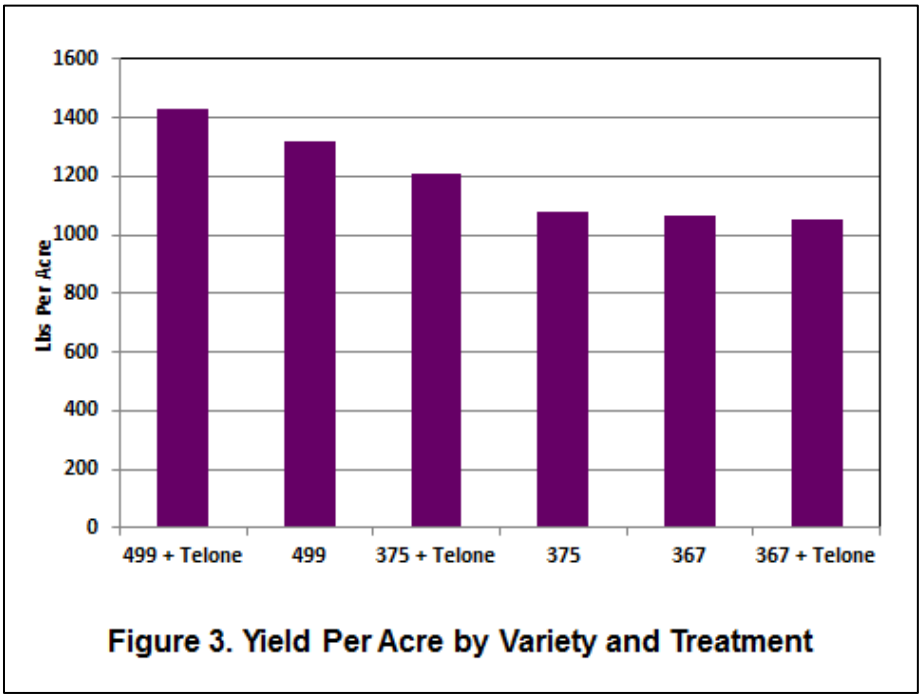

Figure 3. Yield Per Acre by Variety and Treatment

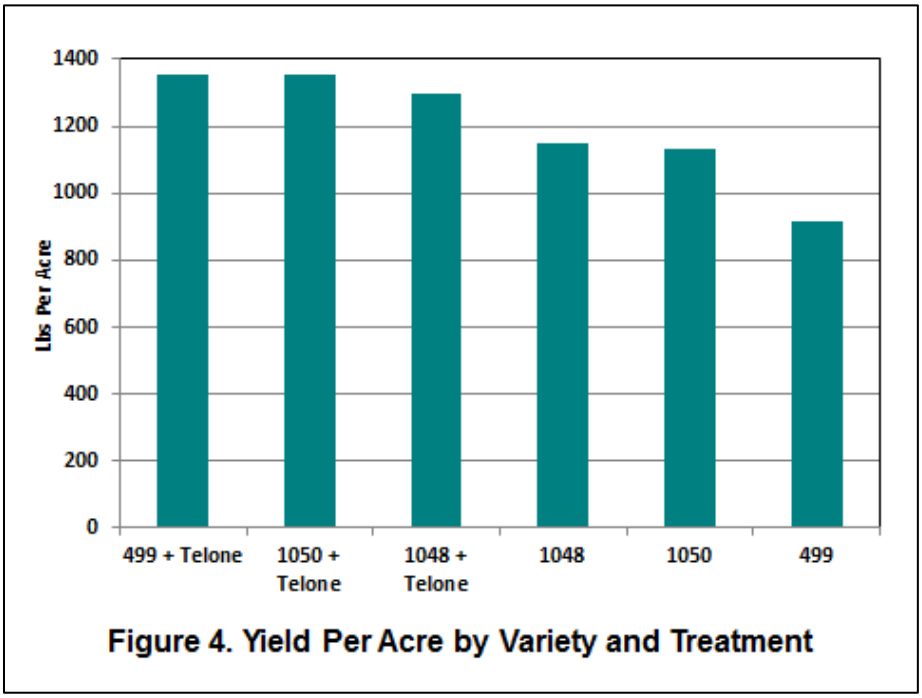

Figure 4. Yield Per Acre by Variety and Treatment