ASSESSMENT OF COTTON VARIETIES WITH RESISTANCE TO ROOT-KNOT AND RENIFORM NEMATODES IN FIELDS INFESTED WITH MELOIDOGYNE INCOGNITA

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Abstract

An estimated 70 percent of Georgia's cotton fields are infested with at least one species of potentially damaging plant-parasitic nematodes. In a statewide survey of cotton fields (nearly 1800 samples were collected) approximately 69 percent of the fields were infested with root-knot nematodes and 5 percent were infested with reniform nematodes. An effective tactic to manage either of these plant parasitic nematodes in cotton production is to plant resistant varieties. Cotton producers in Georgia have the opportunity to plant a number of different varieties that have resistance to the southern root-knot nematode, *Meloidogyne incognita*. As of 2021, growers now have the opportunity to plant cotton varieties with resistance to both *M. incognita* and *Rotylenchus reniformis*, the reniform nematode. The objective of this study was to assess performance of cotton varieties with resistance to plant-parasitic nematodes as compared to performance nematode-susceptible varieties planted with and without nematicides.

Field trials were conducted in 2019, 2020, and 2021 in Colquitt County, GA. Fields where trials were conducted had a history of cotton production and natural infestation with *M. incognita*. Root-knot nematode resistant varieties planted in 2019 included ST 5600 B2XF, DP 1747 B2XF, and PHY 480 W3FE. In addition to those from 2019, root-knot nematode varieties planted in 2020 also included PHY 400 W3FE and PHY 443 W3FE (which has resistance to *M. incognita* and *R. reniformis*). Varieties with resistance to both *M. incognita* and *R. reniformis*, DP 2141 NR B3XF and PHY 443 W3FE, were planted in 2021. Nematode-susceptible DP 1646 B2XF was also planted in each trial each year. In 2019, DP 1646 B2XF was planted with AgLogic 15G (5 lb/A). In 2020, nematicide treatments included DP 1646 with Telone II (3 gal/A), AgLogic 15G (5 lb/A), Velum Total (14 fl oz/A) and Propulse (13.6 fl oz/A). In 2021, DP 1646 B2XF was planted with Telone II (3 gal/A), AgLogic 15G (5 lb/A) AgLogic 15G (5 lb/A) + Vydate CLV (17 fl oz/A), and Velum Total (14 fl oz/A). Field trials were established in a "randomized complete block" design with four replications. Each plot was four rows wide (36 in. spacing) by 900 to 1000 ft in length. Soil was sampled during the season assess populations of root-knot nematodes (reported as J2/100 cc soil). Five plants were selected arbitrarily and destructively sampled twice during each season to be assessed for root-gall ratings (0-100% root area affected). Plots were taken to yield (lb lint/A). Data were analyzed by ANOVA and means separated using Fisher's Protected LSD at P=0.1

From 2019, end-of-season root-knot nematode counts were significantly lower where resistant varieties were planted as compared to DP 1646 B2XF with or without AgLogic 15G (5 lb/A). All resistant varieties significantly out-yielded DP 1646 B2XF without AgLogic 15G. Yields from ST 5600 B2XF and PHY 480 W3FE were significantly better than DP 1646 B2XF + AgLogic 15G.

From the trial conducted in 2020, end of season root-knot nematode counts from plots planted to nematode resistant varieties were numerically lower than were any for DP 1646 B2XF with any nematicide other than Telone II (5 gal/A). Root-gall ratings were numerically lower for root-knot resistant varieties than for DP 1646 B2XF, with or without nematicides. Yields were not statistically different between nematode resistant varieties and DP 1646 B2XF with or without nematicide treatments. However, yield for PHY 443 W3FE was statistically better than for DP 1747 B2XF.

From 2021, end of season root-knot nematode counts from plots planted to either DP 2141 NR B3XF or PHY 443 W3FE were 0.5 and 1.5 J2/100cc, respectively, as compared to DP 1646 B2XF and nematicide combinations, which were all above threshold values (100 J2/100 cc soil). End of season root-gall ratings for DP 2141 NR B3XF and PHY 443 W3FE (0.7 and 1.0, respectively) were numerically lower than were those for the DP 1646 B2XF/nematicide combinations (2.9-6.3). Yields for DP 2141 NR B3XF and PHY 443 W3FE (674 and 684 lb lint/A, respectively) were numerically higher than were those for the DP 1646 B2XF/nematicide combinations (443-560 lb lint/A).

In conclusion, trials conducted from 2019 t0 2021 further confirm the importance of nematode-resistant management tools for cotton producers in Georgia. Not only do these varieties reduce root damage and lower populations of root-knot nematodes, but they also yielded as well or better than a popular susceptible variety with and without protection from nematicides.