

IMPACT OF TILLAGE PRACTICES ON NEMATODE AND SOILBORNE DISEASE MANAGEMENT IN COTTON

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Abstract

Two of the most important pathogens found in Arkansas are the root-knot nematode (*Meloidogyne incognita* (Kofoed & White) Chitwood) and *Thielaviopsis basicola* (Berk. & Broome) Ferris (syn. *Chalara elegans* Nag Raj & Kendrick). Damage associated with these pathogens has been shown to be more severe when both pathogens are present on the same plant. The most effective management strategy for both pathogens is to control the nematode, but in some areas of Arkansas, the adaptation of reduced tillage practices has minimized deep tillage thus potentially limiting the efficacy of fumigant nematicides. Studies were conducted in 2008 to evaluate and quantify the effect of tillage on the efficacy of nematicides and fungicide seed treatments. A cotton field in Leachville, Arkansas with a history of root-knot nematodes and severe black root rot, and a recognized soil compaction problem due to the absence of deep tillage was divided into eight 48-row blocks. Alternating blocks were deep tilled using a Paratill with a disk bedder. Specific control treatments for nematodes and black root rot were tested within the tilled and no-till soil environments. Nematode treatments consisted of: 1.) Untreated Check and 2.) Telone II applied at 3 gal/A with a Yetter® coulter applicator two weeks prior to planting. Fungicide seed treatments were also evaluated for their effects in both tillage environments. Fungicide seed treatments consisted of: 1.) Untreated check; 2.) Baytan 30 (0.5 oz/cwt), Allengiance FL (0.75 oz/cwt), and Vortex FL (0.0856 oz/cwt); 3.) Dynasty CST (3.95 oz/cwt), Baytan 30 (0.5 oz/cwt), Allengiance FL (0.75 oz/cwt), Vortex FL (0.0856 oz/cwt); and 4.) Trilex Advanced FS300 (1.6 oz/cwt), Baytan 30 (1 oz/cwt), Allengiance FL (0.75 oz/cwt), and Vortex FL (0.17 oz/cwt).

Efficacy of the nematicide and fungicide seed treatments was assessed based on plant height (cm), above-ground dry plant weight (g), root length (cm), root dry weight (g), root gall rating (0-5, where 0= no galls and 5= >75% of root system galled), % of root colonized with black root rot, and yield (lbs lint/acre). Roots were plated out in a TBCEN-carrot based medium to establish degree of root colonization by *T. basicola*.

Increased plant height, plant and root dry weight, and yield were seen where plots were sub-soiled. Either sub-soiling alone or the application of Telone II alone resulted in an increase in yield of about 25%. When both sub-soiling and Telone II were combined, yields were increased by about 28%. Sub-soiling also tended to reduce the root colonization by *T. basicola* but there were no consistent differences in yield among fungicide seed treatments.