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SITE-SPECIFIC DETECTION OF *MELOIDOGYNE INCOGNITA* IN COTTON FIELDS

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Abstract

Nematodes cause over $250 million in yield losses to cotton in the United States each year. Farmers usually apply one rate of nematicide across an entire field to protect their crop from nematodes. However, nematodes are not uniformly distributed within fields, and there may be substantial acreage in most fields where nematodes are either not present, or are not an economic concern. Applying a nematicide at one rate over the entire field can be both costly and environmentally questionable. This project will determine the primary edaphic and environmental factors that regulate the spatial relationships and population dynamics of plant-parasitic nematodes in the upper-South. The specific objective of this experiment was to determine the correlation between various edaphic factors and root galling, along with spectral reflectance of cotton and *M. incognita* population density. A 4.0 ha portion of a field near Hornersville, MO and another near Buckeye, AR were selected as the study sites in 2001. Field plots were 2 rows wide (0.97 m row spacing) and 10 m long. Soil samples were collected from each plot (150 plots at Hornersville and 132 plots at Buckeye) at cotton planting and harvest. The soil cores were composited, and one 250 cm^3 sub-sample was analyzed for nematodes (Barker, 1978). The plant-parasitic nematodes were identified to genus. A 100 g sub-sample collected at planting was analyzed for soil texture and nutrients. Roots of six plants arbitrarily selected from each plot were dug immediately after harvest and rated for galls. Spectral reflectance of the crop canopy from the center of each plot was collected at first flower, and the Normalized Difference Vegetation Index (NDVI) was determined. Yield of seed cotton from each plot was collected at harvest. There was no significant correlation between laboratory determined soil electrical conductivity and galls at Buckeye or Hornersville. There was a significant negative correlation between soil cation exchange coefficient (CEC) and galls at Buckeye (probability = 0.0001 and Pearson coefficient = -0.35766) but not at Hornersville. There was a significant correlation between %sand and galls at both sites (probability = 0.0002 and correlation = 0.32116 at Buckeye and probability = 0.0001 and correlation = 0.31888 at Hornersville). There was a significant negative correlation between NDVI and galls at Buckeye (probability = 0.0161 and Pearson coefficient = -0.20911) but not at Hornersville. There was no correlation between the harvest population density of *M. incognita* juveniles and %sand, soil electrical conductivity, CEC, or NDVI at first bloom at either location.