VERTICAL DISTRIBUTION OF THE RENIFORM NEMATODE IN THE UPPER 1.5 METERS OF SOIL ON NINE FARMS IN ARKANSAS, LOUISIANA, AND TEXAS

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Abstract

The reniform nematode (*Rotylenchulus reniformis*) is considered by consultants and farmers in the Mississippi Delta of Arkansas, Louisiana and Mississippi, and in various areas in Alabama and south Texas to cause serious yield losses to cotton in many fields. However, damages in a given year and field are notoriously difficult to predict. Reniform nematode damage is thought by some researchers to be stress-dependent so that plants exhibit damage only if stressed simultaneously or previously by inadequate moisture, specific nutrient deficiencies, or insect pressure. Cotton plants parasitized by the reniform nematode typically set fruit late, look potassium deficient, and in south Texas are exceptionally vulnerable to whitefly. Many anecdotal reports describe water stress dependent plant growth responses to nematicides if the reniform nematode is present. However, while it seems likely that stress plays an important role in many cases, it also should be considered that soil texture and the depthwise distribution of nematodes can profoundly influence many kinds of nematode damage, and that these aspects of reniform nematode damage in cotton have received little investigation. In this ongoing study, the depthwise distribution of the reniform nematode is being examined in relation to soil texture, soil moisture, root growth patterns, and plant damage. At various times during 1998 and 1999, graduated samples were taken in 15-cm increments to 100 cm or deeper in three fields on two farms in the Lower Rio Grande Valley of Texas, two farms in southern Louisiana, two farms in northern Louisiana, and four fields in Arkansas. All fields had a long history of cotton production, although three had been recently rotated to corn, rice, or kenaf. The reniform nematode was found at what were considered high population densities down to below 100 cm in about half of the fields, and often in those fields more than half of the reniform nematodes in the soil profile were below 30 cm deep. In contrast, other nematode species that were prevalent near the surface were virtually absent below 45 cm. In other fields, the reniform nematode also was found only in the top 45 cm, with greatest numbers in the top 15 cm. No correlation has been seen yet between reniform nematode population density and soil texture changes in the soil profile. Soil moisture has shown strong correlations with population density but these can be positive or negative, depending on the field and time of year, and thus appear coincidental with the direction of gravity. Fumigation studies have been initiated to evaluate the yield impact of deeply occurring reniform nematodes. In addition, we hope to learn more about the optimum depth for sampling for the reniform nematode in cotton in different soils at different times of the year.

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