CURRENT RESEARCH WITH *ROTYLENCHULUS RENIFORMIS* IN LOUISIANA: LABORATORY AND GREENHOUSE

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Abstract

Reniform nematode shows differences in fecundity and pathogenicity when comparing populations from several states on cotton and soybean. Differences in reproduction were also observed among populations of reniform nematode when evaluated on the root-knot host differentials. The presence of *Rhizoctonia solani* enhances egg hatch and infectivity of reniform nematode.

Introduction

Losses due to nematodes have been steadily increasing over the past several years. Reniform nematode appears to be rapidly spreading and may be greatly contributing to these increased losses. Considerable variation has been reported among cotton cultivars throughout the mid-South with respect to population development and yield potential in fields infested with the reniform nematode. Two races of reniform nematode have been identified based on reproduction on cotton and castor bean. There appears to be further differences in populations of reniform nematode throughout the cotton region.

Discussion

Laboratory

Populations of the reniform nematode, *Rotylenchulus reniformis*, from LA, TX, MS, AK, and HI exhibit significant variation in reproduction and pathogenicity on cotton and soybean, supporting strongly the hypothesis that distinct races or biotypes exist. Laboratory activities have involved establishment of "pure (axenic)" nematode cultures, speciation of reniform and other cotton-associated nematode populations, and egg hatch studies with various populations of *R. reniformis*. Species of plant-parasitic nematodes identified to date from cotton field soil in Louisiana include the following: *Rotylenchulus reniformis, R. parvis, Meloidogyne incognita, Pratylenchus brachyurus, Helicotylenchus pseudorobustus, Hoplolaimus galeatus, H. columbus, Tylenchorhynchus annulatus, Heterodera glycines,* and *Paratrichodorus* spp. Egg hatch studies with populations of were conducted in both water (neutral pH/28C) and in fumigated soil (23, 28, and 32C). Among populations, egg hatch in water ranged from 42 to 90% and that in soil ranged from 45 to 93% across the three temperatures.

Greenhouse

Greenhouse activities include maintenance and increase of nematode cultures and preliminary studies of nematode reproduction and pathology. Over 3 trials of an experiment designed to compare reproduction and pathogenicity of *R. reniformis* populations from LA, TX, MS, AK, and HI, reproductive values among populations ranged from 8.2 to 68.5 after 95-103 days and reductions in root weights below those of noninoculated controls ranged from 6 to 30%. In other greenhouse studies, populations of *R.reniformis* were used to inoculate the plant species employed in the root-knot host differential assay. All populations reproduced on cotton, tobacco and tomato. Only a single population from LA and the MS isolate reproduced on peanut and pepper, respectively and none of the populations reproduced on watermelon. In other greenhouse studies, the influence of the fungus *Rhizoctonia solani* on reproduction of *R. reniformis* was evaluated in an elaborate series of laboratory and greenhouse studies and found to significantly enhance reproduction by stimulating the hatch of eggs and enhancing the infectivity of females.

Summary

The variation in reproduction and pathology identified in populations of reniform nematode from several states suggest a need for additional work. Reniform nematode will need to better defined in order for effective management strategies to be developed. The interrelationships with other soil organisms may influence population dynamics of reniform nematode, complicating management of this pest.

References

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