NEMATODES IN THE MID-SOUTH

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Abstract

Root-knot and reniform nematodes are a widespread problem of cotton throughout the mid-South. It is extremely important to identify the type present in a management program. Management includes crop rotations, variety selection, cultural methods such as proper fertility and pH, cover crops, and nematicides. A combination of several of these management strategies may be necessary when high populations of either nematode are present.

Introduction

Surveys that have been conducted in the last several years have shown a high incidence of a number of nematodes in cotton. Root-knot and reniform nematode are the most damaging in the mid-South. Root-knot nematode causes galls on the roots during mid- to late season and is easy to identify in the field. Reniform nematode is much more difficult to identify in the field since it doesn't produce any distinctive symptom on the roots. Both nematodes can cause stunting and uneven growth patterns in a field. Yield losses can be severe and reach as high as 40-60% loss from these pests. Reniform nematode appears to be spreading rapidly throughout a number of states including Louisiana, Mississippi, Arkansas, and Alabama. Reniform nematode is not very particular about the soil type it can live in but does seem to favor heavier soils such as the silt loams common throughout the mid-South. Root-knot favors sandier soils and appears to be relatively stable in its distribution, at least not spreading much in recent years. Identification of the types of nematode found is critical for management decisions. Although root-knot and reniform nematodes rarely occur together in the same field, occasionally fields may have both types present.

Discussion

There are a number of management options that are available for producers to use for nematodes such as crop rotation, variety selection, cultural methods (correct pH and nutrient levels, subsoiling, irrigation), and nematicides. Depending on the type and population levels present, one or more options may be required to reduce the level of damage caused by plant-parasitic nematodes.

Crop rotation has recently become a much more acceptable management tool for many cotton producers. Historically, cotton has been planted on the best land with little or no incentive to make any changes in the cropping pattern. Producers now have fewer restrictions on crops and acreage. Crop rotation offers a great way to change the population dynamics of nematodes by planting crops that are nonhosts or resistant to certain nematodes. Tables 1 and 2 indicate the host status of most crops that are normally used in rotation with cotton against the root-knot and reniform nematodes.

One year in a resistant or nonhost crop can reduce the levels of either root-knot or reniform nematodes but best results occur after at least two years. Cotton yields follow these same trends. Unfortunately, populations of both nematodes rebound rapidly on cotton, allowing nematode levels to be back to very damaging levels after only one year back in cotton production. Population levels of reniform nematode develop so high (20,000 or more per pint of soil) that crop rotation should be strongly considered in these fields.

Variety selection is still very limited as a management tool because so few varieties have any resistance. Stoneville 887 and Hyperformer 1560 have at least a moderate level of resistance against the root-knot nematode. None of the commercial varieties have resistance against reniform nematode. Some varieties seem to tolerate reniform nematode better than others. This tolerance is poorly defined at the present because of inconsistencies among varieties in different areas. Producers should evaluate varieties in their own fields, against local populations of reniform nematode and growing conditions.

A third management option is the use of cultural methods including irrigation, proper pH and nutrient levels, subsoiling, timely planting, or other pest controls. Nematodes cause damage to cotton through injury to the roots. These damaged roots are not able to function properly in water and nutrient uptake. Nematodes cause the greatest amount of damage when combined with some other type of stress such as drought, low nutrient availability, hardpans, cold soils, seedling disease, or thrip damage. Good cultural management should minimize any additional stresses to cotton during the growing season.

Nematicides have been a primary method of reducing nematode injury and increasing yield. Nematicides are generally applied either before or at the time of planting, protecting the roots from serious nematode attack for 4-6 weeks. After the initial protection phase, nematodes rapidly attack the plants and build up to high levels by the end of the growing season. Apparently, cotton plants are able to withstand damage by nematodes when attacked later in the season. Temik 15%G and Nemacur 15%G are granular nematicides that are usually applied at the time of planting either in the seed furrow or a narrow band. Telone II is a preplant fumigant that should be applied at least 3-4 weeks before cotton is planted. Vydate L and Temik 15%G are currently being evaluated as either a foliar application (Vydate) or as sidedress application (Temik) to supplement

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the nematode control from a previous application of a nematicide.

Summary

Nematodes such as root-knot or reniform can cause substantial losses to a cotton crop if undetected or not properly managed. Utilizing all the management tools currently available can lessen the impact of these important pests.

References

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Table 1. The hots status of crops and winter cover crops against root-knot nematode that can be grown in rotation with cotton in the Mid-South.

Susceptible	
Susceptible soybean	Wheat
Grain Sorghum	Oats
Corn	Rye
Sweet potato	Vetches
	Clovers
	Austrian winter pea
Resistant or nonhosts	
Peanut	

Table 2. The host status of cops and winter cover crops against reniform nematode that can be grown in rotation with cotton in the Mid-South.

Susceptible	
Susceptible soybean	Clovers
Sweet potato	Vetches
	Austrian winter pea
Resistant	
Resistant soybean	Wheat
Corn	Oats
Grain sorghum	Rye