Nematodes in Cotton - TX

High populations of plant-parasitic nematodes can cause major losses in cotton and increase plant susceptibility to other soil-borne pathogens. Plant-parasitic nematodes have been identified in every cotton-producing state, and continue to be a production problem for the Southeast, Midsouth, and Texas cotton-growing regions. The annual percentage of estimated yield losses has been recorded since 1952. The Beltwide annual average yield loss for the past 50-years is 2.47% with the highest yield loss of 5.32% due to nematode damage reported in 2006.¹

Nematode Life Cycle

Nematodes life cycles have multiple stages, beginning with an egg stage, then four juvenile stages (J1-J4) followed by the adult stages. A typical life cycle of root-knot nematode (RKN) is shown in Figure 1. Nematodes begin to feed on plant roots during the second juvenile stage (J2). Depending on the species and the environmental conditions, the life cycle of a nematode can be completed in 23-27 days and several generations in a year.

Nematode Damage to Cotton

The presence of certain nematode species can vary according to environmental conditions, soil types, and plant growth. Nematodes feeding on root cells reduce the plant’s ability to absorb water and nutrients. Damage caused by root feeding can further predispose a plant by allowing fungal and bacterial pathogens to enter into the plant and cause disease complexes. For example, Fusarium wilt complex is associated with RKN infestation.

RKN and reniform nematodes are increasing in density and distribution in cotton production regions. Even though differences in symptoms occur between each species, laboratory testing should be conducted to verify the most common nematode in the field. Knowing the nematode species will also help determine what crop rotation options are available and what management options may be considered to help reduce populations.

Symptoms of Nematode Damage

Symptoms of nematode feeding are most noticeable when environmental conditions cause plant stress. For all nematode species, common above-ground symptoms include wilting by midday and stunting of growth. Common below-ground symptoms include swollen roots, galls on roots (root-knot nematode), lack of fine roots, minimal root branching and necrotic lesions³ (Figure 2). Nematode damage is rarely uniform in a field, and is typically more visible in areas with sandier soils.

Nematodes are perceived as an increasing problem among cotton producers. Current trends in cotton production may be contributing to higher nematode populations. These practices include limited use of crop rotation, reduced tillage, and less use of soil-applied insecticides.

Testing for Nematodes

To confirm the presence of nematodes, samples of soil, plants, and roots can be submitted to a nematode testing laboratory. In Texas, samples can be sent to the address provided in the right-hand column. The laboratory website provides information on how to take, store, and ship samples. If test results confirm the presence of nematodes, the species and approximate population density will be provided. Thresholds vary by nematode species, soil type, and by state; therefore it is important to use the thresholds provided by the testing laboratory that analyzed the samples or the local extension agent.

If nematodes are a current problem or a suspected problem, a definitive sampling procedure should be used. Samples should be collected around the edges of symptomatic areas and some samples should include roots of the crop. According to the National Cotton Council, the best time to take samples is when cotton is at the BB 17-19 stage of growth. Samples should be collected at least 10 days after irrigation and before the cotton is top dressed with fertilizers.

Testing for Nematodes

Send Nematode Samples to:
Texas Plant Disease Diagnostic Laboratory
1500 Research Parkway, Suite A130
Texas A&M University Research Park
College Station, TX 77845
979-845-8032
http://plantclinic.tamu.edu
Nematodes in Cotton—TX

It is not possible to eliminate nematodes from soil, but it is important to keep populations at low levels to avoid yield and quality losses. Because there are many nematode species, identification is essential for determining the appropriate control option. The following agronomic practices may help growers manage potential nematode infestations.

- **Soil management** - Fertilize according to soil test recommendations. Healthy plants are less susceptible to nematode damage. Tillage may help to expose root systems to reduce nematode populations.

- **Maintain Good Weed Control** - Weeds can be hosts for nematodes and may serve as an alternative host for next year’s crop.

- **Crop Rotation** - For certain nematode species, rotating to a non-host crop can reduce populations.

- **Select Tolerant Cotton Varieties** - Some cotton varieties are resistant to root-knot nematodes/Fusarium wilt complex. Very few cotton varieties offer tolerance to other nematode species.

- **Fumigants, Soil-applied Insecticides, Seed Treatments, and Foliar Applications** - Various chemical options may be used to help protect young cotton plants. Control options may vary from state to state, check with local extension services for specific recommendations.

**Seed Treatment Options/Research and Development**

Seed treatments are a good option to help protect young cotton plants from early-season nematode damage. Seed treatments offer easy application, compatibility with other insect-controlling seed treatments and traits, and offer the ability to target specific areas of a field. Monsanto now offers Acceleron® nematicide and insecticide Seed Treatment Products for cotton featuring the active ingredients abamectin (nematicide), pyraclostrobin (fungicide), thiamethoxam (insecticide), and Fluxapyroxad (fungicide). Some features of the active ingredients include: Pyraclostrobin with the ability to provide increased plant health through more rapid and increased emergence of seedlings under certain colder conditions. Fluxapyroxad, when used in combination with pyraclostrobin offers more complete and consistent protection from early-season fusarium and rhizoctonia diseases. Thiamethoxam which can help provide protection against early-season insect pests. Abamectin offers protection from RKN, reniform, and lance nematodes that can cause sub-lethal damage to cotton root systems.

For additional agronomic information, please contact your Deltapine® Brands Seed Representative.

**Sources:**

*Individual results may vary,* and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Acceleron® is a registered trademark of Monsanto Technology LLC. Deltapine® is a registered trademark of Monsanto Company. All other trademarks are the property of their respective owners. ©2013 Monsanto Company CRB01102013.