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Stunted, Yellowing or Wilting Corn: Could Nematodes Be the Cause?

Gregory L. Tylka

Iowa State University, gltylka@iastate.edu

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Stunted, Yellowing or Wilting Corn: Could Nematodes Be the Cause?

By Greg Tylka, Department of Plant Pathology and Microbiology

There continues to be lots of questions about whether plant-parasitic nematodes are causing damage to Iowa's corn crop. This varied group of microscopic worms has some species that cause damage to corn at very low population densities (numbers) and other species that are not harmful until population densities reach many hundred or more per 100 cm³ (a little less than a half cup) of soil.

It is common for several different species of plant-parasitic nematodes to occur in Iowa cornfields at low numbers. But if numbers increase to damaging population densities, symptoms of injury will appear.

What are symptoms of nematode damage to corn?

Nematode damage symptoms on corn include stunting of plants (Figure 1), yellowing of leaves, and mid-day wilting or leaf curling. Roots may be stunted, fine roots may be lacking (Figure 1), and there may be discrete areas of black, dead tissue, called lesions, on the roots. Also, some nematodes cause roots to swell.



Figure 1. Two young corn plants stunted from nematode feeding (on right) compared to a healthy corn plant (on left). Note stunting of root systems as well as plant tops and also lack of fine roots.

When do symptoms of nematode damage appear during the season?

It would be very unusual for symptoms of nematode damage on corn to occur in the first month of the growing season - except in fields with very sandy soil. For fields with medium and fine textured soils, the aboveground symptoms caused by nematode feeding likely will appear more in the middle of the growing season.

When should fields be sampled?

Samples should be collected when symptoms of damage are seen. Collect soil and root samples from near plants that are showing obvious symptoms of damage, but avoid sampling near plants that are dead or nearly dead. There is no reason to collect samples from corn that is not showing some symptoms of possible nematode damage.

What type of sample should be collected?

Up until V6 growth stage of corn: collect soil and root samples.

- Use a soil probe and collect cores that are at least 12 inches long.
- Collect 10 or more soil cores to represent an area.
- Collect soil cores from within the root zone of plants showing symptoms of damage. Combine, but do not mix, the soil cores and place them in a sealed plastic bag labeled with permanent marker.
- Also collect, with a shovel, the root mass from four to six plants with symptoms of damage (Figure 2). Take care not to strip off the smaller seminal roots. The tops of the plants can be cut off and discarded. Place the root samples in a sealed plastic bag labeled with permanent marker.
- Protect the samples from physical jarring and from high temperatures (above room temperature).



Figure 2. Young corn plant collected to test for plant-parasitic nematodes in root tissue.

From V6 through R3 (milk) corn growth stage: collect soil samples.

- Use a soil probe and collect cores that are at least 12 inches long.
- Collect 10 or more soil cores to represent an area.
- Collect soil cores from within the root zone of plants showing symptoms of damage. Combine, but do not mix, the soil cores and place them in a sealed plastic bag labeled with permanent marker.
- Protect the samples from physical jarring and from high temperatures (above room temperature).

From R4 (dough) corn growth stage to harvest: sampling is not recommended.

There is not a good relationship between crop damage/yield loss and the number of nematodes in soil and roots once the corn crop reaches the R4 growth stage. Therefore, sampling is not recommended after this point in the growing season.

Where to send samples

Several private laboratories and most land-grant university plant diagnostic laboratories process samples and determine the identities and numbers of plant-parasitic nematodes present. Here is a [list of the university laboratories and their contact information](#). At Iowa State University, the facility is:

Plant and Insect Diagnostic Clinic
Room 327 Bessey Hall
Iowa State University
Ames, IA 50011

The test for nematodes that feed on corn from the ISU Plant and Insect Diagnostic Clinic is called the complete nematode count. Samples sent to the ISU Clinic should be accompanied by a completed Plant Nematode Sample Submission Form (referred to on the ISU Extension Online Store as PD 0032) and a check for the \$35 per sample processing fee.

Management options, if nematode damage is confirmed

If damaging population densities of nematodes are found, there is nothing that can be done to manage the nematodes and lessen the yield loss that will occur in the current growing season. Primary management strategies for future years are use of soil-applied Counter[®] 20G nematicide and/or seed treatments such as Avicta[®] and Votivo[™].

Greg Tylka is a professor with extension and research responsibilities in management of plant-parasitic nematode in the Department of Plant Pathology and Microbiology at Iowa State University. He can be reached at gltylka@iastate.edu or 515-294-3021.

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