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New Approach to Assessing Possible Nematode Damage to Corn

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Abstract

Many different species of plant-parasitic nematodes occur in cornfields throughout the Midwest. Most of these microscopic, parasitic worms must reach a damage threshold number before they cause yield loss in corn. The damage threshold numbers for most nematodes that feed on corn in Iowa (see [Common Corn Nematode Characteristics](#), ICM News, Aug. 3, 2009) are 100 or more worms per 100 cm³, which is a little less than a half-cup of soil. The exceptions are the needle and sting nematodes, which damage corn even if only one or two worms per 100 cm³ soil are present. Fortunately, needle and sting nematodes only occur in soil with at least 70 percent sand and, therefore, do not occur in most Iowa fields.

Keywords

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Disciplines

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New Approach to Assessing Possible Nematode Damage to Corn

By Greg Tylka, Department of Plant Pathology and Microbiology

Many different species of plant-parasitic nematodes occur in cornfields throughout the Midwest. Most of these microscopic, parasitic worms must reach a damage threshold number before they cause yield loss in corn. The damage threshold numbers for most nematodes that feed on corn in Iowa ([see Common Corn Nematode Characteristics](#), ICM News, Aug. 3, 2009) are 100 or more worms per 100 cm³, which is a little less than a half-cup of soil. The exceptions are the needle and sting nematodes, which damage corn even if only one or two worms per 100 cm³ soil are present. Fortunately, needle and sting nematodes only occur in soil with at least 70 percent sand and, therefore, do not occur in most Iowa fields.

A more comprehensive approach to addressing a complicated situation

Nematode damage threshold numbers currently used for corn were established in the 1980s. There are no combined or cumulative damage threshold numbers for cornfields infested with multiple nematode species. Damage threshold can vary depending on conditions in the field – things such as soil texture, cropping history, tillage, and other factors. Using a single number as a damage threshold for individual nematode species is an oversimplified approach to assessing the possibility of yield loss due to nematodes feeding on corn.

In September 2011, industry personnel hosted a meeting with university personnel to discuss and develop alternatives to the current single-species damage thresholds for nematodes that feed on corn. Nematologists, plant diagnosticians and agronomists from Iowa State University, University of Nebraska, Kansas State University, University of Missouri, University of Arkansas, University of Wisconsin, Southern Illinois University, Purdue University, and Ohio State University were involved in the discussions.

Standard recommendations for collecting samples to diagnose possible nematode damage to corn were developed, and those recommendations were presented in [Stunted, Yellowing or Wilted Corn: Could Nematodes Be the Cause?](#), ICM News, May 29, 2012. Also, a comprehensive approach was developed for assessing the risk of damage to corn caused by multiple species of nematodes, as described below.

Considering combined nematode damage and risk factors of fields

A value called the “total nematode damage risk index” is used to assess the

potential damage from all plant-parasitic nematodes that feed on corn that are identified in a sample. A "site sensitivity index" is calculated using background information provided about the field from which the sample was collected. Factors that determine if a field is more or less vulnerable to nematode damage on corn include:

- number of years that corn has been grown
- predominate soil texture
- availability of irrigation
- use of conservation tillage
- occurrence of stand establishment and/or compaction problems

The "total nematode damage risk index" and the "site sensitivity index" values are used to assess overall likelihood or risk of damage from nematodes feeding on corn.

New ISU Plant and Insect Diagnostic Clinic Nematode Sample Submission Form

The Iowa State University Plant and Insect Diagnostic Clinic analyzes soil and root samples for plant-parasitic nematodes that feed on corn. In order to allow clinic personnel to calculate a "site sensitivity index" for nematode samples from cornfields, the [Plant Nematode Sample Submission Form](#) (PD 32) was recently revised. The lower half of the form (see figure) asks questions about the site sensitivity factors mentioned above for the fields from which the samples were collected. Persons submitting samples for nematode testing from cornfields should provide complete information in this section of the form in order to facilitate an accurate assessment of the risk.



Section of the new ISU Plant Nematode Sample Submission Form requesting information about site sensitivity factors for nematodes that feed on corn.

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