



Plant Diseases

Two nematode soil sample analysis options

by Greg Tylka, Department of Plant Pathology

The Iowa State University Plant Disease Clinic offers two different nematode analyses for soil samples—the complete nematode count and the soybean cyst nematode (SCN) egg count. Following is a description of how the two analyses differ and when each analysis should be requested.

A complete nematode count gives a count of the worm stages of plant-parasitic nematodes in a soil sample. This analysis does not give a count of the SCN eggs that may be contained in the sample. The only way that SCN would be identified in this technique would be if SCN juvenile worms were observed in the sample, which occurs commonly but not always. The complete nematode count is not appropriate for samples when the primary concern is SCN; an SCN egg count is recommended instead (see below).

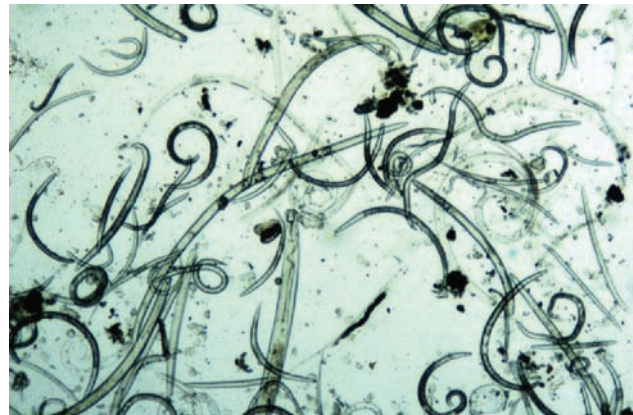
With the complete nematode count, a 100 cm³ (a little less than a half cup) subsample of a soil sample is suspended in water, then the nematode worms and similarly sized soil particles and debris are recovered on sieves with pores small enough to trap the worms but large enough to let smaller soil particles pass through. After that, more sediments are separated from the nematodes by suspending the nematodes and debris in a sugar solution and subsequently passing the nematodes suspended in the sugar solution through another sieve. Finally, the nematodes and any remaining sediment particles are observed with a compound microscope, and all plant-parasitic nematodes in the sample are identified and counted by species.

With the SCN egg count, a 100 cm³ subsample of soil is suspended in water, then the egg-filled SCN cysts (dead females) and similarly sized objects are recovered from the soil on a sieve with pores small enough to trap the cysts but large enough to let smaller soil particles and free nematode eggs and worms pass through. Next, the recovered cysts and sediments are ground to rupture the cysts to release the eggs, which are caught on a sieve with very small pores. Subsequently, the suspension of eggs and some small debris is stained to color the eggs, and the eggs are observed and counted with a dissecting microscope. No worms are counted in the SCN egg count procedure.

For complete nematode counts, soil samples should be taken any time from mid-July to early October. In Iowa, the greatest number of nematodes typically are found around the roots of annual plants from midsummer through fall. Most species of plant-parasitic nematodes can be detected at any time of the year,



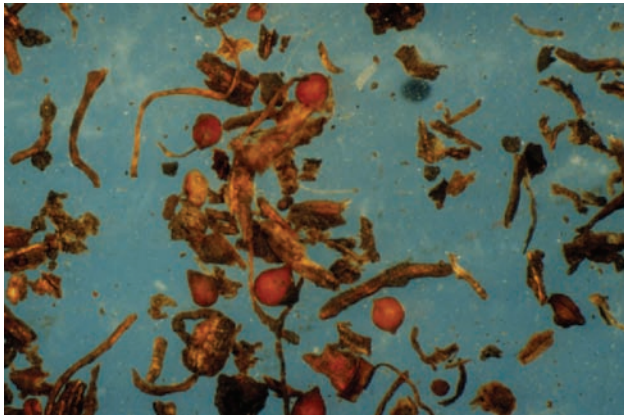
Separating nematode worms or cysts from soil sediments by sieving soil-water suspension. (Greg Tylka)



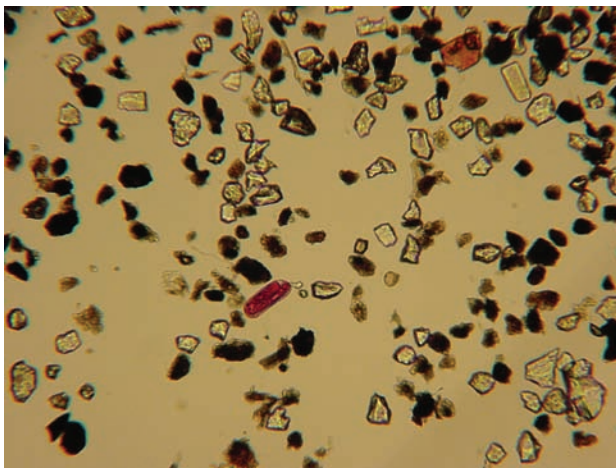
Plant-parasitic and non-parasitic nematodes recovered from soil by sieving. (Greg Tylka)

however. If a nematode problem is suspected on corn, mid-season sampling is recommended. Also, some plant-parasitic nematodes exist primarily in root tissue during the growing season, so a root sample from damaged plants also is requested with a soil sample for a complete nematode count.

For SCN egg counts, soil samples can be collected at any time of the year. An ideal time to sample fields for SCN is in the fall, after harvest and before the soil freezes. However, soil samples collected during the



SCN cysts and similarly sized sediments recovered from soil by sieving. (Greg Tylka)



Pink-stained, oval-shaped SCN egg among soil sediments recovered from soil by sieving. (Greg Tylka)

growing season from near the row of stunted and/or yellow soybeans may reveal whether SCN is the cause of the observed symptoms. The only time soil samples should not be collected is when soil conditions are very wet; nematodes are difficult to extract from soil with the consistency of mud.

The price for complete nematode counts is \$30 per sample for in-state samples and \$60 per sample for samples from outside Iowa (new pricing began August 1, 2006). Analysis of soil samples for SCN eggs is \$15 per sample for Iowa samples and \$20 per sample for out-of-state samples.

Soil samples for complete nematode counts and SCN egg counts can be sent to the ISU Plant Disease Clinic, 323 Bessey Hall, Iowa State University, Ames, IA 50011. Samples should be accompanied by a completed *Plant Nematode Sample Submission Form* (ISU Extension publication PD 32) and a check for the processing fee.

Greg Tylka is a professor of plant pathology with extension and research responsibilities in the management of plant-parasitic nematodes.