



## Plant Diseases

# How to interpret SCN soil test results

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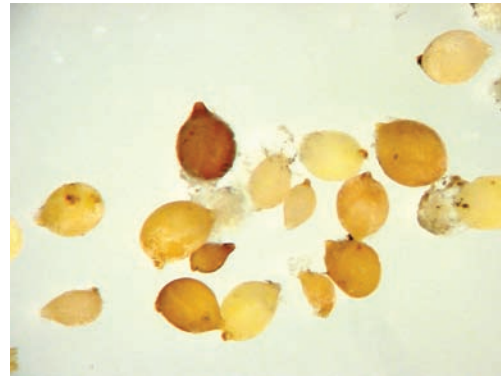
Soybean yield loss due to the soybean cyst nematode (SCN) occurred throughout much of Iowa in 2006. Damage from this pest was particularly noticeable in areas of the state that were very dry. There seems to be increased interest in testing for and managing SCN in Iowa this fall, and there likely has been more fields sampled for SCN this fall than in recent years. Following are some commonly asked questions and answers that illustrate things to consider when interpreting SCN soil sample results. This information is excerpted from ISU Extension publication IPM 61, *Interpreting SCN Soil Sample Results*.

### Were cysts, eggs, or juveniles counted?

When interpreting SCN soil sample results, it is extremely important to understand what life stage of the nematode was counted and reported. Most laboratories report the number of eggs in a sample, but some report the number of SCN cysts or juveniles in the soil. Cysts are dead SCN females that contain eggs. Cyst counts can be loosely converted to egg counts by multiplying the cyst count by a factor of 100 eggs per cyst. SCN juveniles typically are short lived, and their numbers may not be well correlated with the number of cysts or eggs in the soil. Consequently, it is much more informative to have cyst or egg counts done rather than counts of juveniles when monitoring SCN population densities in the soil (see figures).

### What amount of soil was processed?

SCN cyst, egg, or juvenile soil test results are reported based on a certain amount (volume) of soil. So if comparing results of SCN soil samples processed by different laboratories, it is important to make sure that results are expressed in similar amounts of soil. Results usually are reported per 100 cc (cubic centimeters or a little less than a half cup) or per 250 cc (about a cup) of soil. To convert results from 100 cc of soil to 250 cc of soil, simply multiply the number of cysts or eggs per 100 cc of soil by 2.5. Conversely, to convert the number of cysts or eggs per 250 cc of soil to 100 cc of soil, divide the result by 2.5.



Egg-filled females (white) and cysts (tan and brown) of soybean cyst nematode. (Greg Tylka)



Soybean cyst nematode juvenile (left) and egg (right). (Greg Tylka)

### Why are results so variable?

SCN cannot move more than an inch or so under its own power. Even with tillage, the distribution of SCN in a field usually is aggregated. Because of the aggregation of cysts, results of soil samples may be highly variable. The variability in SCN soil test results is especially pronounced in egg counts because in addition to aggregation of cysts, eggs are clustered within cysts (see map on page 260).

It would not be uncommon for two soil samples collected from the same area (e.g., 20 acres) of a field to have cyst or egg counts that vary from 100 to 300 percent. For example, one sample may contain 8,000 eggs per 100 cc of soil and the other may have 20,000 eggs per 100 cc of soil. Similarly, it would not be uncommon to have results of two subsamples from the same bag of soil vary from 100 to 300 percent if the soil in the bag was not mixed thoroughly.

The result of a soil test for SCN, therefore, should be considered a rough estimate of the true population density of the nematode in the field. Fortunately, a precise measure of the SCN population density is not necessary to implement management practices.

Even though variability cannot be eliminated, increasing the number of soil cores and decreasing the area from which a sample is collected make the SCN soil sample results more meaningful.

**Aggregation of soybean cyst nematode (SCN) egg population densities in a small area of naturally infested field research plots near Ames, Iowa. Each small rectangle represents a plot measuring 10 feet by 20 feet. The total area of 64 plots was 80 feet by 160 feet. The number in each rectangle is the number of SCN eggs per 100 cc soil as determined from a 10-core soil sample from each plot.**

11,000	5,100	2,900	3,200	350	250	750	2,200
4,100	1,900	1,900	5,900	1,000	2,600	0	100
32,600	19,500	23,700	11,600	8,200	6,400	10,900	3,400
37,000	7,600	9,400	8,400	6,400	6,200	10,700	1,700
16,500	17,600	6,000	1,500	0	3,700	3,700	6,100
19,700	7,600	2,300	50	450	700	250	1,600
12,600	10,600	100	50	0	0	0	50
9,000	4,800	850	0	250	0	0	500

### How do I relate sample results to management options?

The SCN population density in the soil (number of SCN cysts or eggs) can be used to identify if a field is infested with SCN, to determine what management practices are warranted, and to assess the success of implemented management practices. Management recommendations vary based on the SCN population density in the soil. Iowa State University recommends growing nonhost crops, like corn, in rotation with SCN-resistant soybean varieties as long as SCN population densities are less than 12,000 eggs per 100 cc soil. See ISU Extension publication IPM 63 for specific management recommendations based on results of samples processed by the ISU Plant Disease Clinic.

If you have results of SCN soil tests from a private laboratory and want to determine what the appropriate management recommendations are, be sure to have the results expressed in the same nematode stage (cysts or eggs) and amount of soil (100 or 250 cc) as those used in the management recommendations.

### Does a negative SCN soil test result prove that the field is not infested with the nematode?

Not finding SCN in a soil sample does not prove that it is not present in the field from which the sample was collected for two reasons. The extraction procedures used to extract cysts and eggs of SCN from soil are not 100 percent effective. Consequently, some samples that contain very low population densities of SCN may not test positive when the soil is processed for the nematode. Also, the distribution of SCN can be variable in a field (see the answer to the third question in this article), and it is possible that soil might have not been collected from the areas of the field that are infested with the nematode. A field from which a sample with a negative SCN test is obtained most likely does not have a substantial SCN infestation, but follow-up sampling is recommended to check for SCN infestations that may become established in future years.

ISU Extension publication IPM 61, *Interpreting SCN Soil Sample Results*, is available on the Internet at <http://www.extension.iastate.edu/Publications/IPM61.pdf> and includes a more thorough discussion of the issues presented in this article. ISU Extension publication IPM 63, *Soybean Cyst Nematode (SCN) Management Recommendations*, also is available on the Internet at <http://www.extension.iastate.edu/Publications/IPM63.pdf>. Single copies of these publications are available free of charge from county extension offices or from the Extension Distribution Center by calling (515) 294-5247. Additional information about SCN can be found on the Web at [www.soybeancyst.info](http://www.soybeancyst.info).

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