



Soil probe containing one of multiple soil cores needed in a sample to test for SCN.

Interpreting SCN Soil Sample Results

Introduction

As growers and those who advise them collect soil samples from fields to test for the soybean cyst nematode (SCN) and compare results from various fields and soil testing laboratories over multiple years, there are several things to consider to help interpret the soil sample results.

Were cysts, eggs, or juveniles counted?

When interpreting SCN soil sample results, it is extremely important to know what life stage of the nematode was counted and is being reported. Most laboratories count eggs, but some count cysts or juveniles. Cysts are dead SCN females that contain eggs and juveniles are the infective worm stage of the nematode. A cyst may contain 200 or more eggs when it is first formed. Over the course of several years, juveniles hatch from the eggs within the cysts and move out into the soil, resulting in a variable number of eggs being contained in the cysts.

A soil sample result of 50 cysts per 100 cm³ or cc of soil is 10-times greater than 1,000 eggs per 100 cm³ of soil, because each cyst may contain 200 or more eggs.

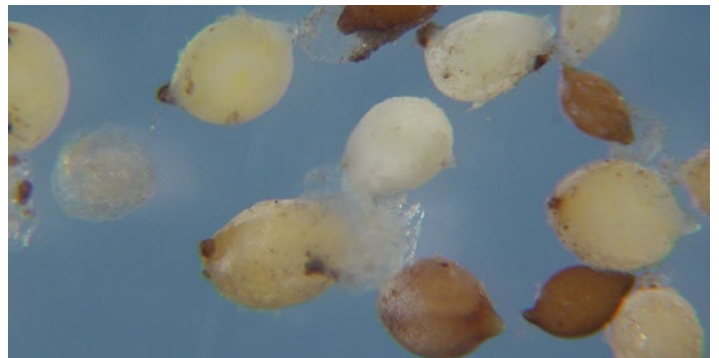
Cyst and egg numbers from a soil sample generally correlate well with each other. Juveniles typically are short lived and their numbers usually are not well correlated to the number of cysts or eggs in the soil. Consequently, when monitoring SCN population densities, it is much more informative to know the number of cysts or eggs in the soil than the number of juveniles. Cyst numbers can be loosely converted to numbers of eggs by multiplying the number of cysts by 100. Although a newly formed SCN cyst may contain 200 or more eggs, multiplying the cyst number by 100 will account

for cysts of various ages containing variable numbers of eggs in the soil sample.

Some laboratories offer both cyst and egg counts, whereas many others only offer egg counts. The processing fee for cyst counts typically is less than for egg counts, but cyst counts do not provide information that is as precise as egg counts, because of the variable number of eggs per cyst.

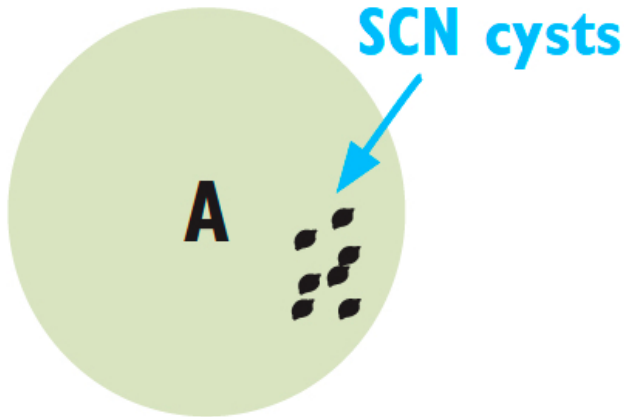
What amount of soil was processed?

SCN cyst, egg, and juvenile counts are reported per a certain volume of soil. When attempting to compare results of different soil samples, it is important to make sure results are expressed in similar amounts of soil. Results usually are reported per 100 cm³ (cubic centimeters or a little less than a half-cup) or 250 cm³ (about a cup) of soil. To convert results from 100 cm³ of soil to 250 cm³ of soil, simply multiply the number of cysts or eggs per 100 cm³ of soil by 2.5. Conversely, to convert the number of cysts or eggs per 250 cm³ of soil to 100 cm³ of soil, divide the number by 2.5.

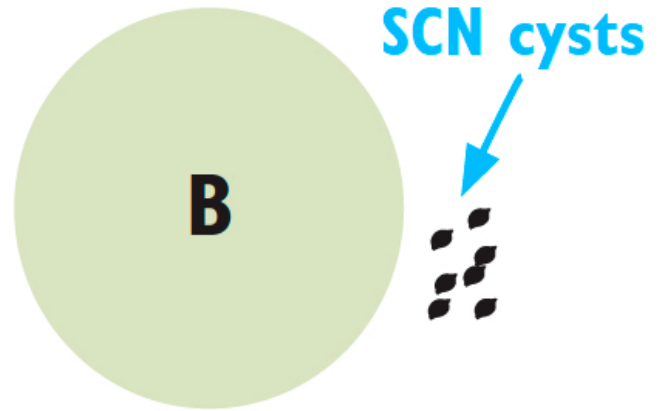


Adult SCN females (white) and cysts (tan and brown).

soil probe tip



soil probe tip



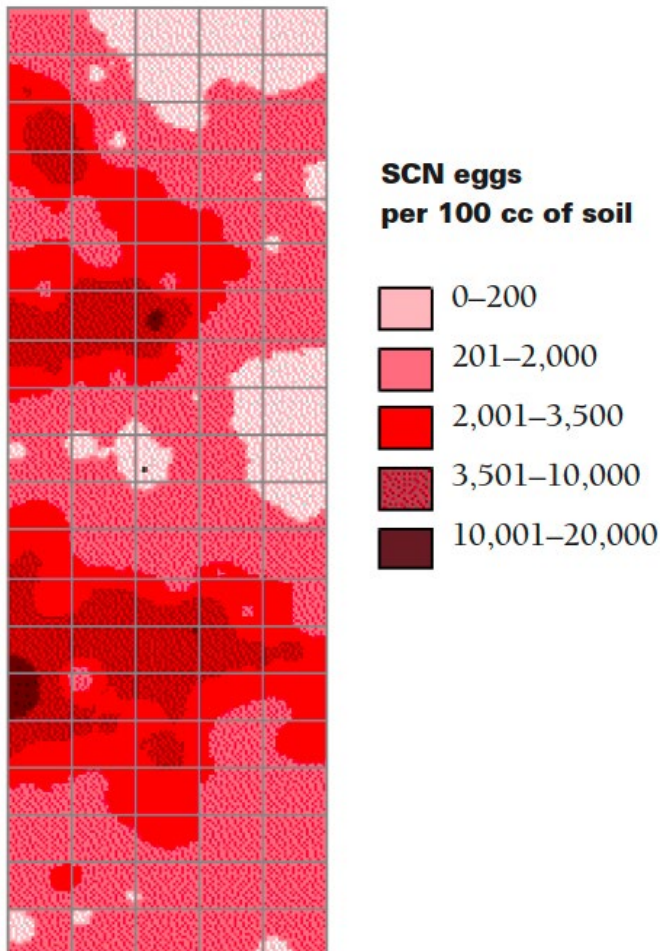
Why are results so variable?

SCN cannot move more than an inch or so under its own power. Consequentially, the distribution of SCN in a field usually is aggregated or clustered, even in tilled fields.

Because of the aggregation of cysts, results of soil samples tend to be highly variable. The variability in SCN soil test results is especially pronounced in egg counts because eggs are clustered within cysts. SCN cysts are very small, and the exact place that a typical 1-inch-diameter soil probe is inserted into the soil can have a tremendous effect on how many egg-filled SCN cysts are captured in that soil core.

In the diagram above, soil probe A (left) is inserted in the ground where it captures seven SCN cysts (not drawn to scale) that may contain as many as 1,400 eggs. If the soil probe is placed only one inch away from where soil probe A originally was inserted in the ground (represented by soil probe B, on the right), the seven SCN cysts containing 1,400 eggs would not be captured in the soil core. In other words, a difference of one inch in where the probe tip was inserted in the ground would have caused a difference of 1,400 eggs in the sample results.

It would not be uncommon for two 20-core soil samples collected from the same area of a field (the same 20 acres) to have cyst or egg counts that vary from 100 to 300%. For example, one sample may contain 8,000 eggs per 100 cm³ of soil and the other may have 24,000 eggs per 100 cm³ 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%.



Variability in SCN egg population densities among half-acre cells of a 50-acre study area in Boone County, Iowa.



SCN egg (left) and hatched juvenile (right).

The result of a soil test for SCN, therefore, should be considered an estimate of the actual population density of the nematode in the field. Fortunately, a precise measure of the SCN population density is not necessary to implement sound management practices. The only difficulty arises when egg densities from separate samples collected from different parts of the same field have greatly different infestation levels with different management recommendations. In such a case, managing for the more severe infestation would be the safest thing to do to limit yield loss. Even though variability in results cannot be eliminated, increasing the number of soil cores and decreasing the area from which a multiple-core soil sample is collected makes the SCN soil sample results more meaningful.

How do I relate sample results to management options?

The SCN population density in the soil (number of SCN cysts or eggs) can indicate if a field is infested with SCN and guide what management practices are warranted. Soil sample results also can be used to assess the success of implemented management practices if sample results are compared over several years.

Growers and those who advise them should consult an extension nematologist or plant pathologist at their state's land-grant university for the most current management recommendations for SCN. The recommendations usually vary based on the SCN population density in the soil. Iowa State University's SCN management recommendations are provided in ISU Extension and Outreach publication IPM 63: [Soybean Cyst Nematode Management Recommendations](https://store.extension.iastate.edu/Product/2441) (store.extension.iastate.edu/Product/2441).

If you have results of SCN soil tests from a private laboratory and want to determine what the appropriate management recommendations are, be sure the results are expressed in the same nematode stage (cysts or eggs) and amount of soil (100 or 250 cm³) as those used in the university management recommendations.

Does a negative SCN soil test result indicate the field is not infested with the nematode?

Not finding SCN in a soil sample does not necessarily mean it is not present in the field where the sample was collected. The distribution of SCN can be very variable in a field, and it is possible soil might have not been collected from areas of the field that are infested with the nematode. Also, the extraction procedures used to recover cysts and eggs of SCN from soil are not 100 percent effective. Consequently, some samples that contain low levels of SCN may not test positive when the soil is processed for the nematode. A field from which a sample with a negative SCN test is obtained likely does not have a widespread, substantial SCN infestation, but follow-up soil sampling is recommended to check for SCN infestations in future years.

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