



Soil samples taken following harvest provide the best estimates of SCN. Check roots during midseason for the presence of females and cysts.

[How to sample soil for SCN»](#)

[How to check roots for SCN»](#)



SCN cysts  
Remember that high-yielding varieties don't always control SCN populations the best, so pay attention to information about SCN reproduction in the field as well as yield.

Photo: *Terry Niblack, OSU*

## SOYBEAN CYST NEMATODE

### Key points to know about SCN

- Many farmers don't know their fields are infested with SCN - you often can't tell SCN is there from looking at the field.
- The effect of SCN on soybean yield is directly related to the numbers of nematodes feeding on the root system.
- Observation of adult females and cysts on the roots of soybean plants is the most accurate way to diagnose SCN infestation in the field.
- Once present in the soil, SCN can never be eliminated. However, the nematode can be managed to minimize SCN reproduction and maximize crop yields.
- Crop rotation coupled with planting SCN-resistant varieties are the cornerstones for the management of SCN. Non-host crops, such as corn, sorghum, sunflower, and alfalfa can reduce SCN population densities each year a non-host crop is planted.
- Anything that moves even small amounts of infested soil is capable of spreading SCN, including farm machinery, vehicles and tools, wind, water, animals, and farm workers.

### How to choose SCN-resistant soybean varieties

Look for varieties that yield consistently well in SCN-infested fields on multiple sites. Yield data from noninfested fields are not useful.

Look for varieties that consistently decrease SCN population densities or keep the SCN numbers in check in multiple fields. It is very difficult to reduce SCN numbers in a field once they develop to high levels, so it is important to consider how well SCN-resistant varieties control SCN numbers in order to maintain the productivity of fields for years to come.

Look for data from as many different reliable sources as possible, including university variety trials and strip trials conducted by co-ops, grain elevators, and seed companies.

Wise selection of varieties will ensure that soybeans can be grown profitably in SCN-infested fields for many years to come.

#### ▶ Agronomic impact

#### ▶ Life cycle

#### ▶ Scouting

#### ▶ Distribution

#### ▶ Management

#### ▼ HG types

### What are HG Types?

The soybean cyst nematode (SCN) is a widespread and serious pest of soybeans. The microscopic worm is long-lived in the soil, can develop and reproduce quickly on susceptible soybean varieties, and is capable of causing significant yield loss even in years with ideal growing conditions.



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Fortunately, soybean varieties have been developed that are resistant to SCN. These resistant varieties suppress 90% or more of the development of most SCN populations, resulting in a significant increase in soybean yields in SCN-infested fields.

However, soon after the release of resistant varieties, scientists discovered some SCN populations that were capable of reproducing at elevated levels on resistant soybean varieties. Consequently, a race test system was developed in 1970 to assess the abilities of SCN populations to reproduce on resistant soybean varieties.

Much has been learned in the past several decades about development of SCN on resistant soybean varieties. It is apparent from this new knowledge that a change in how we describe the abilities of a SCN population to reproduce on resistant soybean varieties is warranted.

A new system, called the HG Type test (HG for *Heterodera glycines*, the scientific name for soybean cyst nematode) has been developed and adopted by agronomists, plant pathologists, and soybean breeders.

#### What is a SCN HG Type test?

A HG Type test is a greenhouse test performed on a SCN population isolated from a field to determine how well the SCN population can develop on soybean lines that were used as sources of resistance for SCN-resistant soybean varieties.

#### Why not a SCN race test?

The HG Type test is similar to a SCN race test, but includes only soybean lines that are sources of resistance in available SCN-resistant soybean varieties. It is much easier to understand than the race test. Once the HG Type test system has been used for a while, it should be easy to remember what an HG Type designation means in relation to the resistance possessed by available SCN-resistant soybean varieties.

For example, if the HG Type of a SCN population in your field has the number 2 in its designation, you will come to recognize that the number 2 corresponds to PI 88788, the most commonly available source of resistance in soybean varieties in the Midwest. The number 2 means the same thing whether the population is an HG Type 2, an HG Type 2.3.7, or an HG Type 1.2.6.

#### Who needs an HG Type test?

Soybean growers who have experienced sub-par performance from SCN-resistant soybean varieties in SCN-infested fields should consider having an HG Type test performed. Also, soybean growers who farm in an SCN-infested area that has had resistant soybeans grown numerous times in the past might consider having an HG Type test performed.

#### How is a HG Type test conducted?

To determine the HG Type of a SCN population, we put the nematodes on soybean lines with different genes for SCN resistance in the greenhouse under controlled conditions (Figure 1). These conditions are similar to those under which resistant soybean varieties are developed.

After 30 days, enough time for SCN females to develop, we count the numbers of females that form on the roots of the various resistant soybean lines (Figures 2 and 3). We compare these numbers to the number of females that formed on a standard susceptible soybean variety. Finally, we note which resistant soybean lines show elevated development by the SCN population. "Elevated development" means that a resistant line has 10% or more of the number of females that developed on the susceptible variety.

#### How do I interpret the results of a HG Type test?

The number or numbers in the HG Type designation correspond directly to sources of resistance used in available SCN-resistant soybean cultivars.

For example, a SCN population of HG Type 1.2 indicates that the nematode population has elevated development on Peking (line #1) and PI88788 (line #2). Either or both lines have been used to breed some SCN-resistant soybean varieties. A grower with a field infested with an HG Type 1.2 might not want to plant SCN-resistant varieties that contain resistance from Peking or PI88788, if possible. Facilities that provide SCN HG Type testing should also offer assistance in interpreting the results of the test.

#### Examples of HG Type Testing»

#### How do I interpret descriptions of public and private SCN-resistant varieties?

Growers should be aware that the traditional way that SCN-resistant varieties are labeled is somewhat misleading. For



**An HG type describes the ability of the SCN population to reproduce on resistant soybean varieties. Shown is a brown cyst (egg sac) on a soybean root.**

*Photo credit: Iowa State University.*

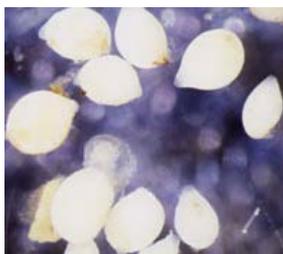


**An HG test in progress.**

**Step 1.** Soybean lines with different resistant genes are inoculated with nematodes and allowed to grow for 30 days. *Photo credit: Iowa State University.*



**Step 2.** The soybean roots are washed over a sieve to collect the females. *Photo credit: Iowa State University.*



**Step 3.** The number of females that have developed on each soybean line are counted, and compared with the number on a standard variety - *Photo: Iowa State University*

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example, an SCN-resistant variety with resistance from PI 88788 may be labeled as resistant to SCN race 3, when in fact it might also be resistant to as many as seven additional SCN races. In addition, this variety also might be vulnerable to elevated development by as many as eight other SCN races. Unfortunately, none of this management-type information is conveyed in the labeling.

With the HG Type designation, we label the nematodes, not the varieties. For example, if a grower's SCN population is an HG Type 2, the name clearly indicates that the nematode exhibited elevated development on PI 88788 (line #2). That makes it more likely that the nematodes could develop on any SCN-resistant variety that obtained its SCN resistance from PI 88788, and it likely would be in the grower's best interest to use a SCN-resistant variety that obtained its SCN resistance genes from a source other than PI 88788, if possible.

#### Examples of HG Type Testing»

[Where can I get a SCN HG Type test performed?»](#)

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