

MANAGEMENT MATTERS  
SERIES

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*Tips to help North Carolina soybean growers  
increase yield & profits*

# Managing Soybean Cyst Nematode

The Invisible Yield Robber





- How can you test for and manage SCN-infested fields to increase yields and improve profits?

SCN is the leading cause of soybean yield loss in North America, yet many growers don't even realize it's a problem. Over 60% of fields in North Carolina are infested with SCN and it's estimated the pest costs North Carolina growers \$30 million in yield loss annually. The first step is to determine the SCN levels in your fields and then tailor a management strategy for your farm.

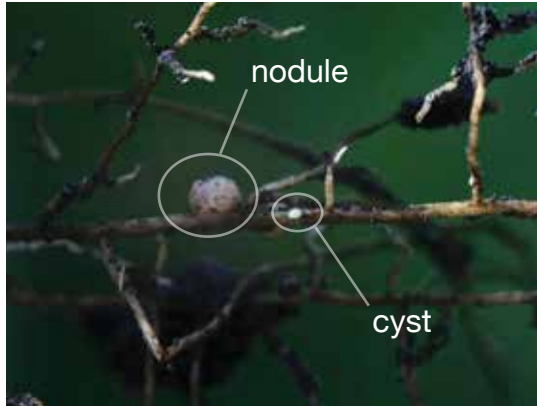
# SCN & Its Life Cycle

The soybean cyst nematode (SCN), *Heterodera glycines*, is a microscopic roundworm that attacks roots of soybeans. Its lifecycle is typically three to four

weeks, meaning several generations of SCN can be completed in a soybean growing season. The adult female is visible on the roots as a very small, lemon-shaped protrusion. It can be seen with the naked eye but it is difficult to spot (nitrogen-fixing nodules are much larger). Once the female dies it can contain several hundred eggs inside its body (referred to as a cyst). The cyst protects the eggs from environmental stresses and allows them to survive in the soil for several years.

Field populations of SCN are characterized by race (or HG type). The race is an indication of a field populations' ability to overcome resistance

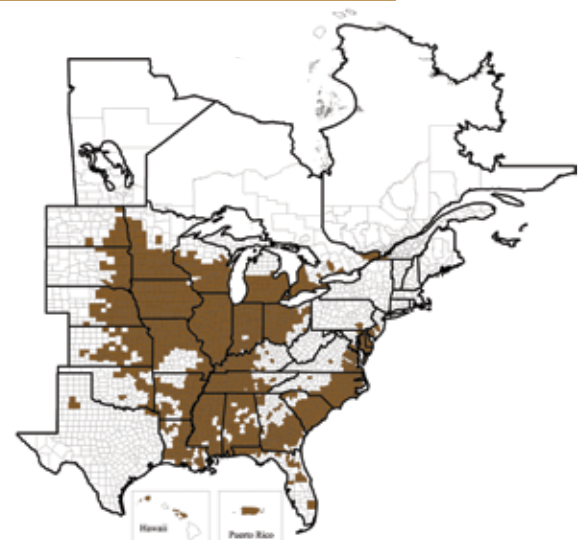
in specific varieties. In the last race survey of SCN in N.C. the majority of the populations were characterized as race 2 (HG type 1.2.5.7) but race 4, 5, 6 and 9 were also present.



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## Distribution

The first report of SCN in the U.S. was in New Hanover Co., N.C. in 1954. The parasite then spread rapidly across N.C. and to other soybean producing states. SCN is concentrated in counties in the Coastal Plain and Blacklands of N.C., although some Piedmont counties with large soybean acreage do have the pest. Severe yield loss is particularly common in the sandy Coastal Plain soils, but SCN is not restricted to any soil type.



Distribution of soybean cyst nematode in the U.S. (Tylka & Marett, 2014)

# Yield Losses/Symptoms

High population densities of SCN can cause noticeable symptoms which include severely stunted plants with chlorotic (yellow) leaves. More often though, few aboveground symptoms are observed, yet SCN contributes

10 – 20% yield loss in infected fields. SCN is probably the most destructive pest of soybeans in N.C. This “invisible” pest feeds on the root system inhibiting the efficient nutrient and water use of infected plants. Damage to the roots also allows an entryway for other pathogens to infect the plant.

The symptoms commonly associated with SCN damage are similar to other crop production problems, therefore professional diagnosis is the best way to check for SCN in a field with poor plant growth.

**SCN: one of the MOST DESTRUCTIVE PESTS of soybeans in N.C.**



Paul Bachii, University of Kentucky, Bugwood.org

# Sampling for SCN

Periodically testing for SCN is the best way to identify fields where SCN may be impacting yield and to monitor fields where SCN is a known problem. The ideal time to sample is in the fall, soon after harvest as SCN numbers tend to be highest shortly after harvest. Soil samples collected for soil fertility analysis can be split so part can be used for a nematode assay. Remember to place the nematode sample in a plastic bag (not the cardboard used for soil samples) and keep the sample out of direct sunlight.

The North Carolina Department of Agriculture will conduct a nematode assay at a cost of \$3.00 per sample. This will tell you what species of nematode are present and the population levels of those nematodes. The higher the population, the greater the potential yield loss.

## How to sample for Nematodes

Use boxes, bags and forms <b>designed</b> specifically for <b>nematode assays</b> . <small>These can be obtained from the NCDA or your local extension office.</small>	Sample at a depth of <b>four to eight</b> inches.
At least <b>20 cores</b> per field should be taken in a <b>zig-zag pattern</b> and <b>mixed</b> together. <small>In very large fields or fields with variable soil types more than one sample should be submitted.</small>	<b>Protect</b> samples from <b>extreme</b> temperatures. <small>Avoid placing samples in direct sunlight, hot vehicles or a freezer.</small>
<b>Avoid sampling when the ground is frozen or excessively wet or dry.</b>	

# Management Recommendations for SCN

Once established in a field, SCN cannot be eradicated. However, there are various practices that can be implemented to minimize SCN reproduction and maximize soybean yields in infested fields.

**1 CROP ROTATION.** This is one of the most effective means of managing SCN. Planting a non-host crop such as corn, cotton, tobacco or peanuts for one year can significantly reduce SCN populations. If SCN levels are high, it is best to plant a non-host crop at least two years to reduce the population.

	MANAGING SCN WITH RESISTANT VARIETIES	MANAGING SCN WITHOUT RESISTANT VARIETIES
Year 1	Non-host crop	Non-host crop
Year 2	Resistant variety	Non-host crop
Year 3	Non-host crop	Soybean
Year 4	Susceptible variety	Repeat cycle
Year 5	Repeat cycle	

**2 REDUCE STRESS.** Plant stress can amplify the effects SCN has on plant yield. Maintaining proper soil fertility and pH levels, minimizing other plant diseases and insects, and reducing weed populations are critical to maximizing soybean yield on infested land.

**3 MANAGE SOIL MOVEMENT.** Planting and cultivating of infested land should be done only after non-infested fields. Soil remaining on equipment should be washed thoroughly to prevent the movement of infested soil.

**4 ALTER YOUR PLANTING PRACTICES.** Late maturing soybean varieties allow for an extra generation of SCN to develop which can double or triple the population density in a field. Planting Group V's or earlier

will prevent this extra generation from developing. No-till and late planting can also help reduce SCN populations. However, be careful not to plant too late or yields will be reduced due to less time for vegetative growth. To avoid this and keep nematode populations as low as possible, plant at a date that allows just enough time for the crop to be three feet tall and have the middles lapped.

Understanding the life cycle of SCN, routine soil testing and proper crop management can reduce the incidence of this pest.

Growers must commit to testing for and managing SCN populations in order to reduce yield loss caused by this destructive pest.

Following the management recommendations in this guide will help lower SCN population numbers. An integrated approach combining several practices will be most effective at reducing yield loss caused by SCN.

#### ACKNOWLEDGEMENTS

Information was gathered from the following resources for the compilation of this brochure.

Management of Soybean Cyst Nematode. Soybean Disease Information Note 1. Steve Koenning, North Carolina State University.

SCN Soybean Cyst Nematode Management Guide, Fifth Edition—Editors: Terry L Niblack, University of Illinois, and Gregory L. Tylka, Iowa State University.



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