How to Sample for Soybean Cyst Nematode (SCN)

Soybean cyst nematode (SCN) remains the most significant yield-limiting pest of soybeans in the United States, causing an estimated $1.5 billion in economic losses annually. First detected in North Dakota in Richland County in 2003, SCN has since spread to many soybean-producing counties across the state. Early detection through soil sampling and proactive management are critical to minimizing yield losses. This guide addresses key questions about sampling for SCN to help farmers protect their crops effectively.

What Am I Sampling For?

SCN (*Heterodera glycines*) is a microscopic, parasitic roundworm that feeds on soybean roots, reducing yield by disrupting nutrient and water uptake. Each female SCN produces 100–300 eggs, which are encased in her body after she dies, forming a protective structure called a cyst. The cysts can survive in the soil for many years, hatching into juveniles that infect soybean roots. When sampling, you're measuring the number of SCN eggs per 100 cubic centimeters (cc) of soil (about 3.4 ounces), which indicates the population level and potential risk to your soybean crop. In our region, SCN typically completes two to three life cycles per growing season, amplifying its impact if not managed.

When To Sample?

The optimal time to sample for SCN is at the end of the soybean growing season, typically in September or October, either just before or after harvest. This timing coincides with peak egg levels in the soil, giving the maximum assessment of SCN populations. Sampling at this time also allows you to plan optimal management strategies, such as variety selection or crop rotation, for the next season. While spring sampling is still okay, egg counts may be lower due to winter die-off or hatching, potentially underestimating the threat.

How Do I Sample?

To collect a representative sample, focus on the soybean root zone where SCN eggs are concentrated. Use a soil probe or a shovel to sample 6–8 inches deep, targeting areas near the plant roots (within a few inches of the stem). Take 10–20 small core samples from across the area of interest, then mix them thoroughly in a bucket to create a composite sample. Fill a soil sample bag with roughly 2 cups of this mixed soil. Avoid sampling overly wet or frozen soil, as this can affect egg recovery. Label the bag with field details (e.g., location, date) and submit it promptly to the diagnostic lab.

What Sampling Strategy Do I Use?

Three main strategies can guide your SCN sampling, depending on your goals (see Figure 1 below for illustrations):

1. **Grid Sampling**: For precision management, divide the field into smaller grids (e.g., 5–10 acres) and sample each systematically. This approach provides a detailed map of SCN distribution but is more labor-intensive.
2. **Management Sampling**: If SCN is already confirmed in your field, sample areas with known infestations to monitor egg levels and assess management effectiveness. Focus on areas in a field that have experienced unexpected decreasing yields.
3. **Detection Sampling**: For fields with no prior SCN history, sample broadly to check for its presence. Target high-risk areas like field entrances, flood-prone zones, or spots with unexplained yield loss.

Recent advancements in precision agriculture, such as GPS-guided sampling, can enhance these strategies by pinpointing SCN hotspots more accurately. Consult your Extension agent or visit www.thescncoalition.com for tailored advice.

Figure 1: Three strategies for sampling for SCN (Source: The SCN Coalition)

Where To Sample?

SCN distribution is often uneven, so target areas most likely to contain the pest:

- Field entrances or equipment pathways where soil may have been introduced.
- Low spots or areas prone to flooding, as water can transport cysts.
- Regions with stunted, yellowing soybeans or unexplained yield declines.
- Edges near fields with known SCN infestations.
- High-pH or sandy soils, which favor SCN.

How Do I Interpret The Results?

SCN egg counts are reported as eggs per 100 cc of soil. Thresholds vary by region and soil type, but general guidelines from NDSU and The SCN Coalition suggest:

Negative Sample (no eggs detected):

- No SCN detected in the sample.
- Keep in mind that a negative sample doesn't prove you don't have SCN as false negatives are possible due to patchy distribution.
- Resample in future seasons to confirm absence.

Positive Sample (eggs detected):

- If ***any eggs are detected,*** we recommend beginning active management immediately.
- SCN populations can increase very quickly. In North Dakota, NDSU has recorded increases from approximately 1,000 eggs/cc to 30,000 eggs/cc in a single growing season when conditions were favorable for SCN reproduction, and the nematode was not managed.
- At ***any egg level.***
    - Monitor populations annually
    - Rotate soybeans with non-host crops (corn, wheat, sunflower, etc.)
    - Plant resistant soybean varieties
    - If possible, rotate source of resistance (e.g., Peking or PI 88788 sources)
    - If egg levels are high and economics pencil out, consider a nematicide seed treatment
- *General* guide to risk of yield loss.
    - 1–1,000 eggs: Low population. Limited yield loss anticipated if actively managed.
    - 2,000–10,000 eggs: Moderate risk. Yield loss is likely to occur if not actively managed.
    - >10,000 eggs: High risk. Yield loss likely, even with active management. In addition to other management strategies, extended crop rotations to non-host is recommended.

Egg levels can fluctuate, so track trends over multiple seasons. Recent research highlights SCN's evolving resistance to the widely used PI 88788 soybean variety, which leads to urges for farmers to diversify resistance sources and integrate other tactics. For detailed interpretation, consult your Extension agent or the NDSU soybean pathology team.

Where Can I Pick Up Sample Bags?

Soil sample bags for SCN testing are widely available at no cost through several sources. The North Dakota Soybean Council (NDSC) partners with NDSU to provide free sampling bags as part of the SCN sampling program, which has been active since 2013. Your local county Extension office is a primary resource for getting sample bags.

For More Information

Visit www.thescncoalition.com for comprehensive SCN resources, including videos, farmer testimonials, and management strategies. Your county Extension agent or the NDSU Plant Pathology team (701-231-8362) or via https://www.ndsu.edu/agriculture/academics/academic-units/plant-pathology can provide localized advice. The NDSC/NDSU sampling program's cumulative data (2013–2024) offers insights into SCN's spread across North Dakota, available through NDSU Agriculture publications.

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Updated: April 2025