



Soybean Cyst Nematode

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The soybean cyst nematode (SCN) is a major limiting factor in Michigan soybean production. This nematode was first detected in Michigan in 1987. SCN is known to exist in all of Michigan's major soybean producing counties (see Figure 1). SCN infestations can result in poor stands, stunted plants, yellow foliage, and low soybean yields. Losses can range from 5 to 90% of the yield potential. It is imperative for all Michigan soybean growers to have a well-developed strategy to avoid SCN problems or to minimize impacts if SCN is already present.

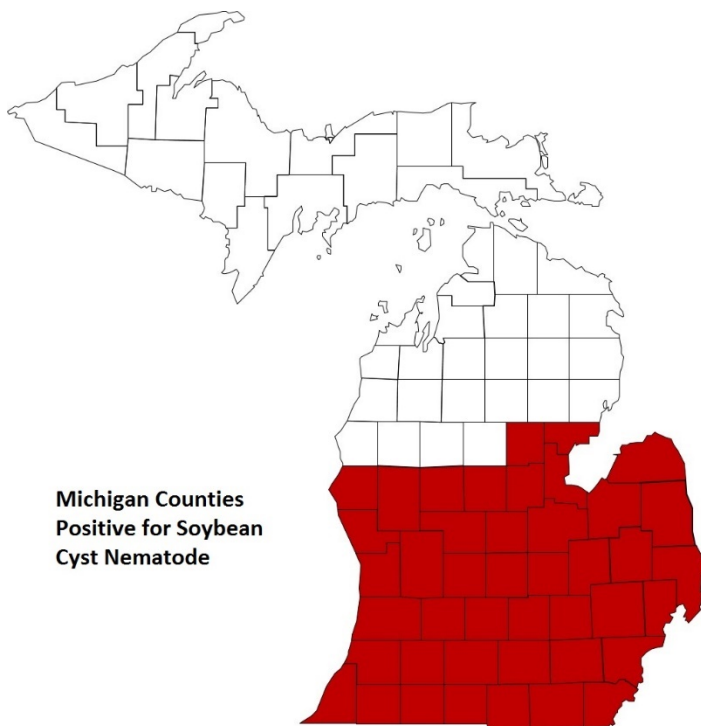


Figure 1. The soybean cyst nematode has been detected in several counties in the lower peninsula of Michigan.

Biology and Symptoms.

SCN is a microscopic plant-parasitic roundworm that overwinters in the soil and feeds on the root system of

its host plant. SCN has 3 major life stages: egg, juvenile and adult. Juvenile stages feed in roots as they develop into either adult males or females. At optimal temperatures, SCN can complete a generation in roughly four weeks. SCN females can be observed on the root systems of soybeans around 45 days after planting. They are small white or yellow spheres, about the size of the head of a pin, attached to the roots of infected host plants (see Figure 2). As females mature, they turn brown, die and become protective cysts for their developing eggs and juvenile stages. Eggs can remain viable in the soil for many years (5-12) even in the presence of host crops. A cyst may contain up to several hundred eggs and many will hatch in the presence of suitable hosts. Hosts for SCN are mainly legumes such as soybeans, dry beans, and snap beans but it has also been known to survive on some winter annual weed species.



Figure 2. Soybean cyst nematode females appear as small white or yellow spheres (about the size of a pinhead) on infected roots. Photo by Angela Tenney.

As previously mentioned, common aboveground symptoms of SCN are stunted plants and the yellowing of foliage (see Figure 3). These symptoms usually appear in circular or oblong patterns within the field. SCN symptoms can be similar to those of nutrient deficiencies or soil compaction.



Figure 3. Usually, above-ground symptoms of SCN appear in the field as patches of very stunted and chlorotic (yellow) plants. Photo by Craig Grau, University of Wisconsin-Madison.

Monitoring and Sampling.

Monitoring for SCN is an essential part of nematode management. Fields in Michigan should be routinely sampled for nematodes, preferably every fall prior to planting soybeans. Early detection is critical to avoid drastic yield losses and high population densities of SCN. Sampling for SCN and other plant-parasitic nematodes is described on the MSU Plant & Pest Diagnostics website under *Detecting and Avoiding Nematode Problems*

(<https://www.canr.msu.edu/pestid/submit-samples/detecting-and-avoiding-nematode-problems>). The Michigan Soybean Committee (<https://www.michigansoybean.org/>)

provides support for growers to submit samples for identification. Samples consisting of roots, soil or both can be submitted to MSU Plant & Pest Diagnostics for nematode analysis (<https://www.canr.msu.edu/pestid/submit-samples/>).

SCN Management.

SCN can be transported over long distances in soil associated with crop transplants (e.g., tomato, strawberry, ornamentals), on machinery, animals and with seed in the form of soil peds (only with bin-run seed). Because SCN occurs in the soil, it is important to keep the movement of soil to a minimum. Fields without SCN should always be worked and harvested before infested fields. To minimize the spread of SCN, equipment should always be washed free of soil after working in SCN-infested fields.

Nematode population reduction is the strategy used for minimizing risks in fields infested with SCN. Once a field is infested with SCN it is very difficult to eradicate since the cysts can remain viable in the soil for many years until the proper hatching conditions occur. If SCN is present in a field, the objective in most situations is to reduce the population density. This can be achieved by growing non-host crops, maintaining good weed management, and incorporating SCN-resistant soybean varieties into cropping schemes. Rotating sources of resistance is important to avoid or slow the development of SCN-resistant populations. Currently, there are a limited number of nematicides registered for control of SCN and the economics of nematicide use for control of this pest in Michigan has not been justified. Recommendations for SCN management will vary depending on population densities and the production needs of the grower. When samples are submitted to MSU Plant & Pest Diagnostics, a nematode diagnostician will provide recommendations to the grower to assist them in implementing appropriate SCN management strategies and tactics.



MSU Plant & Pest Diagnostics was established in 1999 and is supported by funding from Project GREEN, MSU Extension and the National Plant Diagnostic Network to provide plant health analyses and identification of nematodes, weeds, insects, and other arthropods.