
SOYBEAN FACTS

OCTOBER 2000

Management of Soybean Cyst Nematode in Michigan

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The soybean cyst nematode (SCN) is a major limiting factor in Michigan soybean production. This pest was first detected in Michigan in 1987. SCN now is known to be present in 30 counties. It is currently estimated that 25% - 30% of Michigan's soybean acres are infested with SCN. SCN infestations result in poor stands, stunted plants, yellow foliage and low bean yields. Losses can range from 5-90% 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.

Avoidance of SCN

The first line of defense against SCN is avoidance. All Michigan growers should strive to avoid SCN infestations. The best way to avoid SCN is to never plant a field to a host crop more than one out of every three years. Rotating soybeans with nonhost crops, particularly corn and small grains, in the absence of SCN, minimizes the risk of SCN problem development. Rotation, however, does not completely eliminate risk. SCN has a relatively narrow host range. In Michigan, it reproduces on soybeans, dry beans, snap beans and peas.

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. 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 SCN-infested fields.

Nematode Monitoring

Monitoring for SCN is an essential part of nematode management. **All** soybean fields in Michigan should be routinely sampled for nematodes, preferably every fall before soybeans are planted. At a minimum, soybean fields should be sampled at least once every 3 years. SCN management strategies must be based on the nematodes detected in these samples. Early detection is critical to avoid drastic yield losses and high population densities of SCN. Sampling for plant-parasitic nematodes is described in MSU AG Facts Bulletin E-2199, Detecting and Avoiding Nematode Problems.

SCN Population Reduction

Nematode population reduction is the strategy used for minimizing risks in fields infested with SCN. If SCN is present, the objective in most situations is to reduce the population density. This is done by growing nonhost crops, maintaining good weed management, tillage, nematicide applications or the use of SCN-resistant soybean varieties.

Crop Rotation. Two years of nonhost crops such as corn, potatoes, small grains, sugar beets and most vegetables will lower SCN numbers and reduce yield losses. Alfalfa and red clover are very poor hosts of SCN. Dry beans, snap beans and peas must be avoided. Population densities of SCN will decline in the presence of nonhost crops. Occasionally population declines are marginal particularly with corn. It is difficult to predict how SCN populations will respond in the presence of nonhost crops, and it is essential that SCN-infested fields be resampled before soybeans are grown. The duration nonhost crops should



This research and fact sheet funded by
Michigan Soybean Promotion Committee
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be grown before the next soybean crop is dependent on the number of SCN eggs and second-stage juveniles recovered from 100 cm³ of soil.

Weed Management. Weed problems are much greater in SCN-infested fields than in non-infested fields. Good management of weeds, water and soil fertility increases the tolerance to SCN infection. Some weeds are hosts of SCN. Purple deadnettle, henbit, field pennycress and shepherd's-purse were found to support SCN in a study done at Ohio State University. Growers should scout fields for these winter annuals in the fall. If they are found in fields infested with SCN, control is recommended.

Tillage. Reduced tillage systems can result in reductions in SCN population densities compared to conventional tillage. These results, however, vary from farm to farm and are impacted by individual farming practices. Reduced tillage will retard the within field spread of SCN. There are no reports where reduced tillage resulted in increased SCN damage, but these systems may result in the presence of weeds that could serve as alternate hosts to SCN. Personal communication with selected Michigan growers indicates that symptoms due to SCN feeding are not as severe or widespread in no-till or fields under reduced tillage.

Nematicides. A limited number of nematicides, such as Temik 15G, are registered for control of SCN in Michigan. In general, the economics of nematicide use for control of SCN under Michigan conditions has not been justified.

Resistant Varieties. SCN-resistant varieties are available and should be an integral part of any SCN population reduction program. In infested fields, SCN-resistant cultivars yield 5-100% more than their susceptible counterparts. Current resistant varieties are not adequate for use in fields with extremely high population densities of SCN.

SCN-resistant varieties generally have one of two sources of resistance (Peking or PI 88788). In general, varieties with the PI 88788 source of resistance have yielded best in variety trials in Michigan and throughout North Central States. Both private and public varieties are available that are resistant to SCN. Please check with your seed supplier for this information. It is recommended that growers establish their own strip trials to evaluate SCN-resistant soybean varieties on their farms. This is important because varieties reported to be resistant to SCN differ in their yield potentials and their degree of resistance to the nematode. All on-farm strip trials should include at least one variety susceptible to SCN for comparison purposes.

Presently, because commercial lines have only one of two potential sources of resistance, it is important to rotate the sources of resistance as well as rotating crops. Resistance to SCN may break down if one source of resistance is grown too frequently on a site. Research indicates that SCN will adapt in 2-4 years in the presence of resistant varieties with the same source of resistance. It is also important to occasionally include an SCN-susceptible variety in the rotation if the population density of SCN drops below detectable levels or is low enough to allow profitable production of these cultivars.

Recommended Cropping Scheme

A nine-year cropping scheme is recommended for growers to avoid SCN or to minimize its impact in infested fields. This scheme integrates much of the information already provided.

- Year 1 Nonhost crop
- Year 2 Nonhost crop
- Year 3 **Soybeans (PI 88788 resistance)**
- Year 4 Nonhost crop
- Year 5 Nonhost crop
- Year 6 **Soybeans (Peking or other source of resistance)**
- Year 7 Nonhost crop
- Year 8 Nonhost crop
- Year 9 **Soybeans (susceptible variety)**

Michigan Soybean Cyst Nematode Distribution

(Year of detection listed within the county.)

Note: To date the Upper Peninsula has had no detection of SCN)

