COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

ID-110

Soybean Cyst Nematode: A Potential Problem for Nurseries

Win Dunwell, *Department of Horticulture and Landscape Architecture*
Don Hershman and John Hartman, *Department of Plant Pathology*
Rudy Scheibner, *Department of Entomology*

Situation

Soybean cyst nematode (SCN) is a microscopic roundworm that feeds on root systems of soybean plants and reduces their capacity to absorb water and nutrients. Soybean cyst nematode *(Heterodera glycines)* was first discovered in Kentucky in 1957 in Fulton County. It has been confirmed in 36 west and central counties and probably exists to some extent in every county where soybeans are grown.

Soybean cyst nematode causes a problem for field production nurseries because Canada and states such as California do not allow soils (ball-and-burlapped materials) to be imported into their areas without proof that the nursery stock comes from counties free from SCN. Other states, such as Pennsylvania and New York, assume that the blanket statement "free from all pests" includes SCN.

Soybean cyst nematode can be spread by windblown soil, soil attached to hosts or nonhosts, birds, flooding of infested fields, movement of farm and construction equipment, or in stock feed. Essentially anything that causes soil to be moved from one place to another can spread SCN into previously uninfested soil. Among other factors, this rapid spread is attributed to the movement of soil. The quarantine activity is an attempt to limit the continued spread of the nematode.

Soybean growers have learned to deal with SCN by tailoring their production practices to minimize the effect of existing populations of SCN. Nurserymen will not be able to follow similar production practices because they will have to deal with a zero tolerance level when shipping into quarantined and currently uninfested areas. The following states are currently free of SCN: Pennsylvania, New York, and all New England states; all states west of and including North Dakota, South Dakota, Wyoming, Colorado, and New Mexico.

Nursery Program

We recommend that nursery operators plan a proactive program to deal with potential problems relating to the shipment of ball-and-burlapped plants out of Kentucky. The program includes:

- *Preplant sampling of fields.*
- *Host control.* Avoid planting host plants of SCN, and rigorously control weeds that may also serve as hosts of the pest.
- *Rigorous sanitation.*
  1) Do not bring equipment in from other farms and fields that could be contaminated with soil-carrying SCN.
  2) Always clean equipment when moving from one field or farm to another.
  3) When borrowing or purchasing used equipment, always be sure it is clean before bringing it to your nursery.
- *Quarantine your nursery.* Do not bring in any plants from surrounding areas without some assurance that soil coming with the plant material is free of SCN.

One year in a nonhost crop can reduce the SCN population by as much as 90 percent. After two years only five percent of the original population will remain. However, some cysts remain viable in the soil for years; thus, it is virtually impossible to eliminate SCN from a field using nonhost crops. In fact, there is no known way to totally eradicate SCN from a field once it is established. **Therefore, avoiding the problem is the only way to ensure your ability to ship into areas not currently infested with SCN.**

Soil Sampling

The Department of Plant Pathology provides a SCN Soil Analysis Service at the UK Research and Extension Center in Princeton for a nominal fee. For $20 each, samples related to the nursery industry will be screened for the presence of SCN. When cysts are detected (at any level), a bioassay using soybean plants will be conducted to verify that the cysts are in fact SCN and not some other less important cyst nematode species. If SCN is determined to be absent from a field after analysis and testing, the Kentucky State Entomologist will use the test results to certify shipments of nursery stock from that field.

Ideally samples should be taken when nematode populations are the highest in the early fall. However, it may be necessary to collect samples in the spring to avoid planting into a contaminated field. A two-month lead time is required for the SCN laboratory to do a bioassay for SCN. Consequently, you must plan in advance to obtain results relative to planting or leasing land for field-grown plant material.

It is always best to take samples when soil moisture is adequate, but not excessive. One sample (pooled from multiple collection sites) should represent no more than five acres. Samples representing larger areas may yield misleading results. Sampling areas should have a uniform soil type and cropping history.

Collect soil from a depth of 6 to 8 inches using a soil probe or spade from at least 20 locations in each field sampled. Follow a zigzag pattern (see figure). In cropped fields collect soil from the root zones of plants within the rows.

Mix soil in a bucket and immediately place one to two pints of soil in a plastic bag. Label bags with a field number or name and location.

Protect the sample from heat and from drying conditions which could reduce detection of nematode numbers in the sample.

Take the sample to your local county Extension office for mailing to the lab at the UK Research and Extension Center in Princeton. If this cannot be done immediately, store samples in the shade or in an insulated cooler. Any prolonged storage should be done at refrigerator temperatures (approx. 40°F).

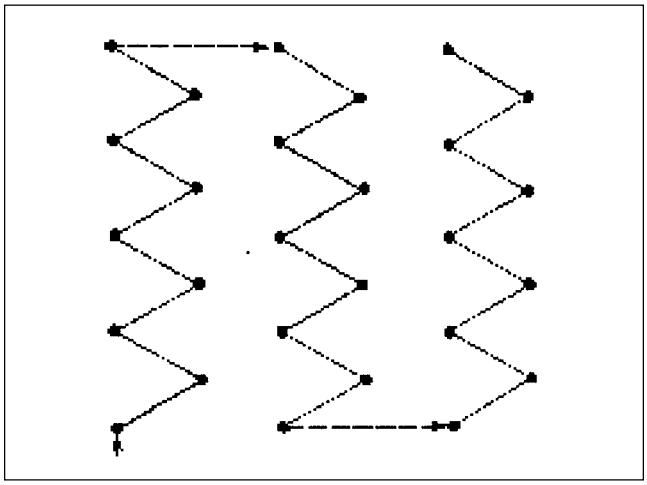

Figure 1. — Sampling Pattern

Host Plants

The following is a list of plants known to be hosts to SCN:

Crops and Ornamental Plants

Soybeans, cultivated and wild (*Glycine* spp.)
Beans, green (snap), bush, or kidney (*Phaseolus* spp.)
Lespedezas (*Lespedeza* spp.)
Vetch, common, hairy, or winter (*Vicia* spp.)
Lupines, white (ornamental species)(*Lupinus* spp.)
Clovers, crimson, scarlet, or alsike (*Trifolium* spp.)
Sweetclover (*Melilotus* spp.)
Birdsfoot-trefoil (*Lotus* spp.)
Crownvetch (*Coronilla* spp.)
Pea, garden (*Pisum* spp.)
Cowpea or black-eyed pea (*Vigna* spp.)
Locust, black (*Robinia* spp.)
Bells of Ireland (*Molucella laevis*)
Borage (*Borago* spp.)
Canarybird flower (*Tropaeolum* spp.)
Caraway (*Carum* spp.)
Chinese Lanternplant (*Physalis* spp.)
Coralbells (*Heuchera* spp.)
Cup-flower (*Nierembergia* spp.)
Delphinium (*Delphinium* spp.)
Foxglove (*Digitalis* spp.)
Geranium (*Geranium* spp.)
Geum (*Geum* spp.)
Horehound, common (*Marrubium vulgare*)
Poppy (*Papaver* spp.)
Sage (*Salvia* spp.)
Snapdragon (*Antirrhinum* spp.)
Sweet basil (*Ocimum spp.*)
Sweet pea (*Lathyrus* spp.)
Verbena (*Verbena* spp.)

Weeds

Henbit (*Lamium amplexicaule*)
Hop clovers (*Trifolium* spp.)
Chickweed, common (*Stellaria media*)
Mullein, common (*Verbascum thapsus*)
Sicklepod (*Cassia obtusifolia*)
Digitalis penstemon (*Penstemon digitalis*)
Pokeweed (*Phytolacca americana*)
Purslane (*Potulaca oleracea*)
Bittercress (*Cardamine* spp.)
Rocky Mountain beeplant (*Cleome serrulata*)
Spotted geranium (*Geranium maculatum*)
Toadflax, old-field (*Linaria canadensis*)
Pigweed, winged (*Cycloloma atriplicifolium*)
Vetch, American, Carolina, or wood (*Vicia micrantha*)
Burclover or toothed medic (*Medicago* sp.)
Dalea (*Dalea alopercuroides*)
Milkvetch, canadia (*Astragalus canadensis*)
Beggarweed or tick clover (*Desmodium nudiorum, D. marilandicum, D. viridiflorum*)
Corn cockle (*Agrostemma githago*)
Hogpeanut (*Amphicarpa bracteata*)
Milkpea (*Galactia volubilis*)
Wildbean (*Strophostyles helvola*)
Hemp sesbania (*Sesbania exaltata*)

References

Soybean Cyst Nematode. Publication of the Soybean Industry Resource Committee.

Hershman, Donald E. 1990. *The Soybean Cyst Nematode in Kentucky.* University of Kentucky Cooperative Extension Publication PPA-3.

Issued 3-92, 1M