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Plant Diseases

Nematode Control in the Home Garden

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Plant-parasitic nematodes are slender, wormlike animals that usually can be seen only with the aid of a microscope. There are thousands of different kinds of nematodes, but few are pests in vegetable gardens of Tennessee. The southern root-knot nematode is the most serious pest nematode in the home garden. Crop yields can be reduced greatly by this nematode.

Symptoms and Detection

Nematodes feed upon plants with a stylet — a movable, spearlike structure similar to a tiny hypodermic needle. This feeding may result in root rot, discoloration and deformities, such as galls. The uptake of water and nutrients by infected plants is reduced greatly when these symptoms occur. Also, symptoms of nutrient deficiency, such as yellowing or stunting, may result. Plants often wilt during the day even though the soil may have an adequate supply of moisture. Plants may be killed where nematode damage is severe.

Confirm the presence of root-knot nematodes by digging up plants at the end of the growing season and looking for galls and swellings on the roots. Soil samples also may be submitted to a lab for analysis.

Nematode injury is greatest in sandy soils. Plant stresses such as improper pH, drought and low nutrient levels also increase nematode damage.

Spread

Nematodes rarely move more than a few inches through the soil under their own power. However, humans often move them from one place to another on infected transplants or in infested soil. In the garden, nematodes are spread by soil-moving implements during cultivation. Nematodes also may be spread from one area to another in drainage water.

Control

Although most infestations are natural, nematodes can enter a garden on transplants. Look at the roots of transplants and do not use plants with tiny knots on the roots. On Irish potatoes, small bumps on the surface may indicate nematodes. Adding soil to the garden may be risky, as nematodes can be carried in it.



Root galls and swellings caused by the root-knot nematode.

Destroy infected plants and plant roots by pulling them up immediately after harvest. Remove the plant material completely from the garden area. Till infested soil a few times during the winter to expose nematodes to the killing effects of the weather.

When a nematode infestation is found, infected plants cannot be treated successfully. However, future plantings can be protected by reducing the nematode population, preventing spread, and growing resistant plants.

In areas of the garden that have root-knot problems, take one of the following actions:

- Plant crops that are nonhosts or poor hosts of root-knot, such as sweet corn, onion, asparagus, broccoli and cauliflower.
- Plant resistant varieties. These varieties are not damaged by root-knot nematodes and reduce the population in the soil, provided susceptible weed hosts are eliminated.

Examples of resistant varieties are listed below. Consult your favorite seed catalogs for additional varieties.

Garden vegetable varieties resistant to the southern root-knot nematode.	
Tomato	Better Boy, Celebrity, Amelia, Park's Whopper, Big Beef, Mountain Fresh Plus, Sweet Million (cherry), Viva Italia (paste), any "VFN" type variety
Sweet potato	Jewel, Jasper, Travis, Resisto, Heartogold
Snap bean	Alabama No. 1 (pole)
Lima bean	Nemagreen
Southern pea	Mississippi Silver, Mississippi Pinkeye, Magnolia Blackeye
Pepper	Charleston Bell, Carolina Wonder (bell), Charleston Hot, Carolina Cayenne, Mississippi Nemaheart (pimento)

- Incorporate organic matter. Any organic material such as compost, animal manure, shredded leaves, pine bark or chopped straw will serve the purpose. Organic soil amendments stimulate natural enemies of nematodes and improve soil structure.

- Plant nematode-suppressive crops. These crops reduce the nematode population by producing nematicidal compounds directly from the roots or after incorporation of the plants into the soil as a green manure. While any crop can provide some nematode control when plowed under as a green manure, those that produce nematicidal compounds are particularly helpful. Crops and their varieties suppressive to the southern root-knot nematode include French marigold 'Tangerine,' 'Lemon Drop,' 'Petite Gold' or 'Petite Harmony'; chrysanthemum 'Escapade'; common vetch 'Cahaba White' or 'Vangard'; rapeseed 'Dwarf Essex' or 'Humus'; and rye (any variety). Rapeseed and rye are cool-season crops that perform best as a green manure, seeded in the fall and plowed under in the spring. These are large plants, and they may be difficult to manage for the small gardener. All nematode-suppressive crops must be grown in solid beds, not as companion plants. Marigolds should be spaced 7 inches apart.

- Fallow (remove all vegetation) for a full growing season by tilling. The nematode population can be reduced greatly by repeated tilling every 10 days to prevent weed growth and to allow the sun to kill the nematodes.

- Solarize the soil. Solarization is the use of heat from the sun for killing nematodes in bare soil. This technique involves placing clear plastic on moist (but not wet), tilled soil. The edges must be well-sealed by burying to a depth of 6 inches, so that the trapped heat does not escape and to prevent loosening by the wind. Apply the plastic in June or July and allow it to remain in place for at least six to eight weeks. Do not remove the plastic until you are ready to plant. If fall crops are not planted in the solarized site, remove the plastic before cold weather.

- Consider packaged products. Several products for nematode control are available commercially. However, research has shown that most products containing organic matter or plant essential oils provide no better control than the homegrown organic amendments mentioned above. The most effective products are those containing residues of plants of the mustard family. These plants produce a compound that is toxic to nematodes and certain fungi. An example of such a product is the pulverized seeds of a certain species of mustard.

References

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