Home & Garden
Pest Management Guide
For British Columbia

2019 Edition

Chapter 10
Nematodes in the Home Garden

Nematodes in the Home Garden

What are nematodes?

Nematodes are worm-like animals that are usually microscopic in size. Not all nematodes are bad. Free-living nematodes feed on bacteria, fungi, and other nematodes. They are important in the breakdown of organic matter and their presence can be an indicator of a healthy soil. Entomopathic nematodes feed on insects and are used in biocontrol. Plant parasitic nematodes are microscopic worms that inhabit soil, water, plant roots, stems, foliage and seeds. Most plant parasitic nematodes affect roots and are detrimental to plant health. Nematodes start out as eggs, go through 4 juvenile stages and become adults.

Plant parasitic nematodes can be accurately identified only by a laboratory diagnosis (See Chapter 2, Identification of Plant Problems).

Factors affecting plant damage

It is rare for nematodes to kill plants. General symptoms of plant damage by nematodes are those expected with poor root health. These include patchy poor growth, stunting, yellowing, and nutritional deficiency symptoms. The plants fail to thrive and often fail faster than expected when other stresses affect the crop. Plant parasitic nematodes feeding on roots create wounds and entry sites for other pathogens. Some plant parasitic nematodes can transmit viruses.

Many factors influence the amount of damage to a crop:

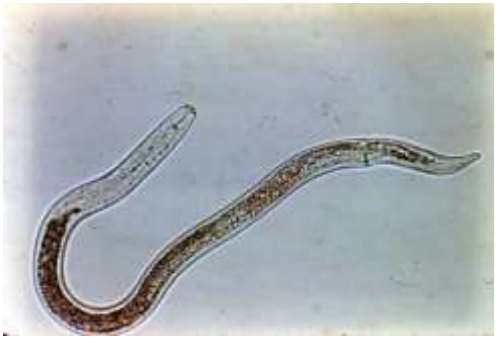
1. **Type of nematodes present and how many** - Some types of plant parasitic nematodes need to be present in high numbers to be problematic, yet others are damaging at lower numbers. If more than one type of nematode is present, they may all be influencing the level of damage.
2. **Susceptibility of the crop being grown** - Different varieties of a crop can show different levels of tolerance or resistance to plant parasitic nematodes.
3. **Age of crop** - Seedlings and first year plantings usually have a limited root system. If there is a large population of plant parasitic nematodes in the soil, the plants may not be able to establish a good root system and fail to thrive. Established plants with a larger root system may be able to tolerate a larger population of plant parasitic nematodes when other stress factors are not present.
4. **Biotic stresses** - Insect, disease, and weed management is crucial to prevent additional stresses to the plants.
5. **Nutrient availability** - A well fertilized and watered crop has a greater capacity to tolerate plant parasitic nematodes.

6. **Environmental conditions:**
    a. Soil moisture - Drought symptoms are often enhanced when plant parasitic nematodes are present.
    b. Soil type - Typically sandier soils show more damage than soils with higher organic matter content. This could be in part due to moisture retention capacity being greater in soils with organic matter and the diverse microbial community that is present.
    c. Temperature - Plant parasitic nematode life cycles are usually shorter at higher temperatures.
    d. Movement with soil and roots - Moving soil, tools, equipment, and infected transplants can transfer plant parasitic nematodes up and down the rows and to other garden sites.

Root lesion nematode, *Pratylenchus* spp.

This is the most common plant parasitic nematode in agricultural crops. Root lesion nematodes have a wide distribution in British Columbia. This nematode feeds by piercing cells with a syringe-like stylet (mouth part) that sucks the cell contents. Once the eggs hatch, all life stages of this nematode can move into the roots, soil, and back to the roots at will.

A lesion on raspberry roots caused by root lesion nematodes.



Root lesion nematode female. The size of these nematodes is about 0.3 – 0.8 mm. A microscope is necessary to see them.

Root knot nematode, *Meloidogyne* spp.

Root knot nematodes are not as widely distributed in British Columbia as root lesion nematodes, however they do attack many hosts. The males and early stage juveniles of this nematode have a wormlike shape and can move into the roots, soil, and back to the roots at will. The female body will swell with eggs and get stuck inside the roots. The eggs will eventually be deposited outside of the roots in a gelatinous matrix and will hatch as favourable conditions occur. The plant responds to this nematode by forming galls on the roots where the females are located.

Typical symptoms of a root knot nematode infestation. Symptoms on tomato roots.

Photo courtesy of Jeffrey W. Lotz, Florida Department of Agriculture and Consumer Services, Bugwood.org

Stem and bulb nematode, *Ditylenchus dipsaci*

This nematode affects the stem, bulb and foliage of a plant and can be problematic in bulb crops such as Narcissus; and onion and garlic. This nematode can survive for long periods in crop debris. Identification must be done through a laboratory as symptoms can mimic other pathogens.

Damage to garlic bulb by Ditylenchus dipsaci. Laboratory identification is necessary as other pathogens can produce similar symptoms.

Other plant parasitic nematodes

Several other plant parasitic nematodes exist in British Columbia however they do not often become a major problem until large numbers are present.

Management

A healthy crop that has adequate nutrition; no moisture stress; managed insects, disease, and weeds; and a healthy soil with organic matter will tolerate nematodes better. Some cover crops are nematode suppressive, however availability may be limited. Transplants brought to the garden should be free of plant parasitic nematodes. Plant nematode resistant varieties, if available. Keeping the soil fallow will reduce the population of nematodes, however weed control is essential. Crop rotation to crops that are not hosts is useful. Soil solarization using plastic to heat the soil to high temperatures (soil solarization, page 5-7) may be an option. Solarization is most likely to be effective in areas with hot sunny weather, such as the Southern Interior of B.C. There are no chemical controls available for the home gardener.