

Common Diseases of Florist Crops

Nematode Diseases

Nematode problems affecting plant root systems are now quite rare, except in cases where soil is used as a component of the growing medium.

Root-knot Nematode

Root-knot nematodes may cause plants to appear stunted and unthrifty and to wilt on warm days. When the root system is examined, galls are generally conspicuous and easily recognized. Root-knot has been seen primarily on herbaceous perennials in recent years. On some crops, root-knot nematodes may cause crop loss even when only a few galls are evident. The presence of root-knot nematodes may also increase the amount of plant injury from bacterial and fungal diseases, or it may break the resistance of plants to these diseases.

Galled plants will not perform as well as healthy ones, but adequate moisture and fertility may mask the difference in vigor between nematode-infested and healthy plants.

Six kinds of root-knot nematodes are recognized in the United States today. All have been identified on greenhouse crops in New York State, although only the northern root-knot nematode, *Meloidogyne hapla*, survives outdoors. Thus the other five kinds are shipped into the state on plant material. The host ranges and host-parasite relationships may vary, but all have essentially the same life history.

Eggs of *Meloidogyne* are about twice as long as they are wide. They are usually found in a gelatinous mass about the posterior end of the female. Eggs hatch into small, slender worms (larvae) about 1/50 inch long. The larvae migrate through the soil seeking new roots, which they enter near the tip. Once inside the root, with its head located in what will become the vascular cylinder, the nematode does not change position. Stimulated by the nematode's saliva, nearby root cells develop into giant cells, which provide nourishment. Other cells adjacent to the nematode enlarge and increase in number, forming the familiar gall or knot. After the giant cells are functioning, the nematode goes through three molts (shedding of cuticle), becomes an adult female, and starts the cycle over. A female can lay as many as 2,000 eggs during her life, but the average is probably 200 to 500.

The temperature of the soil is critical in the development of the nematode. It takes about 17 days at 29° C (85° F) for females to develop from infective larvae to egg-laying adults, 21 to 30 days at 24° C (76° F), and 57 days at 16° C (60° F). Females fail to reach maturity at temperatures above 33° C (92° F) or below 15° C (59° F).

Spread within a greenhouse occurs through movement of infested soil or plant debris by workers, water, and possibly wind. Migration of larvae through the soil is limited to perhaps a few feet per year.

There is no known cure for root-knot nematodes. With continued care, infected bed or bench plants can produce a good crop. Discard infected potted plants carefully to prevent spreading the nematode. Preplanting treatments of steam or fumigants effectively eliminate nematodes from soil, but be sure that infested crop residues are thoroughly decomposed.

Other Nematodes Affecting Roots

Other root-attacking nematodes can cause chlorosis and stunted and unthrifty growth of aboveground parts of the plant. Affected roots may be shortened, thickened, excessively branched to the point of becoming matted, and occasionally killed.

Chemical Control of Root-Attacking Nematodes

Steam disinfestation or fumigation may be used to free soil from nematodes before planting.

Foliar Nematodes

Leaf (foliar) nematodes cause deformity of young growth, leaf spots, and defoliation. The spots are first discernible on the lower leaf surface as yellowish or brownish areas, which eventually turn almost black. Although the lesions are small at first, with favorable temperature and moisture they may spread until much of the leaf is destroyed. Unlike other nematodes, foliar nematodes do not persist in the soil in the absence of living host-crop tissues.

On chrysanthemum plants, the leaf veins retard the spread of the nematodes through the leaf, causing the lesions to be V-shaped or angular. Infection begins on the lower leaves and progresses upward.

On *Peperomia*, gloxinia, African violet, and Elatior begonias, the lesions are less definite in outline and infection may occur on any leaf.

Plants with foliar nematode infestations should be discarded promptly.