# PLANT-PARASITIC NEMATODE GENERA ASSOCIATED WITH CROPS IN ONTARIO IN *1967*

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The Ontario Nematode Diagnostic and Advisory Service processed 724 soil samples for growers between January 1 and November 1, 1967. A modified Baermann pan method (2) was used to extract actively moving nematodes from soil and roots and the Fenwick can method (1) for the separation of cysts from the soil. Tobacco soil samples far outnumbered all other samples combined. This was partly due to inclement weather conditions resulting in poor growth of the tobacco soon after planting.

Root lesion nematodes, Pratylenchus spp., were present in nearly all the thirty-odd crops investigated. They were present in large numbers in the roots of junipers (Juniperus spp.) and yews (Taxus spp.) and caused severe stunting of the conifers. These nematodes continue to cause decline and replant failures in Ontario orchards Large numbers were present ,in soil samples from apple, cherry, and peach orchards. Practically all tobacco soil samples contained root lesion nematodes, averaging 1256/lb of soil. Fumigation against brown root rot of tobacco, which is recommended when the number of root lesion nematodes exceeds 500/lb of soil, has become a widespread practice.

The northern root knot nematode, Meloidogyne hapla Chitwood, was found in several crops, such as cherries, oats, corn, wheat, and tobacco. It is believed that there is a widespread background infestation present in Ontario soils, and that this nematode may become a serious problem when susceptible crops are grown. The nematode was found in 16 tobacco soil samples this year, compared to only one in 1966 and none in 1965. An interesting case of root knot nematode damage was found in ginseng (Panax quinquefolius L.). In one sample, affected ginseng plants showed heavy galling of the roots, accompanied by severe stunting of the plants and bronzing of the leaves.

Cyst nematodes, Heterodera spp., were found in soil samples from several crops. Heterodera avenae Wollenweber, the oat cyst nematode, was found in soils supporting barley, corn, and oats, and H. schachtii Schmidt, the sugar beet nematode, in soils supporting rhubarb and strawberry. Those found in the strawberry field were probably left over from the preceeding rhubarb crop; the source and species of the cyst nematodes found in compost soil were not determined.

Spiral nematodes, Helicotylenchus spp. , occurred on many more crops and in larger numbers than in the previous 3 years, whereas the stunt nematode, Tylenchorhynchus spp., was found on approximately the same number of crops but in smaller numbers. Ring nematodes, Criconemoides spp., and dagger nematodes, Xiphinema spp., were only occasionally found. There is good evidence that the extraction method used is ineffective for the isolation of the last two genera and that they may be much more common than the data in Table 1 indicate.

Roots were included in 399 tobacco soil samples and were rated visually for severity of black root rot caused by the fungus Thielaviopsis basicola (Berk. & Br.) Ferr. Black root rot was absent in 32 samples: trace infection occurred in 128, light infection in 132, moderate in 58, severe in 40, and very severe in 9.

## Literature cited

1. Fenwick, D. W. 1940. Methods for the recovery and counting of cysts of Heterodera schachtii from soil. J. Helminth. 18: 155-172.

2. Townshend, J. L. 1963. A modification and evaluation of the apparatus for the Oostenbrink direct cottonwool filter extraction method. Nematologica 9: 106-110.

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Table 1. Plant parasitic nematodes associated with Ontario crops in 1967

| Crop | Praty-lenchus | Paraty-lenchus | Xiphi-nema | Cricone-moides | Helicoty-lenchus | Tylencho-rhynchus | Meloidogyne larvae | Heterodera larvae |
|---|---|---|---|---|---|---|---|---|
| Apples (51)* | 2010/50** | 284/25 | 24/9 | 10/5 | 405/21 | 0/0 | 0/0 | 0/0 |
| Asparagus (2) | 150/2 | 50/2 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Barley (5) | 216/5 | 131/3 | 0/0 | 0/0 | 550/2 | 0/0 | 0/0 | 45/1 |
| Beans (1) | <1/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Cabbage (2) | 36/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Celery (1) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Cherries (27) | 1592/7 | 990/14 | 131/6 | 45/1 | 273/3 | 0/0 | 630/1 | 0/0 |
| Clover (2) | 4167/2 | 720/1 | 0/0 | 0/0 | 90/1 | 0/0 | 0/0 | 0/0 |
| Compost pile (2) | 0/0 | 4500/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 960/1 |
| Corn (51) | 2504/51 | 886/42 | 0/0 | 0/0 | 428/26 | 86/3 | 225/1 | 100/2 |
| Cucumber (2) | 1100/1 | 50/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Conifers (13) | 1469/13 | 265/4 | 0/0 | 0/0 | 65/2 | 0/0 | 0/0 | 0/0 |
| Fallow (10) | 2187/10 | 232/5 | 0/0 | 0/0 | 327/7 | 0/0 | 112/4 | 0/0 |
| Ginseng (5) | 84/4 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 250/1 | 0/0 |
| Gladiolus (1) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Grapes (4) | 762/4 | 575/4 | 45/1 | 0/0 | 500/1 | 0/0 | 0/0 | 0/0 |
| Hay (2) | 825/2 | 250/2 | 0/0 | 0/0 | 450/2 | 151/1 | 0/0 | 0/0 |
| Lettuce (3) | 270/1 | 148/2 | 175/2 | 0/0 | 0/0 | 75/2 | 0/0 | 0/0 |
| Oats (11) | 738/11 | 394/11 | 50/1 | 0/0 | 515/8 | 100/1 | 100/1 | 43/2 |
| Onions (2) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Parsley (2) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 54/2 | 0/0 |
| Peaches (21 | 5312/21 | 4093/14 | 153/5 | 10/11 | 453/6 | 360/1 | 0/0 | 0/0 |
| Peat bog (2) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Potatoes (4) | 139/4 | 150/1 | 20/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Radish (2) | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Rhubarb (3) | 0/0 | 3615/2 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 | 850/3 |
| Roses (6) | 2025/6 | 480/2 | 0/0 | 0/0 | 920/2 | 180/11 | 250/2 | 0/0 |
| Rye (2) | 540/2 | 18/1 | 18/1 | 0/0 | 0/0 | 0/0 | 0/0 | 0/0 |
| Strawberries (17) | 1043/16 | 416/10 | 0/0 | 0/0 | 50/1 | 27/2 | 15/3 | 1850/1 |
| Tobacco (458) | 1256/444 | 427/73 | 72/39 | 0/0 | 156/59 | 133/13 | 190/16 | 0/0 |
| Tomato (4) | 342/2 | 0/0 | 0/0 | 0/0 | 0/0 | 18/2 | 1370/2 | 0/0 |
| Wheat (6) | 1095/6 | 270/2 | 50/1 | 0/0 | 72/5 | 0/0 | 27/2 | 0/0 |
| Total samples (724) | 1501/674 | 817/222 | 77/66 | 12/17 | 300/146 | 89/36 | 234/35 | 569/10 |

* Number of soil samples processed.

** Average number of nematodes per lb of soil/number of samples containing the nematode.