# SOME RECORDS OF KNOWN AND SUSPECTED PLANT-PARASITIC NEMATODES ENCOUNTERED IN CANADA IN 1963

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## Root-knot Nematodes

The peanut root-knot nematode, Meloidogyne arenaria (Neal, 1889) Chitwood, 1949, was intercepted on Sansevieria sp. from Florida, U.S.A. Two possible cases of this nematode were recorded on strawberry from Delaware, and Philadelphus sp. from Tennessee, U.S.A.

The northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, was found on intercepted plant material from several areas in the United States: on rose from California and Texas, on strawberry from Alabama and Delaware, on honeysuckle from Alabama, on Weigela sp. from Alabama and Tennessee, on Spiraea sp. from New York, and on Deutzia sp. from Tennessee. It was intercepted on rose from Holland and Belgium and on Clematis sp. from Holland. From Ontario, the nematode was recorded on Philadelphus sp. from Cooksville, on parsnip from North Gower, on Berberis thunbergii from Brown's Line, on Berberis sp. from Guelph, Cyclamen sp. from Burlington, and on Deutzia lemoinei compacti from Glen Williams.

The southern root-knot nematode, Meloidogyne incognita (Kofoid and White, 1919) Chitwood, 1949, was found on interceptions of Lonicera sp. from Tennessee, Caladium sp. from Illinois, tomato from Georgia, Sansevieria sp. from Florida, and Hydrangea sp. and Forsythia sp. from Alabama, U.S.A. It was also found on Coleus sp. from Saskatoon, Sask., on Impatiens sp. from Edmonton, Alberta, on Peperomia sandersii from Dundas, Ont., Cyclamen sp. from Toronto, Ont., and Alternanthera sp. from Ottawa, Ont.

The Javanese root-knot nematode, Meloidogyne javanica (Treub, 1885) Chitwood, 1949, was found on eight occasions on tomato plants from Georgia, U.S.A.

In addition, Meloidogyne spp. were recorded on rose from England, on Lonicera sp. from Ohio, U.S.A., and tomato from Georgia, U.S.A.

## Cyst-forming Nematodes

The oat cyst nematode, Heterodera avenae Wollenweber, 1924, was encountered from Holland in soil associated with Picea albertiana conica, P. kosteri, P. alba conica, Picea sp., Juniperus squamata meyeri, Juniperus sp., Taxus cuspidata hicksii, Taxus sp., Thuja occidentalis pyramidalis, T. occidantalis compacta, Thuja sp., Pinus mughus, Pinus sp., Prunus triloba, Caragana sp., Acer sp. and Euonymus alatus. From Belgium it was found in soil associated with Hydrangea sp., Caragana sp. (sent via Holland), Laurus sp., rose, cedar, tuberous begonia and other various trees and shrubs. In addition it was found from Philodendron sp., from Switzerland, Acer sp. from West Germany, soil from any army vehicle from France, and in soil surveys in Nova Scotia, Quebec and Ontario.

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The cactus cyst nematode, Heterodera cacti Filipjev and Schuurmans-Stekhoven, 1941, was tentatively identified from cactus soil from Switzerland and from soil from the rear fender of an improperly washed used car from Germany.

The cabbage cyst nematode, Heterodera cruciferae Franklin, 1945, was found in grape rooted cutting soil from the U.S.A.

The fig cyst nematode, Heterodera fici Kirjanova, 1954, was found from Ficus carica soil from Italy and tentatively from Spirea sp. soil from Belgium (sent via Holland).

The pea cyst nematode, Heterodera goettingiana Liebscher, 1892, was found in soil from Italy and in Thuja lutea soil from Holland.

The hop cyst nematode, Heterodera humuli Filipjev, 1934, was found in soil associated with Picea omorika, Picea albertiana, Picea sp., Thuja elegantissima, Thuja sp., Acer sp., Pinus mughus, Clematis sp., Pelargonium sp., juniper and Taxus cuspidata from Holland and Hydrangea sp. from Belgium. It was tentatively recorded from cactus, Euonymus sp., and ornamental cutting soil from Italy, Euphorbia sp., soil from Switzerland and Asparagus soil from France. In addition numerous tentative identifications were recorded from Holland and Belgium.

The grass cyst nematode, Heterodera punctata Thorne, 1928, was found from Holland in soil associated with Picea pungens, Picea conica, Picea albertiana conica, Picea kosteri, Tilia cordata, Viburnum opulus nanum, Pinus mughus, Rhododendron molle, Rhododendron sp. Syringa sp., Juniperus pfitzeriana, Juniperus sabina, Juniperus sp., Thuja rosenthalii, Thuja elegantissima, Thuja sp., Daphne sp. and possibly Taxus cuspidata nana and Taxus sp. It also was numerous in samples originating in Belgium associated with azalea, Hydrangea sp., Philadelphus sp., Weigela sp., Lonicera sp. Laurus sp., and rose. In addition the nematode was found associated with clover from England, soil in Newfoundland (survey), Cyclamen sp. from Germany, carnation from the United Kingdom, Sansevieria sp., Kafir lily and Christmas cactus from Greece, Philodendron sp. from Switzerland, Viburnum sp. from West Germany, and soil taken from two cars, both from Europe.

The golden nematode, Heterodera rostochiensis Wollenweber, 1923, was found in a soil survey in Newfoundland. It was intercepted in soil associated with heather from England, Taxus sp. from Holland, Hydrangea sp. from Belgium, Asparagus sprengeri from Poland, shamrock from Ireland, flowering cherry from Belgium and Cedrus sp. from Germany.

The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, was found in lily-of-the-valley soil from Germany.

The clover cyst nematode, Heterodera trifolii Goffart, 1932, was intercepted on shipments with soil of Picea albertiana conica, Picea kosteri, Picea sp., Pinus mughus, Thuja occidentalis pyramidalis, T. o. compacta, T. rosenthalii, Juniperus squamata meyeri, J. sabina, J. pfitzeriana, J. glauca, Juniperus sp., Daphne sp., Taxus sp., Rhododendron sp. and Hydrangea sp. from Holland; Berberis sp., Hydrangea sp., Acer platanoides, Acer sp., Betula sp. Laurus sp., rose, azalea, Narcissus sp., and various trees, shrubs and ornamentals from Belgium, clover from England, variegated geranium, Sempervivum sp., and Aspidistra sp. from Italy, Cotoneaster sp. and Tilia sp. from West Germany, Euphorbia sp. from France, carnation soil from the United Kingdom, Coleus sp. from Portugal, and in soil surveys in the Provinces of Prince Edward Island, Quebec, New Brunswick, Ontario, British Columbia and Newfoundland.

Cysts identified only as Heterodera sp., were encountered in soil from shipments of Pinus mughus, Pinus nigra austriaca, Chrysanthemum sp., Thuja rosenthalii, Thuja occidentalis pyramidalis, Thuja occidentalis compacta, Picea kosterii, Acer sp., Taxus sp., Rhododendron sp., Hydrangea sp., Juniperus squamata meyeri, Clematis sp., and Fagus sp., from Holland, Lonicera sp., Cotoneaster sp., Forsythia sp., Robinia pseudoacacia, Quercus rubra, rose, Acer sp., azalea and Hydrangea sp. from Belgium, Tradescantia sp. and Pothos sp. from Switzerland, Viburnum lantana and Juniperus sp. from West Germany, Chrysanthemum sp., Sempervivum sp., mint, cactus, Aspidistra sp., and oleander from Italy, lily and myrtle from Poland, Sansevieria sp., Kafir lily and Christmas cactus from Greece, cactus from England, Chrysanthemum sp. from Yugoslavia, cactus from France, and from soil collected from cars (4) sent from Germany. In Canada, Heterodera spp. were found in soil surveys from the Provinces of Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, and Newfoundland. In addition, cysts were found associated with Hydrangea sp. and tomato soil from Sherbrooke, Que., and alfalfa soil from St. Antoine de Lilly, Que.

## Root-lesion Nematodes

Pratylenchus convallariae Seinhorst, 1959, was found in evergreen soil from Holland.

Pratylenchus crenatus Loof, 1960 was found in soil around roots of azalea from England, evergreens from Belgium, Picea sp. from Holland, dahlia from Portugal, and strawberry from Cobden, Ontario.

Pratylenchus neglectus (Rensch, 1924) Filipjev and Schuurmans-Stekhoven, 1941 was found in soil around roots of Thuja sp. from Holland and strawberry from Cobden, Ontario. The species was tentatively identified from rose soil from Richmond, Indiana.

Pratylenchus penetrans (Cobb, 1919) Filipjev and Schuurmans-Stekhoven, 1941 was found in soil around roots of Helleborus sp., Cytisus sp., Weigela sp., Spirea sp., Pinus sp., and evergreens from Holland, hydrangea from Belgium, cactus and ivy from Italy, begonia from Portugal, and Betula sp. from Tennessee, U.S.A. In addition, it was recorded in strawberry soil from Cobden, Ont., and apple seedling soil from a nursery in Carlisle, Ont.

Pratylenchus pratensis (de Man, 1880) Filipjev, 1936 was found in soil around roots of Cytisus sp. from Holland and fern from Portugal.

Pratylenchus thornei Sher and Allen, 1953 was tentatively identified from soil around the roots of an ornamental shrub from Italy.

Pratylenchus sp. was found in soil associated with the roots of cotoneaster, evergreens, Cytisus sp., lilac, Thuja sp., Buxus sp., and Picea glauca from Holland, hydrangea and Buxus sp. from Belgium, Helleborus sp. and ornamental shrubs from Italy, Colocasia esculenta from Portugal, dahlia tubers from Greece and soil from Pakistan.

## Stunt Nematodes

Tylenchorhynchus acti Hopper, 1959 was found in soil associated with the roots of Juniperus sp. and evergreens from Holland.

Tylenchorhynchus brevidens Allen, 1955 was found in association with Acer sp. from Holland, cactus, ivy and sage cuttings from Italy and apple seedling soil from Carlisle, Ont.

Tylenchorhynchus bursifer Loof, 1959 was found in shipments with soil of rhododendron, Picea sp. and Malus profusum from Holland.

Tylenchorhynchus capitatus Allen, 1955 was found in soil associated with roses from Newark, New York.

Tylenchorhynchus claytoni Steiner, 1937 was intercepted in soil around roots of rhododendron, cotoneaster, hyacinth bulbs, evergreens, Thuja sp., Euonymus sp., Picea sp. and Pinus sp. from Holland, oleander cuttings and succulent plants from Italy and azalea from Lynden, Washington.

Tylenchorhynchus dubius (Buetschli, 1873) Filipjev, 1936 was found in the soil around hydrangea from Belgium.

Tylenchorhynchus maximus Allen, 1955 was found in association with tobacco and potato from Cobden, Ont., Poa pratensis from Waterdon, Ont., and soil from Merrickville, Ont.

Tylenchorhynchus spp. were also found in soil from hydrangea from Belgium, cactus, catalpa cuttings, and ornamental shrubs from Italy, soil from Pakistan and Jamaica, Acer sp. from Holland, rye from Cobden, Ont., and lily bulbs from Toronto, Ont.

## Spiral Nematodes

Helicotylenchus spp. were found in soil associated with roots of cactus, ivy and Euonymus japonicus from Italy, Juniperus sp. and Picea sp. from Belgium, Colocasia esculenta from Portugal, Buxus sp., Acer sp., and Dieffenbachia omoena from Holland, apple from Merrickville, Ont., Alternanthera sp. from Ottawa, Ont., and lily bulbs from Toronto, Ont.

Rotylenchus goodeyi Loof and Oostenbrink, 1958 was found in Pinus sp. soil from Austria.

Rotylenchus robustus (de Man, 1876) Filipjev, 1936 was found in soil associated with roots of primrose plants from England, Weigela sp. from Holland and herbaceous plants from Italy.

Rotylenchus uniformis (Thorne, 1949) Loof and Oostenbrink, 1958 was found in association with Thuja pyramidalis, Adrus libani, azalea and hydrangea from Belgium, and Thuja sp., lilac, Acer sp., Euonymus sp., Juniperus sp., Picea sp., Koster blue spruce and Pinus sp. from Holland.

Scutellonema brachyurum (Steiner, 1938) Andrassy, 1958 was found in evergreen soil from Holland.

## Ring Nematodes

Criconemoides xenoplax Raski, 1952 was found in lilac soil from Holland.

Criconemoides sp. was found in Helleborus sp. soil from Italy.

## Pin Nematodes

Paratylenchus nanus Cobb, 1923, was found in Ontario from soil associated with Poa pratensis and tobacco.

Paratylenchus veruculatus Wu, 1962 was found in azalea soil from England.

In addition, Paratylenchus spp. were found in soil associated with begonia from Germany, evergreens from Holland, herbaceous plants from Italy and iris rhizomes from Clarkson, Ont.

## Other Tylenchids

Anguina graminophila (Goodey, 1933) Christie, 1959 was found on Calamagrostis canadensis in Rupert and St. Martin, Que.

Hexatylus sp. was found in apple seedling soil from Carlisle, Ont.

Rotylenchulus sp. was found in Helleborus sp. soil from Italy.

Boleodorus sp. was found in Berberis sp. soil from Holland.

Ditylenchus dipsaci (Kuhn, 1857) Filipjev, 1936 was found in iris bulbs from Washington, U.S.A.

Species of the genera Aglenchus (Andrassy, 1954) Meyl, 1961, Tylenchus (Cephalenchus) Goodey, 1962, Filenchus (Andrassy, 1954) Meyl, 1961, Lelenchus (Andrassy, 1954) Meyl, 1961, Neoditylenchus Meyl, 1961, Psilenchus de Man, 1921, Tetylenchus Filipjev, 1936, and Tylenchus Bastian, 1865, were also found in association with soil and plants imported from abroad and from some areas in the United States and Canada.

## Aphelenchids

Aphelenchoides parietinus (Bastian, 1865) Steiner, 1932 was found in soil supporting hydrangea from Belgium, primrose, Picea sp., ornamentals, grass, lichens, moss and soil from Austria, azalea from Portugal and Thuja sp. and Picea nidiformis from Holland.

Aphelenchoides subtenuis (Cobb, 1926) Steiner and Buhrer, 1932 was identified tentatively in soil about the roots of hydrangea from Belgium and ornamental shrubs and sage cuttings from Italy.

Aphelenchoides spp. were recorded from soil supporting various conifers, roses and herbaceous plants from Belgium, Holland, Portugal and Italy. From the United States it was recorded from California, Indiana, Massachusetts and Michigan. It also was found in soil from Cobden and Clarkson, Ontario.

Aphelenchus avenae Bastian, 1865 was found in soil supporting cactus, ivy, ornamental shrubs and succulent plants from Italy, azalea and primrose from England, begonia from Germany, lilac, Picea sp., Acer sp., Weigela sp., Pinus mughus and evergreens from Holland and amaryllis from Portugal. In North America it was detected in shipments of soil supporting Clematis paniculata from Massachusetts, Hedera sp. from Washington, strawberry from Manitoba and Croft lily, apple seedlings, strawberry, potato, tobacco, iris and Alternanthera sp. from areas in Ontario.

Aphelenchus spp. were found in soil supporting hydrangea from Belgium, catalpa from Italy, dahlia from Greece and Portugal, Dieffenbachia amoena from Hong Kong, hyacinth, Koster blue spruce and Thuja sp. from Holland, rose from New York, Viburnum opulus from Tennessee, azalea from Washington and Ligistrum sp. from Manitoba.

Paraphlenchus sp. was found in soil in association with the roots of Picea sp. from Holland and iris (rhizome type) from a Clarkson, Ont., nursery.

Seinura sp. was recorded from samples of soil supporting azalea from Belgium, Dieffenbachia omoena and evergreens from Holland, caladium bulbs and ferns from Portugal, oleander cuttings from Italy, and Croft lily bulbs from a nursery in Thornhill, Ont.

## Dorylaimids

Diphtherophora sp. was found in ornamental shrub soil from Italy and in soil from around roots of apple trees in Merrickville, Ont.

Trichodorus primitivus (de Man, 1880) Micoletzky, 1922 was found in Acer sp. soil from Holland. Specimens of Trichodorus sp. were recovered from soil associated with the roots of azalea from England and Belgium, Picea sp. from Holland and Hedera sp. from Michigan, U.S.A.

Triplonchium sp. was found in evergreen soil from Holland and in soil from around roots of apple trees in Merrickville, Ont.

Tylencholaimellus striatus Thorne, 1939 was found in soil supporting Helleborus sp., Taxus sp., and evergreens from Holland, and azalea from Lynden, Washington. Specimens of Tylencholaimellus sp. were also associated with Thuja sp. and Weigela sp. from Holland.

Tylencholaimus sp. was found in ornamental shrub soil from Italy and Pinus sp. soil from Austria. The latter record was tentatively identified as T. steckii.

Xiphinema americanum Cobb, 1913 was found in soil associated with the roots of Betula sp. from Tennessee, U.S.A., and apple seedlings, strawberry and lily bulbs from Ontario. Xiphinema sp. was also found in Helleborus sp. soil from Italy.

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