Seeding was late in Nfld. on account of inclement weather and not until July were many farmers able to work their land. Many of the farmers who planted potato, carrot, beet and parsnip seed in early June were forced to re-seed their land in July as the seed had decayed. Late planting and early frost caused potato tubers to be small and yield was greatly reduced.

Weather conditions were ideal for the spread and increase of many plant pathogens, particularly those causing soft rot, late blight and potato wart (G. C. Morgan).

Notes on Some Nematodes in Canada, 1955

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The sugar-beet nematode, Heterodera schachtii Schmidt, 1871, was not found outside the areas previously reported in Ontario. On the other hand, the oat-cyst nematode, Heterodera avenae (Lind, Rostrup & Ravn, 1913) Filipjev, 1934, was found attacking oats at Tupperville, Ont. Previously this species had not been found west of the Waterloo area. There is no record of the golden nematode, Heterodera rostochiensis (Wollenweber, 1923) Franklin, 1940, in Canada.

Root-knot nematodes, Meloidogyne spp., were intercepted by officers of the Plant Protection Division on strawberry roots from Rockford, Ill., and from Beltsville, Md., U.S.A., and the southern root-knot nematode, Meloidogyne incognita Chitwood, 1949, on chamaeranthemum roots from Florida. The northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, was recorded from shasta daisy roots from a nursery at Port Burwell, Ont., was numerous on strawberry roots from Kentville, N.S., and caused heavy galling of carrots from near Chatham, Ont.

Of the spiral nematodes, Rotylenchus robustus (deMan, 1880)Filipjev, 1934, was found in strawberry soil at Ottawa and at Fredericton, N.B. It was found in wheat soil from Lake Lenore, Sask., in buckwheat soil from Fallowfield, Ont., and in very large numbers around oat roots from Wyman, Que. Rotylenchus erythrinae (Zimmermann, 1904) Goodey, 1940, was found around the roots of Agrostis sp. from Hepburn, Sask., around white clover roots from Pierce's Corners, Ont., around wheat roots from Lake Lenore, Sask., around flax roots from Cardston, Alta., around alfalfa roots from Shawville, Que., around red clover roots from Hazeldean, Ont., and Macdonald College, Que., in oat soil from Tupperville, Ont., and from Wyman, Que., and from soil around a tamarack tree at Pierce's Corners, Ont. A fairly heavy infestation of Hoplolaimus coronatus Cobb, 1923, was found in pasture sod from Brandon, Man.

Records of root-lesion nematodes included Pratylenchus pratensis (deMan, 1880) Thorne, 1949, on oats from Agassiz, B.C., in soil around alfalfa roots from Shawville, Que., and in soil of strawberry roots from Kentville, N.S. Pratylenchus penetrans (Cobb, 1917) Sher & Allen, 1953, was found in soil from apple orchards at Oliver and Kelowna, B.C., and Ottawa, Ont., and on strawberry roots from Kentville, N.S., Keating Valley, B.C., and (heavy infestation) Hatzic, B.C. This species was recorded also from prune and cherry roots from Summerland, B.C., from peach from Peachland, B.C., from corn from Brandon, Man., in grass sod from Langley Prairie, B.C., from red clover roots from Ottawa, Ont., and from around wheat roots from Lake Lenore, Sask. Pratylenchus minyus Sher & Allen, 1953, was recorded from cherry, pear and prune trees from Summerland, B.C., from Japanese millet roots from Macdonald College, Que., in pasture sod from Fallowfield, Ont., in large numbers around pin-cherry roots from Blackburn, Ont., and around chrysanthemum roots from Peters Corners, Ont. Species of Radopholus were found in soil of water lily roots intercepted by officers of the Plant Protection Division from Hong Kong, around strawberry roots from Kentville, N.S., and around wild rice roots from near Richmond, Ont.

Of the subfamily Tylenchinae, Tylenchus filiformis Buetschli, 1873, was recorded from grass sod from Blackwell, Ont., and Tylenchus costatus deMan, 1921, was found near wild cherry roots at Blackburn, Ont. Psilenchus hilarulus deMan, 1921, was found in red clover soil from Hazeldean, Ont. Records of stunt nematodes were considerably expanded, as follows: Tylenchorhynchus dubius (Buetschli, 1873) Filipjev, 1936, from around alfalfa roots and red clover at the Central Experimental Farm, Ottawa, from riverside soil from Picture Butte, Alta., and from soil of Astilbe sp. from London, Ont. Tylenchorhynchus claytoni Steiner, 1937, from Chinese elm at Ottawa and from riverside soil from Picture Butte, Alta. Tylenchorhynchus acutus Allen, 1955, in chrysanthemum soil at Brandon, Man., and in riverside soil from Picture Butte, Alta. Tylenchorhynchus brevidens Allen, 1955, was found around red clover and corn roots at the Central Experimental Farm, Ottawa, around red clover roots from near Manotick, Ont., in cherry soil from Penticton, B.C., in pear soil from Summerland, B.C., and in sugar-beet soil from near Lethbridge, Alta. Tylenchorhynchus leptus Allen, 1955, was (numerous) in pasture soil from Fallowfield, Ont., in oat soil from Manotick, Ont., in grass sod from Arden, Ont., and in timothy sod from York, P.E.I., and Quinnville, Que.

There was no indication that the infestation of the potato-rot nematode, Ditylenchus destructor Thorne, 1945, in Prince Edward Island had spread during 1955. This species is not now considered as a serious threat to the potato industry but rigid inspections and precautions are being continued. The possibility that more than one strain or species is involved is being given attention by nematologists in Canada and the United States, but, up to the present, no one has produced proof of the existence of more than one species. The

writer has felt that the solution of this species question can be obtained only by the culture and study of pure populations, and this first step was accomplished at Ottawa through the development of the necessary techniques and knowledge of the parasite. This information has been passed on to other workers, who are now also culturing and studying pure populations, and the prospects of ultimately finding a clear answer have thus improved greatly.

There is experimental evidence that mass inoculations of the potato-rot nematode from potato to iris and from iris to potato are successful but this test has not yet been made with pure populations of these nematodes. However, there is not yet conclusive evidence that the iris form and the potato form are distinct species and thus, for the present at least, they must be regarded as the same species, i.e., Ditylenchus destructor.

Species of ring nematodes identified at Ottawa included the following: Criconemoides lobatum Raski, 1952, was found on wheat from Lake Lenore, Sask.; on red clover from Hartland, N.B., Hazeldean, Ont., Talon, Que., and Macdonald College, Que.; on strawberry from Stanstead, Que.; in timothy sod from Quinnville, Que.; in pasture sod from Merivale Station, Ont.; and in Fragaria vesca soil from Kentville, N.S. Criconemoides annulifer (deMan, 1921) Taylor, 1936, was found on English holly soil from Brentwood, B.C. Criconemoides curvatum Raski, 1952, was found in nursery soil from Victoria, B.C., and on red clover roots from the Central Experimental Farm, Ottawa, from Macdonald College, Que., and from Danford Lake, Que. This species was recorded also from oat from Preston, Ont., and strawberry from Fredericton, N.B. Criconemoides xenoplax Raski, 1952, was recorded from peach soil from Harrow, Ont., and from maple tree roots on the Central Experimental Farm, Ottawa.

Records of loose-coated nematodes included Hemicycliophora similis Thorne, 1955, on white clover from Stittsville, Ont., on pin cherry from Blackburn, Ont., and in large numbers near maple roots at Old Chelsea, Que. Hemicycliophora uniformis Thorne, 1955, was identified from soil near a tamarack tree at Pierce's Corners, Ont.

A pin nematode, Paratylenchus sp., was found in large numbers around red clover roots at Macdonald College, Que., and were recorded from prune soil at Summerland, B.C., peach tree soil at Peachland, B.C., strawberry soil at Hatzic, B.C., raspberry soil at Matsqui, B.C., prairie sod at Hepburn, Sask., corn soil and red beet soil (numerous) at the Experimental Farm, Brandon, Man., and red clover soil at the Central Experimental Farm at Ottawa, Ont., and at Hazeldean, Ont.

A flanged-spear nematode, Boleodorus thylactus Thorne, 1941, was found in soil of prune and pear orchards at Summerland, B.C., and in soil near a maple tree at the Central Experimental Farm at Ottawa, Ont.

The chrysanthemum nematode, Aphelenchoides ritzema-bosi (Schwartz, 1911) Steiner, 1932, was found in chrysanthemum leaves at Peters Corners, Ont., and the strawberry bud nematode, Aphelenchoides besseyi Christie, 1942, was identified from soil around lily roots imported from Hong Kong.

Records of dagger nematodes continue to accumulate. Xiphinema americanum Cobb, 1913, was found around the roots of the following: alfalfa (numerous) from Shawville, Que.; oats from Wilson's Corners, Que.; and wheat from Lake Lenore, Sask; vetch, wild rice, milkweed, and maple tree from the Ottawa district; peach tree from Leamington, Ont.; strawberry and English holly from Vancouver Island, B.C.; blackberry (numerous) from Otter Lake, Que.; and lawn sod from Agassiz, B.C.

Large numbers of Longidorus elongatus (deMan, 1876) Thorne & Swanger, 1936, were found around maple tree roots on the Central Experimental Farm at Ottawa, and Longidorus sylphus Thorne, 1939, was identified from around strawberry roots collected at Agassiz, B.C.

In the report on nematode problems for 1954 the writer made a plea that greater attention be given to reporting the occurrence of free-living nematodes from soils in different localities even though the role they may be playing is, in many cases, still rather obscure. Records from the Ottawa laboratory for the past year included the following: a species of forked-lip nematode, Chiloplactus symmetricus (Thorne, 1925) Thorne, 1937, was recorded from soil in prune and pear orchards at Summerland, B.C., and from soil in an apple orchard at Kelowna, B.C. Panagrolaimus subelongatus (Cobb, 1914) Thorne, 1937, was recorded from soil of a pear orchard at Summerland, B.C., from soil of an apple orchard at Oliver, B.C., and from soil of an apricot orchard at Osoyoos, B.C. Records of spear nematodes were numerous and included Dorylaimus monohystera deMan, 1880, from oat soil at Preston, Conestogo, and Aurora, Ont., apple soil at Okanagan, B.C., grass sod on the Central Experimental Farm, Ottawa, Ont., sod bank north of Arden, Ont., beach soil at Carleton, Que., pasture sod south of Hepburn, Sask., riverside soil east of Picture Butte, Alta., riverside sod north of Taber, Alta., and grass sod at Jasper, Alta. Another species, Dorylaimus bastiani Buetschli, 1873, was recorded from grass sod on the Central Experimental Farm, Ottawa, Ont., oat soil from Preston, Ont., weed soil from Little York, P.E.I., and lawn sod from Winnipeg, Man. Dorylaimus intermedius deMan, 1880, was found in meadow sod from Amherstburg, Ont., in wheat soil from near Winnipeg, Man., and in streamside soil from east of Hope, B.C. Dorylaimus carteri Bastian, 1865, was found in streamside soil from east of Hope, B.C., as well as Dorylaimus angulosa Thorne & Swanger, 1936. Other records of dorylaimids included Pungentus monohystera Thorne & Swanger, 1936, in timothy and grass sod from Little York, P.E.I., in meadow sod from St. Vallier, Que., and in lawn sod from Agassiz, B.C. Pungentus pungens Thorne & Swanger, 1936, was found in mountainside soil from near Summit, B.C., and Pungentus spp. were observed in peony soil

from Ayer's Cliff, Que., in meadow sod (larvae only) from St. Vallier, Que., and from soil near a maple tree on the Central Experimental Farm, Ottawa. The basket-headed nematode, Carcharolaimus teres Thorne, 1939, was found in wheat soil from Brandon, Man., and in riverside sod from north of Taber, Alta. Tylencholaimellus magnidens Thorne, 1939, was found in wheat soil from north of Carmel, Sask., and Tylencholaimellus striatus Thorne, 1939, in a clover field at Hazeldean, Ont. Some incidental findings included Amphidelus sp. from apple soil at Kelowna, B.C., Dorylaimellus sp. from soil in apple orchard at Osoyoos, B.C., Diphtherophora sp. in apple soil and from near a maple tree on the Central Experimental Farm, Ottawa, and in apple orchard soil from Point Pelee, Ont. Triplonchium sp. was found near a tamarack tree at Pierce's Corners, Ont., Wilsonema sp. from strawberry soil at Keating, B.C., and Paraphelenchus sp. from apple soil at Oliver, B.C., and from clover soil at Hazeldean, Ont.

Records of predacious nematodes included Mononchus parabrachyuris Thorne, 1924, in clover soil from Merivale, Ont., Mononchus brachyuris (Buetschli, 1873) Cobb, 1917, in wheat soil at Coaldale and Tyrs, Alta., and at East Winnipeg, Man., in soil from Harrow and Blackburn, Ont., and in lawn soil from Agassiz, B.C. Mononchus papillatus (Bastian, 1865) Cobb, 1916, was found in soil from Hornepayne and Blackburn, Ont., from Agassiz, Vancouver and Ladner, B.C. Mononchus sigmaturus Cobb, 1917, was found in greenhouse soil with roses at Moncton, N.B., and in celery soil from Armstrong, B.C. Mononchus longicaudatus (Cobb, 1893) Cobb, 1916, was recorded from apple orchard soil from Kelowna, B.C. Aporcelaimus vorax Thorne & Swanger, 1936, was recorded from orchard soil at Kentville, N.S., lawn sod at Agassiz, B.C., and as probably attacking carrot rust fly larvae at Bradford, Ont.

Records of parasites and associates of insects included Spherularia bombi Dufour, 1837, from abdominal cavity of Bombus ternarius Say at Saskatoon, Sask.; Aphelenchulus reversus Thorne, 1935, from abdominal cavity of Dendroctonus pseudotsugae Hopk., at Vernon, B.C.; Bradynema rigidum (Van Siebold) Zur Strassen, 1892, from abdominal cavity of Pseudohylesinus nebulosus at Vernon, B.C.; Aphelenchoides latus Thorne, in frass of Dendroctonus pseudotsugae Hopk., at Vernon, B.C.; and Rhabditis obtusa Fuchs, 1915, in frass of the same insect at Vernon, B.C.

Records of identifications of nematodes are published periodically from the Ottawa laboratory in The Canadian Insect Pest Review.

Phenological Data - 1955

The data for 1955 disclose one remarkable fact, namely that the flower dates at Winnipeg in the early season were ahead of the mean date whereas at Saskatoon the reverse was true. At Edmonton the flowering dates fluctuated sharply in the same period. The dates are given in the accompanying table.