FOREST INSECT AND DISEASE SURVEYS IN THE CENTRAL REGION OF ONTARIO, 1976

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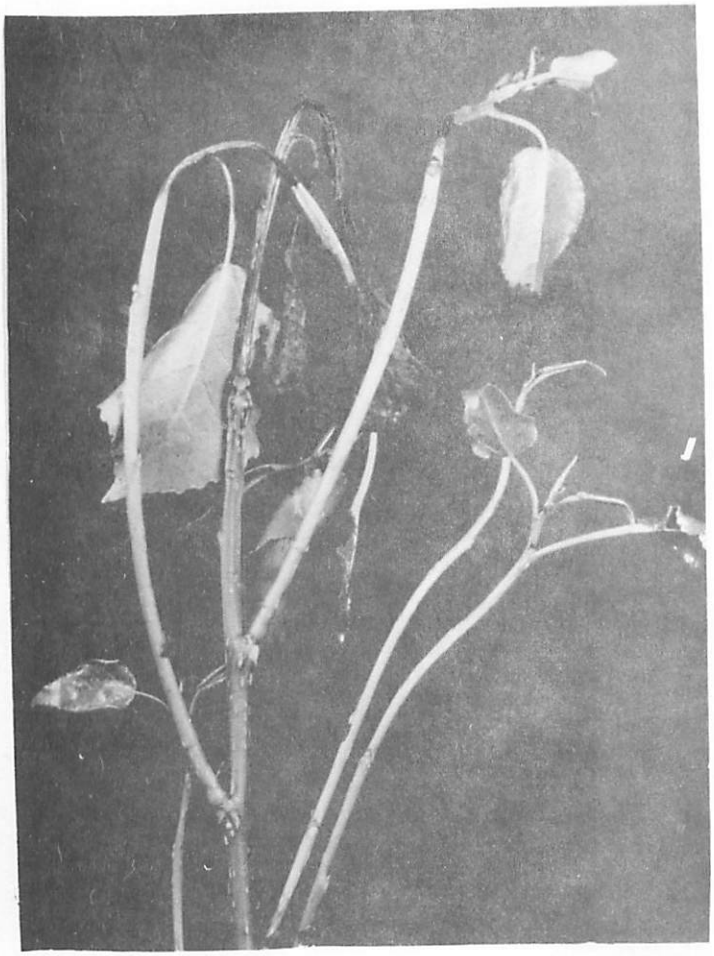
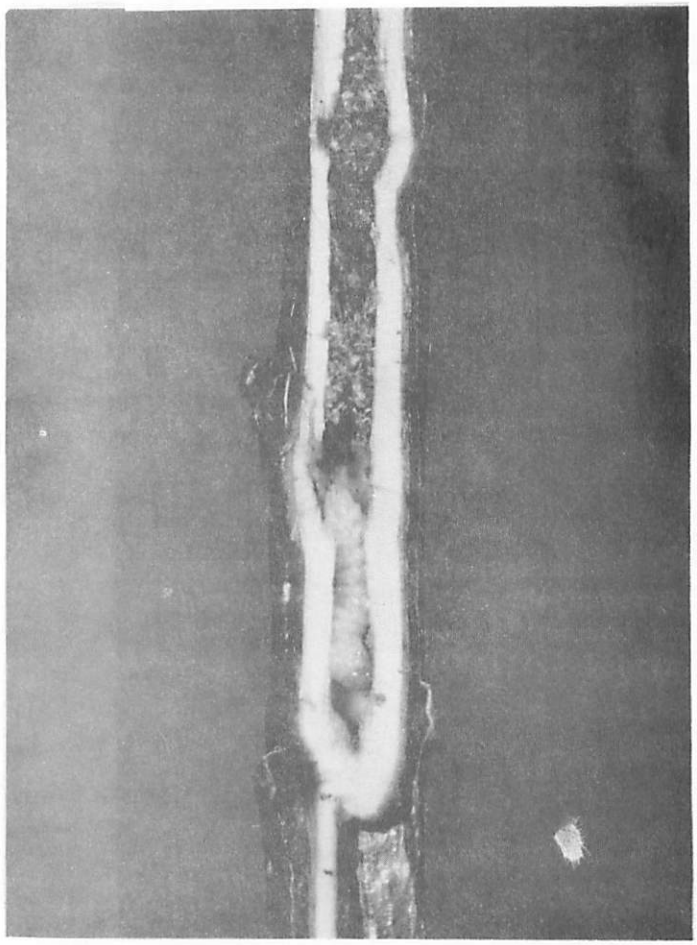
Frontispiece



Typical blackened leaves and "shepherd's crook" on the upper shoots of hybrid poplar caused by *Venturia populina* (Vuill.) Fabric.



Larva and gallery of willow shoot sawfly, *Janus abbreviatus* (Say), in a hybrid poplar stem.

SURVEY HIGHLIGHTS

The following report describes forest insect and disease conditions in the Central Region in 1976. Major declines were evident in populations of the spruce budworm and cedar leafminers which have proved troublesome for a number of years. Other forest insects showed increased activity, namely, the forest tent caterpillar, oak leaf shredder, fall cankerworm, basswood looper, birch leafminer and larch sawfly. Eastern tent caterpillar infestations remained high in the northern part of the Region. A somewhat rare insect, the willow shoot sawfly, caused severe damage to hybrid poplar cutting stock in the Orono Forest Station.

Pathology surveys emphasized the detection and evaluation of foliage diseases in 1976. These, when found, were usually at the trace-to-light infection level. Horse chestnut leaf blotch, leaf anthracnose of maple and winter drying caused widespread damage and resulted in numerous inquiries from the public. Cylindrocladium root rot was again active in the Midhurst Forest Station.

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ACKNOWLEDGMENTS

The excellent cooperation and friendly assistance received from personnel of the Ontario Ministry of Natural Resources, staff of the Georgian Bay Islands National Park and private individuals are gratefully acknowledged.

TABLE OF CONTENTS

(continued)

TABLE OF CONTENTS (concluded)

INSECTS

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Medium-to-heavy infestations of this insect were evident throughout most of the Niagara District. Defoliation was especially noticeable in hardwood bushlots, apple orchards, and on ornamentals in North Cayuga, Moulton, Gainsborough, and Tuscarora townships and in the Fonthill area of Pelham Township. Severe defoliation occurred for the second consecutive year, north and south of Highway 9 in the adjoining townships of Adjala and Albion in the Huronia and Maple districts, respectively. Smaller pockets of heavy infestation were observed in Blenheim Township, Cambridge District, in Tiny Township, Huronia District and at several locations in the southern portion of the Maple District. Small numbers of larvae could be found at many other points throughout the Region.

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. thuiella* Pack., *A. canadensis* Free. and *Pulicalvaria thujaella* (Kft.)

A widespread decline in populations of this leafminer complex was evident. The heavy infestations covering a large part of the southern section of the Region in 1975 were reduced to only a few scattered areas of medium-to-heavy infestation. These were located as follows: in the Hockley Valley area, southern Huronia District; south of Mono Mills, Maple District; and in the Bobcaygeon-Fenelon Falls area, Lindsay District (see Appendix, Fig. A1). A large area of light infestation persisted in the northeastern section of the Lindsay District where populations have been on the decline for several years. Additional light infestations remain in the Cambridge-Halton Hills area, Cambridge District. Although small numbers of larvae are still present, most stands are making an excellent recovery from the severe attack of previous years.

Oak Twig Galls, *Callirhytis cornigera* (O. & S.)

Heavy infestation by a number of gall-forming insects has caused considerable mortality of scattered oak (*Quercus* spp.) in the eastern Niagara Peninsula. The condition, though widespread, was most evident in the areas along the Niagara River from Fort Erie to Niagara on the Lake, in the Welland-Port Colborne area and in the vicinity of Fonthill. The most severe mortality occurred on pin oak (*Quercus palustris* Muenchh.), although bur oak (*Quercus macrocarpa* Michx.), red oak (*Quercus rubra* L.) and white oak (*Quercus alba* L.) were also affected.

Webspinning Sawfly, *Cephalcia* sp. probably *frontalis* Westw.

These insects, which feed in nests of coarse excreta and severed needles tied together with silk, have until recently been considered a

rare and relatively unimportant pest in Ontario. In 1976, heavy infestations caused severe defoliation of planted red pine (*Pinus resinosa* Ait.) in large areas in Harvey, Douro, and Belmont townships, Lindsay District (Table 1). Heavy infestations caused severe damage to Scots pine (*Pinus sylvestris* L.) Christmas tree plantations in Oro and Mono townships, Huronia District. Abnormally high populations were observed at several other widely separated points.

Table 1. Summary of the incidence and degree of infestation by the web-spinning sawfly on red pine at three locations in the Lindsay District (counts based on the examination of 100 trees at each location).

Location (Twp)	Avg ht of trees (m)[a]	No. of trees infested	Degree of infestation
Harvey	1	80	heavy
Douro	2.5	91	heavy
Belmont	2	67	heavy

[a] 1 m = 3.28 ft

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of spruce budworm surveys, damage appraisals, and egg-mass counts have been included with those of the remainder of the province in a separate report by G.M. Howse et al. (Report O-X-260). This report provides details of control operations, and analysis of the overall spruce budworm situation in Ontario, along with infestation forecasts for 1977.

Larch Casebearer, *Coleophora laricella* Hbn.

Feeding injury caused conspicuous browning of European larch (*Larix decidua* Mill.) foliage in Whitchurch Township, Maple District and in West Gwillimbury and Oro townships, Huronia District. A medium infestation in 1975 on native tamarack (*Larix laricina* [Du Roi] K. Koch) near Luther Lake, Cambridge District declined to light intensity. Small numbers of larvae were found at many other locations.

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Population trends varied considerably in 1976. In the Lindsay District, infestations which, over the past 5 years, had caused up to 40%

mortality of red oak in a stand in the Durham-Ganaraska Forest, declined to small pockets of light-to-moderate defoliation. Populations which have been high in the Uxbridge-Ballantrae area of Maple District declined to medium intensity. In the northern Huronia District, heavy infestations occurred south of Methodist Point and west of Penetanguishene including the site of Awenda Provincial Park (see Appendix, Fig. A2). Red oak on the park site is now showing signs of deterioration. Plans for aerial spraying of high-value stands, to control the oak leaf shredder, are now being formulated by the Ontario Ministry of Natural Resources (OMNR). Medium-to-heavy infestations were detected by means of aerial surveys on islands in Georgian Bay, including Beausoleil Island in the Georgian Bay Islands National Park. Small patches of medium infestation were observed in the Dufferin County Forest in Tosorontio and Mulmer townships. Low populations were observed at a number of other points.

Basswood Looper, *Erannis tiliaria* Harr.

Increased damage by this hardwood defoliator was evident for the second consecutive year. Medium-to-heavy infestations recurred in scattered woodlots with a high content of sugar maple (*Acer saccharum* Marsh.) in Melancthon, Tay, Tiny and Nottawasaga townships, Huronia District. High numbers were also observed near Hillsburg in Erin Township, Cambridge District. Substantial numbers of larvae were observed feeding in conjunction with the fall cankerworm in the Niagara Peninsula and at numerous other points.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Populations which declined in 1975 rebounded to high levels in 1976. Heavy infestations were observed on white pine (*Pinus strobus* L.) at several locations in Medonte Township, and on red pine, jack pine (*Pinus banksiana* Lamb.) and Austrian pine (*Pinus nigra* Arnold) in Essa and Vespra townships, Huronia District. Medium infestations occurred on white pine in West Gwillimbury Township, Huronia District and in white and Scots pine plantations near Conestogo Lake in Maryborough and Peel townships, Cambridge District. Light infestations were common throughout the remainder of the Region.

A Birch Leafminer, *Fenusa pusilla* (Lep.)

Severe mining of birch foliage by this introduced leafminer occurred for the fourth consecutive year in the Angus-Creemore area and at scattered locations in Nottawasaga Township, Huronia District. Pockets of heavy infestation on white birch (*Betula papyrifera* Marsh.) were recorded south of Victoria Harbour, in Tay Township and north of

Orillia in Orillia and Rama townships, Huronia District. High populations were also observed in Uxbridge Township, Maple District and at several locations in the southern Cambridge and eastern Niagara districts. Populations declined to generally low levels in the Lindsay District. Heavy attacks on ornamental birch (*Betula* spp.) again prompted numerous inquiries from homeowners.

Fall Webworm, *Hyphantria cunea* Dru.

Damage by the fall webworm was again extensive in northern Huronia District, eastern Niagara District, and Douro and Clarke townships, Lindsay District. The heaviest single infestation occurred in a 20-ha (50-acre) woodlot in Adjala Township where 15-m (50-ft) red maple (*Acer rubrum* L.) and black ash (*Fraxinus nigra* Marsh.) were completely encased in silk. Unsightly feeding nests on roadside and ornamental trees prompted many inquiries from the Midland, Honey Harbour and Orillia areas, Huronia District. Numerous nests were also observed in the Fort Erie-Niagara on the Lake area, Niagara District and at several widely separated locations in the Cambridge District.

Willow Shoot Sawfly, *Janus abbreviatus* (Say)

This shoot borer caused severe damage to the stems of poplar (*Populus* spp.) cutting stock in the Orono Forest Station, Lindsay District. Up to 30% mortality occurred in two compartments where the stems and upper roots of Carolina poplar (*Populus* X *canadensis* Moench) and hybrid poplars were heavily infested.

The adult lays her eggs in the fast-growing shoots of poplar and willow (*Salix* spp.) and by so doing sometimes causes girdling and death of the stem above this point. The larva, upon emerging, bores down the pith (see Frontispiece) and sometimes into the upper roots. Larval tunnelling causes dieback of some or all of the stem. In late summer, the larva, now fully grown, lines its burrow with a thin transparent membrane, thereby forming a chamber in which it overwinters. In the early spring it pupates and emerges shortly afterward as an adult to complete the cycle.

Eastern Tent Caterpillar, *Malacosoma americanum* F.

Large numbers of unsightly feeding nests and defoliation of a variety of different host trees were again common in the northern and central parts of the Huronia and Lindsay districts. The most severe damage was observed along highways 400 and 27, north of Barrie, east of Vasey, and in the vicinity of the town of Angus, Huronia District. Small patches of light and medium infestation were common in the Maple District and the northern part of the Cambridge District. This insect also attacks black cherry (*Prunus serotina* Ehrh.) in the forest.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The buildup of infestations which began in 1974 continued into 1976. Moderate-to-severe defoliation occurred in predominantly sugar maple woodlots across the northern third of the Huronia District (see Appendix, Fig. A3). Smaller pockets of heavy infestation occurred around the town of Lindsay. Patches of light and moderate defoliation were common on the periphery of these infestations. Single colonies and wandering caterpillars could be found readily in most of the Cambridge and Maple districts. This situation prompted widespread concern among maple sugar producers, and numerous inquiries from the public at large. Adult emergence checks and egg-band counts indicate that the problem will continue in 1977 (Tables 2 and 3).

Table 2. Summary of forest tent caterpillar adult emergence checks in the Huronia District in 1976 (counts based on the examination of 100 cocoons at each location).

Location (Twp)	No. of adults emerged	No. of cocoons healthy	No. of cocoons parasitized	No. of cocoons diseased	No. of cocoons killed by predators	Dead from unknown causes
Medonte	44	3	16	29	3	5
Matchedash	46	0	36	16	2	0
Tay	54	0	24	17	3	2
Rama	49	1	47	3	0	0
Tiny	62	0	13	17	5	5

A Birch Leafminer, *Messa nana* Klug

This introduced leafminer was first recorded in Canada in Hamilton and Haldimand townships, Lindsay District, in 1967. Between that time and 1974 the insect has extended its range to include most of central and southeastern Ontario, with heavy infestations occurring at numerous locations. Numbers began to decline within the original areas of infestation in 1975 and continued to decline in 1976. At one permanent sample point in Clarke Township, Lindsay District, the incidence of leaves mined declined from 100% in 1974 to 17% in 1976 (Table 4). Light infestations persist in the Ganaraska and Durham county forests in Lindsay District and very small pockets of medium and heavy infestation were found in Tiny, Medonte and Matchedash townships, Huronia District.

Table 3. Summary of forest tent caterpillar egg-band counts in two districts in 1976 and infestation forecasts for 1977 (counts based on the average number of egg bands on five branches, one from each of five trees, or the average number on the entire crowns of three felled trees in each area).

Location (Twp)	Host	Ave DBH of trees (cm)[a]	Avg no. of egg bands (per tree)	(per 1.25-m branch)[b]	Infestation forecasts for 1977
Cambridge District					
Onondaga	sM	30	0	0	nil
Pilkington	sM	25	1	-	trace
Huronia District					
Medonte	sM	32	-	4	severe
Baxter	ltA	10	2	-	light
Tiny	tA	20	17	-	severe
Flos	tA	10	7	-	moderate
Tiny	sM	12	42	-	severe

[a] 1 cm = 0.39 in.

[b] 1 m = 3.28 ft

Balsam Fir Sawfly, *Neodiprion abietis* complex

A single, heavy infestation was observed in the Grand Valley Forest in Erin Township, Cambridge District. Light-to-medium infestations were common on scattered balsam fir (*Abies balsamea* [L.] Mill.) in pastured woodlots in the Barrie-Elmvale area and between Orangeville and Shelbourne in the Huronia District. Light infestations were also observed along Highway 24 east of Guelph in the Cambridge District.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Severe defoliation of red pine plantings occurred throughout the northern part of the Lindsay District. Localized pockets of heavy infestation were also observed in Rama Township, Maple District, and in Matchedash Township, Huronia District. Light defoliation was again evident at several other locations. Experimental biological control in the form of aerial spraying using a suspension of a nuclear polyhedrosis virus that affects only the sawfly was carried out in Douro and Harvey townships, Lindsay District by OMNR in cooperation with the Insect Pathology Research Institute (Sault Ste. Marie). Followup surveys indicated that an excellent

kill of larvae was achieved. OMNR personnel achieved effective control using Malathion in hand sprayers at numerous other locations.

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

Damage by this defoliator of pines decreased and heavy infestations in Beverly Township, Cambridge District and Vespra Township, Huronia District declined to light intensity. Medium infestations were observed on 1-m (3.28-ft) red pine trees and 2-m (6.56-ft) Austrian pine in Oro and Medonte townships, Huronia District. Elsewhere in the Region numbers were generally low but the usual defoliation of ornamental trees in urban areas again prompted numerous inquiries.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Little change occurred in populations of this pest since 1975. Heavy infestations were observed in white spruce (*Picea glauca* [Moench] Voss) plantations in Vespra and Mara townships, Huronia District. Medium infestations occurred in Whitchurch Township, Maple District, and in Mulmur and Melancthon townships, Huronia District. Smaller numbers were common on ornamentals, in plantations, and open-grown trees at numerous other locations in the Region.

White Pine Weevil, *Pissodes strobi* (Peck)

Populations remained at a generally low level. The heaviest infestation observed, occurred in a 4.5-m (15-ft) white pine plantation in Medonte Township, Huronia District where 47% of the leaders were infested (Table 4). Low-to-medium numbers of infested leaders were observed in the remainder of the Region except for the Niagara District, where weevil damage was rare.

Table 4. Summary of leader damage by the white pine weevil in two districts in 1976 (counts based on the examination of 100 trees systematically selected at each location).

Location (Twp)	Avg DBH (cm)[a]	Leaders infested (%)
Huronia District		
Medonte	8	47
Matchedash	8	15
Niagara District		
Willoughby	5	3

[a] 1 cm = 0.39 in.

Imported Willow Leaf Beetle, *Plagiodera versicolora* Laich

Infestations caused severe browning of willow trees along the Trent Canal in the city of Peterborough and on ornamental trees at the Northumberland County Forest headquarters in Haldimand Township, Lindsay District. Heavy defoliation was also observed along the Humber River in Vaughan Township, Maple District and at several locations in Ancaster Township, Cambridge District. Localized pockets of light and medium infestation were observed north of Orillia and in the Waubaushene area of Huronia District.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Marked increases in numbers of this defoliator were evident. Heavy infestations recurred on Japanese larch (*Larix leptolepis* Sieb. & Zucc. Gord.) in Clarke Township, Lindsay District, and on European larch in Whitchurch Township, Maple District. New, heavy infestations were observed in Uxbridge and Albion townships, Maple District, in Mono and West Gwillimbury townships, Huronia District and in large areas of native tamarack in the Luther Marsh, Cambridge District. Light-to-moderate defoliation was evident at many other points.

Oak Leafmining Sawfly, *Profenusa lucifex* Ross

Continued heavy infestations caused severe browning of red oak and white oak foliage in approximately 6,750 ha (15,000 acres) south of Rice Lake in Hamilton Township, Lindsay District (see Appendix, Fig. A4). Somewhat less severe damage occurred in Manvers and Haldimand townships, Lindsay District. Small pockets of heavy infestation in combination with the Solitary Oak Leafminer, *Lithocolletis hamadryadella* Cham., were observed in Pickering Township, Maple District, in Vespra Township, Huronia District, and along the Niagara Parkway east of St. Catharines, Niagara District. Light-to-moderate damage was noted at several locations in Brant, Onondaga and Tuscarora townships, Cambridge District.

European Pine Shoot Moth, *Rhyacionia buoliana* Schiff.

Populations remained high at quantitative sample points in Puslinch, North Dumphries and Eramosa townships, Cambridge District, with only minor fluctuations being recorded (Table 5). Localized pockets of heavy infestation were observed on Scots pine south of Highway 401 in Puslinch Township, and on red pine near Mimosa in Erin Township, Cambridge District. Small numbers were observed at many other locations in the southern part of the Region.

Table 5. Summary of shoot damage by the European pine shoot moth in the Cambridge District from 1974 to 1976 (counts based on the examination of 100 bud clusters systematically selected at each location).

Location (Twp)	Host	Avg ht of trees (m)[a]	Bud clusters infested 1974	1975 (%)	1976
Cambridge District					
North Dumphries	rP	2	80	96	81
Eramosa	rP	1.5	39	67	59
Puslinch	rP	2	26	37	44
Erin	rP	1.5	-	-	40

[a] 1 m = 3.28 ft

Table 6. Other forest insects

Insect	Host(s)	Remarks
Acrobasis rubrifasciella Pack.	Al	medium infestation near New Lowell, Huronia District
Acrobasis stigmella Dyar	Wa	light defoliation in Humberstone Twp, Niagara District
Anchylopera burgessiana Zell.	bO	medium infestation south of Honey Harbour, Huronia District
Anisota finlaysoni Riotte	wO, bO	high populations of the orange striped oakworm caused heavy defoliation in the Caledonia-Dunnville area and Willoughby Twp, Niagara District, and in Esquesing and Woolwich twp, Cambridge District
Aphrophora parallela (Say)	ScP	heavy in Christmas tree plantations in Oro Twp, Huronia District, and in Darlington Twp, Lindsay District; light at many other locations

(continued)

Table 6. Other forest insects (continued)

Insect	Host(s)	Remarks
Archips cerasivoranus (Fitch)	ecCh & other deciduous hosts	medium-to-heavy defoliation on small shrubbery at numerous locations
Argyrotaenia quercifoliana Fitch	rO	medium infestation near Minising, Huronia District
Choristoneura pinus pinus Free.	jP, ScP	medium populations in a jack pine plantation in Essa Twp and on Scots pine in Tiny Twp, Huronia District
Corthylus punctatissimus Zimm.	sM	medium and heavy mortality of small reproduction at several locations in Huronia District
Corythucha spp.	blCh, Bu	caused conspicuous browning of the foliage of a variety of deciduous hosts throughout the Region
Dasineura gleditschiae O.S.	sunburst locust	heavy infestations of the locust pod gall at a number of locations in the Region
Datana integerrima G. & R.	Wa	scattered, medium infestations in the Cambridge-Brantford area, Cambridge District; in Seneca Twp, Niagara District; and in Innisfil Twp, Huronia District
Ecdytolopha insiticiana Zell.	blL	medium infestation west of Craighurst, Huronia District
Ectoedemia populella Busck.	ltA	high populations at one location in the York Regional Forest, Maple District

(continued)

Table 6. Other forest insects (continued)

Insect	Host(s)	Remarks
Eriophyes nyssae Trott.	black gum	medium infestation on a few trees west of Cayuga, Niagara District
Eupithecia mutata Pears.	He	heavy infestation of this cone feeder in West Gwillimbury Twp, Huronia District
Halisidota caryae Harr.	sHi	scattered heavy infestations in Brant County, Huronia District
Macrodactylus subspinosus F.	various deciduous hosts	heavy infestations of rose chafers at many locations in the Maple and southern Huronia districts
Neodiprion pratti banksianae Roh.	jP	high populations in Essa and Sunnidale twp, Huronia District
Orthotomicus caelatus Eich.	wP	high populations of bark beetles in rodent-damaged trees at Rock Point Provincial Park, Niagara District
Pachypsylla spp.	Ha	moderate leaf gall damage on hackberry near Drumbo in Blenheim Twp, Cambridge District
Phyllobius oblongus Linn.	sM	high populations of adult weevils in woodlots near Hillsburg in Erin Twp, Cambridge District
Pristiphora geniculata (Htg.)	Mo	found in varying numbers on ornamentals throughout the Region

(continued)

Table 6. Other forest insects (concluded)

Insect	Host(s)	Remarks
Prociphilus imbricator Fitch	Be	heavy wooly aphid infestations near the town of Midhurst, Huronia District
Pseudexentera oregonana Wlshm.	tA	light infestation of leaf rollers in Essa Twp, Huronia District
Psilocorsis cryptolechiella (Cham.)	Be	heavy infestations of leaf tiers at several locations in Vespra Twp, Huronia District
Pulvinaria innumerabilis Rath.	sM	light cottony maple scale at a few widely separated locations
Pyrrhalta luteola (Mull.)	wE	several mature trees severely defoliated in the town of Lindsay
Toumeyella numismaticum (P. & M.)	ScP	heavy at one location in Tiny Twp, Huronia District
Vespamima pini Kell.	nS, Aus. P	severe stem damage on ornamentals in the town of Galt, Cambridge District and near St. Anns, Niagara District

TREE DISEASES

A Needle Rust on Pine, *Coleosporium asterum* (Diet.) Syd.

Extensive sampling of this rust was carried out as part of a special survey to assess the importance and distribution of foliage diseases. The disease was found commonly across the entire Region although damage was generally light and confined to the lower branches of planted or open-growing trees. The percentage of trees infected ranged from 5 in Rama Township, Huronia District to 90 in Ancaster Township, Cambridge District. Actual defoliation did not exceed 5% (Table 7).

Table 7. Percentage of trees affected and level of foliar damage caused by a needle rust of pine in three districts in 1976.

Location (Twp)	Host	Avg ht of trees (m)[a]	Trees affected (%)	Level of foliar damage (%)
Huronia District				
Vespra	rP	2.7	18	0.4
Flos	rP	2.1	40	5.0
Medonte	rP	1.6	10	2.0
Essa	rP	1.8	39	3.0
Rama	rP	2.7	5	5.0
Cambridge District				
Erin	rP	2.1	40	5.0
East Flamborough	rP	2.1	80	5.0
East Luther	jP	3.0	68	1.0
Ancaster	rP	2.1	90	1.0
Lindsay District				
Mariposa	rP	2.1	67	5.0

[a] 1 m = 3.28 ft

Cylindrocladium Root Rot, *Cylindrocladium floridanum* Sob. and Seymour

This organism again proved troublesome in several compartments in the Midhurst Forest Station. The disease was first discovered on black spruce (*Picea mariana* [Mill.] B.S.P.) seedlings in Compartment

A14. The trees in this compartment were lifted and used as planting stock in the spring of 1976. All stock from infected beds was root-dipped in the fungicide benlate before shipping. Damage is present in several other beds, the most serious being in Compartment A35 where black spruce seedlings suffered moderate mortality. *C. floridanum* was also isolated from samples taken at the Orono Forest Station, Lindsay District, but little damage was apparent at this time.

Annosus Root Rot, *Fomes annosus* (Fr.) Karst.

Several new pockets of infection were detected in 1976. Two of these were located in unthinned jack pine plantations in the Metro Toronto Conservation Authority in Albion Township, Maple District. Another large infection center was located in an unthinned plantation of mixed jack pine and Scots pine in Adjala Township, Huronia District. OMNR continues to cut out known infection centers and to use the wood-destroying fungus *Peniophora gigantea* (Fr.) Mass. on the cut stumps in this situation. Stumps in all other thinning operations are treated with sodium nitrate solution to prevent establishment of the root rot.

Sycamore Anthracnose Disease, *Gloeosporium nervisequum* (Fckl.)

This disease causes leaf anthracnose as well as cankering and dieback of twigs and small branches of sycamore (*Platanus occidentalis* L.) and oak. In 1976, high damage levels were observed on scattered sycamore trees in the eastern Niagara Peninsula, and on ornamentals in the cities of Port Colborne, Niagara Falls, Niagara on the Lake and St. Catharines. Defoliation and death of young twigs was rated as high as 75% at several locations in Wainfleet and Moulton townships. Most trees later refoliated, although in some cases, thin crowns were evident throughout the summer.

Leaf Anthracnose of Maple, *Kabatiella apocrypta* (El. & Ev.) Arx

Symptoms of this disease were observed much more frequently in 1976 than in recent years, possibly owing to the wet summer weather. Roadside maples, small clumps of trees, and ornamentals were much more severely damaged than trees growing in the interior of stands. At one location in Adjala Township, Huronia District, 90% of 15-m (50-ft) sugar maple trees were diseased with an average of 18% defoliation on the infected trees. The disease, while observed throughout the Region, was most common in the Cambridge, Niagara and southern Huronia districts.

Horse Chestnut Leaf Blotch, *Phyllosticta paviae* Desm.

This disease of ornamentals was observed more commonly than usual, again possibly as a result of the wet weather in late summer. Although

infections were widespread they were much more common in the Maple, Niagara and Cambridge districts than in the Lindsay and Huronia districts. Particularly severe damage was observed in the cities of Niagara Falls, Fonthill and St. Catharines, Niagara District; in Brantford, Cambridge, and Guelph, Cambridge District; and in the village of Bobcageon, Lindsay District.

Leaf and Twig Blight of Poplar, *Venturia populina* (Vuill.) Fabric.

Heavy infections of this blight, in conjunction with another disease, *Morsonina populi* (Lib.) Magn., caused up to 50% mortality of Carolina and hybrid poplar cutting stock in two beds at the Orono Forest Station, Lindsay District (see Frontispiece). Generally low damage levels were observed at several other locations in the Lindsay District, near the town of Angus, Huronia District, and near Luther Lake, Cambridge District.

Salt Damage

This perennial problem was again present in varying degrees. As usual, trees along more heavily travelled roads, on curves, hills, and at intersections, suffered the greatest damage. The most severe damage occurred on a variety of deciduous and coniferous trees along Highway 400 north of Toronto, along Highway 401 east and west of Toronto and to a lesser extent along highways 93 and 27 in the Barrie area.

Winter Drying

Unusually warm weather in mid-April, with temperatures in the 20°C (70°F) range when the ground was frozen, followed by cold dry weather, is thought to have caused moderate-to-severe browning of foliage in many pine plantations throughout the Huronia and Cambridge districts. Localized pockets of severe damage occurred in Scots pine Christmas tree plantations in Oro and Tiny townships where up to 60% over-all defoliation was recorded (Table 8). An exotic planting of Alpine fir (*Abies lasiocarpa* [Hook] Nutt.) in the same plantations in Tiny Township suffered much less damage. Moderate damage to red pine plantations was also observed in Erin, East Flamborough, and Ancaster townships, Cambridge District and in Flos, Medonte, and Rama townships, Huronia District. Winter drying was much less severe in the Maple, Niagara and Lindsay districts.

Table 8. Percentage of trees affected and level of foliar damage caused by winter drying in two districts in 1976

Location (Twp)	Avg ht of trees (m)[a]	Tree species	Trees affected (%)	Level of foliar damage (%)
Huronia District				
Oro	2.0	ScP	65	22
Tiny	2.0	ScP	54	60
Medonte	1.5	rP	80	40
Medonte	1.0	wP	100	70
Flos	2.0	rP	25	10
Essa	2.5	rP	10	15
Rama	2.5	rP	90	70
Cambridge District				
Caledon	1.5	rP	90	60
East Flamborough	2.0	rP	10	25
Ancaster	2.5	rP	70	20

[a] 1 m = 3.28 ft

Table 9. Other forest diseases

Organism	Host(s)	Remarks
Cenangium ferruginosum Fr. ex Fr.	muP	associated with top-killing of ornamentals in the town of Angus, Huronia District
Ceratocystis ulmi (Buism.) C. Moreau	wE	Dutch elm disease continues to eliminate many of the remaining elms.
Chrysomyxa ledi (Alb. and Schw.) d By.	bS	trace infections at two locations

(continued)

Table 9. Other forest diseases (continued)

Organism	Host(s)	Remarks
Chrysomyxa ledicola Lagh.	bS	medium infection near Severn Falls in Matchedash Twp, Huronia District
Cronartium quercuum (Berk.) Miyabe ex Shirai	ScP	found at varying infection levels at numerous locations in the Region
Cronartium ribicola J.C. Fischer	wP	little change in the status of white pine blister rust from previous years
Cytophoma pruinosa (Fries) v. Hohnel	wAs	associated with moderate ash dieback at several locations in Medonte Twp, Huronia District
Cytospora nivea (Hoff.) Fr.	tA	causing twig and branch cankers to trees along Hwy 400 in Flos Twp, Huronia District
Discula quercina (Cooke) Sacc.	wAs, wO	light infections by leaf anthracnose at several locations in Medonte Twp, Huronia District and North Cayuga Twp, Niagara District
Ectostroma liriodendri Kunze ex Fr.	Tu	associated with twig blight on ornamental trees south of Brantford, Cambridge District
Entomosporium maculatum Lev.	Haw	heavy infections in the Brantford area, Cambridge District
Favolus alveolaris (DC.) Quel.	rO	associated with canker-killed branches in Uxbridge Twp, Maple District

(continued)

Table 9. Other forest diseases (concluded)

Organism	Host(s)	Remarks
Gymnosporangium clavipes (Cke. & Pk.) Cke. & Pk.	Haw.	very heavy infections at several locations in Baxter and Vespra twp, Huronia District
Melampsora ribesii-purpurea Kleb.	W	heavy infections near the Luther Marsh, Cambridge District
Phomopsis juglandina (Fckl.) Hoehn.	English walnut	causing severe cankering and dieback to several trees near Brantford, Cambridge District
Phyllosticta caryae Pk.	shH	heavy infections on scattered trees at several locations in Crowland Twp, Niagara District
Phyllosticta catalpae Ell. & Martin	catalpa	heavy leaf anthracnose on ornamentals in the town of Alliston, Huronia District
Pollaccia radiosa (Lib.) Bald. & Cif.	tA	light infections on scattered reproduction near Victoria Harbour, Huronia District and in three twp in the Lindsay District
Pucciniastrum epilobii Otth	bF	observed at the trace level at several locations in the Cambridge and Huronia districts
Sphaerotheca phytophila Kell. & Swing.	Ha	associated with witches' brooms on roadside hackberry near Drumbo, Cambridge District
Semimature tissue needle blight	wP	medium-to-heavy at several locations in the Huronia and Cambridge districts

APPENDIX

CENTRAL REGION

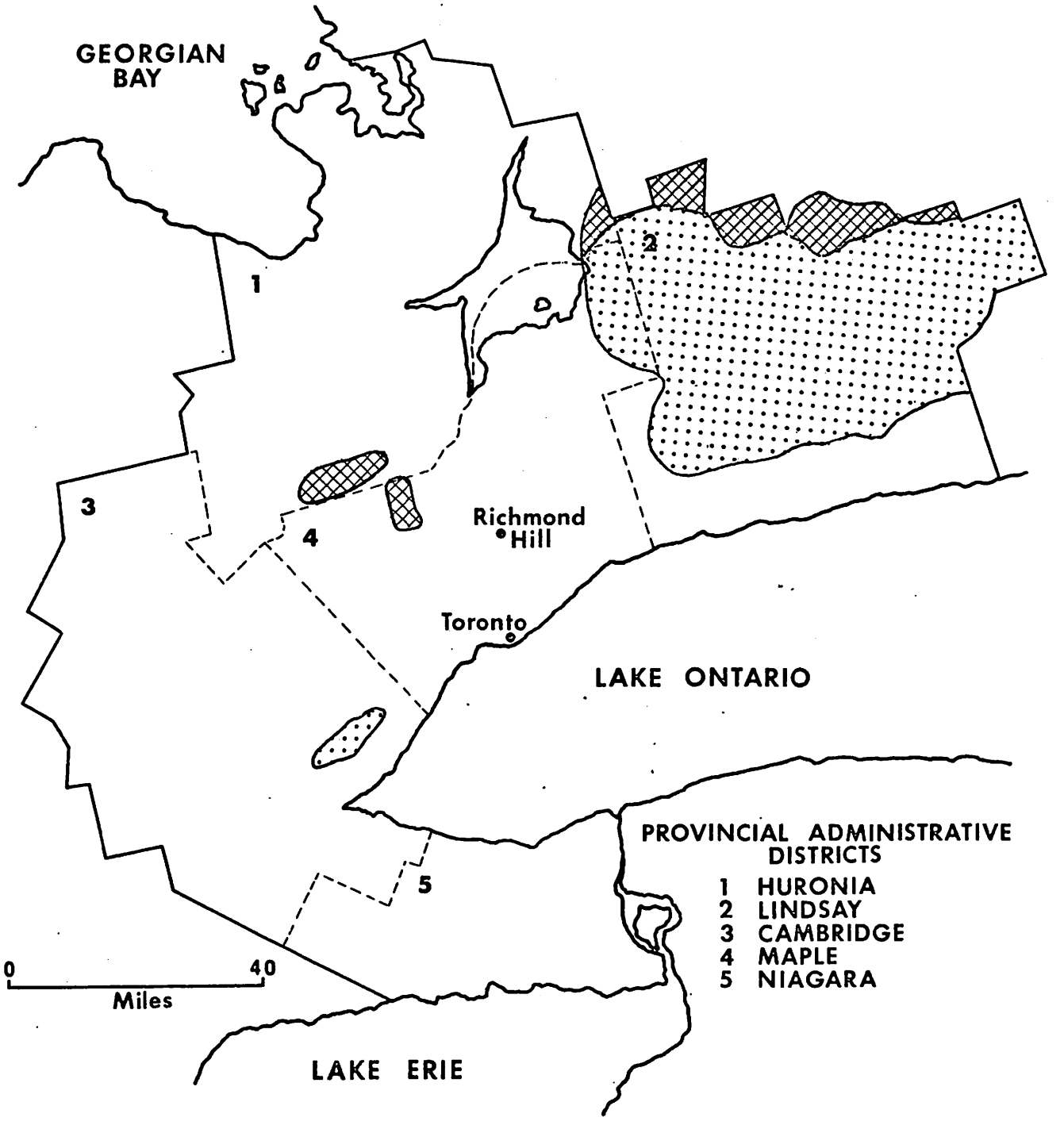

Fig. A1. CEDAR LEAF MINERS

Areas within which damage to eastern white cedar occurred in 1976

Moderate-to-severe browning of foliage . .

Light browning of foliage . . . . . .

CENTRAL REGION

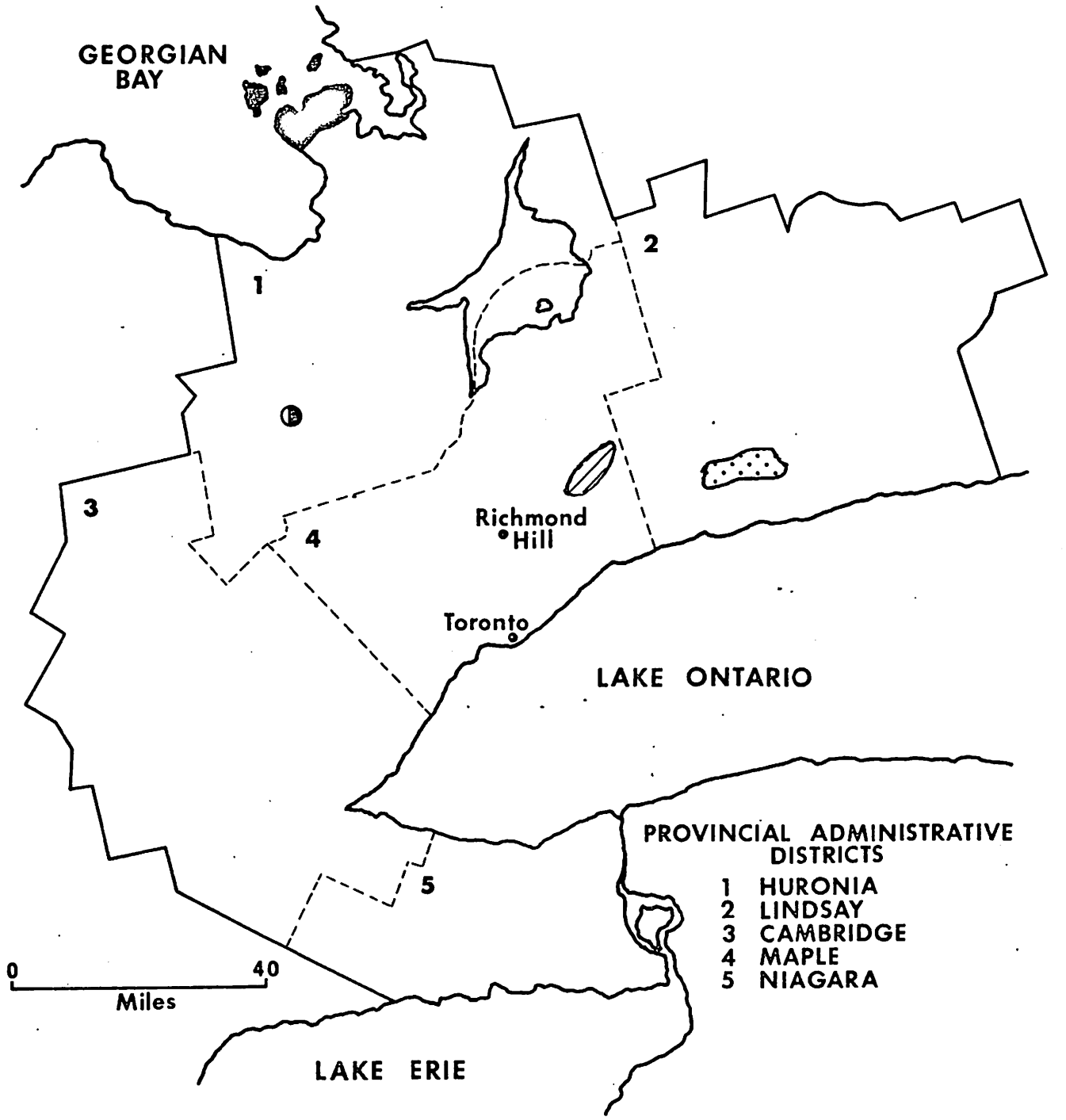

Fig. A2. OAK LEAF SHREDDER

Areas within which infestations occurred in 1976

Heavy infestation . . . . .

Moderate infestation or

Light infestation . . . . .

CENTRAL REGION

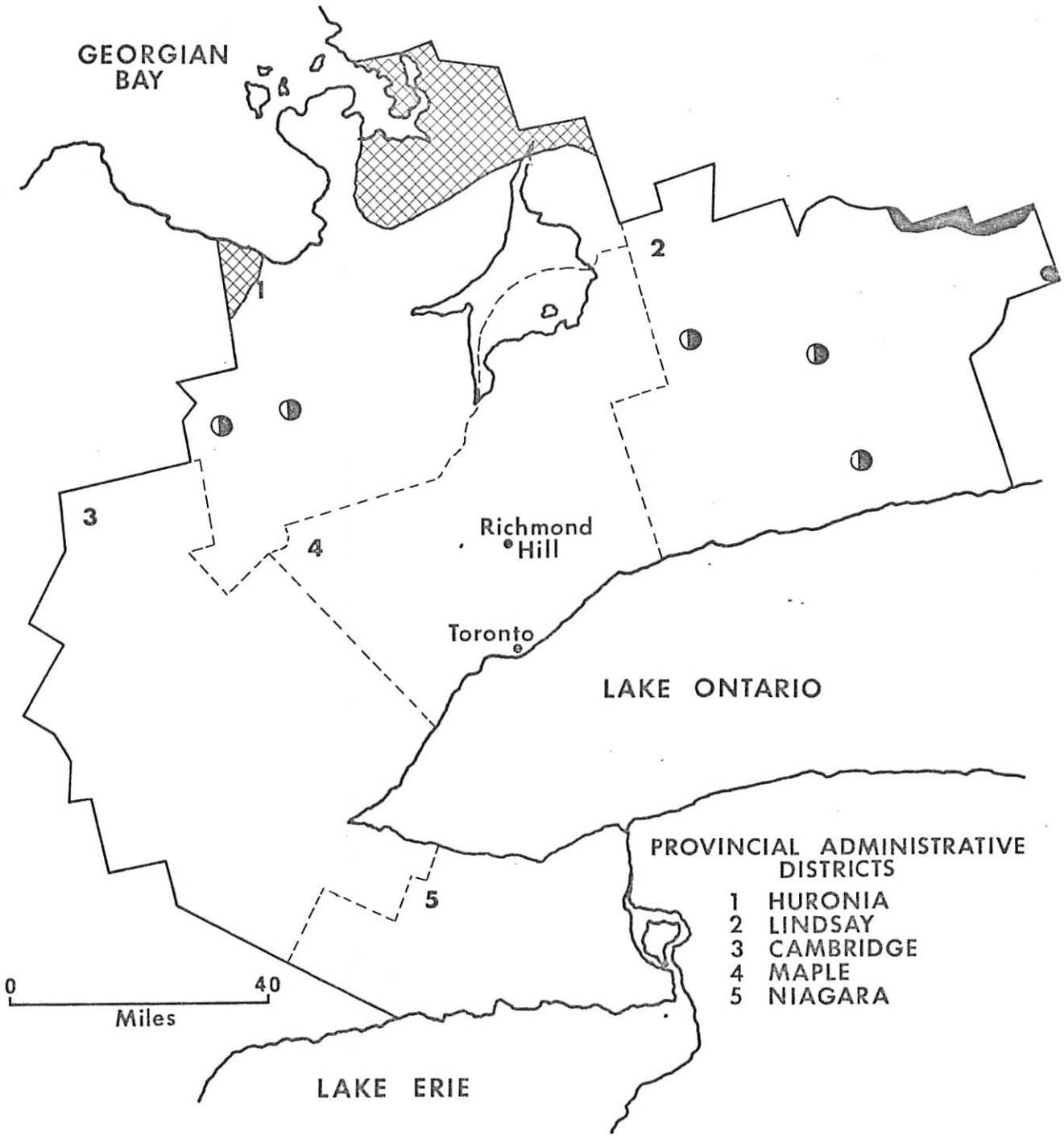

Fig. A3. FOREST TENT CATERPILLAR

Areas within which infestations occurred in 1976

Heavy defoliation ● or ▨

Moderate defoliation . . . ◐

CENTRAL REGION

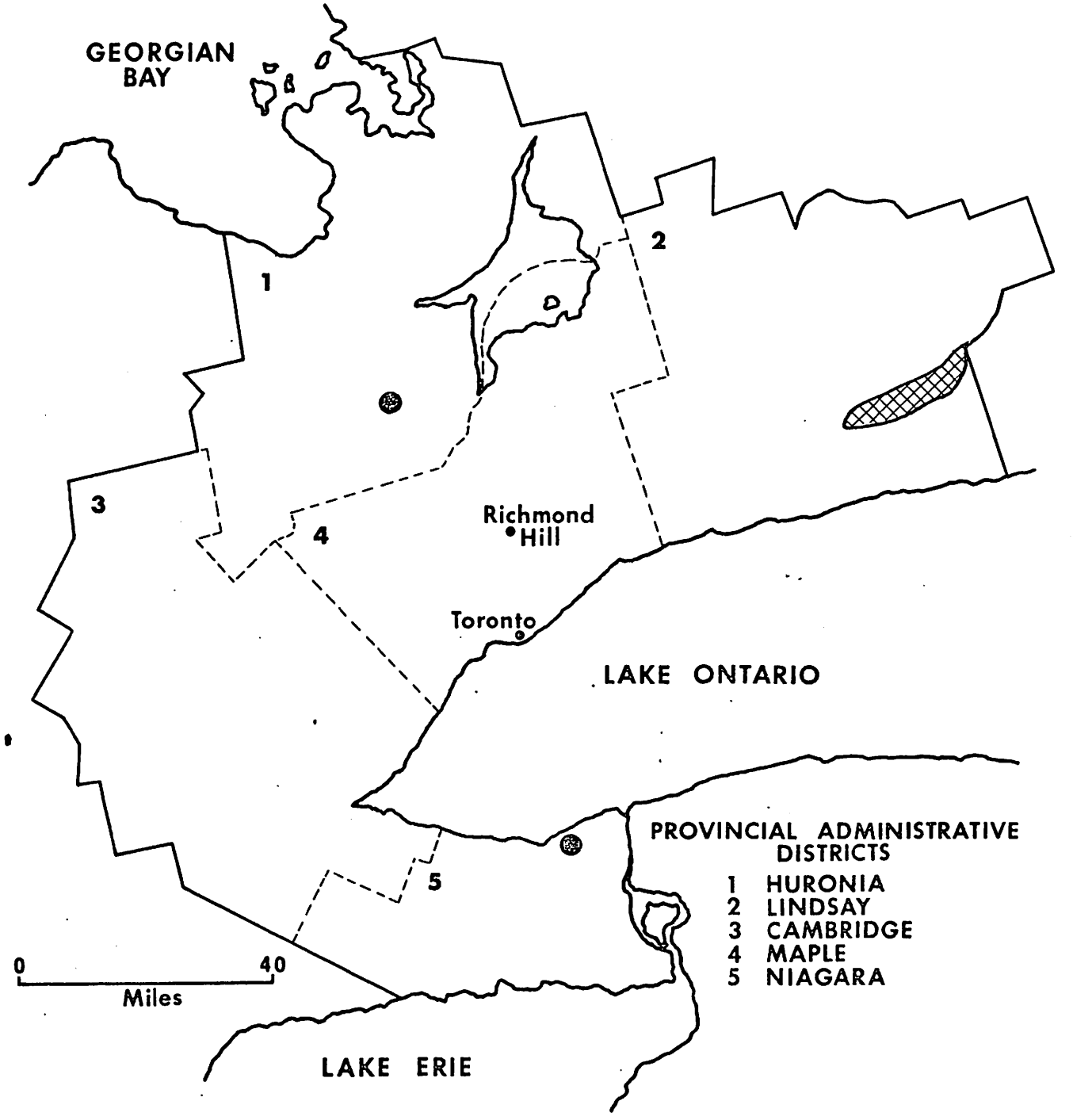

Fig. A4. OAK LEAFMINING SAWFLY

Areas within which infestations occurred in 1976

Heavy infestation ● or ▨