

Southwestern Forest Region, 1965
Status of Insects in the Lake Simcoe
District

Harnden, A.A.

Information Report O-X-9
(Forest Research Laboratory, Ontario Region)

FOREWORD

J. E. MacDonald

Outbreaks of the forest tent caterpillar have highlighted reports dealing with forest insect surveys for the past several years. In 1965, the outbreak in Western Ontario reached its peak and poplar stands within an area of about 34,000 square miles were severely defoliated. Egg surveys in the fall revealed that a marked decline in infestation intensity will occur in Sioux Lookout and Kenora districts but high larval populations will persist in Fort Frances and Port Arthur districts in 1966. Trends in infestation intensities will vary from area to area in eastern Ontario, with the most noteworthy increase in the extent of infestations occurring in the Lake Nipissing outbreak.

The development of new infestations of Bruce spanworm and the European pine sawfly were of particular interest in 1965. Infestations of the former occurred in Sault Ste. Marie, Sudbury and Pembroke districts. Severe defoliation of hardwoods that resulted in relatively large areas represented first records of extensive infestations in Ontario. A major extension in the known distribution of the European pine sawfly was recorded when the insect was found in two Scots pine plantations on Manitoulin Island. This extension places the insect much closer to major stands of jack pine in northern Ontario.

For the third consecutive year low temperatures in the spring caused considerable mortality of the current year's shoots of balsam fir and white spruce at many locations in Ontario. Continued cold weather throughout the summer delayed the development of many insects and in some instances larvae failed to reach maturity before freezing temperatures occurred in the fall.

Tree disease surveys continued to reveal serious losses of white elm resulting from Dutch elm disease in southern Ontario. In northern Ontario two centers of infection occurred on Manitoulin Island and infected elm were found at one location near Spanish on the North Shore of Lake Huron. Intensive surveys to determine the distribution and incidence of this disease will be continued in 1966.

During the early years of the Survey in Ontario Field Technicians were largely concerned with determining the distribution and abundance of forest insects and appraising losses in forest stands. As a consequence the detection aspect of survey work was of a high order. Later, added responsibility for disease surveys and the development of more elaborate sampling procedures, reduced the time available for purely detection work. To compensate for this, greater emphasis has been placed on systematic aerial reconnaissance throughout the vast forested areas of central and northern Ontario.

The Survey welcomed the addition of a Forest Research Technician to its staff in 1965. This appointment now provides one field representative for each district in the Southeastern Region where formerly three men were responsible for survey work in four districts.

In the reports that follow, insects and tree diseases that are of interest in adjoining districts are dealt with on a regional basis. Others are dealt with in detail on a district basis.

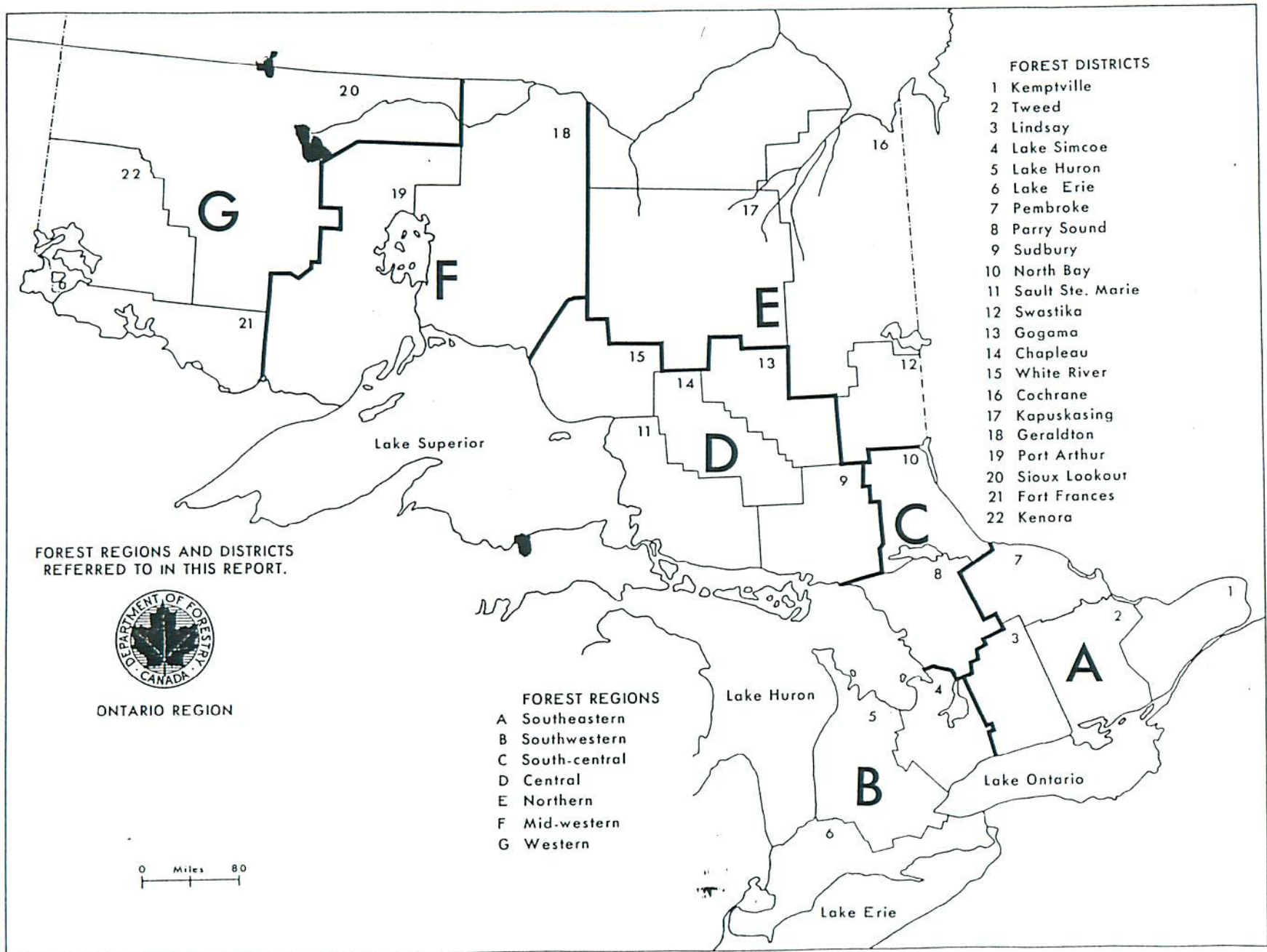


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INTRODUCTION

Southwestern Region

The European pine sawfly is now known to occur throughout most of the Region and in 1965 defoliation was severe in numerous pine plantations. Heavy infestations of the larch sawfly, spruce budworm, black-headed jack-pine sawfly, pine weevils, and poplar leaf rollers recurred, and notable increases in the number of larch case-bearer, walnut caterpillar, and red-headed pine sawfly were recorded. In contrast, decreases in population levels of a leaf miner on ironwood, the introduced pine sawfly, jack pine budworm, spruce bud moth, and spring and fall cankerworms occurred. The Zimmerman pine moth and white-pine shoot borer continued to be troublesome pests in Christmas tree plantations.

Field rearing of Eucosma gloriola Heinr. larvae was undertaken to obtain pupae for life-history studies, and rearing of European elm bark beetle pupae was initiated to obtain further information on parasites. Continuing studies of parasites attacking larvae and cocoons of various sawflies revealed that three species, Dahlbominus fuscipennis (Zetterstedt), Pleolophus basizonus (Gravenhorst) and Drino bohemicus Mesn., introduced from Europe several years ago had advanced as much as 70 miles from release points. The three species are well established in populations of pine sawflies.

An intensive program to recover polyhedral virus diseases was carried out by Department of Lands and Forests personnel in co-operation with Forest Research Technicians for use in control of European pine sawfly and red-headed pine sawfly infestations in 1966.

Intensive surveys were carried out to determine the incidence and mortality of elm caused by Dutch elm disease and to assess the deterioration of roadside maple trees. Fomes root rot and root and butt rot of conifers caused considerable tree mortality in Lake Simcoe District. Efforts were intensified to determine the distribution of two root diseases, Polyporus tomentosus Fr. and Rhizina undulata Fr.

The interest and co-operation given by Department of Lands and Forests personnel and others in the region is gratefully acknowledged.

A. A. Harnden

STATUS OF INSECTS

European Pine Sawfly, Neodiprion sertifer (Geoff.)

Marked increases in population levels of this sawfly occurred for the second consecutive year at many locations in Lake Simcoe and Lake Huron districts. Very heavy defoliation of the old foliage of Scots, red, and jack pine trees was observed commonly in young plantations and for the first time in older plantations in which the crowns were closed. Larval feeding on the tender bark of current shoots caused considerable wilting and breakage in heavily infested plantations (Table 1).

In Lake Simcoe District, the eastern limit of known distribution between Midland and Barrie in Simcoe County was relatively unchanged (see Map). However, in the southeastern part of the district infestations advanced to the south shore of Lake Simcoe thence southeast from Port Bolster to the north end of Lake Scugog in the Lindsay District. Heavy infestations causing almost complete defoliation of the old foliage of Scots pine occurred in many plantations in the north part of Tiny Township and in the area south of a line extending between Collingwood and the south end of Lake Scugog. Infestations that recurred in numerous Christmas tree plantations where control measures had been taken in previous years probably resulted from mass migrations of sawfly adults from neighbouring infestations. The greatest population increase at sample points occurred near Balsam, in Ontario County, where more than 100 colonies per tree were counted on neglected, 10-foot Scots pine trees, compared with 23 per tree in 1964.

In Lake Huron District significant increases in larval populations occurred at numerous locations for the second consecutive year. Seventy-five to 100 per cent defoliation of Scots and jack pine trees in unattended plantations occurred commonly, particularly in Bruce and Grey counties. Severe defoliation of red pine trees was observed in some mixed plantations adjacent to infested Scots pine plantations. As many as 75 to 100 colonies were counted on 15- to 20-foot Scots and jack pine trees in the Owen Sound-Durham area. Notable defoliation was observed occasionally on white pine trees in heavily infested mixed pine plantations.

In Lake Erie District heavy infestations recurred in Norfolk County and light to heavy infestations were observed at numerous points in the remainder of the district. Severe defoliation was recorded on several roadside Scots pine trees in the Delaware-Mount Brydges area and on 15 jack pine trees at a point in Canborough Township, where 95 per cent of the old foliage was destroyed. Medium to heavy infestations occurred in several Scots pine plantations in the Newbury-Bothwell area while infestations were of medium intensity in scattered red and Scots pine plantations in Pelham Township.

The use of insecticides such as DDT and a polyhedral virus was effective in controlling the insect in Christmas tree plantations. A small-scale experimental spray project to control the insect in the adult stage was carried out in a Christmas tree plantation in Mulmur Township. Several rows of 5-foot Scots pine trees were sprayed with one part of 25 per cent emulsifiable concentrate DDT to three parts of water by mist blower in the first week of September, 1964. Few colonies were found in the test area in 1965, whereas an average of 15 colonies per tree were counted on adjacent untreated trees. Neodiprion sertifer is the only species of insect affected by the polyhedral disease referred to above, therefore no loss of beneficial parasites and predators results from its use as an insecticide.

An extensive virus recovery program carried out in Lake Simcoe and Lake Huron districts in 1965 by Department of Lands and Forests personnel in co-operation with Forest Research Technicians provided a supply of virus for use in 1966.

Biological control involving the importation and release of European parasites was introduced in 1940. Eleven species were imported up to 1962. A recovery program was initiated by the Forest Insect Survey in Southern Ontario to study the establishment and spread of the parasites. The results of the survey completed in 1962 were reported by A. H. Rose and W. L. Sippell in the Canadian Entomologist, Volume 98, Number 1, 1966.

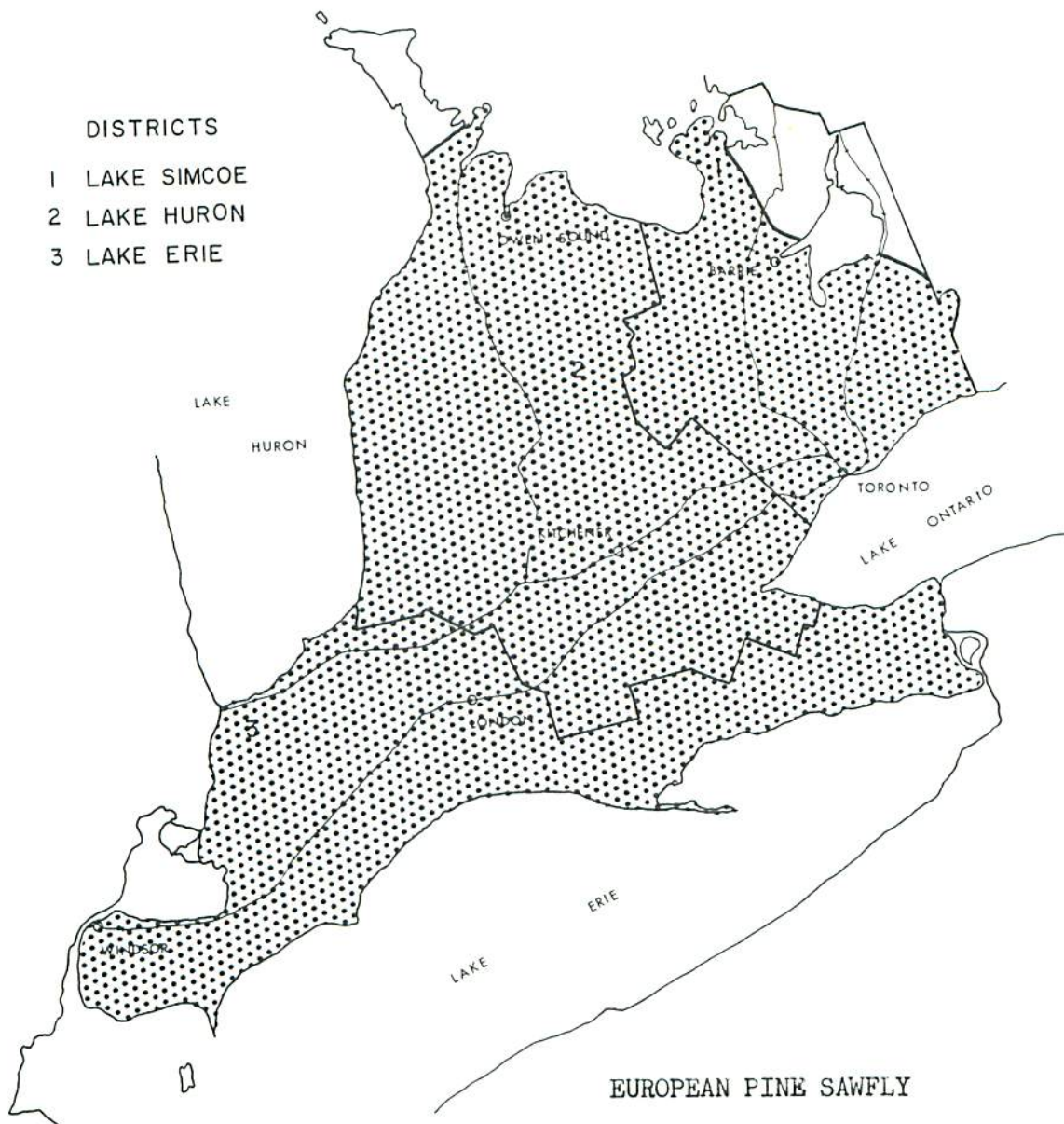
"Cocoons of the European pine sawfly were exposed in rodent-proof trays to determine what parasites attack this pest in southern Ontario. Exposures showed that two introduced parasites, Dahlbominus fuscipennis (Zetterstedt) and Pleolophus (=Aptesis) basizonus (Gravenhorst), are firmly established throughout the distribution of the host. The former parasite has spread more than 30 miles and the latter at least 70 miles in approximately 20 years. The number of trays found by each species varied considerably with each locality. In general, the number of native parasite species obtained tended to increase with the age of infestation, with Mastrus aciculatus (Provancher) being the most prevalent (Table 2). Nine other native parasites occurred sporadically and in small numbers."

TABLE 1

Summary of European Pine Sawfly Colony Counts and Degrees of Infestation on Scots Pine Trees in the Southwestern Region in 1964 and 1965

Location (township by district)	Av. height of trees in feet	Av. no. colonies per infested tree		Per cent of trees infested in 1965	Degree of infestation in 1965
		1964	1965		
<u>Lake Simcoe</u>					
Caledon	18	10	8	100	Medium
Toronto	28	7	14	100	Light
Pickering	14	5	23	100	Heavy
Whitby	10	23	100+	100	Heavy
E. Gwillimbury	5	-	1	48	Light
Tecumseth	4	-	30	100	Heavy
<u>Lake Huron</u>					
Stanley	14	1	1	13	Light
E. Wawanosh	20	5	12	95	M to H
Goderich	10	2	6	100	M to H
Brant	15	1	2	50	Light
Blandford	14	2	0.5	19	Light
<u>Lake Erie</u>					
Adelaide	7	13	4	60	Light
Aldbrough	6	2	1	15	Light
Euphemia	8	5	4	65	Light
McGillivray	11	6	5	80	Medium
N. Cayuga	10	1	5	60	Light
Romney	10	4	2	80	Medium
Willoughby	11	3	3	75	Light
Yarmouth	7	2	4	60	Light

SOUTHWESTERN REGION



EUROPEAN PINE SAWFLY

The known distribution of the sawfly
in the Region in 1965

MILES
0 20

Legend

Distribution of the sawfly.....



Thirty-two trays were set out at each sample point except at Maple and Uxbridge where 23 and 20 trays respectively were used.

TABLE 2

Summary of Parasitism of *N. sertifer* Cocoons in Trays by Three Species of Parasites at 10 Sampling Points in Southwestern Ontario

Location	Infestation age, years	Percentage of trays containing cocoons parasitized by three species		
		<i>D. fuscipennis</i>	<i>P. basizonus</i>	<i>M. aciculatus</i>
Harrow	22	43.8	15.6	21.9
Ridgetown	17	34.4	37.5	3.1
Aylmer	12	9.4	59.4	9.4
Goderich	12	81.3	78.1	9.4
Williamsford	7	53.1	81.3	59.4
Rockton	7	81.3	28.1	6.3
Alton	4	93.8	96.9	9.4
Tottenham	2	96.9	96.9	56.3
Maple	2	82.6	73.9	0.0
Uxbridge	0	65.0	5.0	0.0

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)

Population levels of this insect declined at many points in the region in 1965 (Table 3). In Lake Simcoe District a medium infestation recurred in a Mugho pine shelterbelt at one location in Markham Township. Light infestations persisted in Scots, red, and Mugho pine in the south half of Peel, York, and Ontario counties. No living larvae were found at quantitative sample points in Toscorontio and Mulmur townships where severe frosts occurred during the winter.

Infestations generally declined in intensity in the Lake Huron District. Exceptions to this trend were noted in private plantations at Port Elgin and near Roseville where medium infestations persisted. A heavy infestation in a stand of small red pine in the Kiwanis plantation in Keppel Township in 1964 declined to light intensity in 1965. Population levels were low elsewhere in the district.

In Lake Erie District medium to heavy infestations occurred on several red pine trees at Lundy's Lane in the City of Niagara Falls. Moderate damage recurred on several roadside red pines in Woodhouse Township, in a neglected Scots pine plantation in Wainfleet Township, and on a few Scots pine ornamentals in a municipal park at Niagara-on-the-Lake. A medium infestation in Romney Township in 1964 declined to light intensity in 1965, although one tree in this 100-acre plantation was heavily infested and 50 per cent of the bud clusters were attacked.

A new quantitative sample point was established in Pelham Township. Numerous Syrphidae and dipterous maggots were found in shoots infested by the shoot moth at this location. Parasitism remained high in a Scots pine plantation at Rhineland, Middleton South Township.

TABLE 3

Summary of European Pine Shoot Moth Damage
in the Southwestern Region
in 1964 and 1965

Location (township by district)	Av. d.b.h. of trees in 1965	Per cent of bud clusters infested in the spring		Degree of infestation in 1965
		1964	1965	
<u>Lake Simcoe</u>				
Tosorontio	2	27.0	0.0	Light
Mulmur	2	2.0	0.0	Light
<u>Lake Huron</u>				
Keppel	3	10.4	2.0	Light
Saugeen	2	11.4	29.0	Medium
Bentinck	4	0.0	0.0	Light
Beverly	3	-	0.0	Light
<u>Lake Erie</u>				
Aldborough	1	1.8	0.0	Light
Euphemia	2	2.4	0.5	Light
North Cayuga	2	1.6	0.7	Light
Pelham	1	-	5.5	Light
Romney	2	10.3	4.6	Light
Willoughby	3	1.3	1.1	Light
Woodhouse	4	0.8	0.3	Light
Yarmouth	1	2.6	1.5	Light

Larch Sawfly, Pristiphora erichsonii (Htg.)

High populations of this insect persisted in European and Japanese larch plantations in Lake Simcoe and Lake Erie districts. Medium infestations increased to heavy intensity at some locations in the Lake Huron District.

In the Lake Simcoe District heavy infestations recurred in the older European and Japanese larch plantations in Simcoe and Dufferin counties and in the northern parts of Peel, York, and Ontario counties. Defoliation averaged about 80 per cent and complete stripping of the trees occurred in many plantations. Except in Wildman Forest in Tiny Township where young trees were heavily defoliated, infestations were generally light in younger plantations. Infestations in native tamarack stands were generally light.

Tip mortality due to oviposition was severe in some older larch plantations but was light in other plantations. Although late larval mortality recurred in heavy infestations it was much less severe than in recent years and larger numbers of larvae spun cocoons. For example, a total of 600 cocoons was collected in a 4-foot square area in a plantation near Midhurst.

The medium infestation in a permanent sample plot in St. Edmunds Township in the Lake Huron District increased to heavy intensity. Curled tip counts revealed that 50 per cent of the current year's growth were curled, compared with 16 per cent in 1964. Defoliation in the area approximated 75 per cent. Medium infestations occurred commonly in tamarack stands elsewhere in the Bruce Peninsula. A heavy infestation recurred in a clump of tamarack in Howick Township and a medium infestation in Artemesia Township increased to heavy intensity. Infestations in European larch and tamarack elsewhere in the district were generally light but groups of trees suffered moderate defoliation in some areas.

In the Lake Erie District severe defoliation of European larch recurred at quantitative sampling points in South Walsingham Township and in the Turkey Point Nursery, Charlotteville Township. Aerial spraying was carried out near Five Corners at the latter location using Malathion. The insecticide was applied at the rate of 11 ounces per acre and 97 per cent of the larvae were killed within eight hours of spraying. Medium infestations recurred on mature European and Japanese larch trees at the St. Williams Forest Nursery. Light infestations in the Reynolds Tract, Howard Township increased to medium intensity.

Sequential sampling to determine population densities was carried out at five points in the region. The results, based on the percentage of curled tips caused by adult oviposition, are summarized in Table 4.

TABLE 4

Summary of Curled Shoot Counts and Degrees of Infestation
of the Larch Sawfly in the Southwestern Region
from 1963 to 1965

Location (township by district)	Host	Av. d.b.h. in inches in 1965	Per cent of tips curled			Degree of infestation		
			1963	1964	1965	1963	1964	1965
<u>Lake Simcoe</u>								
Oro	eL	7	75	65	60	H	H	H
Uxbridge	eL	9	33	35	70	H	H	H
<u>Lake Huron</u>								
St. Edmund	tL	8	70	16	50	H	M	H
<u>Lake Erie</u>								
Howard	eL	10	48	4	20	H	L	M
S. Walsingham	eL	12	53	60	44	H	H	H

White-pine Shoot Borer, Eucosma gloriola Heinr.

Although light, medium and heavy infestations of this shoot borer persisted (see map) larval populations declined generally in the region in 1965 (Table 5). Scattered heavy infestations were recorded in Lake Huron and Lake Erie districts and only one small medium infestation was noted in the Lake Simcoe District.

Leader damage to white pine in sample plots in Oro and Albion townships in the Lake Simcoe District declined from 12 and 10 per cent in 1964 to six and four per cent respectively in 1965. Elsewhere in the district leader damage did not exceed five per cent. As in previous years large vigorous shoots of unpruned Scots pine trees sustained little damage and survived attack by the insect. A number of parasites apparently play a major role in controlling larval populations of E. gloriola. Three hundred infested shoots were caged at Angus. The duff under the caged shoots was examined in October and produced numerous parasite pupae.

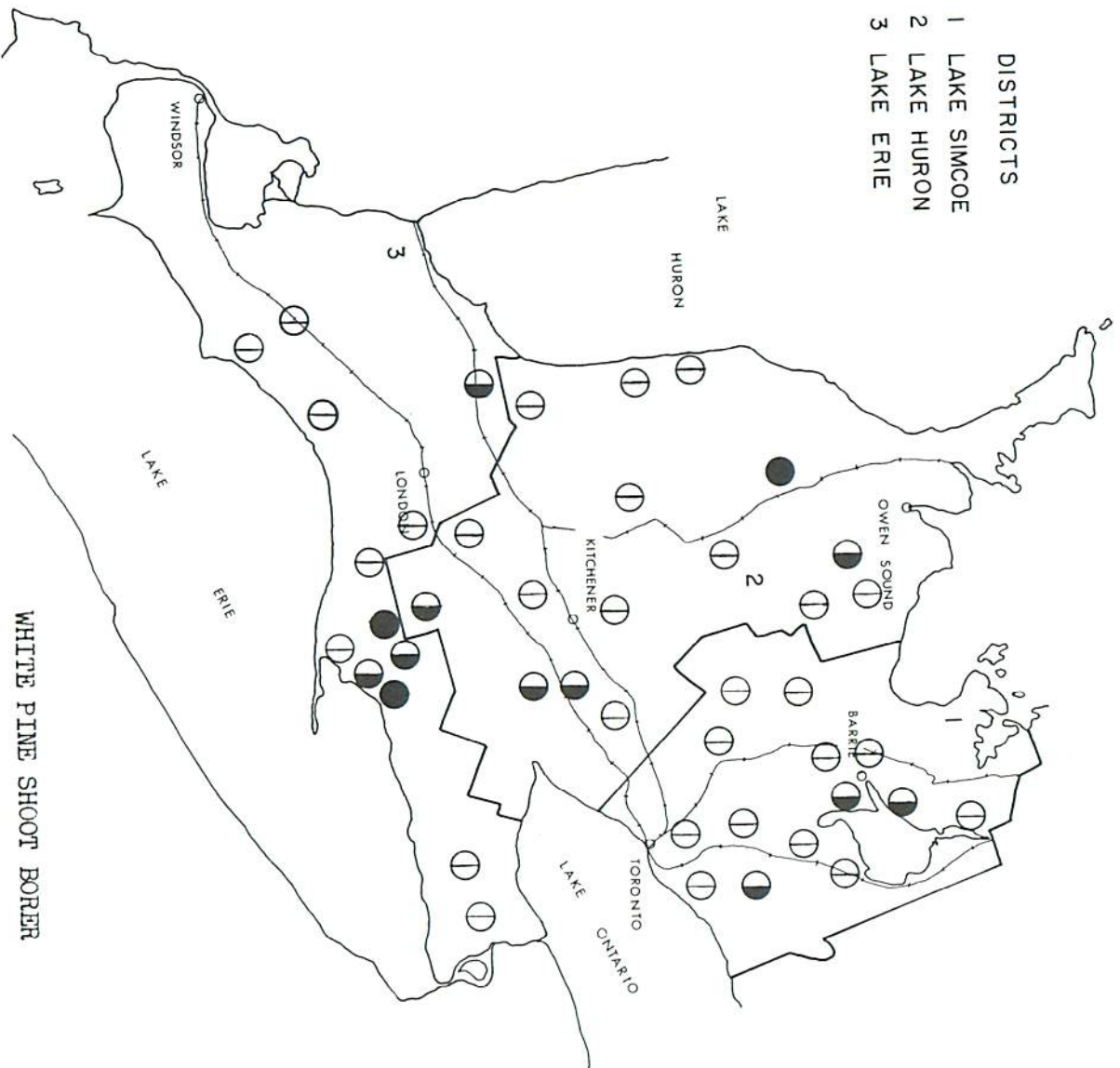
In the Lake Huron District a heavy infestation occurred in a white pine plantation in the Brant Tract in Brant Township. In this plantation an average of 12 shoots per infested tree were attacked and 40 per cent of the leaders were infested. Medium infestations were noted in white pine plantations in North Norwich, Puslinch, and Holland townships. Leader damage in the Little Tract in Puslinch Township increased from eight per cent in 1964 to 15 per cent in 1965. Light infestations were found commonly in Scots, red and white pine plantations. A light infestation was observed for the first time in a small jack pine plantation in Stephen Township.

In the Lake Erie District populations of the insect declined at all sample points except in Thorold Township where a small increase was recorded in a white pine plantation. Although larval populations declined considerably, a heavy infestation recurred in a Scots pine plantation in Middleton South Township where 23 per cent of the leaders were attacked. Heavy infestations in white pine plantings in Charlotteville and Mosa townships declined to medium and light infestation respectively. Mass collections of infested shoots in 1964 may be responsible in part for the marked decline in the Charlotteville area. Further evidence on this theory will be obtained in 1966 in Middleton South Township where mass collections were made in 1965.

SOUTHWESTERN REGION

DISTRICTS

- 1 LAKE SIMCOE
- 2 LAKE HURON
- 3 LAKE ERIE



Locations where infestations were
observed in 1965

Legend

- Light infestation.....
- ◐ Medium infestation.....
- Heavy infestation.....

TABLE 5

Summary of Shoot Damage by the White-pine Shoot Borer
in the Southwestern Region
from 1963 to 1965

Location (township by district)	Host	Av. height of trees in feet	Per cent of trees infested			Av. no. of attacks per infested tree			Per cent of leaders attacked		
			1963	1964	1965	1963	1964	1965	1963	1964	1965
<u>Lake Simcoe</u>											
Oro	wP	15	-	46	45	-	0.7	0.5	-	12	6
Albion	wP	10	-	45	40	-	1.7	0.5	-	10	4
E. Gwillimbury	wP	10	-	-	66	-	-	0.8	-	-	4
King	wP	12	-	-	90	-	-	1.1	-	-	5
Orillia	wP	10	-	-	42	-	-	0.5	-	-	2
<u>Lake Huron</u>											
Ashfield	wP	12	87	85	80	5.0	4.0	4.0	6	3	5
Puslinch	wP	12	78	100	100	6.0	10.0	8.0	4	8	15
Brant	wP	10	-	-	100	-	-	12.0	-	-	40
<u>Lake Erie</u>											
Aldborough	wP	6	15	52	15	1.0	1.2	1.1	0	16	2
Charlotteville	wP	7	10	95	7	1.0	4.0	1.3	8	54	7
McGillivray	wP	7	-	-	31	-	-	3.4	-	-	9
Middleton S.	scP	9	20	100	85	2.0	10.8	7.6	2	40	23
Mosa	wP	6	10	85	13	3.0	4.5	1.0	1	35	0
Thorold	wP	11	-	31	35	-	1.3	1.5	-	0	6

STATUS OF TREE DISEASES

Eastern Dwarf Mistletoe, Arceuthobium pusillum Pk.

This parasite continued to cause moderate branch mortality and light stem mortality in the Bruce Peninsula. Infections appeared to be heaviest on white and black spruce growing in very shallow soil between Greenough Point and Tobermory. Witches'-brooms were very common in this area. Heavy infections were also noted on white spruce trees near Wasaga Beach in Flos Township at at one location in Orillia Township.

Armillaria Root Rot, Armillaria mellea (Vahl ex Fr.) Kummer

Light tree mortality occurred in numerous pine plantations in the region in 1965. Moderate mortality of jack pine reproduction followed a recent windthrow of a parent stand in a small part of Dufferin Forest, Mulmur Township. Presumably A. mellea developed around the roots of the larger windthrown trees and spread to the regeneration.

Several spruce seedlings which were planted between the stumps of a shelter row that had been removed about 10 years ago died in 1964 and 1965. Mycelium and

rhyzomorphs were abundant on the roots of both dead and dying trees and numerous sporophores were seen on adjacent stumps. No spread of tree mortality was observed on the perimeter of a typical circular area in a red pine plantation in Uxbridge Township around which a trench had been dug and from which all the trees had been removed in 1962. Only one tree died at the edge of a similar centre of infection in a 30-year old red pine plantation in Medonte Township where no trench was dug but all the dead and dying trees were removed.

Dutch Elm Disease, Ceratocystis ulmi (Buism.) C. Moreau

Recurrent high incidence of this disease caused severe tree mortality at numerous locations in the region (see photograph). Counts and surveys throughout the region show as high as 100 per cent incidence and almost total mortality in scattered clumps of white elm trees (Table 6). Tree mortality was most severe in the southern part of the Lake Simcoe District particularly in the Toronto-Brampton area. Elsewhere mortality was generally confined to small groups of trees and light infections were common.

Although tree mortality was more severe in the southern part than elsewhere in the Lake Huron District the incidence of diseased trees increased sharply for the second consecutive year in Grey and Bruce counties. Even though sanitation measures have been carried out in several towns in the area it is almost impossible to obtain complete control and large elm shade trees are gradually diminishing in number in many residential areas.

A marked increase in the incidence of infection was noted in small trees in the Lake Erie District. The disease continued to spread on English elm trees, Ulmus procera Salisb. at Port Stanley where it was first found on this host in 1964. One tree was removed from this site in the spring of 1965 but eight more were infected by September.

TABLE 6

Summary of Dutch Elm Disease Surveys Carried Out On
Roadside Elm Trees in the Southwestern Region
in 1964 and 1965

Location (township)	No. of trees examined		Condition of Trees						Per cent of trees infected	
	1964	1965	Healthy		Diseased		Dead		1964	1965
			64	65	64	65	64	65		
<u>Lake Simcoe</u>										
Toronto	50	50	25	24	17	12	8	14	50	52
Nottawasaga	50	50	49	49	1	1	0	0	2	2
Orillia	50	50	50	50	0	0	0	0	0	0
Reach	111	105	103	95	5	5	3	5	7	10
Caledon	-	100	-	0	-	22	-	78	-	100
Innisfil	-	58	-	48	-	7	-	3	-	17
<u>Lake Huron</u>										
Sydenham	50	50	48	47	1	2	1	1	4	6

TABLE 6 (continued)

Location (township)	No. of trees examined		Condition of Trees						Per cent of trees infected	
	1964	1965	Healthy		Diseased		Dead		1964	1965
			64	65	64	65	64	65		
<u>Lake Huron (cont'd)</u>										
Stanley	50	50	41	33	9	13	0	4	18	34
E. Oxford	50	50	46	43	3	5	1	2	8	14
Nassagaweya	50	-	37	-	6	-	7	-	26	-
<u>Lake Erie</u>										
Bosanquet	11	11	11	11	0	0	0	0	0	0
Dunn	17	17	17	14	0	3	0	0	0	18
Gainsborough	50	50	50	48	0	2	0	0	0	4
Maidstone	50	50	45	35	5	2	0	13	10	30
Southwold	31	42	30	29	1	5	0	8	3	31
Thorold	21	21	20	19	1	1	0	1	5	10
Zone	7	7	1	1	6	0	0	6	86	86

White Pine Blister Rust, Cronartium ribicola J. C. Fischer

Light and medium infections occurred commonly in white pine plantations in Lake Simcoe and Lake Huron districts (see photograph). In contrast, in the Lake Erie District the infection was observed at only one location in 1965. The heaviest centre of infection was noted in a county forest compartment in Melancthon Township where approximately 70 per cent of the trees were affected.

In the Lake Huron District the incidence of attack ranged from one to 15 per cent and the highest stem mortality occurred in white pine plantations in Euphrasia Township. The medium infection in the Lake Erie District occurred in a private plantation near St. Thomas.

Cytospora Canker of Spruce, Cytospora kunzei Sacc.

Tree deterioration attributable to this pathogen and its perfect stage, Valsa kunzei Fr. continued in a small Norway spruce plantation near Shelbourne. Tree mortality increased from 15 per cent to approximately 35 per cent in 1965. Stem cankers occurred on many white spruce trees in a 35-year old plantation near Midhurst. Some trees have been girdled and killed by cankers in recent years and many others are threatened. In order to study the development of cankers and to forecast the rate of decline of trees in the plantation, cankers were measured, and their current periphery marked on ten typical randomly selected diseased trees. The cankers will be re-measured annually and the findings summarized. Cankers were common on the branches and stems of all other species of spruce occurring in the Lake Simcoe District.

Cytospora nivea Hoffm. ex Sacc.

A centre of severe infection was again observed in hybrid poplar in the Ontario Paper Company plantation in Wainfleet Township. Affected trees were characterized

by branch and stem cankering and withering of leaves. Considerable tree mortality occurred. In Vespra Township, a heavy infection caused severe branch tip mortality on several Carolina poplar trees. Fruiting was also observed on a recently killed balsam poplar in Essa Township.

Black Knot of Cherry, Dibotryon morbosum (Schw.)
Theiss. & Syd.

Moderate and severe infections recurred, particularly on eastern choke cherry, at several points. Stem mortality in excess of 30 per cent was noted at several locations in the region.

Chestnut Blight, Endothia parasitica (Murr.)
P. J. & H. W. Anderson

Since the turn of the century this canker-causing fungus has eliminated sweet chestnut from the commercial forests of southern Ontario. Accidentally introduced into North America from Asia in 1904, it is one of the most destructive forest tree pathogens.

This blight is common throughout Lake Erie District. Numerous sprouts which appear at the stumps of blight-killed trees appear thrifty for a time then become infected and die. They are then replaced by younger sprouts which in turn escape infection for a short time. The E. parasitica spores can be spread by rain splashing, by birds and insects, or by tools and clothing.

Occasional solitary trees in the St. Thomas and St. Williams areas have attained heights of 15 to 25 feet but have failed to fruit. A mass collection of diseased material was made at the latter point on September 7 for use at the University of British Columbia.

Fomes Root Rot, Fomes annosus (Fr.) Cke

This root rot fungus continued to cause tree mortality in a recently-discovered infection centre in a 30-year old red pine plantation in Orr Lake Forest, Medonte Township, and in an old infection centre at St. Williams (see photographs). No additional tree mortality occurred in an old infection centre in Vivian forest, Whitchurch Township, although current fruiting of the causal organism was in evidence. In an attempt to prevent further spread of the disease by wind-borne spores, newly cut stumps in county forests were treated with a 10 per cent solution of sodium nitrite. Since this treatment will not curb the advance of the disease from tree to tree through root grafts tree mortality will likely continue in most of the established infection centres.

Root and Butt Rot of Conifers, Polyporus tomentosus Fr.

This organism had not been reported by the survey in Ontario for several years prior to 1964 and 1965 when it was found at three points in Midhurst Nursery and at three locations elsewhere in Simcoe County. Investigations of mortality and wind-throw of large white spruce trees in shelter-rows between nursery compartments in 1964 indicated that this disease was the causal fungus (see photographs). A few sporophores were found near the base of some of the dead trees. In 1965, additional trees died and numerous sporophores were attached to the roots of dead and dying

trees. Fruiting bodies were common under the trees in a white spruce shelter row in Innisfil Township where about 50 per cent of the trees had died in recent years. Fruit bodies were also common in a 25-year-old white spruce plantation in Camp Borden as well as in a mixed natural stand near Angus in Essa Township, both of which were recently thinned.

Deterioration of Roadside Maple

Maple trees along paved highways in the Southwestern Region have deteriorated alarmingly at many points (see photograph and Table 7).

At some locations all the trees were damaged, some heavily, and at a sample point in Vespra Township 23 per cent of the trees were dead. Symptoms were generally less prevalent and severe along gravelled and recently hard surfaced roads. For example, only 20 per cent of the trees along a road which had been hard surfaced in 1963 in East Garafraxa Township were damaged compared with 100 per cent in Vespra Township beside a long-established hard surfaced road.

Symptoms of damage include leaf scorch, curled stunted leaves, premature shedding, dead and dying branches in the crown, loss of vigour and eventual death of the tree. Several fungi commonly occur in association with this condition.

It is suspected that annual heavy applications of salt to the road surface for snow and ice control is a major factor in causing tree decline. This is supported by evidence presented in a recent publication by A. E. Rich and N. L. Lacrosse. They found that 98 per cent of the trees examined along an unsalted road were healthy compared with only 12 per cent healthy trees along a salted highway. Salt content in the leaves, twigs and sap declined with increased distance between the tree and the road, and damage was less severe where the tree was more than 30 feet from the paved road or drainage was good.

TABLE 7

Summary of Sugar Maple Deterioration in the Southwestern Region in 1965

Location (township)	Av. d.b.h. in inches	No. sample trees	No. of infected trees	Per cent trees infected	Per cent tree mortality
<u>Lake Simcoe</u>					
Vespra	24	30	30	100	23
W. Gwillimbury	6	36	35	97	17
E. Garafraxa	20	45	9	20	0
Caledon	20	66	64	97	62
<u>Lake Huron</u>					
Goderich	14	23	19	83	0
E. Wawanosh	18	63	25	40	2
Saugeen	12	43	16	31	2
N. Dumfries	16	19	7	37	0

Injury Due to Changing Water Levels

High water in spring followed by drought conditions in summer appears to have caused high mortality of red and white pine in several young plantations in the Lake Simcoe District. High water in the spring presumably killed the original root system forcing new roots to grow further up the root collar. These roots were very shallow, one inch or less and were not able to withstand summer temperatures, particularly where water levels were low.

For the second consecutive year low water levels caused severe browning, loss of vigour and light tree mortality in the Bruce Peninsula and on shoreline trees as far south as Goderich. The condition was most evident in clumps of eastern white cedar, white spruce and tamarack.

Frost Injury

For the second consecutive year late spring frosts severely damaged buds and new growth of a wide variety of deciduous and evergreen trees (see photographs). Damage was usually most severe in localized low-lying areas. Red oak, white oak and white ash were the most seriously affected deciduous hosts and moderate and severe bud damage occurred in white spruce, Norway spruce, fir and European larch at many points in the region.

Leaf Scorch

This physiogenic disease continued to be very prominent in the region in 1965. Premature discolouration and leaf drop was most prevalent on deciduous trees along older paved highways. Although it is felt that this disease is induced by several other conditions such as high temperatures and drying winds, it would appear that excessive use of salt in controlling snow and ice conditions is a major contributor. This supposition is borne out through surveys and observations on secondary roads where smaller quantities of salt are used and the disease is much less severe.

TABLE 8

Other Noteworthy Diseases in the Southwestern Forest Region in 1965

Organism	Host(s)	Remarks
<i>Apiosporina collinsii</i> (Schw.) Van Hohnel	Se	Cankers on single branches and blackening of leaves of two infected trees in Saugeen Twp.
<i>Aureobasidium pullulans</i> (deBary) Arnaud	wP, rP, wS	Common in Lake Simcoe District.
<i>Camarosporium robiniae</i> (Westd.) Sacc.	Hon	Heavy infection in hedgerow near Garnet in Walpole Twp., 2½ miles NE of point where disease was first found in Canada in 1961.
<i>Chrysomyxa ledi</i> de Bary and C. ledicola	wS	Heavy foliar infection associated with dwarf mistletoe at Wasaga.
<i>Coleosporium asterum</i> (Diet.) Syd.	jP, rP	Heavy infections in plantations in Melancthon and Grantham twps. Light infections common elsewhere.

TABLE 8 (continued)

Organism	Host(s)	Remarks
<i>Cryptodiaporthe densissima</i> (Ell.) Wehm.	rO	Cankering common on several small trees in Waterloo Twp.
<i>Cytophoma pruinosa</i> (Fr.) Hohn.	Wa	Caused light branch mortality on 3" D.B.H. trees in Binbrook Twp. and at one point in Orillia Twp.
<i>Cytospora chrysosperma</i> Fr.	W	Light and medium infections common in the region.
<i>Cytospora</i> spp.	Haw, rP, sIM	Common on decadent coniferous and deciduous hosts.
<i>Daedalia quercina</i> L ex Fr.	rO	Fruiting bodies numerous on stump in N. Cayuga Twp.
<i>Diaporthe eres</i> Nit.	eDo	Cankers common on dead and dying stems and branches in Bentinck Twp.
<i>Diplodia</i> sp.	Mo, rP	Associated with moderate mortality of young planted trees in a small compartment of the Midhurst Nursery and was present on dying 2-0 red pine stock in the St. Williams Nursery.
<i>Dothichiza populea</i> Sacc. & Braird	bPo, cPo, lPo	Following severe infections in recent years infections were relatively light in the region in 1965.
<i>Eutypella parasitica</i> Davidson & Lorenz	sM	Cankered trees common in region. Heavy infection caused stagnation of planted trees in Sunnidale Twp.
<i>Fomes igniarius</i> (L. ex Fr.) Gill	Lo	Occasional conks on stem of one tree in Niagara Falls.
<i>Fomes everhartii</i> (Ell. & Gill) V. Schrenk	rO	Fruiting on stem of one tree in Pinery Provincial Park.
<i>Ganoderma applanatum</i> (Pers.) Pat.	rP	Common on stumps in Holland Twp.
<i>Gnmonia ulmea</i> (Sch. ex Fr.) Thum.	wE	Light and moderate foliage infections common in the region.
<i>Gnmonia veneta</i> (Sacc. & Speg.) Kleb.	Sy	Severe cankering and branch damage in Vaughan Twp.
<i>Gymnoconia peckiana</i> (Howe) Trotter	Rasp- berry	Moderate and light infections in Williams West and Euphemia twps. respectively.
<i>Gymnosporangium clavariiforme</i> (Pers.) D. C.	Haw	Light on one tree in Dawn Twp.
<i>Gymnosporangium globosum</i> Fare.	Haw	Heavy foliage and current shoot damage in Medonte Twp.
<i>Gymnosporangium juniperi- virginianae</i> Schw.	rJ	Very heavy infection at Fairfield Pioneer Village, Zone Twp.; medium and light at numerous points in the region.
<i>Gymnosporangium</i> sp.	Se	Heavy foliar infections in Baxter and Oxford twps.

TABLE 8 (continued)

Organism	Host(s)	Remarks
<i>Hypodermella ampla</i> (J. J. Davis) Dearn.	jP	Heavy foliar infections occurred in 30-year old plantations in Albion and Oro twps.
<i>Hypomyces</i> sp.	wE	Hypo parasite on agaric shelf fungi in S. Thorold Twp.
<i>Lenzites saepiaria</i> (Wulf.) ex Fr.	rP	Occurring on slash in Holland Twp.
<i>Melampsora abietis-canadensis</i> Ludw. ex Arth.	eH	Eastward extension recorded in Lake Erie District; found at Spooky Hollow, Charlotteville Twp. No change in status in Lake Huron or Lake Simcoe districts.
<i>Melanconis everhartii</i> Ell.	Amur maple	Associated with heavy branch mortality in Midhurst Nursery.
<i>Melanconis juglandis</i> (E & E) Graves	Wa	Commonly associated with branch mortality in Albion Twp.
<i>Melanconium</i> sp.	wE, wB	Commonly associated with dying trees in Barrie.
<i>Peridermium</i> sp.	scP, pP	Little change in the status of this gall forming fungus disease in 1965.
<i>Phomopsis</i> sp.	Haw	Fruiting on dying branches of one tree in Binbrook Twp.
<i>Pollaccia elegans</i> Serv.	bPo	Infected branches common on small trees in Caledon Twp.
<i>Pollaccia radiosa</i> (Lib.) Bald. & Cif.	tA	Light infections caused twig mortality at widely scattered locations in the Lake Huron District.
<i>Polyporus conchifer</i> (Schw.) Fr.	wE	Conks numerous on dead tree in Southwold Twp.
<i>Polyporus sulphureus</i> Bull. Fr.	rO	Heavy infections on stumps in Turkey Point Nursery and light on living trees in this area and at Pinery Provincial Park.
<i>Polyporus schweinitzii</i> Fr.	wS, jL	Found in association with dead and dying trees in the Lake Simcoe District.
<i>Polyporus tulipiferae</i> (Schw.) Overholts	wO	Heavy fruiting on dying branches along Severn River in Baxter and Matchedash twps.
<i>Polyporus versicolor</i> L. ex Fr.	Sweet gum	Fruiting on dead branch of one tree at Port Dover.
<i>Puccinea coronata</i> Cda.	Buck- thorn	Foliage rust common in Brock and Markham twps.
<i>Scolecocetraria scolecospora</i> (Bref.) Seav.	wP	Light infection in Turkey Point Nursery.
<i>Steganosporium pyriforme</i> Cda.	sM, rM	Associated with severe branch mortality in the Lake Simcoe District.

TABLE 8 (continued)

Organism	Host(s)	Remarks
Stereum sp.	Che, Wi	Light on chestnut coppice and on dead witch-hazel at St. Williams Nursery and near Grand Bend respectively.
Tubercularia sp.	siM, Mu	Associated with branch mortality at points in Lake Simcoe and Lake Huron districts.
Tubercularia vulgaris Tode ex Fr.	I, sM	Cankering observed in Wood and Bosanquet twps.
Uncinula salicis (Fr.) Wint.	tA	Moderate and heavy infections on lower foliage at several locations in the Lake Simcoe District.
White Pine Needle Blight	wP	The incidence of this physiogenic disease was high on sporadic trees in the region.

STATUS OF INSECTS IN LAKE SIMCOE DISTRICT

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A Midge on Red Pine.....	<u>Cecidomyia</u> sp. B 16
Spruce Budworm.....	<u>Choristoneura fumiferana</u> (Clem.) B 16
Larch Casebearer.....	<u>Coleophora laricella</u> Hbn. B 17
Pitted Ambrosia Beetle.....	<u>Corthylus punctatissimus</u> (Zimm.) B 17
Zimmerman Pine Moth.....	<u>Dioryctria zimmermani</u> Grt. B 18
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Pine Root-collar Weevil.....	<u>Hylobius radialis</u> Buch. B 21
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A. A. Harnden

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Cedar Leaf Miners, Argyresthia thuiella Pack. and
Pulicalvaria thujaella Kft.

Little change in the status of these leaf miners was noted in 1965. Heavy infestations again caused premature shedding of the foliage of eastern white cedar in a 40-mile wide band across the central part of the district. Severe defoliation in recent years has reduced growth and caused some branch and tree mortality.

Jack-pine Resin Midge, Cecidomyia reeksi Vock.

Moderate and heavy damage of the shoots of jack pine recurred at many points in the older plantations in the district. At many points in Sunnidale, Tosorontio, Essa, Whitchurch, and East Gwillimbury townships 75 per cent of the current shoots were killed and the remainder severely damaged.

A Midge on Red Pine, Cecidomyia sp.

A little-known midge caused heavy damage to the current year's foliage of red pine trees in late summer in plantations in Vespra, Essa, Tosorontio, Sunnidale, and Oro townships. This minute insect feeds at the base of the needle within the needle sheath. At some locations 75 per cent of the needles were killed and prematurely shed in 1965.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Spruce budworm infestations recurred at approximately the same intensity as in 1964 in Uxbridge Forest Headquarters Tract and declined for the second consecutive year at Midhurst. A new medium infestation occurred in West Gwillimbury Township (Table 9).

A medium-to-heavy infestation caused 55 per cent defoliation of the current year's foliage in a 35-year old white spruce plantation in Uxbridge Forest. The egg density increased from 68 clusters per 100 square feet of foliage in 1964 to almost 200 in 1965 indicating that population levels will greatly increase in this plantation in 1966. Medium infestations recurred in younger trees in adjacent compartments where 181 larvae were collected on 20-tray beating samples. Defoliation averaged approximately 40 per cent of the current foliage.

Defoliation in a 35-year old white spruce plantation at Midhurst declined from 11 per cent in 1964 to five per cent in 1965. Egg density surveys carried out in the fall revealed an increase in numbers of clusters from 1.4 in 1964 to 3.4 per 100 square feet of foliage in 1965.

A new medium infestation caused approximately 45 per cent defoliation on young blue spruce ornamentals along Highway 400 in West Gwillimbury Township in 1965.

TABLE 9

Defoliation of White Spruce by the Spruce Budworm
in 1964 and 1965, Egg Densities, and
Corresponding Forecasts for 1966

Location	Per cent defoliation		Egg density per 100 feet of foliage		Forecast for 1966
	1964	1965	1964	1965	
Uxbridge Forest	55	55	68	196.6	Heavy
Midhurst Forest	11	5	1.4	3.4	Light

Larch Casebearer, Coleophora laricella Hbn.

A new but small heavy infestation of this insect occurred in a European larch compartment in Vivian County Forest in 1965. Severe discolouration of the foliage due to larval feeding was observed over the entire crowns of the infested trees. No larvae were found on branch samples from plots in Vespra, Uxbridge, and Whitchurch townships in 1964 and 1965. The number of larvae per sample increased slightly in a plot in Albion Township but decreased in Medonte Township (Table 10).

TABLE 10

Summary of Larch Casebearer Larval Counts
in 1964 and 1965

Location (township)	Av. d.b.h. in inches in 1964	Av. no. of larvae per 18-inch branch	
		1964	1965
Medonte	5	6	1.5
Albion	4	1	4.6

Pitted Ambrosia Beetle, Corthylus punctatissimus (Zimm.)

Sample plots were established in 1962 to study the effects of infestations of this beetle on sugar maple reproduction. The plots were located in various degrees of exposure to light in or adjacent to mature sugar maple stands. All reproduction in square-yard quadrats in the study areas has been uprooted and examined annually.

Infestations have declined for the second consecutive year in all quadrats. In plots 2A and 2C, located in an undisturbed stand in Oro Township no infested trees were found. In plot 3A in a partially thinned stand in Oro Township, the incidence of attack declined from 10 per cent in 1964 to 5.8 per cent in 1965.

In a mature sugar maple stand in East Gwillimbury Township, part of which was heavily thinned in recent years, the incidence of attack declined by 1.7, 22.5 and 17.8 per cent in shaded, fringe and open quadrats respectively.

Since 1963 the incidence of attack in shaded areas has been considerably lower than in more open areas. However, the per cent of trees that have recovered was much higher in the open than in more shaded areas (Table 11).

TABLE 11

Summary of Damage by the Pitted Ambrosia Beetle
in Lake Simcoe District, 1963-1965

Location (township)	Plot number	Av. basal diameter in in. in 1965	Per cent of trees infested			Per cent trees recovered	Degree of exposure
			1963	1964	1965		
Oro	2A	4.0	2.5	2.5	0.0	0.0	Shaded
	2C	5.6	17.6	2.5	0.0	13.0	Fringe
	3A	3.8	22.2	10.0	5.8	7.8	Partial
East Gwillimbury	1A	4.4	3.7	3.1	1.4	0.0	Shaded
	1B	4.4	30.6	37.0	14.5	3.6	Fringe
	1C	9.7	22.0	35.0	17.2	20.7	Open

Zimmerman Pine Moth, Dioryctria zimmermani Grt.

Heavy infestations of this insect persisted in the trunks of several 8-inch Scots pine trees near Meadowvale in Toronto Township. Light infestations occurred in wounds caused by rodent feeding in the lower stem of young Scots and Austrian pine trees at several locations. A light infestation in the current shoots of red pine (the only known infestation of this insect in red pine shoots in Ontario) recurred in Camp Borden in 1965. Approximately five per cent of the shoots were mined and shed.

Nursery Pine Sawfly, Diprion frutetorum (F.)

A general decline in population levels of this sawfly of pines occurred at all sample points but one in 1965. The most notable decline occurred at one location in Pickering Township where a total of three larvae were counted on a 15-tray sample in 1965 compared with 29 larvae in 1964 (Table 12).

TABLE 12

Summary of Introduced Pine Sawfly Larval Counts
in Lake Simcoe District in 1964 and 1965

Location (township)	Tree species	Av. d.b.h. in inches	Total number of larvae per 15-tray sample	
			1964	1965
Pickering	scP	6	29	3
Reach	scP	6	34	27
Melancthon	scP	4	4	0
Mono	scP	7	6	3
Vespra	scP	5	7	14
Orillia	scP	4	16	11
Oro	wP	4	5	2
Caledon	scP	4	-	2
Markham	scP	4	-	5

European Spruce Sawfly, Diprion hercyniae (Htg.)

Population levels of this sawfly fluctuated considerably in 1965 compared with 1964. Quantitative samples from spruce trees at seven widely-separated points showed that the highest population in the second generation occurred in Uxbridge Township where 21 larvae were counted in a 15-tray sample (Table 13).

TABLE 13

Summary of European Spruce Sawfly Larval Counts
in Lake Simcoe District in 1964 and 1965

Location (township)	Tree species	Total no. of larvae per 15-tray sample	
		1964	1965
Medonte	wS	25	18
Mara	nS	5	6
Whitchurch	wS	1	0
Vespra	wS	3	16
Nottawasaga	wS	10	0
Oro	wS	1	5
Uxbridge	wS	0	21

Introduced Pine Sawfly, Diprion similis (Htg.)

A decline in population levels occurred for the second year at all sample points but one, located in Pickering Township. The most noteworthy decline occurred in a Scots pine shelterbelt at a point in Mono Township where three larvae were counted on a 15-tray sample in 1965, compared with 199 larvae in 1964 (Table 14). The eastern boundary of known distribution on the west side of Lake Simcoe was unchanged in 1965.

TABLE 14

Summary of Introduced Pine Sawfly Larval Counts
in Lake Simcoe District in 1964 and 1965

Location (township)	Tree species	Av. d.b.h. in inches	Total number of larvae per 15-tray sample	
			1964	1965
Pickering	scP	6	13	67
Reach	scP	6	111	41
Melancthon	scP	4	6	0
Mono	scP	7	199	3
Vespra	scP	5	0	2
Oro	wP	4	17	8

Jack-pine Needle Miner, Exoteleia pinifoliella (Cham.)

Heavy infestations of this needle miner have persisted for several years in jack pine plantations in Flos, Vespra, Whitchurch, Uxbridge, and Albion townships. In Albion Township surveys showed 45.6 per cent of the current year's needles were killed by primary mining of the insect and most of the old foliage was mined. Light infestations were common elsewhere in the district.

Sugar-maple Borer, Glycobius speciosus (Say)

Recurrent attack by this large beetle in recent years caused severe damage to mature sugar maple trees in a 5-acre stand near Newmarket in East Gwillimbury Township (see photographs).

The eggs are laid under bark scales or in crevices of the bark from which the larvae mine directly between the bark and wood, usually across the grain of the wood. Larval mines causing large open wounds girdled and killed some trees, other mines healed but were easily detected by ridges and gall-like swellings in the bark. A high proportion of branches were girdled and killed. In addition, the value of the trees was greatly reduced by the damage and the accompanying wood stains.

Birch Leaf Miner, Fenusa pusilla (Lep.)

Marked increases in the extent and intensity of infestations of this sawfly occurred in 1965 (see map). Heavy infestations were observed commonly on weeping birch ornamentals in the district. At many locations 90 per cent of the leaves were mined and 75 per cent of the leaf surface damaged. Infestations were generally light in white birch stands.

Pales Weevil, Hylobius pales (Hbst.) and the Northern Pine Weevil,
Pissodes approximatus Hopk.

These weevils continued to be major pests in Scots pine plantations where Christmas trees were harvested three or more consecutive years and in plantations where considerable tree mortality resulted from heavy infestations of the root collar weevil, Hylobius radicis Buch. The extent of damage to the branches of living trees by adult weevil feeding was proportionate to the numbers of stumps

and dying trees available for brood material.

Sodium arsenite applied to newly-cut stumps gave effective control in several plantations. However, hazards to persons applying the poison and to cattle, deer, and other animals, prevented widespread use of the chemical. Tests carried out in two Scots pine plantations using two parts of 25 per cent emulsifiable concentrate DDT to three parts of water sprayed on the trees by mist blower early in September 1964, prevented further damage. Scars caused by Pales weevil adult feeding prior to application of the spray healed by August 1965 and little or no "flagging" occurred. In adjacent untreated parts of the plantations adult feeding was heavy, typical "flagging" of the branches was severe, and the value of the trees was greatly reduced.

Pine Root-collar Weevil, Hylobius radialis Buch.

No change was noted in the extent and intensity of infestations of this weevil in 1965. Heavy infestations recurred in pine plantations in seven townships between Thunder Beach on Georgian Bay in the north and Highway 89 in the south. High population levels persisted in Camp Borden, Tosorontio Township.

Surveys carried out in mature Christmas tree plantations in Essa, Tosorontio, and Vespra townships revealed 33, 14, and 14 per cent tree mortality respectively.

Eastern Tent Caterpillar, Malacosoma americanum (F.)

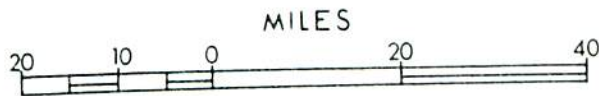
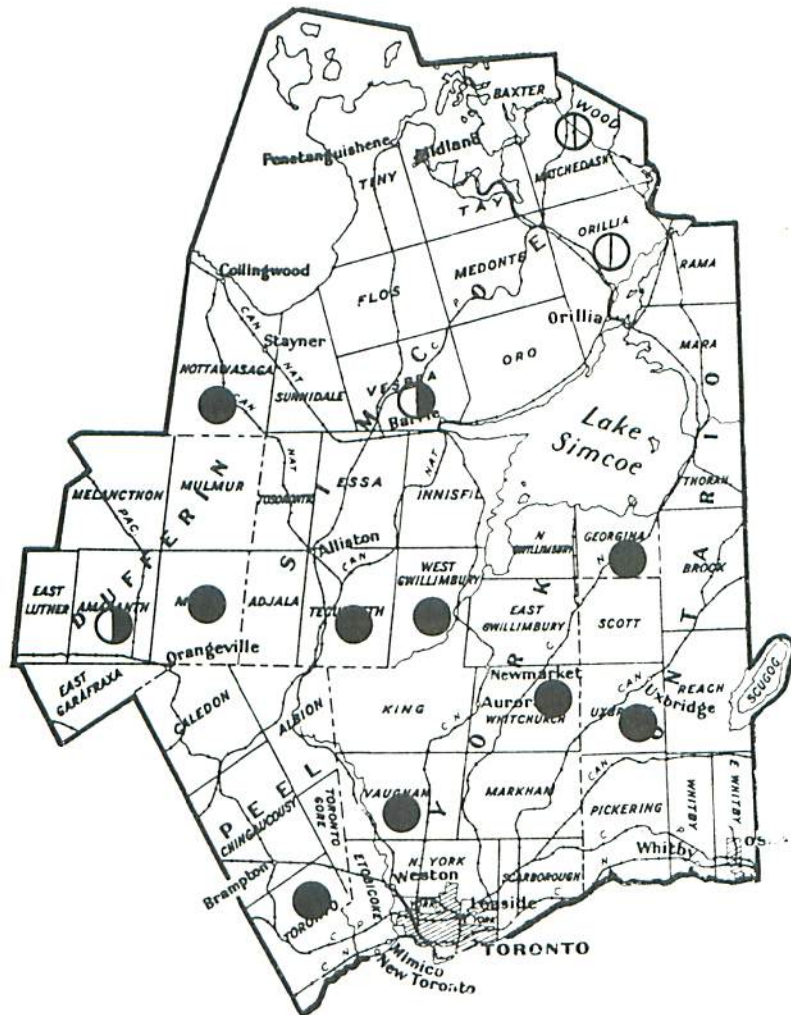
As in recent years considerable fluctuation in the numbers of tents of this insect occurred in the district. The heaviest infestations occurred in the northern half of Simcoe County (see map). At sample locations in Baxter and Medonte townships 129 and 132 tents respectively were counted on wild cherry and hawthorne shrubs along one mile of roadway. A small pocket of very heavy infestation recurred in Flos Township where 154 tents were counted on 3-inch diameter black cherry trees along one-tenth of a mile of roadway. In the remainder of the district infestations declined to low levels. For example, at a point in East Luther Township no tents were observed in 1965 where 62 were counted in 1964 (Table 15). Parasites and predators reduced population levels considerably. Parasitism by Rogas species occurred commonly; and black birds, starlings and Baltimore orioles were observed feeding on the larvae at several locations in the district. The use of herbicides on roadside shrubbery was also a control factor locally.

TABLE 15

Summary of Eastern Tent Caterpillar Colony Counts
in Lake Simcoe District in 1964 and 1965

Location (township)	Type of plot	Number of tents	
		1964	1965
Sunnidale	One mile	31	15
Tiny	" "	215	141
Medonte	" "	74	129
East Luther	" "	62	0
Baxter	" "	-	132
Flos	10th "	-	154

LAKE SIMCOE DISTRICT



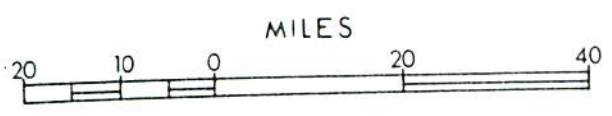
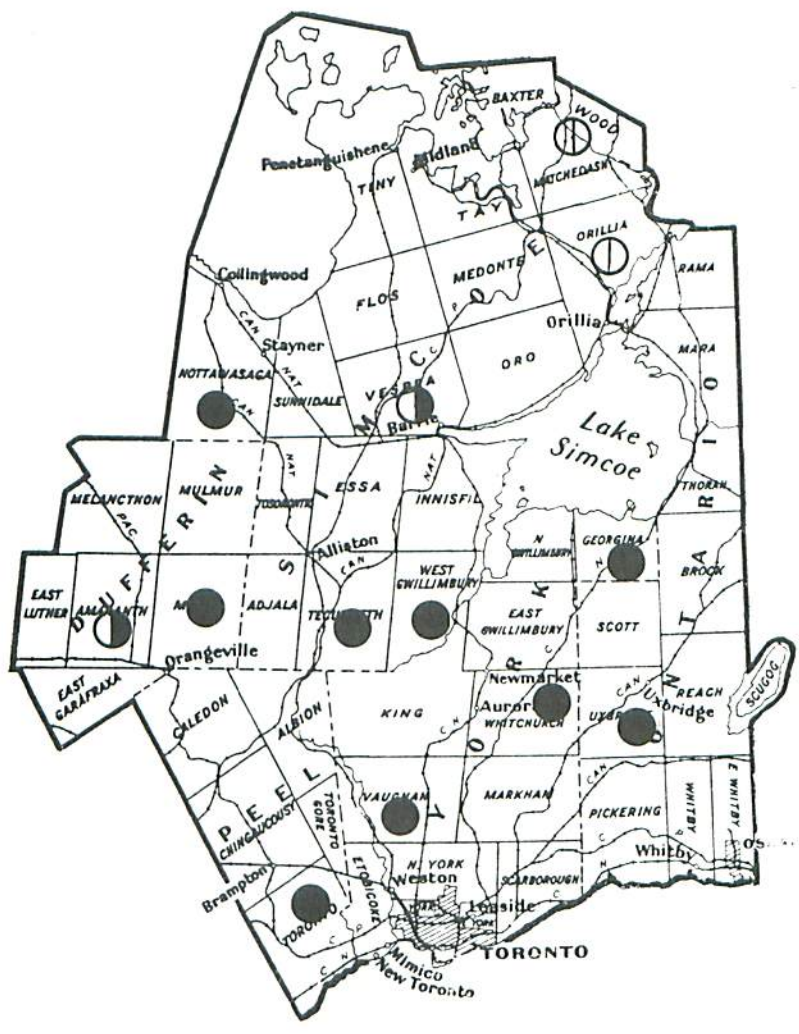
BIRCH LEAF MINER

Locations where infestations were observed in 1965

Legend

- Light infestation..... ○
- Medium infestation..... ◐
- Heavy infestation..... ●

LAKE SIMCOE DISTRICT



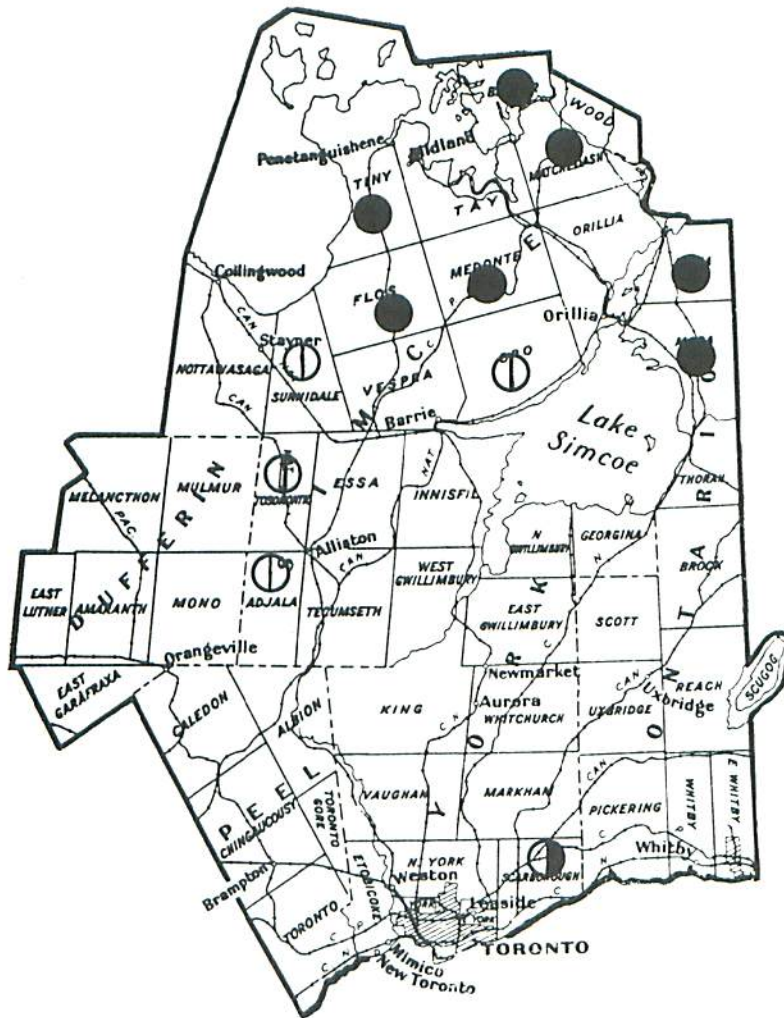
BIRCH LEAF MINER

Locations where infestations were observed in 1965

Legend

- Light infestation..... ○
- Medium infestation..... ◐
- Heavy infestation..... ●

LAKE SIMCOE DISTRICT



EASTERN TENT CATERPILLAR

Locations where infestations were observed in 1965

Legend

- Light infestation..... ○
- Medium infestation..... ◐
- Heavy infestation..... ●

Forest Tent Caterpillar, Malacosoma disstria Hbn.

A new light infestation of this insect occurred on red oak shade trees in Camp Borden in 1965. A heavy infestation which had occurred in a sugar maple stand in Medonte Township for three consecutive years declined largely to light intensity in 1965. Surveys revealed that although 90 per cent of the eggs hatched, a high percentage of the larvae were killed by a polyhedral virus disease. Mass collections of mid-instar and late-instar larvae and pupae were submitted to the laboratory for rearing. Rearing records revealed that 74 per cent died in the mid-larval stage; 40 per cent in the late larval stage and four per cent in the pupal stage. In the same collections Rogas species parasites killed 20 per cent of the mid-instar larvae; several species of dipterous parasites killed 40 per cent of the late-instar larvae and a common pupal parasite Sarcophaga aldrichii Park. killed 83 per cent of the pupae. As a result only 11 per cent of the insects in the collections reached maturity. No egg bands were found on three, 4-inch diameter trees sampled in the infested area in the fall. Forecasts of defoliation in 1966 based on egg band counts are given in Table 16.

TABLE 16

Summary of Forest Tent Caterpillar Egg Band Counts
Taken on Three Trees at Each of Six Locations
in 1965

Location (township)	Tree species	Av. d.b.h. in inches	Total no. of egg bands	Forecast
Medonte	sM	4	0	Trace
Mara	tA	3	0	Trace
Orillia	tA	3	0	Trace
Wood	tA	4	2	Light
Matchedash	tA	4	2	Light
Baxter	tA	5	5	Light

Red-headed Pine Sawfly, Neodiprion lecontei (Fitch)

Small pockets of heavy infestation of this sawfly recurred at some locations and declined at others. At points in Baxter, Mara, Orillia, and Matchedash townships small pockets of heavy infestation were sprayed with a polyhedral virus disease. Most of the larvae died before pupation and it is therefore unlikely that heavy infestations will recur at those locations in 1966.

Two Jack-pine Sawflies, Neodiprion pratti paradoxicus Ross and
N. pratti banksianae Roh.

A medium infestation of N. pratti paradoxicus persisted for the second consecutive year in a jack pine plantation in Melancthon Township in 1965. Defoliation averaged an estimated 40 per cent of the old foliage. A light infestation of N. pratti banksianae increased to medium intensity on six open-grown jack pine trees at one location in Mara Township. Defoliation approximated 45 per cent of the old foliage. A light infestation that had persisted for two years in a jack-pine shelter-belt in Oro Township subsided in 1965.

Cocoons set out at the above locations to study the parasite complex of the two species showed that a native parasite, Lamachus species and an imported species, Drino bohemica Mesn. attacked larvae of N. pratti banksianae in Oro Township, a native parasite, Mastrus aciculatus (Provancher) attacked cocoons of both species in Oro and Mara townships and two cocoon parasites, Dahlbominus fuscipennis (Zetterstedt) and Pleolophus basizonus (Gravenhorst) which were imported from Europe and released about 20 years ago were found at all three locations (Table 17).

TABLE 17

Summary of Parasite Recoveries of Jack Pine Sawflies
in Lake Simcoe District in 1963 and 1964

Parasite species	Host stage at attack	Location of recoveries (township)		
		Melancthon	Mara	Oro
<u>Lamachus</u> sp.	Larva			x
<u>Drino bohemica</u> *	"			x
<u>Pleolophus basizonus</u> *	Cocoon	x	x	x
<u>Dahlbominus fuscipennis</u> *	"	x	x	x
<u>Mastrus aciculatus</u>	"		x	x

Note* Imported parasite species

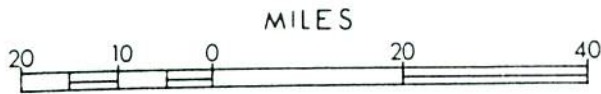
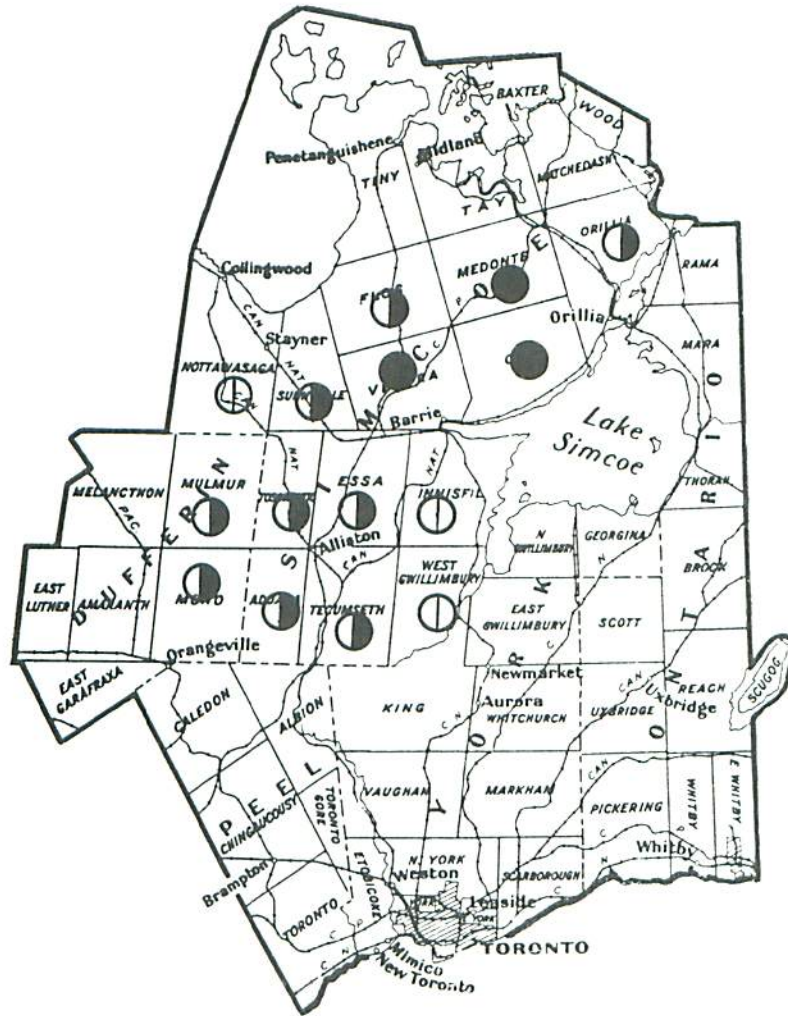
Spring Cankerworm, Paleacrita vernata (Peck)

Infestations of this looper declined in extent and intensity on elm trees at many locations in the district (see map). However, heavy infestations causing approximately 90 per cent defoliation persisted at numerous locations in Medonte, Oro, and Vespra townships. Heavy infestations on fence-row trees and in elm stands in Sunnidale, Essa, Adjala, Mono, Malmur, and Orillia townships declined to medium intensity. A medium infestation on large open-grown trees at one location in Nottawasaga Township declined to light intensity. Tree mortality occurred in a clump of large trees in Sunnidale Township where severe defoliation had occurred for three consecutive years.

A Leaf-folding Sawfly, Phyllocolpa sp. on Poplar

Populations of this leaf-folding sawfly, formerly known as Nematus species, fluctuated considerably in 1965 compared with 1964. Surveys in Matchedash and Tosoronto townships showed that the incidence of leaf folds increased from two to 22, and from seven to 24 respectively (Table 18). The heaviest infestation in the district was found on trembling aspen trees in Medonte Township where 98 folds were counted on 100 leaves examined. At a sample point in West Gwillimbury Township, of 53 folds counted on 100 leaves, 37 were empty and little damage resulted, due largely to failure of the eggs to hatch.

LAKE SIMCOE DISTRICT



SPRING CANKERWORM

Locations where infestations were observed in 1965

Legend

- Light infestation..... ○
- Medium infestation..... ◐
- Heavy infestation..... ●

TABLE 12

Summary of Leaf-folding Sawfly Counts in Lake Simcoe District
in 1964 and 1965

Note: Counts were based on the examination on 100 leaves of four trees at each location.

Location (township)	Tree species	Number of folds per hundred leaves	
		1964	1965
Matchedash	tA	2	22
Orillia	tA	1	4
Albion	tA	44	31
Tosorontio	tA	7	24
W. Gwillimbury	cPo	-	53
Medonte	tA	-	98

June Beetle, Phyllophaga sp.

Although little root damage by larvae of this insect was recorded in 1965 heavy adult populations which emerged from the soil in May and June caused moderate to severe defoliation of a wide variety of deciduous trees in the district. In Mara Township, heavy adult feeding over a prolonged period resulted in mortality of a few young open-grown ash trees (see photograph). Heavy adult flight occurring at 3-year intervals usually results in severe larval damage to the roots of ground vegetation and young trees the following summer. Control measures are advised in 1966 where second-year white grubs are common, especially where the planting of trees is contemplated in sodded fields.

White-pine Weevil, Pissodes strobi Peck

The incidence of leader damage caused by this weevil increased at three sample points and declined at six points in 1965 (Table 19). The most notable decline in leader damage occurred at a point in Matchedash where nine per cent of regeneration white pine trees were attacked in 1965, compared with 36 per cent in 1964.

TABLE 19

Summary of Leader Damage by the White-pine Weevil
in Lake Simcoe District in 1964 and 1965

Location (township)	Tree species	Per cent of trees weevilled	
		1964	1965
Whitchurch	wP	30	54
Matchedash	wP	36	9
Essa	wP	71	30
Orillia	wP	18	11
E. Gwillimbury	wP	35	65
Oro	wP	26	13
Whitchurch	nS	5	10
Vespra	nS	44	30
Innisfil	wP	-	38
King	wP	33	24

A Poplar Leaf Roller, Pseudexentera oregonana Wlshm.

Heavy infestations of this leaf-roller recurred for the sixth consecutive year in trembling aspen stands in Baxter, Wood, Matchedash, Orillia, Medonte, and Rama townships where up to 90 per cent of the leaves were rolled. Scattered medium and heavy infestations recurred south of Lake Simcoe in East Gwillimbury, North Gwillimbury, West Gwillimbury, and Georgina townships. Heavily infested trees did not produce adventitious foliage.

Elm Bark Beetles, Scolytus multistriatus (Marsh.) and Hylurgopinus rufipes Eich.

No change in the eastward advance of S. multistriatus was noted in 1965. In Simcoe County this vector of Dutch elm disease, Ceratocystis ulmi (Buism.) C. Moreau was found in small numbers west of a line between Midland and Hawkstone, and in Ontario County south of a line between Lake Simcoe near Port Bolster and Cannington. High populations occurred in dead and dying elm trees in the southern part of the district, decreasing in numbers northward to approximately Highway 89 where light infestations occurred. Pupae reared in the field showed that pupal parasites played a very minor role in population control. Heavy infestations of the native species, H. rufipes were found at all points examined in the district and was considered the more important vector of the disease in the district.

Maple Webworm, Tetralopha asperatella (Clem.)

A heavy infestation of this webworm that occurred in a sugar maple stand in Medonte Township in 1964 declined to light intensity in 1965. Adults of this species oviposit in rolled or folded leaves within which the resulting larval colonies feed. Leaves rolled by the forest tent caterpillar in this area prior to 1965 provided an abundance of oviposition sites and heavy infestations of the webworm resulted. However, a sharp decline of forest tent caterpillar populations in 1965 reduced the number of rolled leaves and webworm populations subsided.

TABLE 20

Summary of Miscellaneous Insects Collected
in Lake Simcoe District

Insect	Host(s)	Remarks
<i>Acleris variana</i> Fern	wS	Recurred at very low levels.
<i>Adelges abietis</i> Linn.	nS, wS	Moderate numbers of galls on some trees.
<i>Adelges lariciatus</i> (Patch)	wS	Galls numerous on some trees.
<i>Adelges strobilobius</i> Kalt.	eL, nS	Heavy foliage damage of European larch at many points. Galls light on Norway spruce.
<i>Agrilus liragus</i> Bary. & Br.	tA	Sucker growth mortality common in most areas.
<i>Alsophila pometaria</i> (Harr.)	E, Ba, bO	Light infestation on burr oak near Orillia, very low numbers elsewhere.
<i>Altica ulmi</i> Woods	E	Populations very low.
<i>Anacampsis innocuella</i> Zell.	tA, ltA	Heavy populations at points in Mulmur and Medonte townships.

TABLE 20 (continued)

Insect	Host(s)	Remarks
<i>Anoplonyx canadensis</i> Hgtn.	eL	Populations very low.
<i>Aphrophora parallela</i> Say	scP, wP	Heavy and medium infestations at many locations.
<i>Archips cerasivoranus</i> Fitch	ecCh	Small pockets of medium and light infestation in north half of district.
<i>Archippus packardianus</i> Fern	wS, blue spruce	Larvae common along Highway 400.
<i>Argyrotaenia pinatubana</i> Kft.	wP	Light infestations common.
<i>Brachyrhinus ovatus</i> Linn.	wS, wP	Adults common in most areas examined.
<i>Bucculatrix canadensisella</i> Chamb.	wB	Very low populations in the district.
<i>Choristoneura pinus</i> Freem.	scP, jP	Light infestations in the flowers at some locations.
<i>Choristoneura rosaceana</i> Harr.	lA, wO, bO	Populations low.
<i>Chrysopeleia ostryaella</i> Cham.	I	Medium infestations in Albion Township declined to light intensity.
<i>Coleophora ulmifoliella</i> McD.	E	Heavy infestations recurred in Georgina Township.
<i>Croesia semipurpurana</i> Kft.	rO	Populations at very low levels.
<i>Dasyneura balsamicola</i> (Lint.)	bF	Populations high at points in Mulmur and Medonte townships, low elsewhere.
<i>Datana integerrima</i> G. & R.	Wa	Heavy infestation on six trees north of Barrie.
<i>Datana ministra</i> Dru.	wB, W, Ap	Colonies rarely found.
<i>Dendroctonus valens</i> Lec.	rP, scP	Adults found in lower stems of trees adjacent to dying trees, and in stumps.
<i>Dioryctria disclusa</i> Heinr.	scP, jP	Light infestations in the shoots of young reproduction trees in Essa Township.
<i>Elaphidion parallelum</i> Newn.	rO, bO	Branch damage generally light.
<i>Epinotia nanana</i> Treit	nS, wS	Medium infestations on Norway spruce, light on white spruce at Midhurst.
<i>Erannis tiliaria</i> Harr.	Ba	Populations very low.
<i>Eriophes populi</i> Nal.	tA, bPo	Galls common at some locations.
<i>Exoteleia dodecella</i> Linn.	scP	Low populations recurred.
<i>Fenusa ulmi</i> Sund.	E	Heavy infestations in Brampton declined to medium, heavy infestations recurred in Vespra and Nottawasaga townships.
<i>Gretchena delicatana</i> Heinr.	I	Heavy infestations declined to light intensity.
<i>Hyphantria cunea</i> Dru.	deciduous	Only occasional colonies seen.

TABLE 20, (continued)

Insect	Host(s)	Remarks
<i>Ips chagnoni</i> Sw.	rP	Heavy infestations in dying trees.
<i>Ips pini</i> Say	rP, wP	High populations in dying trees.
<i>Leucoptera albella</i> Cham.	bPo	Light infestations common at many points.
<i>Lithocolletis aceriella</i> Clem.	sM, rM	Light infestations common.
<i>Lithocolletis ostryarella</i> Cham.	I	Light infestations in Simcoe and Dufferin counties.
<i>Lithocolletis salicifoliella</i> Cham.	tA	Low populations persisted in the district.
<i>Macrophya punctum-album</i> (L.)	Privet	Heavy infestations recurred on hedges in North York Township.
<i>Neodiprion abietis</i> (Harr.)	bF	High populations in the top six feet of many trees in Simcoe and Dufferin counties.
<i>Neodiprion virginianus</i> complex	jP	Light infestation on six trees in Mara Township increased to heavy. Seventy-five per cent defoliation resulted.
<i>Nymphalis antiopa</i> Linn.	deciduous	Widely scattered colonies common.
<i>Ocnerostoma strobivorum</i> Free.	wP	Populations very low in the district.
<i>Pamphilius ochreipes</i> (Cr.)	Viburnum	Heavy infestation on shelter-belt at Midhurst.
<i>Paratetranychus ununguis</i> (Jac.)	Numerous	Heavy concentrations found on many host species throughout the district.
<i>Petrova albicapitana</i> (Busck)	jP	Pitch masses common at points in Whitchurch and E. Gwillimbury townships.
<i>Phratora purpurea purpurea</i> Brown	tA	Heavy infestations in Uxbridge Forest declined to medium intensity.
<i>Pikonema alaskensis</i> (Roh.)	wS	Light infestations recurred in Melancthon Township. Small heavy infestation at a point in Mara Township.
<i>Pineus strobi</i> (Htg.)	wP	Heavy concentrations in Vivian and Uxbridge forests declined to light. Medium infestation on current shoots of 4-year old wP in Adjala Township.
<i>Pityogenes hopkinsi</i> Sw.	wP	Heavy infestations in young dying trees.
<i>Pleroneura borealis</i> Felt	bF	Populations very low due to two-year life cycle of the insect.
<i>Pristiphora geniculata</i> (Htg.)	Mo	Heavy infestation on a few trees near Orillia.
<i>Phyllocoptes aceris-crumena</i> (Rly.)	sM	Heavy infestations recurred on some trees.

TABLE 20 (continued)

Insect	Host(s)	Remarks
<i>Recurvaria florae</i> Free.	rP	New heavy infestations in flowers. Life history of this insect unknown but will be studied in 1966.
<i>Rhyacionia adana</i> Heinr.	rP	Heavy shoot damage recurred in Nottawasaga Township.
<i>Rhyacionia busckana</i> Heinr.	jP	Mined shoots common in the district.
<i>Saperda moesta</i> Lec.	tA	Heavy infestations recurred in stems of young trees in Vivian Forest.
<i>Schizura concinna</i> J. E. Smith <i>Sternochetus lapathi</i> (L.)	tA, W, Ap bPo, tA	Widely scattered colonies. High populations in stems of young trees in Uxbridge and Essa townships.
<i>Taniva albolineana</i> Kft.	Blue spruce	Heavy infestations on ornamental trees along Highway 400 recurred.
<i>Trisetacus grosmani</i> Keifer	bF	Infested buds numerous at a point in Medonte Township.
<i>Zeiraphera ratzeburgiana</i> Ratz.	wS	A heavy infestation declined to medium at a point in Medonte Township.
<i>Zelleria haimbachi</i> Busck.	jP	Heavy infestations declined to light intensity in 1966.