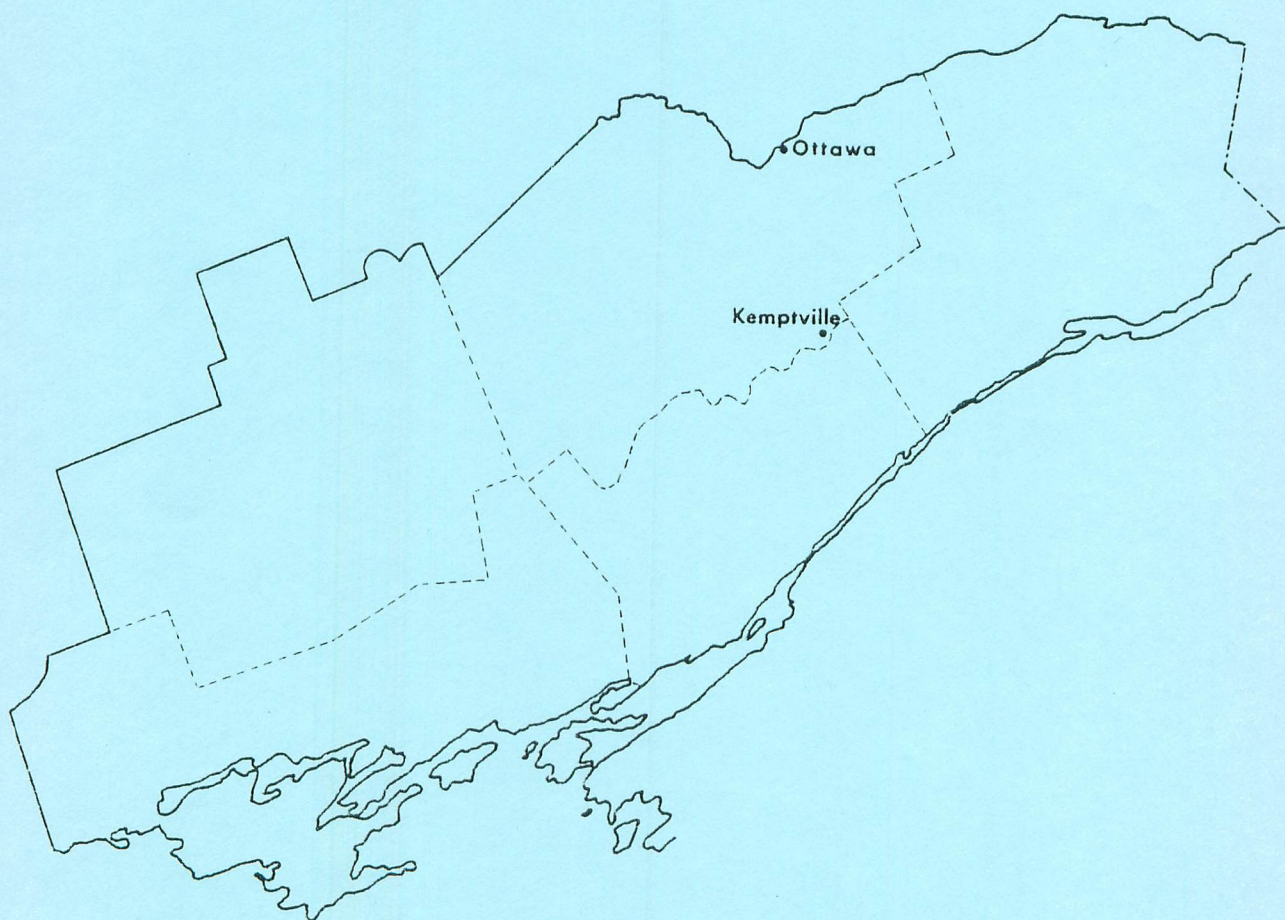


Results of forest insect and disease surveys in the EASTERN REGION of Ontario, 1981



CARRIED OUT BY THE GREAT LAKES FOREST
RESEARCH CENTRE IN CO-OPERATION WITH
THE ONTARIO MINISTRY OF NATURAL RESOURCES

SURVEY HIGHLIGHTS

The following information deals with the more important insect and disease conditions in the Eastern Region in 1981.

Gypsy moth populations and distribution increased within the Region, with the largest area defoliated being approximately 10.5 km² in the vicinity of Kaladar in the Tweed District. Spruce budworm populations declined throughout the northern portion of the Region, and the cedar leafminer infestation collapsed completely. There was a marked increase in the area defoliated by the maple leafcutter in the central portion of the Region, and the solitary oak leafminer population remained very high at numerous locations. The unusual winter weather apparently had a direct effect on both insect and disease conditions.

Extensive aerial and ground surveys were conducted for Scleroderris canker (European race) throughout the Region, and once again the results were negative. Maple continued to decline at numerous locations, and leaf rusts and spots caused heavy defoliation of hybrid poplar and butternut. Winter damage was very evident, and caused varying levels of damage to a wide range of host trees.

Special surveys included a collection of white spruce female flowers and mature cones to determine insect problems, and a white spruce plantation survey to identify insects and diseases with an impact on growth.

The format of the Table of Contents has been changed this year to simplify the rating scheme for both insects and diseases. The criteria used to categorize the insects and diseases are as follows:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs (formerly categories A and B)

Minor Insects or Diseases

Capable of sporadic or localized injury but not usually a serious threat to living trees or shrubs (formerly category C)

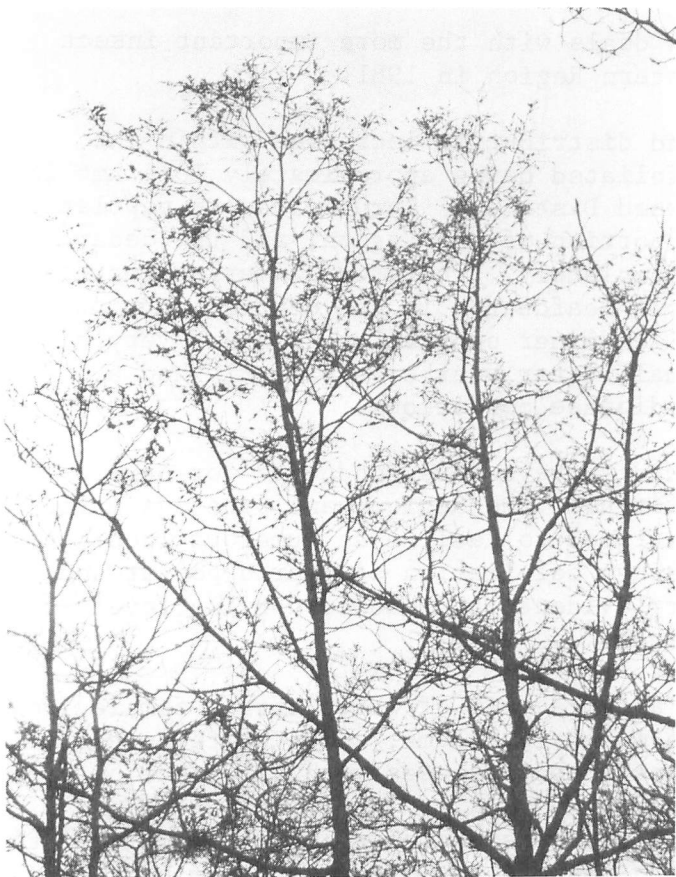
Other Forest Insects/Diseases (Tables)

These tables provide information on two types of pests: 1) those which are of minor importance and have not been known to cause serious damage to forest trees, and 2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1981.

The author would like to express his appreciation to the personnel of the Ontario Ministry of Natural Resources for their excellent cooperation during the 1981 field season.

R. J. Sajan

Frontispiece



Typical stand defoliation
resulting from a heavy
infestation of gypsy moth
(*Lymantria dispar* L.)

An adult female gypsy moth
laying egg masses on the side
of an oak (*Quercus* spp.) tree



TABLE OF CONTENTS

Page

INSECTS

Major Insects

Pine False Webworm, <i>Acantholyda erythrocephala</i>	1
(Carleton Place, Brockville and Cornwall districts)	
Cedar Leafminers, <i>Argyresthia aureoargentella</i> , <i>A. canadensis</i> , <i>A. thuiella</i> and <i>Pulicalvaria thujaella</i>	1
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Spruce Budworm, <i>Choristoneura fumiferana</i>	1
(Brockville, Cornwall, Carleton Place and Tweed districts)	
Fall Webworm, <i>Hyphantria cunea</i>	2
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Gypsy Moth, <i>Lymantria dispar</i>	2
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Redheaded Pine Sawfly, <i>Neodiprion lecontei</i>	4
(Carleton Place and Tweed districts)	
Jack Pine Sawfly, <i>Neodiprion pratti paradoxicus</i>	4
(Brockville and Carleton Place districts)	
Maple Leafcutter, <i>Paraclemensia acerifoliella</i>	5
(Brockville and Napanee districts)	

Minor Insects

Solitary Oak Leafminer, <i>Cameraria hamadryadella</i>	5
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Walnut Caterpillar, <i>Datana integerrima</i>	7
(Brockville, Carleton Place, Napanee and Tweed districts)	
Yellownecked Caterpillar, <i>Datana ministra</i>	7
(Carleton Place, Napanee and Tweed districts)	
Hickory Tussock Moth, <i>Halysidota caryae</i>	7
(Brockville and Tweed districts)	

Other Forest Insects	9
--------------------------------	---

(continued)

TABLE OF CONTENTS (concluded)

	<i>Page</i>
 TREE DISEASES	
<i>Major Diseases</i>	
Scleroderris Canker, <i>Gremmeniella abietina</i>	12
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Canker of Poplars, <i>Leucostoma nivea</i>	12
(Brockville, Carleton Place and Napanee districts)	
 <i>Minor Diseases</i>	
Anthracnose, <i>Gnomonia leptostyla</i>	12
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Ink Spot of Poplar, <i>Mycosphaerella populicola</i>	14
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Other Forest Diseases	14
 <i>Diebacks and Declines</i>	
Maple Decline	16
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
Oak Decline	17
(Carleton Place District)	
 <i>Abiotic Damage</i>	
Winter Damage	18
(Brockville, Cornwall, Carleton Place, Napanee and Tweed districts)	
 <i>Special Surveys</i>	
Nursery Report	
<u>Insects</u>	19
<u>Diseases</u>	19
White Spruce Cone Insects	20
White Spruce Plantation Survey	21
Light Trap	23

INSECTS

Major Insects

Pine False Webworm, *Acantholyda erythrocephala* (Linn.)

For the first time in three years population levels of this webworm declined throughout the central portion of the Region. In a 3 ha red pine (*Pinus resinosa* Ait.) plantation in Marlborough Township, Carleton Place District, 79% of the trees examined averaged five web masses per tree, and in a 4 ha jack pine (*Pinus banksiana* Lamb.) plantation in the same township, 9% of the trees averaged only one web mass per tree. In 1980, these two plantations averaged nine web masses per tree.

There was a noticeable decline from the recorded high in 1980, when an average of 15 web masses per tree were detected in Scots pine (*P. sylvestris* L.) Christmas tree plantations in the East Oxford area of Oxford on Rideau Township, Brockville District. This season, fewer than 5% of the trees examined were affected (an average of only two web masses per tree). This decline was attributed to the single application of the insecticide Sevin by the private landowner involved.

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

The infestation of this complex of leafminers that has caused severe defoliation of cedars (*Thuja* spp.) for the past three years throughout most of the Region virtually collapsed in 1981. Samples taken in Kitley and August townships, Brockville District and in Marlborough Township, Carleton Place District, produced heavily parasitized larvae and dead pupae. Parasitism is a large factor in the natural control of these leafminers and has historically caused abrupt declines in infestations in Ontario. The extremely cold temperatures experienced throughout the Region in February of 1981 may also have been a controlling factor.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts will be included with those of other Regions in a special report to be published later this year. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1981 and will give infestation forecasts for the province for 1982.

Fall Webworm, *Hyphantria cunea* Dru.

There were increases in population and distribution of this webworm at many points throughout the Region. The heaviest defoliation was recorded on fringe black ash (*Fraxinus nigra* Marsh.) and white elm (*Ulmus americana* L.) in Huntley and Goulbourn townships, Carleton Place District, on black ash and Manitoba maple (*Acer negundo* L.) south of the Raisin River in Charlottenburg Township, Cornwall District; and on ash and hickory (*Carya* spp.) along Highway 7 in Olden Township, Tweed District.

Moderate defoliation was sampled and recorded throughout Nepean Township, Carleton Place District; in Sidney Township, Napanee District; and in Oxford on Rideau Township, Brockville District.

Elsewhere trace to light levels of defoliation were detected at numerous scattered points on fringe and ornamental trees throughout the Region.

Gypsy Moth, *Lymantria dispar* (Linn.)

Historically this insect has occurred in small, isolated pockets along the southern fringe of the Region. However, in 1981 there was a major increase in population levels and distribution throughout the Region (see Frontispiece).

Gypsy moth was accidentally introduced into the United States in 1869 and for the next 20 years slowly spread over an area of approximately 900 km² in the vicinity of Boston. The total area infested then rapidly increased until 1902 when damage was detected throughout the New England states, the eastern portion of New York state and parts of New Jersey. The annual rate of spread of this moth then declined; however, by 1925 the gypsy moth had moved northward into southern Quebec, and in 1969 it was found in Ontario on Wolfe Island, south of Kingston, in the Napanee District.

The largest area of defoliation in the Region in 1981 was 3 km west of the village of Kaladar, along Highway 7, in the Tweed District, where approximately 10.5 km² were severely defoliated. Two additional pockets, 2.5 km² and 1.5 km², were found adjacent to the area described above (Fig. 1). Throughout the three pockets, red oak (*Quercus rubra* L.), white oak (*Q. alba* L.), aspen (*Populus* spp.), red maple (*Acer rubrum* L.), and various types of ground vegetation were severely defoliated.

Heavy defoliation was also detected in a 10 ha mixed hardwood stand in Charlottenburg Township, and in a 4 ha sugar maple (*Acer saccharum* Marsh.) woodlot and roadside trees in Lancaster Township, Cornwall District. In the Brockville District heavy defoliation was confined to an island south of Ivy Lea, in the St. Lawrence River. Similar

EASTERN REGION

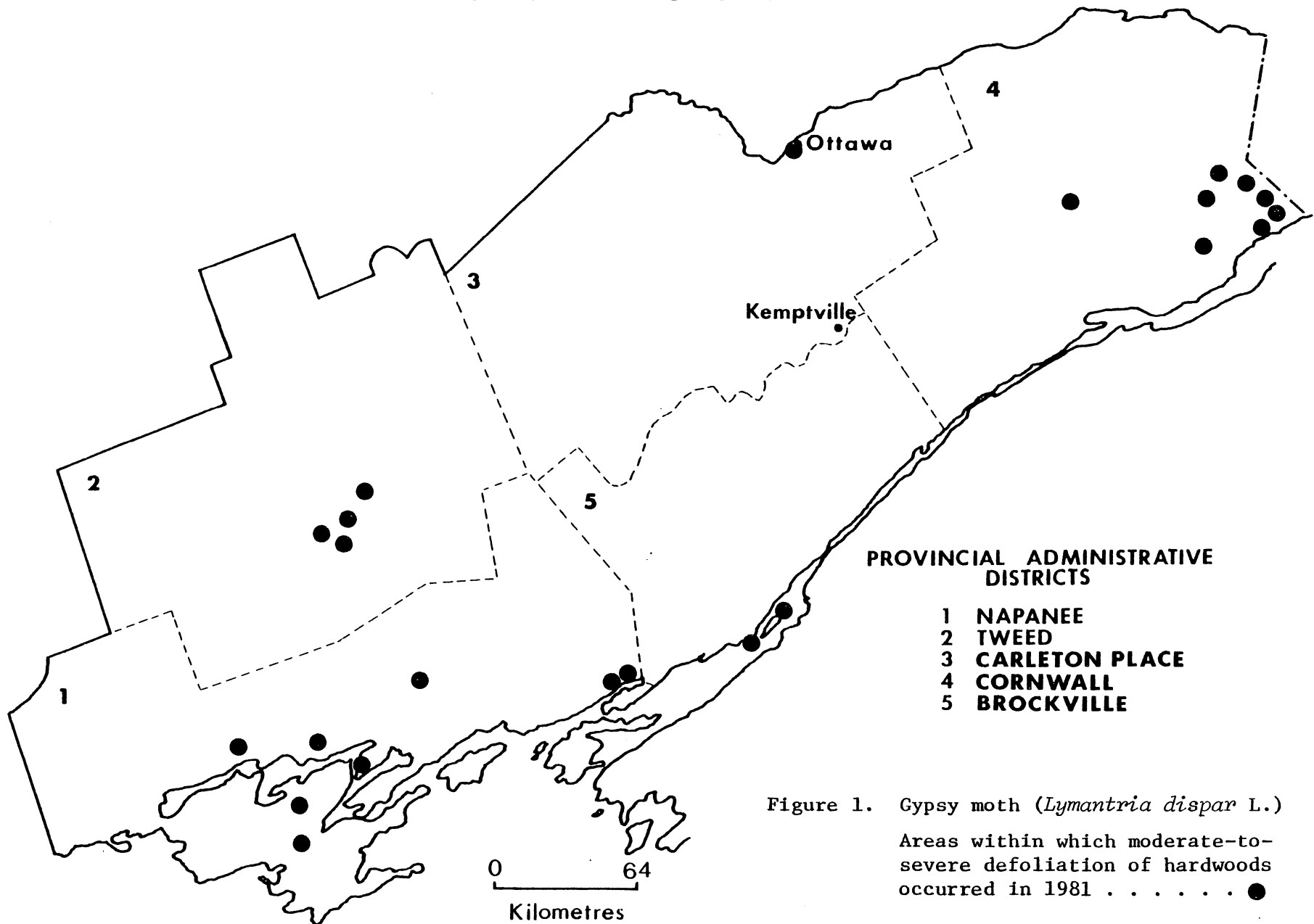


Figure 1. Gypsy moth (*Lymantria dispar* L.)
Areas within which moderate-to-severe defoliation of hardwoods occurred in 1981 ●

damage was detected in a 200 ha mixed hardwood stand in the Pitts Ferry area of Pittsburg Township; on scattered individuals along County Road 9 in Adolphustown Township and Highway 2 in Tyendinaga Township; and in the Demorestville area of Sophiasburg Township in the Napanee District.

Moderate levels of defoliation were detected in a 4 ha stand on Hill Island, east of Ivy Lea in the Brockville District and west of Picton in Hallowell Township of the Napanee District.

Light defoliation of ornamentals occurred in the northwest portion of the city of Cornwall, Cornwall District; along Island Park Drive, within the city of Ottawa, Carleton Place District; and within the city of Belleville, Napanee District.

Single larvae were collected in a hybrid poplar plantation in Roxborough Township, Cornwall District and in a white spruce (*Picea glauca* [Moench] Voss) plantation in Hinchinbrooke Township, Tweed District.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Extensive surveys conducted in pine regeneration throughout the Region revealed that population levels of this sawfly were extremely low for the second consecutive year.

In a single 6 ha jack pine plantation in Hungerford Township, Tweed District this sawfly was detected causing serious damage. An evaluation revealed that 70% of the trees were affected, with an average of three colonies per tree. Upon detection of this single heavy infestation the Ontario Ministry of Natural Resources (OMNR), using the insecticide Malathion, controlled this localized population.

In a 5 ha red pine plantation in Beckwith Township, Carleton Place District, it was determined that 1% of the trees were infested with an average of only one colony per tree.

Jack Pine Sawfly, *Neodiprion pratti paradoxicus* Ross

In a 20 ha jack pine plantation in Ramsay Township, Carleton Place District, and in a 12 ha plantation in Elizabethtown Township, Brockville District, surveys revealed that this sawfly had caused severe defoliation (Table 1). Four consecutive years of insecticide applications by OMNR in Ramsay Township have had no significant impact on the population. Therefore, a nuclear polyhedral virus spray program under the direction of the Forest Pest Management Institute in Sault Ste. Marie has been proposed for 1982 in the two plantations described above.

Elsewhere in the Region, populations are at a very low level, with only trace defoliation encountered occasionally on fringe trees.

Table 1. Summary of jack pine sawfly colony counts in the Eastern Region.

Location (Twp)	Host	Avg ht of trees (m)	Area affected (ha)	Total no. of trees examined	Total no. of trees infested	Avg no. of colonies/ tree
Brockville District						
Elizabethtown	jP	1.9	12	150	150	6
Carleton Place District						
Ramsay	jP	2.2	20	150	150	6
Lanark	scP	9.0	1	50	30	1

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

A marked increase in population and distribution of this maple defoliator was recorded in 1981 in the central portion of the Region. The area infested expanded from 20 km² in 1980 to approximately 1,300 km² this season. The defoliation extended from the northeastern corner of the Napanee District along the south side of Bobs Lake in Bedford Township, and into the northern portion of Loughborough Township; and from the western edge of Bedford Township in an easterly direction to Big Rideau Lake in Bastard Township, Brockville District (Fig. 2).

As a result of the heavy feeding of this leafcutter, sugar maple foliage throughout the described area was severely browned and was falling prematurely by mid-August. However, healthy maples should be capable of sustaining several years of heavy defoliation in succession with no major loss of tree vigor.

Minor Insects

Solitary Oak Leafminer, *Cameraria hamadryadella* Clem.

The results of surveys for this leafblotch miner indicated that the population levels remained high throughout most of the Region for the second consecutive year. Moderate-to-severe defoliation of bur oak (*Quercus macrocarpa* Michx.) and red oak occurred south of a line from the city of Ottawa in Carleton Place District, west along the Rideau River to

EASTERN REGION

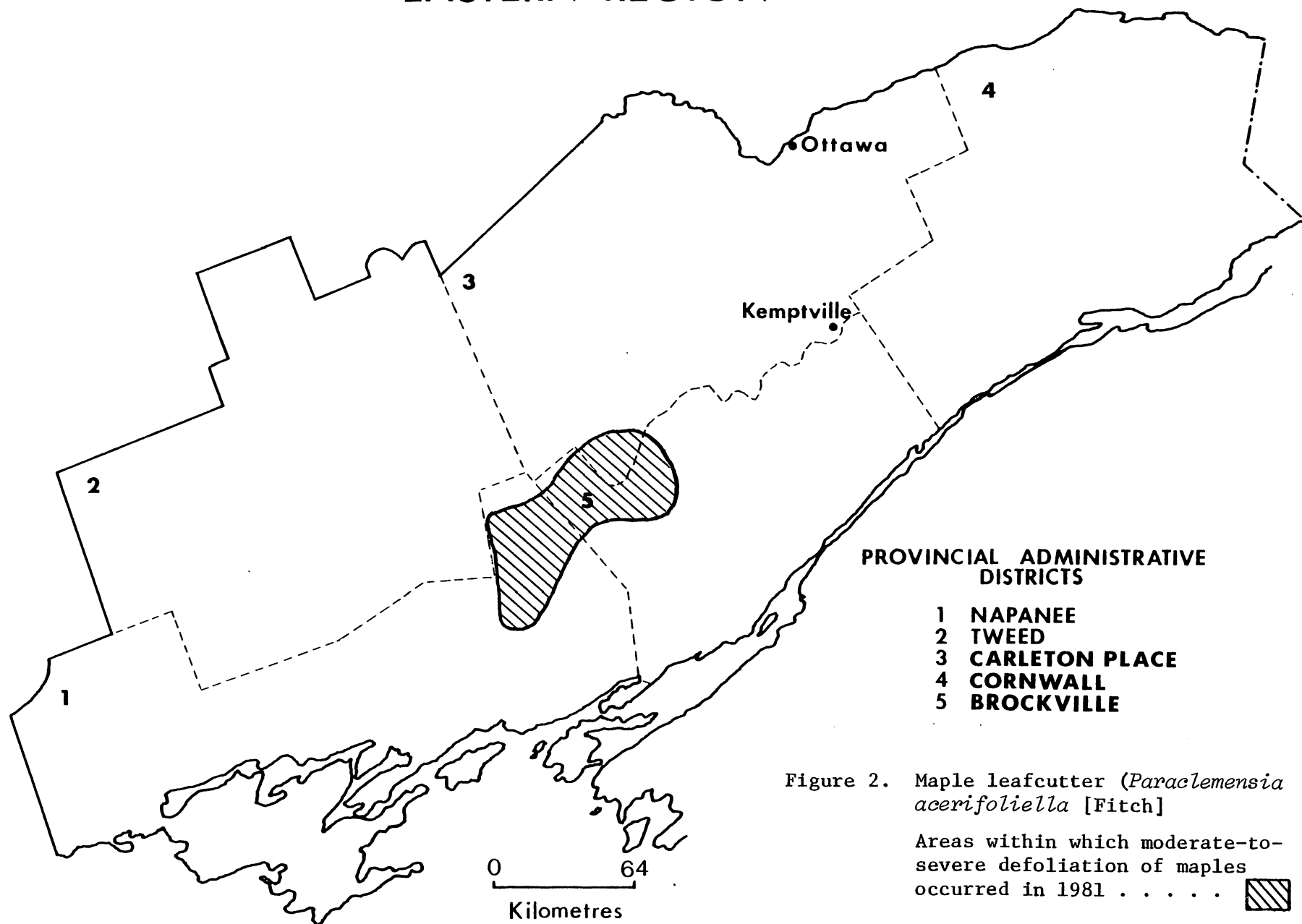


Figure 2. Maple leafcutter (*Paraclemensia acerifoliella* [Fitch])

Areas within which moderate-to-severe defoliation of maples occurred in 1981



the Westport area of Brockville District, and southwest to the Campbellford area of Napanee District.

Light-to-moderate damage was detected at numerous points north of the line described above from the town of Marmora in the Tweed District to the Fitzroy Harbour area of the Carleton Place District.

Walnut Caterpillar, *Datana integerrima* G. & R.

Populations of this caterpillar continue to increase slowly in the Region, especially throughout the Napanee District (Fig. 3). Butternut (*Juglans cinerea* L.) was the preferred host and at numerous locations was completely defoliated. In the western end of the Napanee District, the few remaining white elm trees scattered throughout the area were also heavily defoliated.

This caterpillar feeds in colonies and is therefore capable of rapidly defoliating entire trees; it often attacks single, open-grown trees. The feeding period occurs during the latter part of the growing season from late July to early September. Several consecutive years of defoliation can result in tree mortality.

Yellownecked Caterpillar, *Datana ministra* (Dru.)

There was a marked increase in populations of this caterpillar in the Region in 1981. In the previous year, only trace numbers were reported on fringe trees on Wolfe Island in the Napanee District.

Severe defoliation of white elm and basswood (*Tilia americana* L.) was detected and sampled along Highway 401 in Kingston, Ernestown and Sidney townships, with moderate levels being recorded in Tyendinaga and Thurlow townships, Napanee District. Light defoliation was sampled in Marmora Township, Tweed District, and in Goulbourn Township, Carleton Place District.

Hickory Tussock Moth, *Halysidota caryae* (Harr.)

For the first time since 1956 this tussock moth was detected causing noticeable defoliation in the Region. Light-to-moderate defoliation was recorded on scattered basswood, elm and butternut through approximately 60 km² in the southeastern portion of Hungerford Township and the adjacent southwest corner of Sheffield Township, Tweed District.

EASTERN REGION

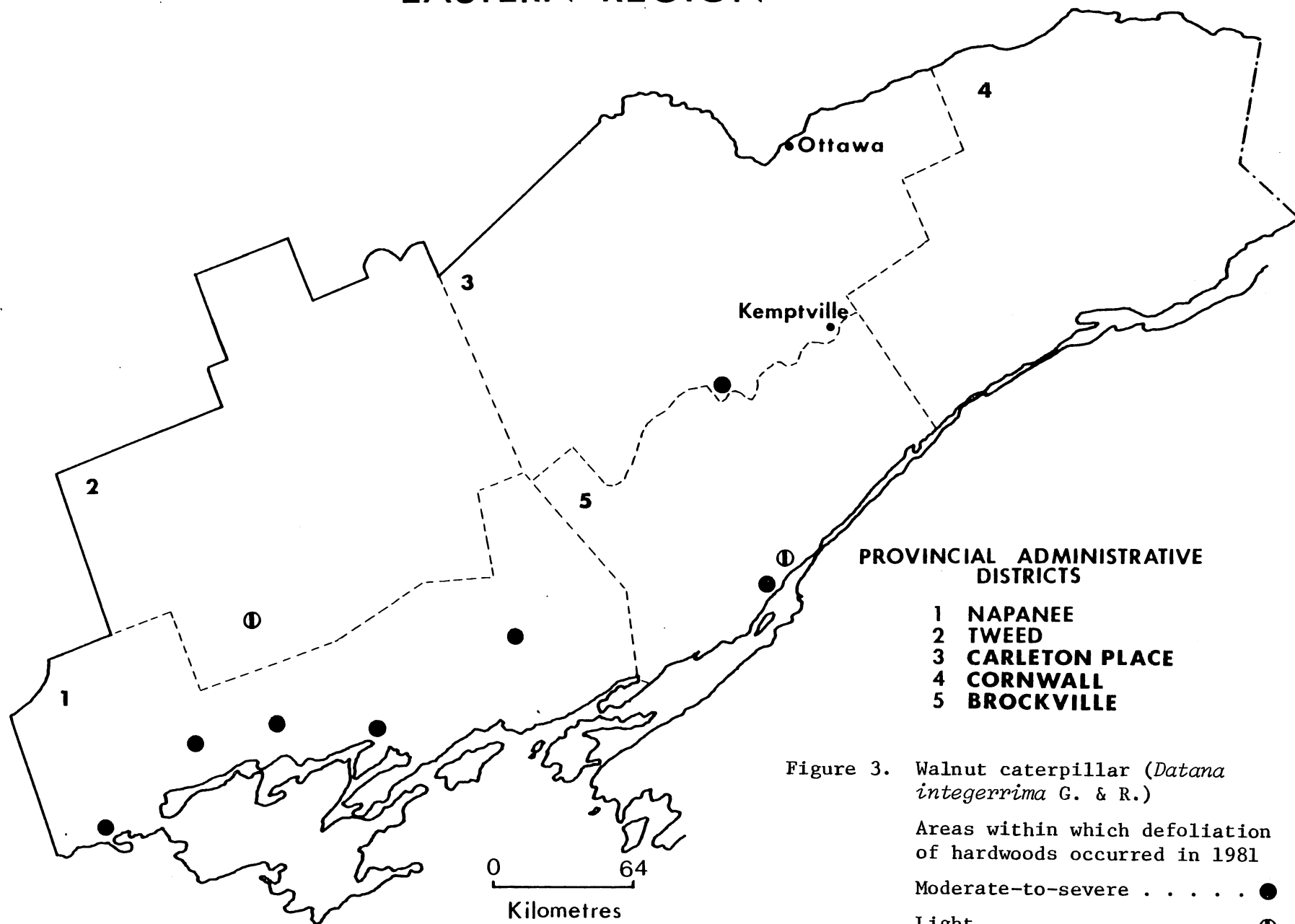


Figure 3. Walnut caterpillar (*Datana integerrima* G. & R.)

Areas within which defoliation of hardwoods occurred in 1981

Moderate-to-severe ●

Light ①

Trace defoliation was encountered occasionally on fringe trees south of the above area in Ernestown and Kingston townships, Napanee District. Bitternut hickory (*Carya cordiformis* [Wang.] K. Koch) along the Thousand Islands Parkway, west of Ivy Lea in the Brockville District, showed similar trace levels of defoliation.

Table 2. Other forest insects.

Insect	Host(s)	Remarks
<i>Adelges</i> sp. A scale	L	high populations detected on ornamental trees in Lancaster Twp, Cornwall District, and in Marlborough Twp, Carleton Place District
<i>Aphrophora cribrata</i> (Wlk.) Pine spittlebug	scP, jP	very common in low numbers at numerous locations in the Region
<i>Coleophora laricella</i> (Hbn.) Larch casebearer	tL	trace numbers found in a 1 ha seed production area in Finch Twp, Cornwall District
<i>Croesia semipurpurana</i> (Kft.) Oak leaf shredder	0	a marked decline in area defoliated in the Region; trace levels detected in the Mazinaw Lake area of Tweed District
<i>Diprion similis</i> (Htg.) Introduced pine sawfly	scP	trace populations detected on open-grown ornamentals in South Gower Twp, Brockville District
<i>Eucosma gloriola</i> Heinr. Eastern pine shoot borer	scP, wP	3% incidence rate detected in a 3 ha plantation in Bastard Twp, Brockville District, and 1% in a 2 ha plantation in Beckwith Twp, Carleton Place District
<i>Fenusa pusilla</i> (Lep.) Birch leafminer	wB	very common on ornamental and roadside trees throughout the central portion of the Region

(continued)

Table 2. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Lecanium corni</i> Bouche European fruit lecanium	Ba	common on host trees throughout Augusta Twp, Brockville District
<i>Leperisinus</i> sp. A bark beetle	wAs	high numbers recovered from a dying tree in Kitley Twp, Brockville District
<i>Lepidosophes ulmi</i> (Linn.) Oystershell scale	Be	very common throughout the northern portion of North Crosby Twp, Brockville District
<i>Leucoma salicis</i> Linn. Satin moth	Po	Although high levels were recorded in 1980, there was a complete collapse throughout the Region in 1981.
<i>Neodiprion nanulus nanulus</i> Schedl. Red pine sawfly	rP	trace numbers detected in pine plantings in Marlborough Twp, Carleton Place District
<i>Neodiprion sertifer</i> (Geoff.) European pine sawfly	scP	populations extremely low throughout the Region; trace populations found on fringe trees along County Rd 16 in Lanark Twp, Carleton Place District
<i>Nymphalis antiopa</i> (L.) Mourningcloak butterfly	E,W, As	encountered at numerous locations throughout the Region
<i>Pantographa limata</i> G. & R. Basswood leafroller	Ba	very common on host trees throughout North Crosby Twp, Brockville District
<i>Pikonema alaskensis</i> (Roh.) Yellowheaded spruce sawfly	wS	common at trace levels on open-grown trees in the Region; for further information see the white spruce plantation survey in text
<i>Pissodes approximatus</i> Hopk. Northern pine weevil	ScP	3% mortality rate in a 5 ha Christmas tree plantation in Edwardsburg Twp, Brockville District

(continued)

Table 2. Other forest insects (concluded).

Insect	Host(s)	Remarks
<i>Saperda vestita</i> Say Linden borer	Ba	commonly found on ornamentals within the city of Ottawa, Carleton Place District
<i>Schizura concinna</i> (J.E. Smith) Redhumped caterpillar	E	trace defoliation in Pakenham Twp, Carleton Place District

TREE DISEASES

Major Diseases

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

For the fourth consecutive year extensive surveys were conducted throughout the Region for the European race of Scleroderris canker. As in previous years, no evidence of the disease was detected.

The 1981 survey entailed re-examination of 10 of the 20 permanent sample plots in the Region, and examination of the nine locations in which seedlings from the Saratoga Tree Nursery in New York have been planted (Fig. 4). At each of these locations 500+ randomly selected trees were examined for any symptoms of the disease.

In addition, an aerial survey of the eastern and southeastern portion of the Region to detect any dead or dying pine was completed. Eight suspect locations were mapped. Extensive ground checks of these areas indicated that the damage was due to other causes, i.e., flooding, fire, cattle, etc.

Staff of the Pathology Department of Lakehead University, under contract to OMNR, Cornwall District, conducted an additional survey in the Region. Approximately 125 pine plantations south of Highway 43 to the St. Lawrence River in the Cornwall District were examined for symptoms of the disease. Forty samples from suspected trees were shipped to the Great Lakes Forest Research Centre in Sault Ste. Marie for identification. This survey produced no evidence of the disease.

Canker of Poplars, *Leucostoma nivea* (Fr.) Hoehn.

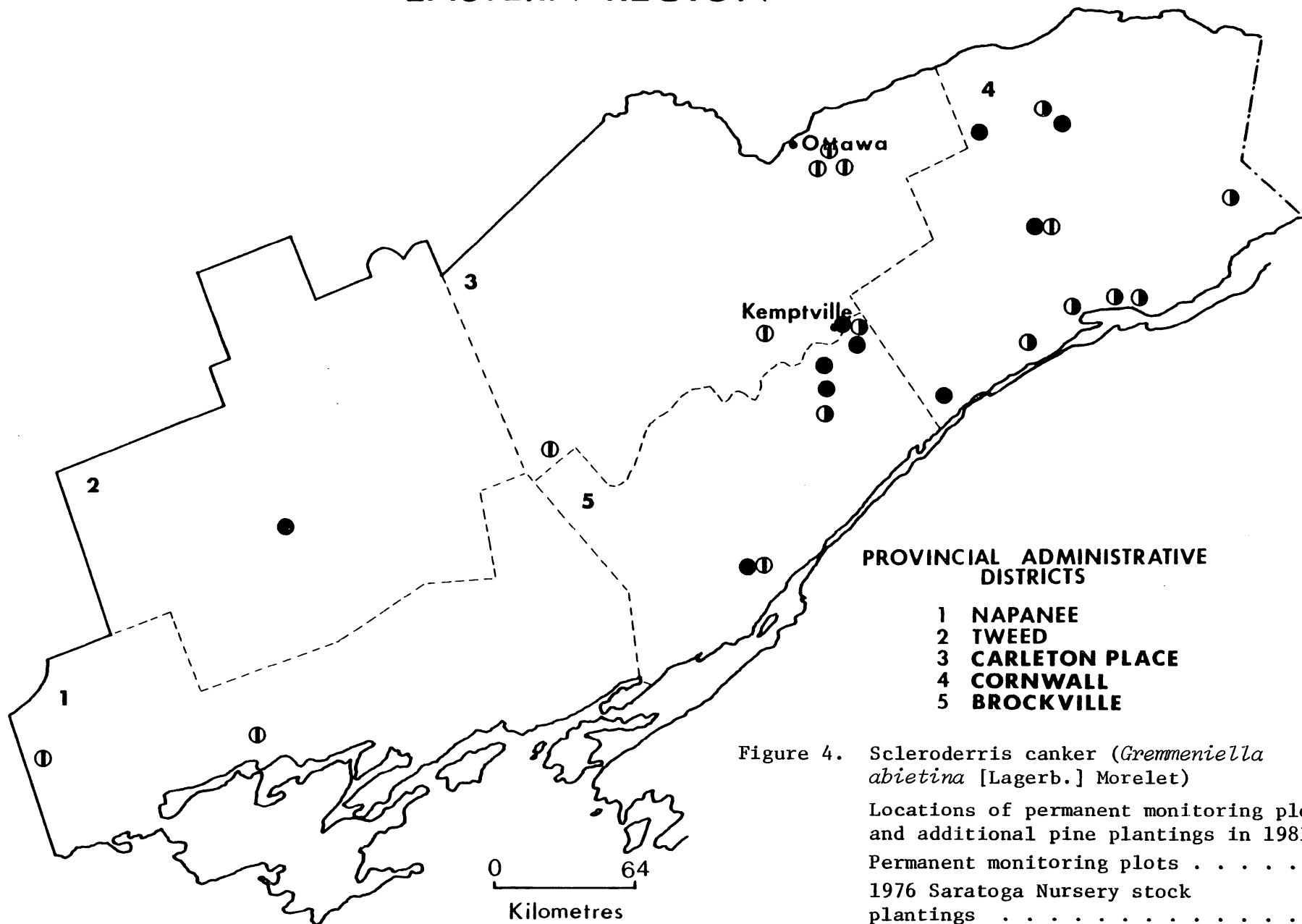
Surveys conducted in hybrid poplar plantings throughout the Region revealed that the incidence rate of this particular stem canker was usually low. However, in a 2 ha plantation east of the town of Osgoode in Osgoode Township, Carleton Place District, a mortality rate of approximately 10% was recorded. A similar mortality rate was recorded in a plantation along Highway 16 in Oxford on Rideau Township, Brockville District. A mortality rate of only 1% was recorded in a 3 ha plantation northeast of Stirling, in Rawdon Township, Napanee District.

Minor Diseases

Anthraxnose, *Gnomonia leptostyla* (Fr.) Ces. and de n.

Open-grown ornamentals and small pockets of roadside butternut trees throughout most of the Region sustained varying levels of defoliation caused by this leaf disorder. Nearly 100% defoliation was detected

EASTERN REGION



PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 NAPANEE
- 2 TWEED
- 3 CARLETON PLACE
- 4 CORNWALL
- 5 BROCKVILLE

Figure 4. Scleroderris canker (*Gremmeniella abietina* [Lagerb.] Morelet)

Locations of permanent monitoring plots and additional pine plantings in 1981

- Permanent monitoring plots ●
- 1976 Saratoga Nursery stock plantings ⊙
- Additional areas checked ⊙

in the vicinity of Parham in Bedford Township, Napanee District, and along the Raisin River in Charlottensburg Township, Cornwall District.

Moderate levels of damage were reported in Osgoode Township, Carleton Place District; along Highway 401 in Kingston Township, Napanee District; and in Huntington and Hungerford townships, Tweed District.

Elsewhere in the Region, light-to-moderate defoliation was present wherever the host occurred.

Ink Spot of Poplar, *Mycosphaerella populicola* G.E. Thoms.

Balsam poplar (*Populus balsamifera* L.) occurs in small pockets, usually less than 0.2 ha in size, along the edges of low-lying wet areas throughout the Region. In 1981 these widely scattered pockets were heavily defoliated by this leaf spot. In many instances, 90 to 100% defoliation was recorded by late August.

This high level of damage was observed and/or sampled in Oso, Olden, Madoc and Hungerford townships, Tweed District, and in Pakenham, Beckwith and Fitzroy townships, Carleton Place District. Similar levels were often detected in Oxford on Rideau, Edwardsburg and August townships, Brockville District, and in Cambridge, Finch, Mountain, Williamsburg and Charlottensburg townships, Cornwall District.

Table 3. Other forest diseases.

Organism	Host(s)	Remarks
<i>Chrysomyxa pirolata</i> Wint. Cone rust of spruce	tA	trace cone damage found on 1% of trees in a 20 ha plantation in Charlottensburg Twp, Cornwall District
<i>Ciborinia whetzelii</i> (Seaver) Seaver Ink spot of aspen	tA	moderate foliar damage on ornamental trees east of Kemptville in Oxford on Rideau Twp, Brockville District; trace damage on fringe roadside trees in Nepean Twp, Carleton Place District
<i>Coleosporium asterum</i> (Diet.) Syd. Pine needle rust	rP	trace foliar damage detected on 39% of trees in a 2 ha plantation in Finch Twp, and on 4% of trees in a 6 ha plantation in South Plantagenet Twp, Cornwall District

(continued)

Table 3. Other forest diseases (continued).

Organism	Host(s)	Remarks
<i>Cytospora</i> sp.	rAs	trace mortality in a mixed woodlot in Seymour Twp, Napanee District
<i>Cytospora</i> sp.	rJ	30% of new foliage dead on scattered, open-grown trees near Corbyville in Thurlow Twp, Napanee District
<i>Davisomycella ampla</i> (Davis) Darker Needle cast	jP	trace foliar damage detected in a 3 ha pine plantation north of Dunrobin in Torbolton Twp, Carleton Place District
<i>Guignardia aesculi</i> (Pk.) V.B. Stewart Leaf blotch	Horse chestnut	moderate level detected on roadside trees in the Colborne area of Cramahe Twp, Napanee District
<i>Hypoxylon mammatum</i> (Wahl.) J.H. Miller Hypoxylon canker of poplar	tA	very common in Region; incidence rate of 14% encountered in Finch Twp, Cornwall District
<i>Marssonina brunnea</i> (Ell. & Ev.) Magn. Leaf spot of poplar	hybrid poplar	100% of trees affected in a 2 ha plantation east of Oxford Station in Oxford on Rideau Twp, Brockville District; a similar incidence level was detected in a 3 ha plantation northeast of Stirling in Rawdon Twp, Napanee District
<i>Melampsora medusae</i> Thuem. Leaf rust of poplar	Ba	high incidence level recorded in a 3 ha woodlot in Pakenham Twp, Carleton Place District
<i>Scolecnectria cucurbitula</i> (Tode ex Fr.) Booth	rP	associated with a small pocket of dead trees in a 4 ha plantation east of Actinolite in Hungerford Twp, Tweed District
<i>Valsa sordida</i> Nits. Canker of poplar	hybrid poplar	associated with 7% mortality in a plantation in Charlottenburg Twp, Cornwall District

(continued)

Table 3. Other forest diseases (concluded).

Organism	Host(s)	Remarks
<i>Venturia acerina</i> Plakidas ex Barr Leaf spot of maple	rM	moderate damage to foliage of trees growing in low-lying areas in the Oxford Mills area of Oxford on Rideau Twp, Brockville District
<i>Venturia macularis</i> (Fr.) Müller & Arx Shoot blight	tA	high incidence recorded on fringe regeneration north of Roebuck in Augusta Twp, Brockville District

Diebacks and Declines

Maple Decline

Throughout the entire Region sugar maples continue to die along roadsides, driveways and on residential property. In 1980, this decline was recorded in two large bands. One band extended southwest from the Oxford Mills area of Oxford on Rideau Township, to the Charleston Lake area of the Rear of Yonge and Escott Township, Brockville District. The other band extended southwest from north of the city of Kingston in Kingston Township to the town of Napanee and into Prince Edward County, Napanee District. Throughout these areas, chiefly roadside trees were affected.

In 1981 the decline intensified to the point that declining maples were detected throughout the entire Region. In towns such as Smiths Falls and Perth in Carleton Place District, 75% of the ornamental maples were found to be dead or dying. In the town of Athens in Brockville District, several mature maples growing along a driveway into a senior citizens' complex all started to die in May and June. Maple trees within the towns of Vankleek Hill and Hawkesbury in Cornwall District were also found to be declining through May and June. Numerous ornamentals throughout the city of Ottawa and south along the Rideau River in Carleton Place District began to decline during this same period. Roadside trees growing along numerous county roads throughout the Region are also declining and dying.

The most common symptoms of maple decline are as follows. Small branches begin to die in the uppermost crown by late May, and throughout

June the majority of the crown and/or the entire tree dies. In August the bark on the main branches cracks, dries out and falls off.

As reported in 1980, only secondary organisms have been cultured from collected samples and these are not considered capable of being the primary cause of mortality. The survey has detected the problem chiefly on mature trees; however, the decline has been detected affecting all age classes of sugar maple.

Oak Decline

The oak decline impact plots in the northwestern portion of Carleton Place District were retallied for the fifth consecutive year. In the two 100-tree plots the study trees have exhibited a steady decline in vigor. An average of 86% of the trees were considered to be very healthy when the study was begun; however, five years later, an average of only 43% of the trees were considered to be very healthy, and mortality totalled 8% on the two plots (Table 4).

Table 4. Summary of data collected from the oak decline impact plots in Carleton Place District, from 1977 to 1981 (based on the re-examination of 100 tagged trees at each location).

Location (Twp)	Avg DBH of trees (cm)	Year	Crown classes ^a					
			0	1	2	3	4	5
Carleton Place District								
Lavant - Plot 1	24	1977	-	46	38	12	4	0
	24	1978	-	21	59	13	7	0
	24	1979	2	3	51	32	8	4
	24	1980	0	7	41	36	11	5
	24	1981	0	11	33	37	12	7
Lavant - Plot 2	19	1977	-	28	60	11	1	0
	19	1978	-	14	72	10	4	0
	19	1979	1	4	73	18	2	2
	19	1980	0	2	53	33	7	5
	19	1981	0	2	41	40	8	9

^a Class 0: trees considered healthy; classes 1-3: trees have 1-59% branch mortality; class 4: trees have 60%+ branch mortality; class 5: trees are dead.

Abiotic Damage

Winter Damage

Damage resulting from the unusual winter weather experienced throughout the Region in 1980-1981 was observed and sampled at numerous locations on a wide variety of tree species. Regional temperatures fluctuated from a minimum of -23°C on 5 February to a maximum of $+12^{\circ}\text{C}$ on 22 February, and then declined again to -14°C by 3 March. The normal monthly maximum and minimum temperatures for the month of February are -4.7°C and -14.4°C , whereas the means for 1981 were 1.4°C and -6.7°C , respectively (recorded data obtained from the Atmospheric Environment Service Weather Office at Ottawa).

The browning of foliage on pines, caused by the transpiration of moisture while root systems are in frozen ground, was recorded throughout the Region. Young sugar maple in Charleston Lake Provincial Park and in the northern portion of the city of Brockville in the Brockville District were found to be heavily damaged by sunscalding, a condition in which a portion of the bark on the main stem cracks and splits open as a result of being heated by direct, warm winter sunlight.

At the G. Howard Ferguson Forest Station in the Brockville District, the extremely cold weather caused some hybrid poplar clones to be killed back to the groundline or completely killed, especially in the DN 1 clone. Throughout the station, larch (*Larix* spp.), cedar, silver maple (*Acer saccharinum* L.), and ash (*Fraxinus* spp.) seedlings all sustained varying amounts of top kill. The terminal bud on approximately 20% of the rising 2-0 white spruce was also damaged or killed by the winter conditions.

Outplantings of hybrid poplars in Oxford on Rideau and Kitley townships, Brockville District; in Osgoode Township, Carleton Place District; in Finch, Roxborough and Charlottenburg townships, Cornwall District; and in Hinchinbrooke Township, Tweed District, averaged 10% mortality as a result of the cold temperatures. Top kill, which in some cases extended to the groundline, was detected commonly in the hybrid poplar plantations examined.

Throughout the Region ornamental hedges and windbreaks were heavily damaged and often completely killed. Mountain ash (*Sorbus americana* Marsh.) appeared to be the ornamental most often completely killed by the frost.

Special Surveys

Nursery Report

Insects: Scattered pockets of trace defoliation detected on the cedar windbreaks throughout the G. Howard Ferguson Forest Station were caused by cedar leafminers (*Argyresthia aureoargentella*, *A. canadensis*, *A. thuiella*, and *Pulicalvaria thujaella*). This is a marked decrease from previous years and is due to the combined effects of the continuous control program by the nursery staff and the general collapse of this complex throughout the Region.

Rising 2-0 white pine in compartments 55 and 26 were lightly infested with a pine bark adelgid (*Pineus* sp.). Small pockets, comprising approximately 3% of the seedlings, were yellowed as a result of the feeding of the aphid; however, mortality was less than 1%.

Spider mites (Acari) were detected in one of the greenhouses causing severe browning of foliage on hybrid poplars that were being propagated for outplanting at the nursery. Because of this scheduled outplanting and threat of spread to other clones, a successful control program was initiated which consisted of several treatments of three different miticides.

The imported willow leaf beetle (*Plagiodera versicolora* [Laich]) was detected causing heavy defoliation of hybrid poplars, especially in compartment 53. Both the larvae and adults feed on foliage, and there may be more than one generation per year, a factor which compounds the total damage sustained by the seedlings.

The leaf curl midge (*Prodiplosis morrissi* Gagné) was detected causing severe damage to the elongating shoot and foliage of the hybrid poplar clone DN 132. Other hybrid types on the four adjacent sides of this particular clone were examined and were found unaffected by this midge. Random spot checks of other clones throughout the nursery also produced negative results for this midge.

Diseases: General surveys in late May revealed a mortality rate of approximately 8% in germinating white spruce and 1% in white pine. The problem was identified as damping off. One week later approximately 10% of the rising 1-0 cedar showed similar symptoms, and consequent laboratory cultures produced *Fusarium* sp., an organism known to cause damping off. The three compartments were treated with the fungicide Captan and the problem was solved.

A mortality rate of approximately 2% was detected in compartment 30 in rising 1-0 white pine. Examination of the dying seedlings revealed a marked swelling and splitting of the bark at the groundline. It was later determined that these symptoms were caused by excessive heat.

The leaf rust of poplar (*Melampsora medusae* Thuem.) was very prevalent throughout the hybrid poplar clones. The heaviest defoliation was recorded in DTAC clones, especially DTAC 15, and in several of the DN clones. It was estimated that the DTAC 15 clone was 90% defoliated by this rust.

Red pine seedlings in compartment 31 began to die in scattered pockets across the entire compartment in mid-May. Soil samples yielded *Cylindrocladium* root rot (*Cylindrocladium floridanum* Sob. & Seymour). It was estimated that 20% of the total seedlings in this compartment were lost to this root disorder.

White Spruce Cone Insects

In a spruce budworm infested area of open-grown mixed white spruce, black spruce and balsam fir, averaging 15 m in height, in Ramsay Township, Carleton Place District, two special collections of white spruce cones were made. The first collection, consisting of 200 female flowers, was made on 13 May to determine the percentage of flowers damaged by the feeding of second- and third-instar spruce budworm larvae and/or any additional insects. Flowers that are damaged by insect feeding are often aborted by the tree. The second collection, consisting of 100 mature cones, was made on 10 August, to determine the percentage of seed destroyed by insect feeding.

These collections revealed that 32% of the flowers and 67% of the mature cones were damaged by various feeding insects (Table 5). It was determined from the flower collection that the spruce budworm and the spruce bud moth (*Zeiraphera canadensis* Mut. & Free.) were the major problems, causing more than half the damage. In the mature cone collection, the spruce cone maggot (*Hylemya anthracina* [Czerny]) and spruce cone axis midge (*Dasineura rachiphaga* Tripp) were responsible for more than 60% of the damage. In both collections, feeding caused by unidentified lepidoptera was very common and accounted for approximately 50% of the recorded damage.

Table 5. A summary of the percentages of damaged white spruce flowers collected on 13 May and damaged white spruce cones collected on 10 August in the Eastern Region in 1981.

Location (Twp)	No. of flowers examined	Flowers damaged (%)	No. of flowers damaged by ^a		No. of cones examined	Cones damaged (%)	No. of cones damaged by ^a	
			Lepi- doptera	Other insects			Lepi- doptera	Other insects
Carleton Place District								
Ramsay	202	32	72	0	100	67	54	47

^a

Damage to an individual flower or cone may be caused by more than one insect.

White Spruce Plantation Survey

A special survey in high-value white spruce plantations was conducted at six randomly selected locations throughout the Region in 1981. The plantations were stratified in the following three height classes: < 2 m, 2-6 m, and > 6 m. Each stand was to be evaluated at two different periods during the season, mid- to late June and late July to determine the extent of damage caused by the following insects and diseases:

Visit No. 1

1. Spruce budworm, *Choristoneura fumiferana* (Clem.)
2. Spruce coneworm, *Dioryctria reniculelloides* Mut. & Mun.
3. Spruce shootworms, *Zeiraphera* spp.
4. Armillaria root rot, *Armillaria mellea* (Vahl ex Fr.) Kumm.
5. Broom rust, *Chrysomyxa arctostaphyli* Diet.
6. Mistletoe, *Arceuthobium pusillum* Pk.
7. Chlorosis
8. Frost

Visit No. 2

1. Total defoliation by spruce budworm and coneworm
2. Yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.)
3. White pine weevil, *Pissodes strobi* (Peck)
4. Needle rust of spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By.
C. ledicola Lagh.
5. Cone rust of spruce, *Chrysomyxa pirolata* Wint.

Included in the second visit was a special sample for butt decay in the trees in the two stands > 6 m in height. Three increment cores, one each at heights of 0.0 m, 0.3 m, and 1.3 m, were taken from a total of 10 trees on each of the two plots. However, in the two stands examined in the Region, no decay or stain was detected.

Table 6 summarizes the results of this survey. No damage caused by broom rust, needle rust, cone rust, mistletoe, Armillaria root rot or white pine weevil was detected, and these organisms are therefore not included in the tables. The pests that are included in the tables were found to be causing only trace levels of defoliation.

Table 6. Summary of results of the high-value white spruce plantation surveys conducted in six plantations in the Eastern Region (based on the examination of 150 randomly selected trees at each location between 15 and 18 June and 20 and 24 July.

Location (Twp)	Avg ht of trees (m)	Area (ha)	Esti- mated trees/ ha	Chlorosis % affected	Frost		Percentage of trees affected by			Avg % defolia- tion by spruce budworm and spruce coneworm		yellowheaded spruce sawfly	
					%	%	%	%	%	%			
											% defolia- tion	spruce budworm	spruce coneworm
Cornwall District													
Charlottenburg	1.4	5	3500	0	74	1	0	0	0	0	2	2	
Tweed District													
Hinchinbrooke	1.2	3	2800	0	31	1	0	0	0	0	5	9	
Huntingdon	3.4	8	3000	0	93	1	0	0	0	0	1	4	
Carleton Place District													
Nepean	4.4	3	3000	7	0	0	3	3	80	1	0	0	
Brockville District													
Rear of Yonge and Escott	14.4	3	2500	0	0	0	0	0	0	0	0	0	
Cornwall District													
Clarence	10.5	15	2000	0	0	0	32	0	0	5	0	0	

Light Trap

As in previous years a light trap was located and operated at the G. Howard Ferguson Forest Station in the Brockville District. The trap is used primarily to monitor the adult spruce budworm flight and therefore is operated only from late June to mid-July. Table 7 summarizes the data collected during this 3-week period.

The distance from which insects are attracted to a light trap is undetermined, and therefore the total number of adults trapped cannot be used to forecast populations. However, a light trap can be used to indicate that populations are present in an area, and the total numbers trapped each year indicate changes in population levels.

Table 7. Summary of data collected from a light trap operated at the G. Howard Ferguson Forest Station in the Brockville District.

Insects (Year)	Operating dates									
	June: 27-28	29-30	July: 1-2	3-4	5-6	7	8-9	10-12	13-14	15-16
---- No. of insects collected ----										
Spruce budworm (<i>Choristoneura fumiferana</i>)										
1979	81	81	25	-	-	30	40	145	-	-
1980	9	22	20	30	6	80	30	30	140	104
1981	5	6	8	11	4	1	35	121	37	14
Obliquebanded leafroller (<i>Choristoneura rosaceana</i>)										
1979	75	68	18	-	-	7	15	15	-	-
1980	4	31	30	50	18	24	16	-	-	-
1981	5	12	2	13	10	3	9	5	-	-
Forest tent caterpillar (<i>Malacosoma disstria</i>)										
1979	8	-	-	-	-	1	-	1	-	-
1980	-	-	-	-	-	1	-	13	-	3
1981	-	-	-	-	-	-	-	-	-	-
Spotted cutworm (<i>Amathes e-nigrum</i>)										
1979	565	560	118	-	3	11	-	31	-	-
1980	28	24	210	163	74	83	80	21	-	-
1981	62	59	22	18	15	3	-	4	-	-