RESULTS OF FOREST INSECT AND DISEASE SURVEYS IN THE SOUTHWESTERN REGION OF ONTARIO, 1984

(FOREST DISTRICTS: OWEN SOUND, WINGHAM, CHATHAM, AYLMER AND SIMCOE)

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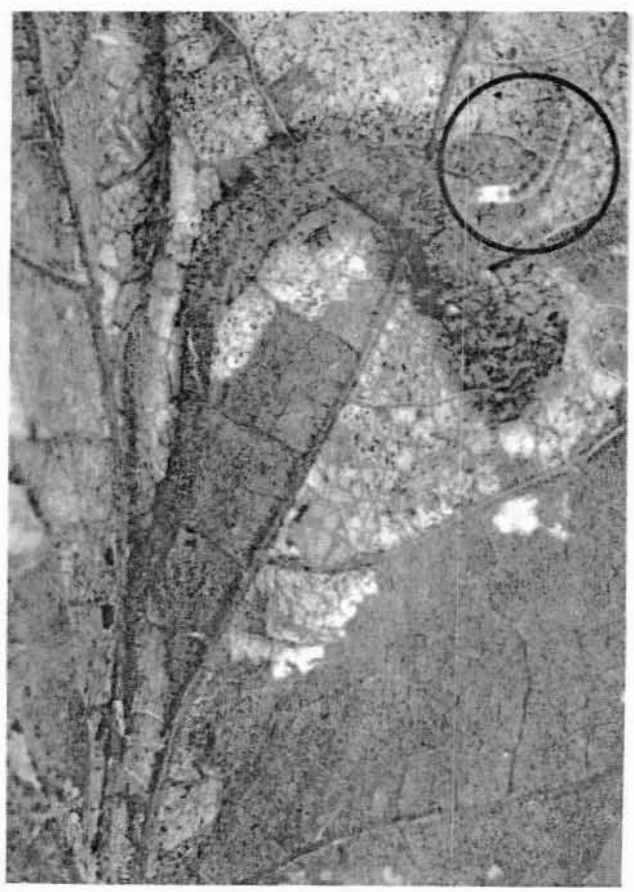
CANADIAN FORESTRY SERVICE

GOVERNMENT OF CANADA

1985

MISCELLANEOUS REPORT NO. 23

Female gypsy moth, *Lymantria dispar* (L.), and egg mass



Maple trumpet skeletonizer larva (circled), *Epinotia aceriella* (Clem.), with trumpet-shaped excrement-tube shelter

2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1984.

During the fall of 1983, Mr. Charles Barnes was promoted to field supervisor and subsequently reassigned to the Northwestern Region. He was replaced by Mr. Holger Brodersen who previously served 3 years in the Algonquin Region. Thanks are extended to the Ontario Ministry of Natural Resources and all other supporting agencies for all assistance provided in the execution of the 1984 field season.

H. Brodersen

H.J. Evans

SURVEY HIGHLIGHTS

This report deals with the forest insects and diseases encountered in the course of special and regular surveys carried out during the 1984 field season in the Southwestern Region of Ontario. The large infestation of the cedar leafminer complex reported in the Simcoe District last year collapsed to near endemic levels; however, a significant expansion of this defoliator occurred in the Owen Sound District. The birch skeletonizer infestation on the Bruce Peninsula collapsed. No significant changes occurred in the spruce budworm population. Oak leaf shredder numbers remained low across the Region while maple trumpet skeletonizer and the fall webworm persisted at numerous widely separated locations. Male gypsy moths were caught at all but one of the provincial parks where traps were deployed.

Continued checks for Scleroderris canker proved negative. Leaf blotch of horse-chestnut was commonly sighted across the Region. Two new incidences of larch needle cast were recorded in the Owen Sound District. Surveys of oak stands monitored in the south continue to show recovery from the decline attributed to oak leaf shredder. Special surveys for pests of white spruce were conducted in seven plantations throughout five districts. A comprehensive survey of white spruce cones from the Aylmer District was carried out to analyze damage by seed and cone pests. Five maple bushlots were inspected for Eutypella canker across the Region, as well as for general vigor based on crown condition. Finally, an acid rain plot was established in the Wingham District as part of a national early warning system to be monitored by the Forest Insect and Disease Survey Unit.

As in previous reports, the following categories are used to describe the importance of insects and diseases:

Major Insects or Diseases

capable of causing serious injury to or death of living trees or shrubs

*Minor Insects or Diseases**

capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs

Other Forest Insects/Diseases (Tables)

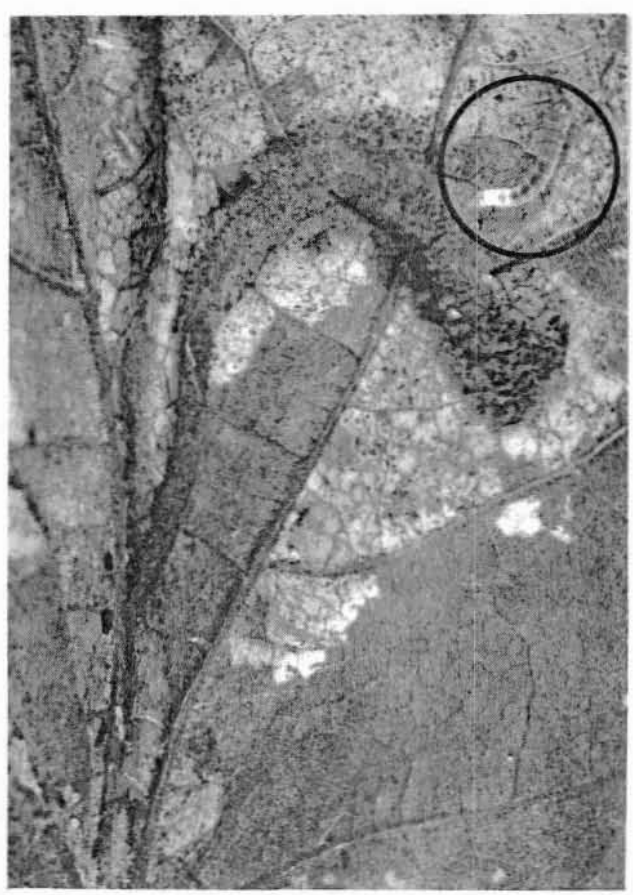
These tables provide information on two types of pest:

1) those which are of minor importance and have not been known to cause serious damage to forest trees,

* No minor insects or diseases were reported in the Southwestern Region in 1984.

Frontispiece

Female gypsy moth, *Lymantria dispar* (L.), and egg mass



Maple trumpet skeletonizer larva (circled), *Epinotia aceriella* (Clem.), with trumpet-shaped excrement-tube shelter

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INSECTS

Major Insects

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

High populations of this leafminer complex continued to damage eastern white cedar (*Thuja occidentalis* L.) along the western shore of the Bruce Peninsula. The area of moderate-to-severe damage increased from 400 ha in 1983 to approximately 1,400 ha in 1984 (Fig. 1). The townships of St. Edmunds and Lindsay were the most severely affected with pockets of damage continuing south into Eastnor township, Owen Sound District. Outside of the infestation on the peninsula, populations remained at low levels with negligible damage. Throughout this infestation, scattered mortality was commonly noted.

The two infestations mapped in Aylmer and Simcoe districts in 1983 declined to endemic levels in 1984. Checks of cedar hedgegrows and windbreaks throughout the Wingham, Chatham, Aylmer and Simcoe districts revealed only trace or low damage levels at all locations surveyed.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Ground checks conducted throughout the Bruce Peninsula, Owen Sound District, revealed a major decline in population levels compared to those reported in 1983. The distribution of this skeletonizer of birch (*Betula* sp.) did not change appreciably from the previous year. Larvae were commonly found throughout the peninsula causing low levels of defoliation in mid- to late September, sufficiently late in the growing season that the impact was negligible.

Two distinct pockets of moderate defoliation, one each in Amabel and Albemarle townships, Owen Sound District, and both less than 1 ha in size, were the only exceptions noted. Throughout the remainder of the Region no significant populations were detected.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Results of damage surveys, population sampling and egg-mass counts of this perennial pest will be published with those of other regions at a later date in a report specifically devoted to this insect. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1984 and will give infestation forecasts for the province for 1985.

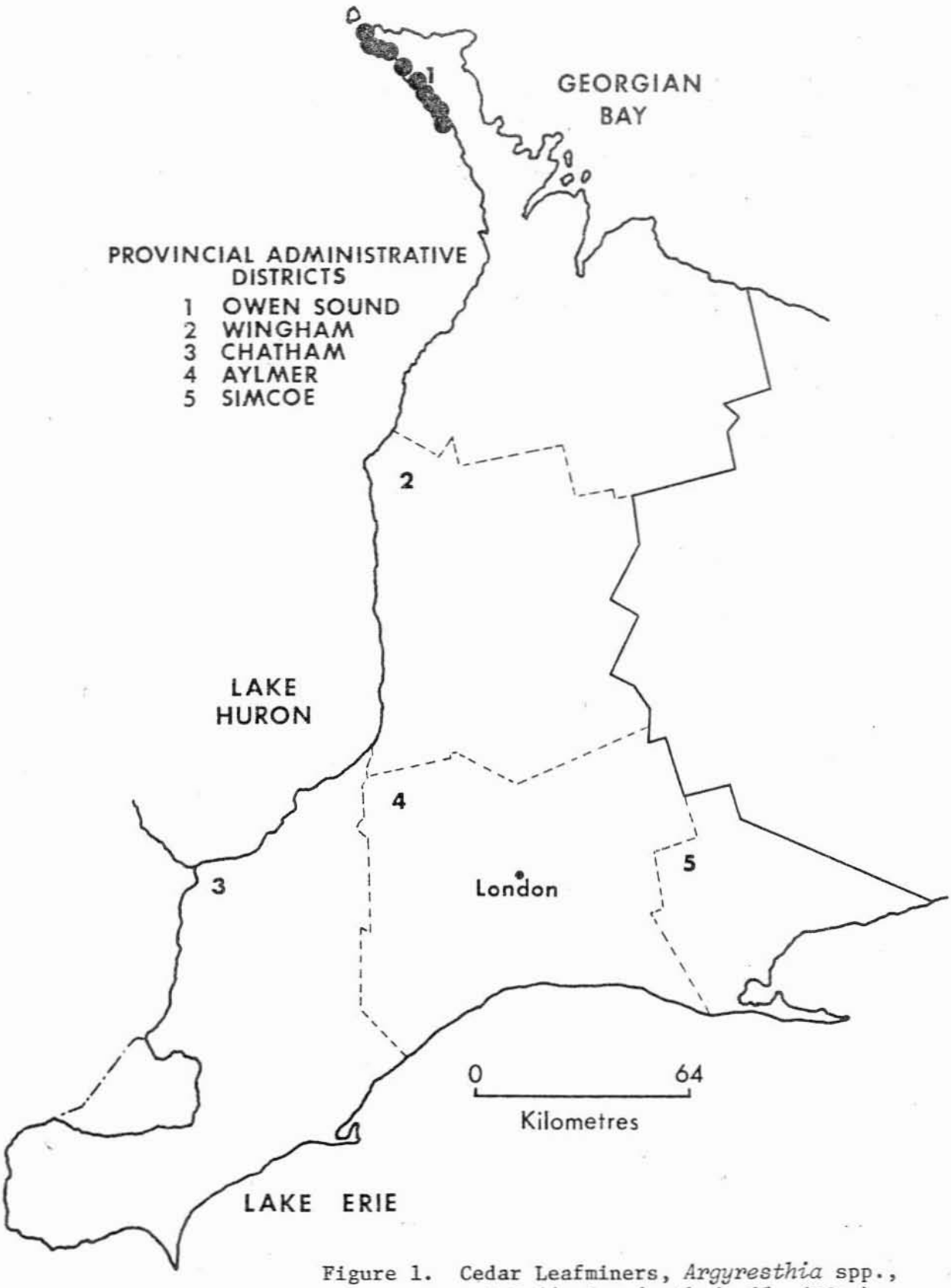

Figure 1. Cedar Leafminers, *Argyresthia* spp., and *Pulicalvaria thujaella* (Kft.)

Areas within which medium-to-heavy infestations occurred in 1984 . . .

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Jack pine budworm populations noted on the Bruce Peninsula in 1983 remained at low numbers in 1984. Branch samples (60 cm long) inspected for current defoliation in Amabel and St. Edmunds townships, Owen Sound District revealed no discernible current defoliation; only in Lindsay Township were low levels of damage evident (4%). Infestation forecasts based on egg-mass counts predict low levels of defoliation in all three townships for 1985.

Scots pine (*Pinus sylvestris* L.) trees located on the fringes of a jack pine (*P. banksiana* Lamb.) plantation in Amabel Township suffered foliar losses of up to 20%; however, trees within the plantation suffered minimal foliage loss (<5%). Elsewhere in the Region no populations were encountered during routine surveys.

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

Low numbers of male moths were captured in pheromone traps at only one of three locations in which they had been placed at the St. Williams Forest Station. Because of vandalism, results of pheromone trapping were unavailable for Turkey Point Provincial Park, Simcoe District, and the traps submitted from Pinery Provincial Park, Chatham District were lost in shipment. Defoliation at all oak plots in 1984 was trace to low (Table 1). Branch samples taken from these three areas were examined for overwintering eggs in an effort to forecast populations for 1985.

Maple Trumpet Skeletonizer, *Epinotia aceriella* (Clem.)

Foliar damage to sugar maple (*Acer saccharum* Marsh.) stands and woodlots was noted at numerous locations throughout the Region. While the incidence or presence of the insect was high, in most cases (>75%) foliar damage varied from trace to low (<25%). Trees of all sizes were affected. Defoliation was notable as far north as Owen Sound District in Collingwood, Osprey and Keppel townships, where it averaged 20%. The most southerly infestation noted occurred in Pearce Provincial Park, Aylmer District, where 100% of the maples averaged 20% defoliation.

Birch Leafminer, *Fenusa pusilla* (Lep.)

First-generation damage to white birch (*Betula papyrifera* Marsh.) ornamentals was once again noted throughout the entire work area; however, total foliar damage normally amounted to less than 25%. Townships with the highest incidence of attack included Delhi and Charlotteville, Simcoe District; Adelaide, Aylmer District; Raleigh, Mersea, Bosanquet and Sarnia, Chatham District; and Colborne, Wingham district.

Second-generation larval feeding did not increase the overall damage to any significant extent.

Table 1. Results of oak leaf shredder pheromone trapping, egg counts and defoliation forecasts for two districts in 1983 and 1984.

Location	Total no. of adults captured 1983	1984	Avg. no. per trap 1984	Leaves attacked 1984 (%)	Foliar damage 1984 (%)	No. of eggs 1983	1984	Defoliation forecast 1985
Chatham District								
Bosanquet Twp (Pinery Provincial Park)	519	na	na (lost in mail)	3	3	0	0	Nil
Simcoe District								
Charlotteville Twp (Turkey Point Provincial Park)	316	na	na (all traps vandalized)	24	10	0	0	Nil
South Walsingham Twp (St. Williams Forest Station)	100	46	8	6	6	0	0	Nil

na = not available.

Fall Webworm, *Hyphantria cunea* (Dru.)

Fall webworm continued to cause unsightly defoliation to ornamentals and roadside trees throughout the Region. Typically, damage involved low levels of defoliation, affecting several branches on a given tree; occasionally entire trees were defoliated. Ash (*Fraxinus* sp.) appeared to be the preferred host along with numerous other hardwoods, primarily basswood (*Tilia* sp.), elm (*Ulmus* sp.), maple (*Acer* sp.), cherry (*Prunus* sp.) and catalpa (*Catalpa bignonioides* Walt.). The highest damage levels recorded occurred on the Bruce Peninsula in the Owen Sound District where moderate levels of foliar damage (25-75%) were commonly noted. While the damage is unsightly, this insect is not known to persist at high levels for more than two or three years, so healthy trees should survive these attacks.

Gypsy Moth, *Lymantria dispar* (L.)

Burlap and pheromone traps were deployed at 13 provincial parks across the Southwestern Region in 1984 (Fig. 2). Pheromone traps only were deployed at Point Pelee National Park.

Burlap traps, monitored by personnel from the Ontario Ministry of Natural Resources (OMNR), failed to capture larvae at any locations. Results of the 1984 pheromone trapping revealed a marked increase over 1983 in the number of locations where male moths were captured.

Routine surveys throughout the Region during the summer months failed to detect any discernible defoliation attributable to this defoliator.

Table 2. Results of gypsy moth pheromone and burlap trapping in 1984.

Location (Park)	No. of burlap traps	No. of larvae caught	No of pheromone traps	No. of male moths caught
Owen Sound District				
Craigleith	10	0	2	2
Cyprus Lake	10	0	2	3
Sauble Falls	10	0	2	4
Inverhuron	10	0	2	12
MacGregor Point	10	0	2	1
Chatham District				
Rondeau	10	0	1	1
Ipperwash	10	0	2	1
Pinery	10	0	2	0
Pt. Pelee	10	0	2	1
Alymer District				
Iroquois Beach	10	0	1	1
Simcoe District				
Long Point	10	0	2	7
Selkirk	10	0	1	6
Turkey Point	10	0	1	15
Wingham District				
Point Farms	10	0	2	8

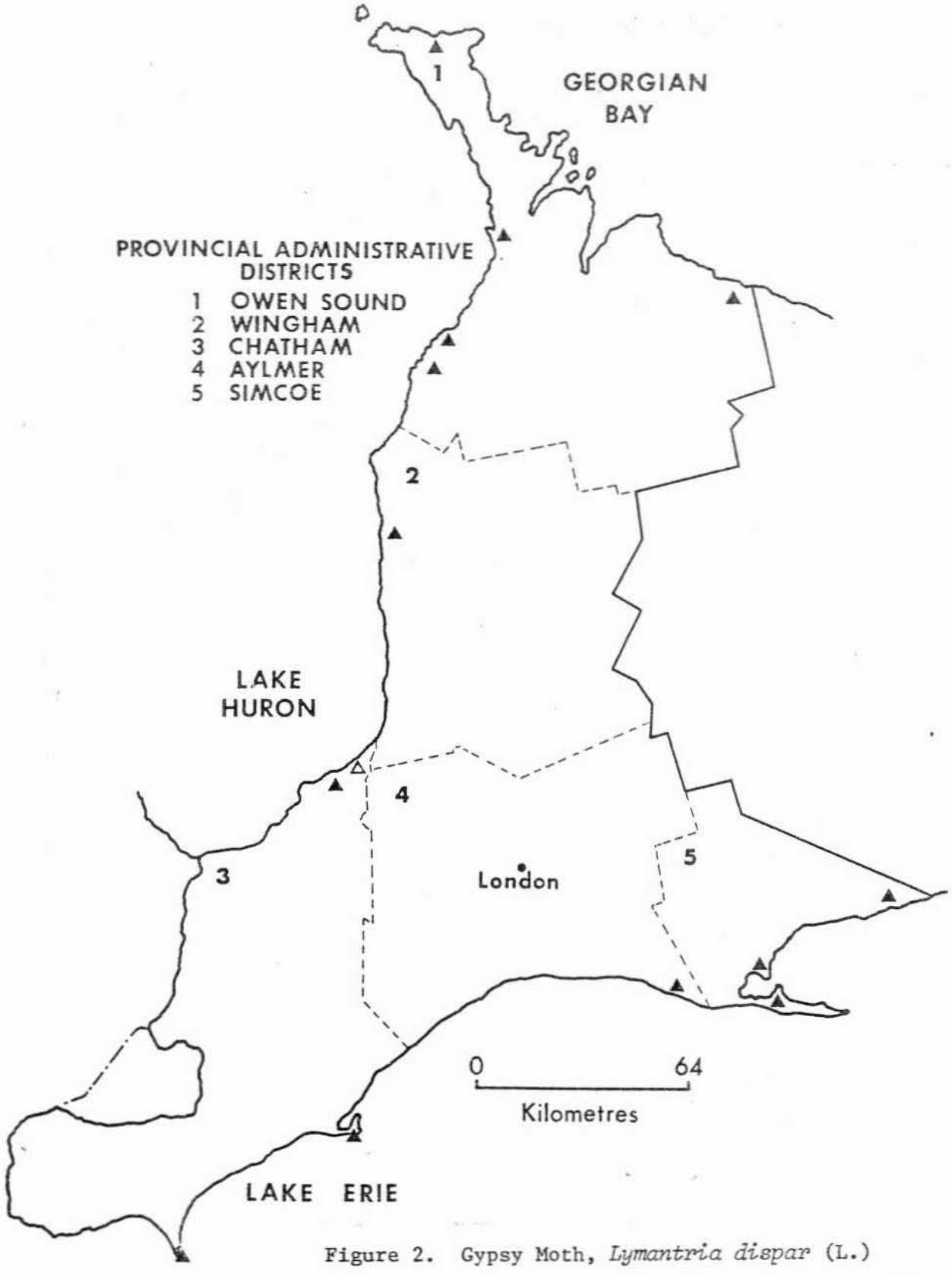

Figure 2. Gypsy Moth, *Lymantria dispar* (L.)

Provincial parks where pheromone and jute traps were deployed

Negative . . . . . △

Positive . . . . . ▲

White Pine Weevil, *Pissodes strobi* (Peck)

Leader damage to white pine (*Pinus strobus* L.) plantations remained low at all locations surveyed with the exception of two plantations noted in the Owen Sound District (Table 3), where a high incidence of damage occurred. In 1984, for the second consecutive year, the OMNR effected control measures in the Owen Sound District with an energetic clip and destroy program. Examination of further random locations is planned for 1985.

Table 3. Summary of leader damage by white pine weevil in four districts in 1984 (counts based on the examination of 100 white pine trees at each location).

Location (Twp)	Avg height of trees (m)	Stocking (trees/ha)	Area affected (ha)	Leaders attacked in 1984
Aylmer District				
West Oxford	2.0	2,990	3	3
Owen Sound District				
Glenelg	3.0	2,500	11	56
Glenelg	2.5	2,500	5	0
Sullivan	7.0	1,600	1	31
Simcoe District				
North Walsingham	4.0	3,600	2	4
Wingham District				
Hullet	2.5	1,200	50	0
Turnberry	2.5	2,300	6	3

Table 4. Other forest insects.

Insect	Host(s)	Remarks
Acantholyda erythrocephala (L.) Pine false webworm	wP	light foliar damage on 2.5-m trees in a 5-ha plantation, Glenelg Twp., Owen Sound District

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
Acrobasis demotella Grt. Walnut shoot moth	Wa	single occurrence of high level of crown damage to mature tree, Dunwich Twp, Aylmer District
Acrobasis sp. Twig borer	Wa	low levels of twig mortality on trees of various ages in a 1-ha woodlot, Brooke Twp, Chatham District
Aphrophora cribrata (Wlk.) Pine spittlebug	Wa	low numbers on 16% of 2- to 3-m regeneration in Wellington County forest, Minto Twp, Wingham District
Bucculatrix ainsliella Murt. Oak skeletonizer	O	trace levels (<10%) of foliar damage in Pinery Provincial Park, Bosanquet Twp, Chatham District on more than 75% of host trees
Cameraria cincinnatiella (Cham.) Gregarious oak leafminer	wO	moderate levels of foliar damage to golf course ornamentals, London Twp, Aylmer District
Cecidomyia ocellaris (O.S.) Ocellate gall midge	rM	commonly found on roadside trees, with high incidence throughout crowns but with low resultant damage (<10%), in Charlotteville Twp, Simcoe District
Chionodes vernella Murt. Spring oak leafroller	rO	low numbers noted causing negligible foliar damage on roadside trees, Charlotteville Twp, Simcoe District
Conophthorus coniperda (Sz.) White pine cone beetle	wP	small number of damaged cones found on ground in mixed conifer woodlot, Charlotteville Twp, Simcoe District
Contarinia baeri (Prell) European pine needle midge	scP	small stand (<1 ha) of 10-m roadside trees on Hwy 21, Amabel Twp, Owen Sound District found with low levels of laterals or leaders damaged

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
Corthylus punctatissimus Zimm. Pitted ambrosia beetle	sM	approximately 10% mortality in regeneration in mature woodlot, Egremont Twp, Owen Sound District
Dioryctria abietivorella (Grt.) Fir coneworm	wP	damage to 2-m plantation trees recorded on laterals on 3% and 11% of the trees in Turnberry and Hullet twps, Wingham District, respectively, and on 3% of the trees in a single plantation in West Oxford Twp, Aylmer District
Eucordylea blastovora McLeod Banded jack pine needleminer	wS	trace incidence in budworm plot in semimature plantation trees, Colborne Twp, Wingham District
Gonioctena notmani (Schaef.) Willow leaf beetle	W	low levels of larval damage on mature ornamentals in Wonderland Park, city of London, Aylmer District
Hydria prunivorata Ferg. Cherry scallopshell moth	bCh	moderate levels of defoliation (50%) to understory regeneration of sugar maple, Egremont Twp, Owen Sound District
Hylemya anthracina (Czerny) Spruce cone maggot	wS	low number of damaged cones in 1-ha plantation in West Oxford Twp, Aylmer District
Lecanium corni Bouché European fruit lecanium	Honey locust	single occurrence on ornamental, resulting in low level of shoot damage, in town of Port Dover, Simcoe District
Malacosoma americanum F. Eastern tent caterpillar	ecCh Haw, Ap	high numbers of nests counted in Amabel, Keppel, Sarawak, Derby, Holland, Bentinck and Sydenham twps, Owen Sound District, with colony counts of 23 and 140 per 0.5 km of roadside in Bentinck and Sydenham twps, respectively

(continued)

Other forest insects (continued).

Insect	Host(s)	Remarks
Nephopteryx subfuscella Rag. Striped sumac leafroller	Su	common at moderate-to-severe damage levels, often reaching 100% defoliation, at Craigleith Provincial Park, Owen Sound District
Pandemis limitata (Rob.) Threelined leafroller	rO	low numbers detected on foliage of semimature trees, near Turkey Point Provincial Park, Charlotteville Twp, Simcoe District
Petrova albicapitana (Busck.) Northern pitch twig moth	jP	single occurrence of low numbers on an ornamental in Wildwood Park, Downie Twp, Wingham District
Physokermes piceae (Schr.) Spruce bud scale	nS	low numbers on scattered, mature ornamentals in town of Port Rowan, Simcoe District
Pikonema alaskensis (Roh.) Yellowheaded spruce sawfly	wS	few individual trees noted with light defoliation in St. Edmunds Twp, Owen Sound District
Pineus strobi (Htg.) Pine bark adelgid	wP	noted on 10% of the 1-m trees in a 1-ha plantation in North Walsingham Twp and on semimature trees in a thinned plantation in the St. Williams Forest Nursery Complex, Simcoe District where high populations continue after several years
Pleroneura brunneicornis (Roh.) Balsam shootboring sawfly	bF	low numbers on scattered semimature trees in Saugeen Valley Conservation Authority at Bells Lake, Owen Sound District
Psilocorsis reflexella Clem. Twoleaf tier	rO	trace populations on mature trees in Pinery Provincial Park, Chatham District

(continued)

Other forest insects (concluded).

Insect	Host(s)	Remarks
Rhyacionia buoliana (Schiff.) European pine shoot moth	rP	A 10-ha plantation of 2.4-m trees suffered varying levels of damage on 87% of all stock examined in Osprey Twp, Owen Sound District; a 1-ha plantation of 2.5-m trees was observed with low levels of shoot damageon 10% of trees in West Nissouri Twp, Aylmer District.
Tetralopha expandens (Wlk.) Striped oak webworm	rO	a few isolated larvae noted in oak decline plot, Charlotteville Twp, Simcoe District
Vasates quadripes (Shim.) Maple bladdergall mite	rM	single occurrence with low level of damage to foliage on roadside tree, Charlotteville Twp, Simcoe District

TREE DISEASES

Major Diseases

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

Special surveys have been conducted for seven years in the Region to detect the presence of Scleroderris canker. This year, 12 plantations in four districts were formally surveyed; in addition numerous areas of susceptible host trees were checked as they were encountered during routine travel. Finally, an aerial survey was taken over the Simcoe District where a high concentration of red pine (*Pinus resinosa* Ait.) is known to exist.

To date all of these efforts have failed to detect the presence of either race of this fungus in the Region.

Horse Chestnut Leaf Blotch, *Guignardia aesculi* (Pk.) Stewart

This disease was again common on ornamental horse-chestnut (*Aesculus hippocastanum* L.) across a large portion of the Region. Heavily infected trees were frequently sighted as far north as the city of Owen Sound, where trees suffered high levels of foliar damage (> 75%). In the Wingham, Chatham and Aylmer districts single trees and clumps of ornamentals suffered high incidence of attack (>75%); however, in all instances foliar damage was low (<25%).

Larch Needle Cast, *Meria laricis* Vuill.

The presence of this needle cast was confirmed once again in Sullivan Township, Owen Sound District; however, the high levels of foliar damage reported in 1983 did not recur, and only low numbers of trees suffered trace foliar damage (<5%). The organism was also collected at two new locations, one in Glenelg Township, Owen Sound District, where trace foliar damage was present on European larch (*Larix decidua* Mill.). The other, a follow-up in Harwich Township, where the disease was previously confirmed, detected low levels of needle cast damage to young larch trees. However, examination of these samples could not confirm the presence of the fungus this year.

Needle Blight, *Rhizosphaera kalkhoffii* Bub.

In a stand near Bells Lake, Glenelg Township, Owen Sound District, where needle blight damage was previously reported, 90% of blue spruce (*Picea pungens* Engelm.) over 4 m tall were affected at a rate of 30% on old needles. Occasionally, the rate of infection on smaller trees reached 100% on old needles. Trees over 4 m in height rarely

suffered any foliar damage in the upper crown portions, but the lower crown portions were commonly infected and whole branch mortality was frequently noted.

In a 2-m tall stand of white spruce *(Picea glauca* [Moench] Voss) adjacent to the blue spruce, 30% of the trees suffered foliar damage averaging 50%.

Table 5. Other forest diseases.

Organism	Host(s)	Remarks
Cenangium ferruginosum Fr.: Fr. Twig blight	Japanese red pine	varying levels of branch mortality and whole tree mortality in single plantation (< 1 ha in area) of 2-m trees in Charlotteville Twp, Simcoe District
Coleosporium asterum (Diet.) Syd. Pine needle rust	rP	trace damage levels (< 5%) found on 16% of the 1.5-m regeneration examined in a 1-ha area of the Wellington County Forest, Minto Twp, Wingham District
Cronartium ribicola J.C. Fisch. ex Rabh. White pine blister rust	wP	stem cankers commonly observed on semimature plantation trees in Bruce County Forest, Lindsay Twp, Owen Sound District
Cytospora kunzei Sacc. Cytospora canker	col S	low levels of branch mortality on mature ornamentals in city of London, Aylmer District
Cytospora pruinosa (Fr.) Sacc. Branch canker	wAs	canker-causing organism associated with dieback in small pocket of mature trees (< 1 ha in area) at London Hunt Club, London Twp, Aylmer, Ont
Cytospora sp. Cytospora canker	col S, M, Mo, wAs, wS	several species of this fungus noted affecting ornamentals in the western portion of the Region, most notably in London Twp, Aylmer District and in Sarnia Twp, Chatham District; 8% incidence of stem canker causing mortality on 15-m white spruce trees in a 2-ha plantation, Brant Twp, Owen Sound District

(continued)

Other forest diseases (continued).

Organism	Host(s)	Remarks
Discula umbrinella (Berk. & Br.) Sutt. Anthracnose	M, rO	low incidence and low foliar damage levels on weakened tissues of several ornamentals noted in Delhi Twp, Simcoe District and on fringe woodlot trees in Burford Twp, Simcoe District where 14% of trees examined averaged 5% foliar damage in a 1-ha stand; high levels of foliar damage also noted on a single group of mature ornamentals in Sarnia Twp, Chatham District
Gnomonia leptostyla (Fr.) Ces. & de N. Anthracnose	Wa	light foliar damage to scattered ornamentals throughout Rondeau Provincial Park, Chatham District
Gymnosporangium clavipes (Cke. & Pk.) Cke. & Pk. Quince rust	Haw	low incidence and light foliar damage on wild shrubs in Falls Reserve, Colborne Twp, Wingham District
Kabatina thujae var. *juniperi* (Schneider & v. Arx) Morelet Needle blight	J	high incidence of low levels of foliar damage to 1-m nursery stock, Windham Twp, Simcoe District
Leucostoma kunzei (Fr.) Munk Cytospora canker	nS	low levels of branch mortality on semimature hedgerow ornamentals in Morris Twp, Wingham District
Marssonina brunnea (Ell. & Ev.) Magn. Leaf spot	Po	trace levels of foliar damage on 5% of private nursery stock (2 m tall) in West Nissouri Twp, Aylmer District
Marssonina juglandis (Lib.) Magn. Leaf spot	Wa, Bu	low incidence of light foliar damage to ornamentals in Rondeau Provincial Park, Harwick Twp, Chatham District and Windham Twp, Simcoe District

(continued)

Other forest diseases (concluded).

Organism	Host(s)	Remarks
Mycosphaerella dearnessii Barr Brown-spot needle blight	muP	moderate foliar damage (50%) to small group of ornamentals at Inverhuron Provincial Park, Owen Sound District
Oidium sp. Mildew	Hi	high numbers of damaged leaves on mature scattered individuals near Sturgeon Creek, Mersea Twp, Chatham District
Phomopsis elaeagni Arnold & Carter Phomopsis canker	Russian olive	high incidence of whole crown mortality to mature ornamentals in London Twp, Aylmer District
Phyllosticta catalpae Ell. & Martin Leaf spot	Catalpa	single incidence of moderate foliar damage to ornamentals in South Walsingham Twp, Simcoe District
Scoleconectria cucurbitula (Tode: Fr.) Booth Canker and dieback	wP	low incidence of mortality in < 2-m regeneration on hillside plantation (< 1 ha), Culross Twp, Wingham District
Ustulina vulgaris Tul. White brittle rot	sM	single incidence of decay on mature woodlot tree, Morris Twp, Wingham District
Venturia macularis (Fr.) E. Müller & v. Arx.	tA	low incidence (3%) on regeneration in white pine plantation in North Walsingham Twp, Simcoe District

DIEBACKS AND DECLINES

Oak Decline

Oak decline has been monitored for eight years at three permanent plots in the Simcoe and Chatham districts. Over the past several years, the rate of decline in all three plots has slowed. Surveys of annual damage (i.e., damage to the crown realized in the last growing season only) confirm that no significant crown damage is occurring at present. Table 6 summarizes the cumulative data, which is the percentage of crown damage since the onset of the problem. With few exceptions, trees in all plots continue to recover and flourish free of the effects of any significant oak leaf shredder activity. The foregoing combined with the sloughing of dead branch material by the elements is restoring a near normal crown shape to the majority of the affected trees. An extra ten living trees were introduced in the survey count at the South Walsingham location to replace those trees that had died to date in the sample plot. This was done for statistical reasons to bring the complement of study trees back to 100.

Maple Decline

In an effort to determine the general condition of maple trees across the Southwestern Region, five hardwood stands in four districts were examined for vigor based on the condition of the crown. Stands with a minimum of 40% sugar maple were chosen from randomly selected locations. Red maple (*Acer rubrum* L.) was also examined for crown condition where encountered; however, no significant crown damage was noted at any of the stands surveyed.

The results of the sugar maple survey revealed only insignificant crown damage on the majority of the surveyed trees (Table 7). This level of damage was not in excess of what might be routinely encountered in a given maple stand subject to the normal stresses of site, competition, weather and silvicultural practices.

Table 6. Summary of oak decline at three locations in the Region (100 red and/or white oak trees examined at each location).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	Year	Cumulative percentage of crown dead				No. of trees dead
				0-20	21-40	41-60	> 60	
				No. of trees				
Simcoe District								
Charlotteville	32	315	1977	70	8	12	10	0
			1978	69	9	10	12	0
			1979	58	14	19	8	1
			1980	29	37	25	8	1
			1981	25	41	30	3	1
			1982	23	50	25	1	1
			1983	23	54	21	1	1
			1984	79	16	2	2	1
South Walsingham	22	150	1977	42	35	18	5	0
			1978	40	33	19	4	4
			1979	36	38	16	3	6
			1980	29	38	22	5	6
			1981	19	41	29	1	9
			1982	19	52	18	1	9
			1983	19	50	20	2	9
			1984	72	23	5	1	9
Chatham District								
Bosanquet (Pinery Provincial Park)	29	2,542	1977	69	7	17	7	0
			1978	69	7	17	7	0
			1979	68	11	16	5	0
			1980	53	19	21	7	0
			1981	48	24	21	7	0
			1982	49	38	9	2	2
			1983	35	39	20	4	2
			1984	80	12	2	2	4

Table 7. Summary of maple decline at five locations in the Region (expressed as a percentage of total trees examined).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	Cumulative percentage of crown dead				No. of trees dead
			0-20	21-40	41-60	>60	
			No. of trees				
Aylmer District							
Dunwick	28	7	99	1	0	0	0
Chatham District							
Warwick	23	18	100	0	0	0	0
Owen Sound District							
Egremont	34	8	98	2	0	0	0
Winsham District							
Grey	18	30	99	1	0	0	0
Morris	30	23	100	0	0	0	0

ABIOTIC DAMAGE

Drought

The effects of the drought experienced during the 1983 growing season, followed by the ravages of winter drying in the subsequent winter, caused moderate levels of mortality to young white spruce plantations at three locations in the Owen Sound District. One plantation of 2-m trees in Greenock Township suffered 12% whole tree mortality, while in Brant Township trees of similar size suffered an 8% mortality rate. Similar abiotic influences caused desiccated tops on 40% of all young white pine examined in a 1-m tall plantation in Sydenham Township. Affected tree tops broke off from the added strain of wind and snow.

Frost

Routine surveys throughout the Southwestern Region failed to detect any significant, widespread damage due to frost in 1984. In a single 4-ha plantation of 2.9-m tall white spruce in Glenelg Township, Owen Sound District, 95% of the trees examined suffered an average of 8% foliar damage. A small plantation (< 1 ha) of 2-m tall white spruce in Middleton Township, Simcoe District sustained about 15% foliar damage on 11% of the trees examined. Trace levels of foliar damage (< 5%) were commonly noted on balsam fir *(Abies balsamea* [L.] Mill.) of all ages throughout much of Amabel Township, Owen Sound District.

Late Spring Leaf Scorch

Several days of very warm, windy weather in early June resulted in low amounts of foliar damage to a small percentage of the maples at a few scattered locations in the southern portions of the Region. Damage was noted in Houghton and South Walsingham townships, Simcoe District and in East Oxford Township, Aylmer District. Marginal desiccation of the leaves was typical of the damage inland. The whipping action of new leaves in early June, caused by high winds along lakeshore properties, resulted in partial or complete shredding of new leaves at one location in South Walsingham Township; these leaves were completely desiccated in only a few days.

Table 8. Other abiotic damage.

Type of damage	Host(s)	Remarks
Fire damage	scP	low levels of branch mortality to 10-m trees in a 0.5-ha private plantation attributed to firing of underbrush, North Walsingham Twp, Simcoe District
Salt damage	rP, aP, wP,	high percentage of trees with moderate foliar damage (25-75%) on roadside planting in Turnberry and Minto twps, Wingham District, moderate damage commonly noted on mature Austrian pines along Hwy 81, Caradac Twp, Aylmer District; light damage to roadside white pine plantation trees in North Walsingham Twp, Simcoe District
Winter drying	nS, wP	common on windbreak Norway spruce (*Picea abies* [L.] Karst.) throughout Owen Sound District; also recorded on 1-m white pine at low damage levels (20%) on 70% of trees examined in a 4-ha plantation, Bentinck Twp, Owen Sound District

SPECIAL SURVEYS

White Spruce Plantation Survey

In 1984 white spruce plantations in the Southwestern Region were sampled for significant damage by the insects and diseases that have historically affected spruce.

Seven plantations were inspected in three height classes: one plantation was in the 0- to 2-m class, four were in the 2- to 6-m class and two were in the 6-m class. Two visits were made to each plantation to allow for the seasonal variation in the occurrence of specific insects and diseases. The first visit was scheduled between 15-30 June and the second between 15-31 July.

The only abiotic problems encountered were chlorosis and frost damage. Chlorosis was reported on the old foliage of young trees planted on an old nursery site; tree vigor did not appear notably retarded. The varied incidence of frost at two locations resulted in only light foliar damage (Table 9). The plantations were also inspected for the presence of any broom rust, mistletoe, needle rust, cone rust, stand openings, and Armillaria root rot, *Armillaria mellea* (Vahl: Fr.) Kummer. None of these forest pest problems were detected in any of the plantations. Insects causing notable damage included the spruce budworm and the spruce coneworm, *Dioryctria reniculelloides* Mut. & Mun.; defoliation by these two pests was assessed cumulatively due to the similarities in feeding damage. The spruce bud moth, *Zeiraphera canadensis* Mut. & Free., was the only insect found in all plantations and although incidence rates were observed as high as 80%, foliar damage was light in all instances. The yellowheaded spruce sawfly was noted at a single plantation causing low levels of damage.

White Spruce Flower, Cone and Seed Survey

The collection of cones for examination by Forest Insect and Disease Survey (FIDS) staff was continued this year to determine the extent of damage caused by cone and seed insects on white spruce. Two collections of 100 samples each were made from a plantation located on the Public Utilities Commission properties in West Oxford Township, Aylmer District. A second location in St. Edmunds Twp, Owen Sound District, was also sampled. The first collection was made in late May when the developing cones were in the late flowering stage, the second in the middle of July when the developing cones were firm but still green. Results of this survey are listed in Table 10.

Table 9. Summary of the results of a white spruce plantation survey carried out at seven locations in the Southwestern Region in 1984.

Location (Twp)	Estimated density m^2/ha	Avg ht of sample trees (m)	Trees affected by chlorosis		Frost		Cone rust		Spruce budworm	Spruce coneworm	Spruce budworm and spruce coneworm	Spruce bud moth	Yellowheaded spruce sawfly	
			faded green (%)	yellow (%)	trees affected (%)	foliage damaged (%)	No. of cones examined	cones rusted (%)	trees affected (%)	trees affected (%)	foliar damage combined (%)	no. of trees attacked (%)	no. of trees attacked (%)	foliar damage (%) (%)
Alymer District														
Bayham	19.0	6.8	0	0	0	0	100	0	0	0	0	60	0	0
Malahide	22.0	6.5	0	0	0	0	100	0	0	0	0	80	0	0
Chatham District														
Harwick	9.0	5.5	0	0	0	0	100	0	0	0	0	41	0	0
Owen Sound District														
Glenelg	NA	2.9	0	0	95	8	100	0	0	0	0	27	20	5
Simcoe District														
Delhi	13.0	5.8	0	0	0	0	100	0	0	0	0	10	0	0
Middleton	NA	1.7	50	0	11	5	100	0	0	0	0	8	0	0
Wingham District														
Minto	17.0	12.0	0	0	0	0	100	0	33	20	5	10	0	0

NA = not applicable

Table 10. Summary of the results of the white spruce flower, cone and seed survey carried out in the Southwestern Region in 1984.

Location (Twp)	Female flowers		Cones		
	Sound (%)	Damaged (%)	Sound (%)	Damaged (%)	Seed loss in damaged cones (%)
Aylmer District					
West Oxford	78	22	88	12	31
Owen Sound District					
St. Edmunds	70	30	49	51	24

The greater portion of damage on both female flowers and cones submitted was attributed to unknown Lepidoptera; as damage was not sufficiently characteristic to allow for positive identification by species. Insects positively identified in female flowers in the Aylmer District submission were: spruce budworm, orange spruce needleminer, *Pulicalvaria piceaella* (Kft.) and the spruce bud moth. The spruce cone maggot was identified on cones only.

Insects positively identified on flowers in the Owen Sound District submission included: spruce budworm, spruce micro moth, *Eucordylea blastovora* McLeod; spruce bud moth and purplestriped shootworm, *Zeiraphera destitutana* (Walker). In cones, the following pests were identified: spruce cone maggot, spruce budworm, and spruce coneworm.

All insects positively identified were present at trace-to-low levels only.

Eutypella Canker of Maple, *Eutypella parasitica* Davidson & Lorenz

A survey for this bole-canker was conducted at five locations in stands composed primarily of sugar maple. This fungus attacks all species of maple but sugar maple is the preferred host. The initial infection occurs at a branch scar or wound on the main stem. It causes a depressed area surrounded by callous tissue which enlarges with age. Small trees (<10 cm DBH) may be killed while larger trees normally lose a portion of their merchantable timber and are rendered susceptible to windsnap, at the point of canker. Cankered trees were noted at three locations (Table 11). Cankers were noted at varying heights, from the butt up to 5 m high on the bole. Canker lengths ranged from 50 to 130 cm, and averaged 60 cm.

Table 11. Summary of incidence of Eutypella canker at five locations in the Southwestern Region (expressed as a percentage of the total trees examined).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	No. of trees affected (%)
Aylmer District			
Dunwich	28	7	3.0
Chatham District			
Warwick	23	18	3.8
Owen Sound District			
Egremont	34	8	7.8
Wingham District			
Grey	18	30	0.0
Morris	30	23	0.0

Pinewood Nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle

This pest is known on several pine species: cedar, larch (*Larix* spp.) and spruce in the United States; however, currently it is not considered to be a major threat in Canadian forests. The nematodes are transferred from infested to healthy pines by long-horned beetles. Nematodes kill the host tree by rapidly multiplying in the sapwood of branches and main stems, causing wilt and possibly mortality. To date all suspect material submitted from the Southwestern Region has proved negative for this pest.

Acid Rain National Early Warning System

The Ontario FIDS Unit is establishing study plots in strategic areas across the province as part of a national program designed to detect any damage attributable to acid rain in stands of commercial tree species as early as possible. Vertical and radial growth, crown structure and density, mortality, incidence of insect and disease attack as well as specific acid rain symptoms will be among the parameters measured. To date, one plot has been located in the Southwestern Region in West Wawanosh Township, Wingham District, near the village of Auburn. It is expected that the establishment of more plots in the Region will begin in 1985.

Climatic Data

Forest insects and diseases can be greatly influenced by prevailing weather conditions at specific times critical to their development. Baseline data (Table 12) is included in this report for the purpose of substantiating this contention where and when applicable. Two stations were chosen in 1984: one in the northern portion of the Region (Mount Forest), the other further to the south (Simcoe). Data were supplied by the Atmospheric Environment Service, Environment Canada.

Table 12. Summary of mean temperature and total precipitation from two locations in the Southwestern Region in 1984.

Location	Month	Mean temperature		Deviation from normal (°C)	Total precipitation		Deviation from normal (mm)
		Normal[a] (°C)	Actual (°C)		Normal[a] (mm)	Actual (mm)	
Mount Forest	Jan.	-8.4	-11.4	-3.0	74.8	67.9	-6.9
	Feb.	-8.2	-6.4	+1.8	63.1	60.4	-2.7
	Mar.	-3.6	-6.4	-2.8	80.7	70.4	-10.3
	Apr.	4.4	6.0	+1.6	72.4	55.8	-16.6
	May	10.7	8.4	-2.3	82.8	87.8	+5.0
	June	15.9	16.3	+0.4	79.4	115.8	+36.4
	July	18.2	17.5	-0.7	75.8	71.8	-4.0
	Aug.	17.5	18.5	+1.0	86.1	41.2	-44.9
	Sept.	13.8	12.0	-1.8	80.1	102.0	+21.9
	Oct.	8.1	9.5	+1.4	80.5	55.4	-25.1
	Nov.	1.6	1.2	-0.4	96.1	105.4	+9.3
	Dec.	-5.4	-2.2	-3.2	92.5	92.2	-0.3
Simcoe	Jan.	-5.6	-9.0	-3.4	67.9	43.3	-24.6
	Feb.	-5.3	-1.3	+4.0	55.9	113.0	+57.1
	Mar.	-0.3	-4.6	-4.3	81.4	58.8	-22.6
	Apr.	6.8	7.6	+0.8	84.9	87.2	+2.3
	May	12.6	10.1	-2.5	75.8	111.0	+35.2
	June	18.1	18.7	+0.6	69.5	120.6	+51.1
	July	20.7	19.6	-1.1	75.8	66.4	-9.4
	Aug.	19.6	20.7	+1.1	71.5	83.4	+11.9
	Sept.	15.7	14.3	-1.4	83.2	120.3	+37.1
	Oct.	9.6	11.0	+1.4	80.9	20.2	-60.7
	Nov.	3.7	3.4	-0.3	79.1	78.0	-1.1
	Dec.	-2.8	0.1	+2.7	80.8	105.6	+24.8

[a] Normal temperature and precipitation are based on the period 1930-1980.