GREAT LAKES FOREST RESEARCH CENTRE
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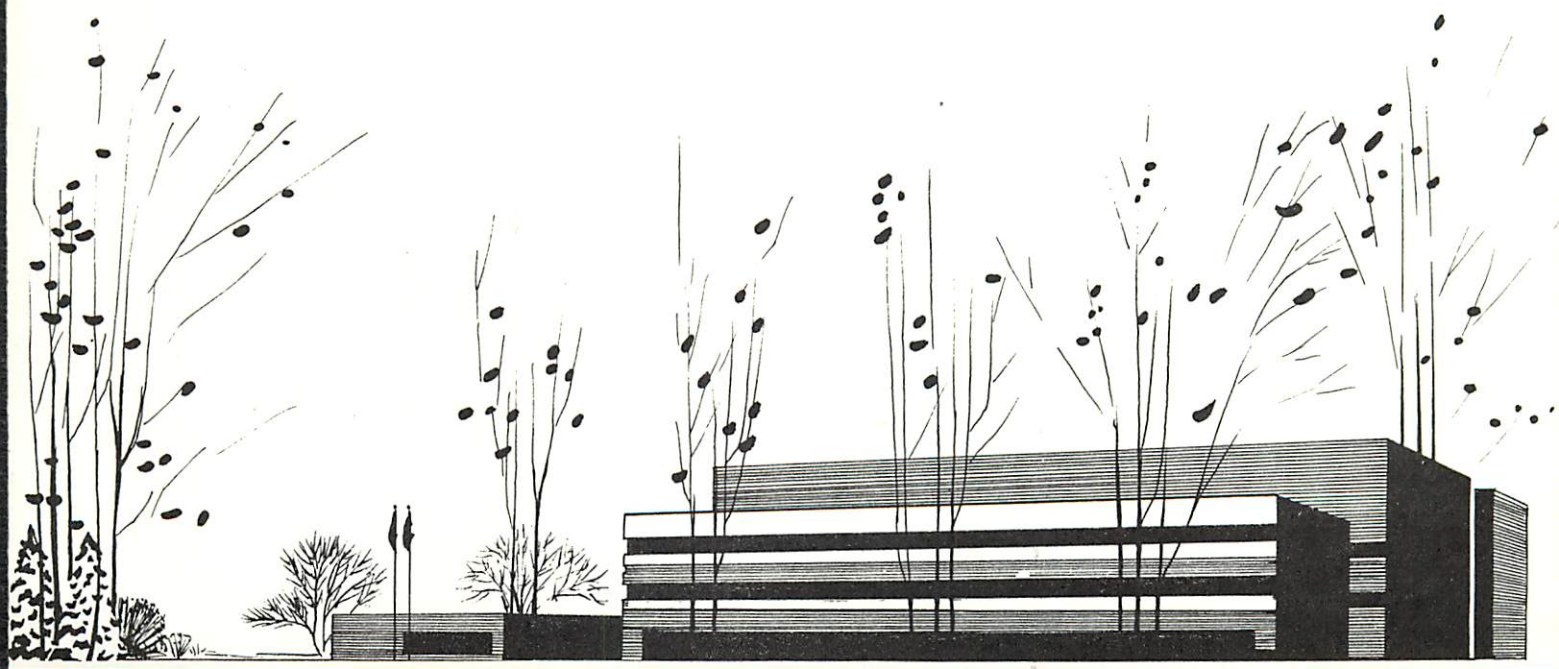
Results of forest insect and disease surveys in the CENTRAL REGION of Ontario, 1982

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



Canada

SURVEY HIGHLIGHTS

The following report deals with forest insects and diseases encountered and surveyed for in the Central Region in 1982. The emphasis of the annual survey has, in the past several years, shifted somewhat from annually recurring insects or diseases that fluctuate little to more specific problems. Special surveys have been undertaken on cone pests, maple and oak decline, Scleroderris canker, plantations, and the incidence of Dutch elm disease and associated elm bark beetles. This is the first year of reporting on the gypsy moth, which has recently entered the Region. Surveys have been conducted on a continuing basis for pests that occur in neighboring jurisdictions but have yet to be recorded in the Central Region.

Among the many forest insects, increases were noted in populations of cherry scallopshell moth, birch skeletonizer and jack pine budworm, whereas damage caused by larch sawfly and the cedar leafminer complex decreased. Of the diseases, Diplodia tip blight damage intensified but other damaging diseases such as poplar leaf disease and leaf anthracnose of maple declined.

The format for this report remains unchanged from that of 1981. Insects and diseases are categorized under the following headings:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of 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, 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 1982.

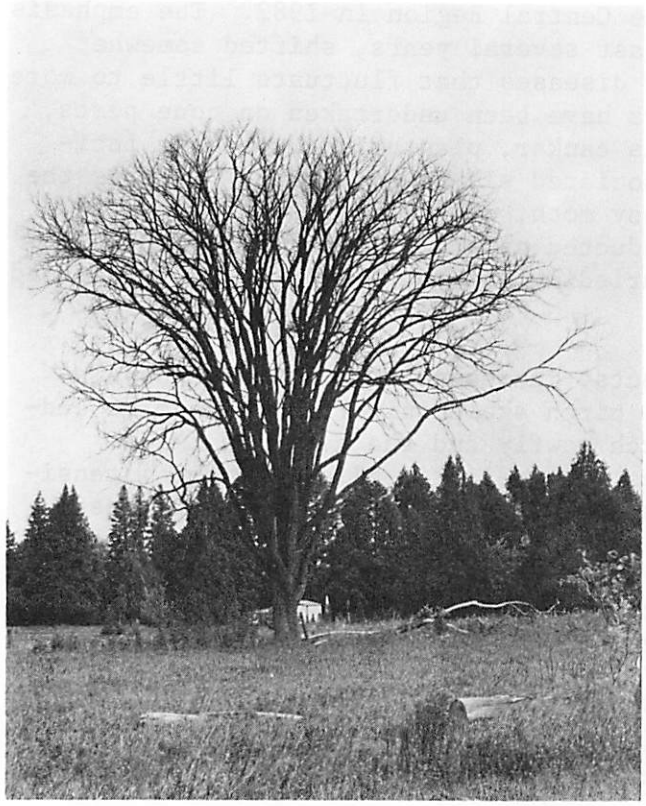
The valuable assistance and cooperation of personnel of the Ontario Ministry of Natural Resources (OMNR), Agriculture Canada, other government agencies and private individuals during the 1982 field season are gratefully acknowledged.

H. J. Evans

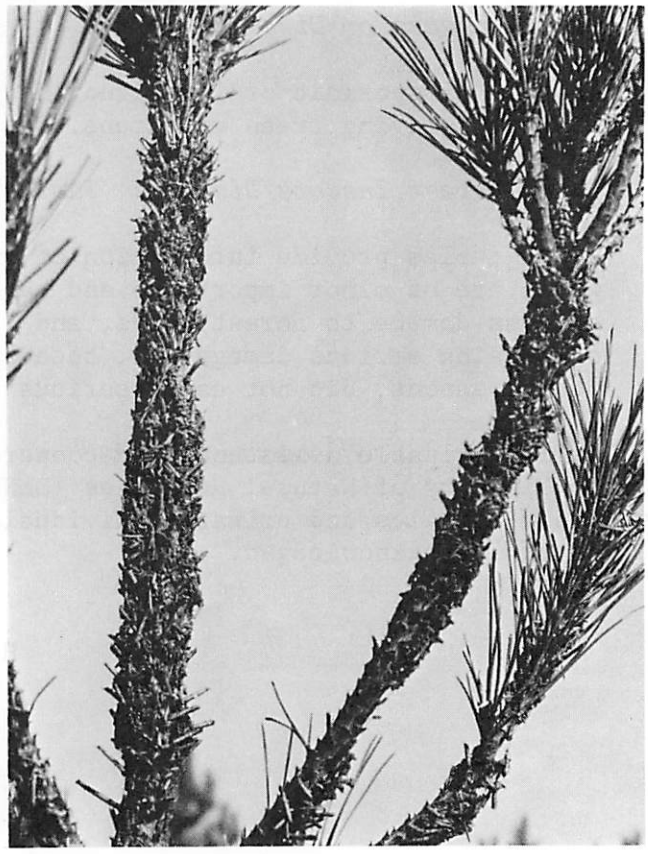
H. J. Weir

C. A. Barnes

Frontispiece



White elm (*Ulmus americana* L.) dead as a result of Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau



Webbing nests on red pine (*Pinus resinosa* Ait.) caused by pine false webworm, *Acantholyda erythrocephala* (L.)

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INSECTS

Major Insects

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

This insect continues to cause serious damage to pine (*Pinus* spp.) regeneration and to Christmas trees in some areas of the Region. The highest populations were centred in the Huronia District, with generally lower numbers being recorded in the surrounding districts of Lindsay, Maple and Cambridge. There has been no record of the pest in the Niagara District.

Although infestations have been recorded on white pine (*Pinus strobus* L.) and Scots pine (*P. sylvestris* L.), the most serious damage in 1982 was recorded on red pine (*P. resinosa* Ait.) (see Frontispiece). Two small pockets of extremely severe infestation were detected on the latter host at points in Flos and Oro townships, Huronia District (Table 1). At these locations no tree mortality has occurred but repeated defoliation has caused an obvious height growth reduction on heavily affected trees.

Table 1. Summary of damage caused by the pine false webworm in two districts in 1982 (counts based on the examination of 150 trees at each location).

Location (Twp)	Host	Avg ht of trees (m)	Affected area (ha)	Estimated trees per ha	Trees infested (%)	Foliar[a] damage (%)
Huronia District						
Tosorontio	rP	1.5	12	2000	21	10
Flos	rp	3.5	14	2500	78	35
Adjala	rP	0.6	5	2500	37	30
Oro	rP	3.6	5	2500	73	25
Maple District						
Albion	rP	1.5	2	2500	52	5

[a] Damage to old foliage only

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

In 1982, a decline in populations of this complex of leafminers continued. The total area in which eastern white cedar (*Thuja occidentalis* L.) suffered moderate-to-severe damage was reduced to approximately 2900 km^2 from the 19,100 km^2 infested in 1981. In the Lindsay District populations of high intensity persisted in the eastern part of the district as they did in an area south of Lake Simcoe in the Maple District. Another large area remained infested in the Cambridge-Guelph area of the Cambridge District. In addition, several discrete smaller pockets of medium-to-heavy infestation were evident throughout much of the Region (Fig. 1). In the Niagara District light defoliation was common on ornamental and hedgerow trees. Pockets of whole-tree and tip mortality were observed in a total area of 10 ha in North Monaghan, Harvey and Emily townships of the Lindsay District where populations have been high for the past several years.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

This pest of white birch (*Betula papyrifera* Marsh.) occurs late in the growing season but heavy defoliation can have a detrimental effect on trees and predispose them to other harmful agents. The early larvae mine the leaves but after molting they feed externally, skeletonizing the leaf surface (see photo).

It has been several years since an outbreak of this pest has occurred in the Central Region. In 1982, following heavy infestations in other parts of the province, high populations were found through much of the Huronia District (Fig. 2). The largest area of heavy damage was centred in the Borden-Angus area with smaller pockets of heavy infestation being recorded in the surrounding townships of Sunnidale, Flos, Vespra, Medonte and Tiny. A few small pockets of heavy damage were also encountered in Rama Township. Foliar damage often included 100% of the leaves on the trees. The total area of infestation was 1050 km^2, of which 600 ha were severely damaged.

Poplar Leafrollers, *Choristoneura conflictana* (Wlk.), *C. rosaceana* (Harr.), and *Pseudexentera oregonana* Wlshm.

A further decline in the area infested by this complex of insects occurred in 1982. The largest decrease was evident in the Huronia District where only light defoliation occurred in Tecumseth, Tosorontio and W. Gwillimbury townships. In the Maple District populations and damage were similar to those reported in 1981. Approximately 40 ha were infested moderately to severely in two separate infestations in King and Georgina townships. Hosts favored by this complex of insects include trembling aspen (*Populus tremuloides* Michx.) and largetooth aspen (*P. grandidentata* Michx.).

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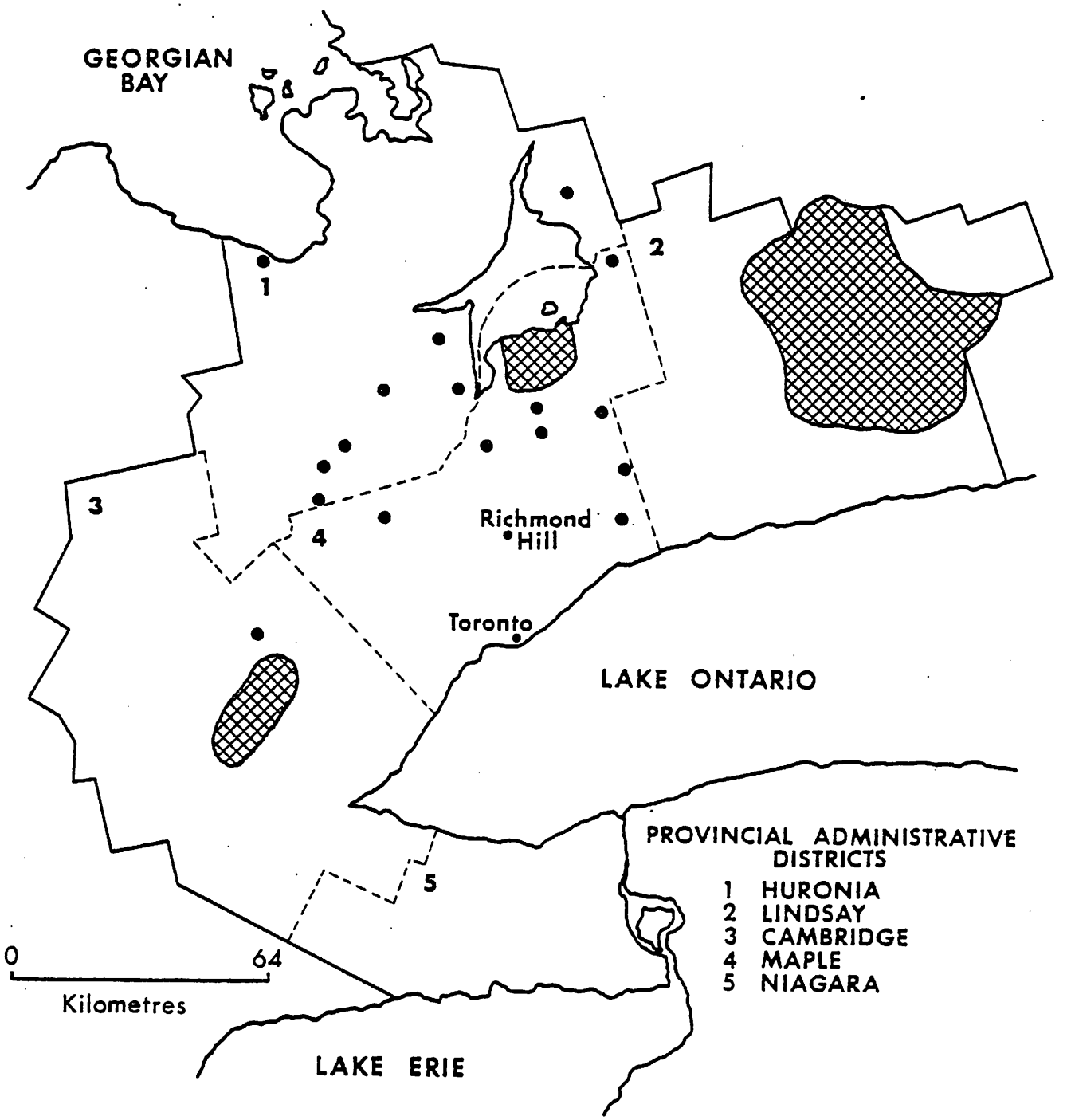
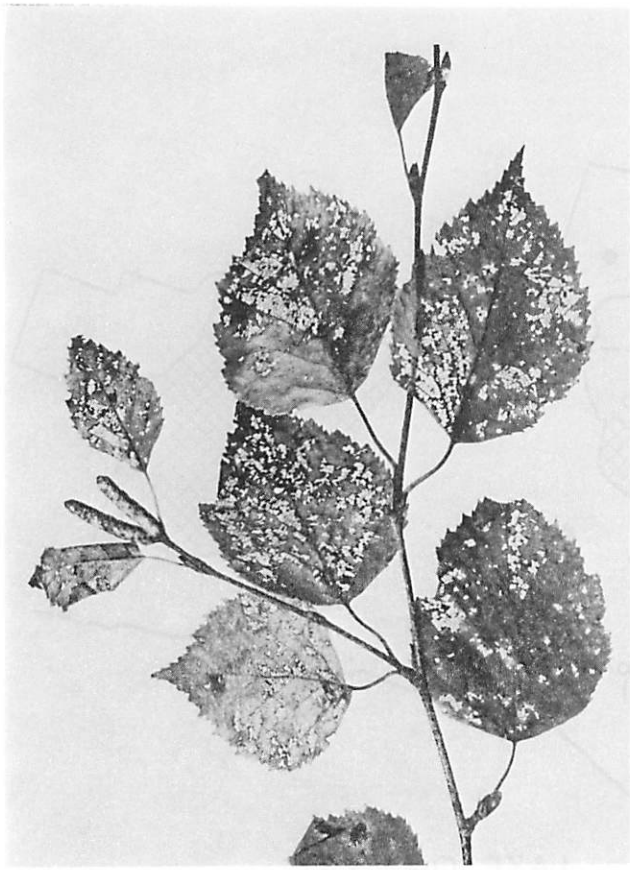


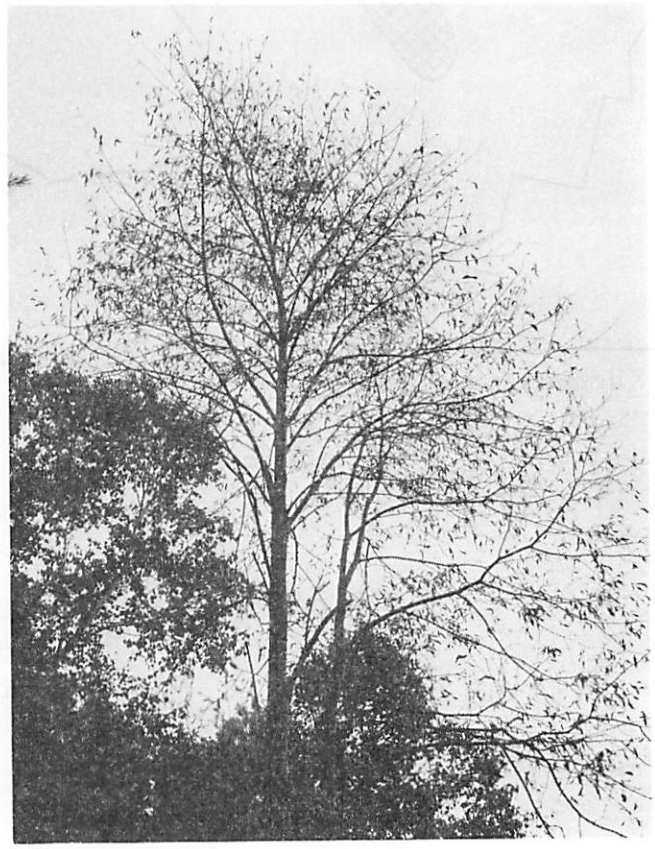
Figure 1. Cedar Leafminers, *Argyresthia* spp. *Pulicalvaria thujaella* (Kft.)

Areas within which medium-to-heavy infestations occurred in 1982

. . . . . ● or . . . . . ▨



Damage by birch skeletonizer, *Bucculatrix canadensisella* Cham.



Damage by cherry scallopshell moth, *Hydria prunivorata* Ferg.

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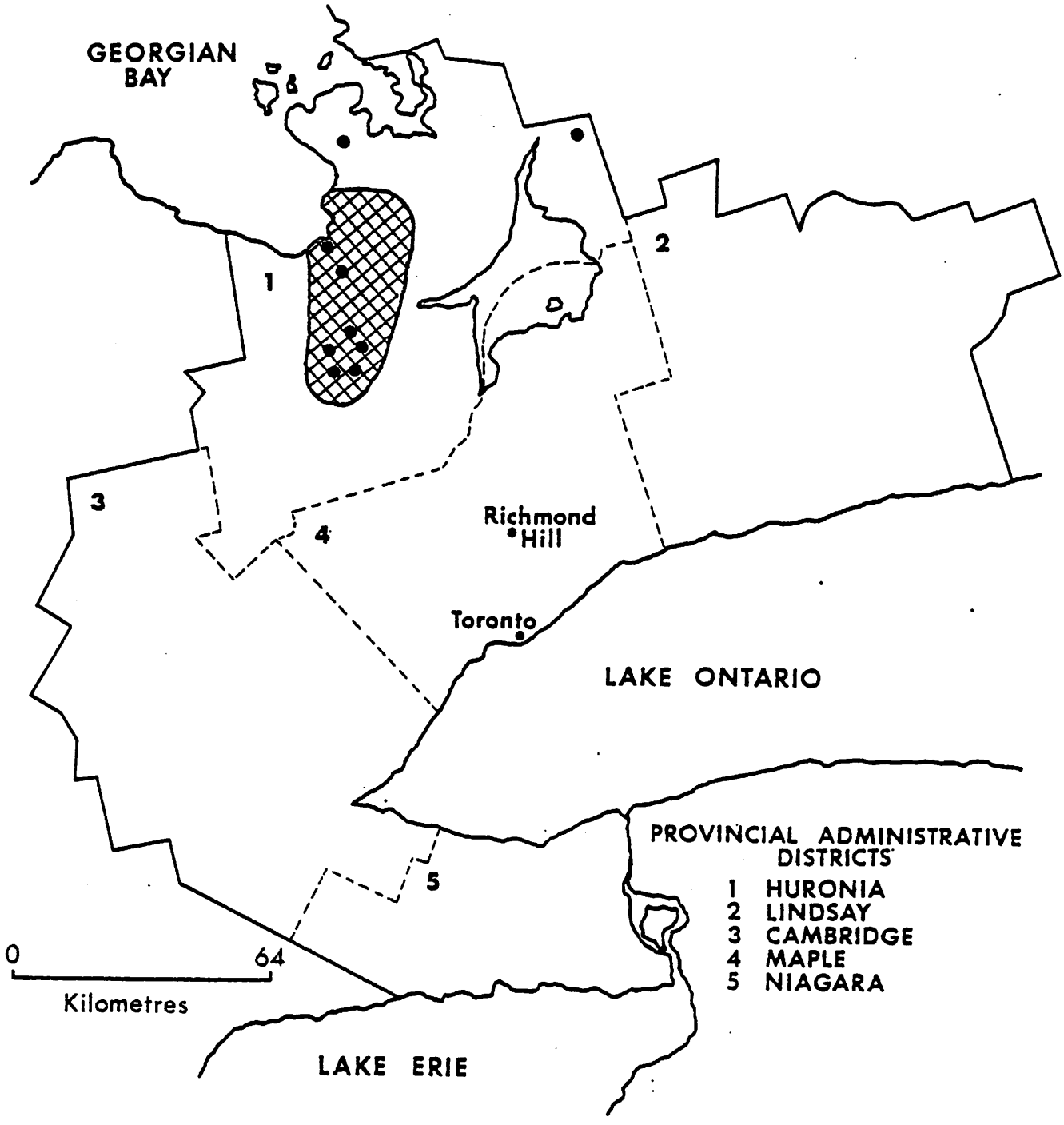

Figure 2. Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Area within which light infestations occurred . . .

Pockets of moderate-to-severe defoliation . . . .

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 1982 and will give infestation forecasts for the province for 1983.

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

This potentially serious pest of jack pine (*Pinus banksiana* Lamb.) has been at relatively low levels for the past several years; however, in 1982, increased populations were evident in the Huronia District. This corresponds with increases in the adjacent districts of Owen Sound in the Southwestern Region and Parry Sound in the Algonquin Region.

In the Huronia District the largest area of infestation was on the Hendrie Tract of the Simcoe County Forest where most of the mature jack pine stands were moderately infested. Current foliar damage averaged about 50%. In the bordering township of Oro on both private and county property there were several small pockets of similar infestation. A total area of approximately 80 ha was moderately damaged in the Huronia District.

Egg-mass sampling was performed at six of the infested locations in order to forecast populations of the insect for 1983. The results are listed in Table 2. It is expected that similar, if not heavier, levels of infestation will occur in 1983.

Table 2. Summary of jack pine budworm egg-mass counts and defoliation estimates at six locations in the Huronia District in 1982 (based on examination of six 61-cm branches at each location).

Location (Twp)	Total no. of egg masses	Estimated defoliation 1982 (%)	Infestation forecast for 1983
Huronia District			
Vespra Twp			
Hendrie Tract - Compartment 190	4	50	medium
" 198	4	66	"
" 191	0	34	nil
" 199	4	60	medium
Oro Twp			
Con I, lot 34	3	57	medium
Con III, lot 7	12	50	heavy

Larch Casebearer, *Coleophora laricella* (Hbn.)

High populations of this insect recurred in the Minesing Swamp in the Huronia District. Here, approximately 100 ha of tamarack (*Larix laricina* [Du Roi] K. Koch) were heavily damaged. In the Maple District a small 5-ha stand of tamarack was moderately defoliated. Light damage was common in European larch (*L. decidua* Mill.) plantations in South Dumfries, Woolwich and Arthur townships, Cambridge District. At Balls Falls Conservation Area, Niagara District there were low numbers on occasional planted larch trees. Elsewhere only very low numbers of the casebearer were found and this represents a general decline in the overall incidence of this pest.

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

Population levels of this insect and the resultant damage to red oak (*Quercus rubra* L.) stands increased in some areas and decreased or remained low at other locations. The total area which suffered moderate-to-severe defoliation actually decreased to 700 ha from the 1,100 ha that were infested in 1981.

In the Maple District, the Main Tract of the Durham Regional Forest and much of the adjacent area suffered moderate and severe damage. Average defoliation was over 50% in this area. Lower numbers were observed in the Vivian area.

The heaviest damage in the Huronia District occurred on the Main Tract of the Dufferin County Forest and in the adjacent oak stands of the Simcoe County Forest in Tosorontio Township. Average foliar damage through this area approached 50% and this represents the second year of increased populations in this area. In the northern part of the district generally light damage prevailed, with occasional pockets of moderate damage occurring in the townships of Tiny and Flos.

There was a general population increase throughout much of the Niagara District. Medium-to-heavy infestations, with defoliation in the 20% to 40% range, occurred in the Cayuga-Fonthill-St. Catharines area along with smaller infestations in the Balls Falls and Vineland areas. Elsewhere in the Region low populations prevailed.

As in past years many other insects feeding in association with the oak leaf shredder and contributing to the overall resultant defoliation were collected. Of these, the tortricid oakworm (*Argyrotaenia quercifoliana* Fitch) and the oak olethreutid leafroller (*Pseudexentera cressoniana* Clem.) were found in increasing numbers in 1982.

No conventional spray operations were carried out in the Region in 1982 against this pest; however, the Forest Pest Management Institute (FPMI), on an experimental basis, treated 40 ha of the Wildman Tract, Simcoe County Forest, Huronia District with the insect growth regulator Dimilin. Generally good results were achieved.

As in the past several years, branch samples were taken at numerous locations to determine the number of overwintering eggs and provide a forecast of populations for 1983. Results are summarized in Table 3. Generally light defoliation is to be expected throughout the Region in 1983 with the exception of Dufferin County Forest, where moderate or heavy defoliation is expected to occur. In 1981, a program was instituted to assess the value of sex attractant as a survey technique. This involved setting out moth traps containing different concentrations of sex pheromone lures at various locations. This program was continued in 1982 and results are summarized in Table 4. As in 1981 there appeared to be a fairly strong relationship beteen moths trapped and eggs deposited.

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)

There was a general increase in the population levels of this insect in Awenda Provincial Park, Tiny Township, Huronia District. Light-to-moderate numbers were recorded in the park on a number of hosts. Foliar damage to sugar maple (*Acer saccharum* Marsh.) ranged from 15% to 30%. Except for the occasional larva, the saddled prominent was seldom found outside this area in 1982.

Fall Webworm, *Hyphantria cunea* (Dru.)

This pest was widespread on numerous deciduous hosts throughout the Region. In the Huronia District small pockets of medium infestation occurred at locations in Baxter, Innisfil and Medonte townships. Although incidence was common in the Maple District, damage was usually light, except in a low-lying area in East Gwillimbury Township where black ash (*Fraxinus nigra* Marsh.) was moderately affected. In the Cambridge District numerous unsightly tents were evident in the Luther marsh area and in the vicinity of the city of Cambridge. Nests were also common along the Niagara Parkway from Niagara-on-the-Lake to Fort Erie in the Niagara District.

Table 3. Summary of oak leaf shredder egg counts and defoliation forecasts for three districts in 1982.

Location	Plot no. or property owner	Mean no. of eggs/38-cm sample		Defoliation forecast for 1983[a]
		1981	1982	
Huronia District				
Awenda Provincial Park	1	1.4	0	n
	2	2.5	1.6	l
	3	3.4	0.1	l
	4	2.3	1.2	l
	5	2.6	0.1	l
	6	3.0	1.6	l
	7	4.4	1.5	l
	8	3.0	1.6	l
	9	2.5	1.9	l
	10	4.5	3.4	l
	11	6.6	4.0	l
	12	10.3	7.0	l
	13	2.3	1.2	l
	14	6.6	4.9	l
	15	2.5	2.0	l
	16	0.4	2.0	l
	17	7.9	16.5	m
	26	3.3	2.2	l
	30	0.7	3.1	l
	31	0	0	n
Wildman Tract	1	25.8	0.9	l
	2	8.9	4.1	l
	3	3.3	2.6	l
	4	4.6	2.8	l
	5	5.1	2.0	l
	6	4.9	0.4	l
	7	15.9	0	n
Hendrie Forest	1	2.6	0.1	l
	2	0.1	0	n
	Check 1	4.4	6.2	l
Midhurst Nursery	1	3.9	0.4	l
	2	2.1	0.8	l
	3	1.6	0.5	l
	Check 1	7.8	1.8	l

(continued)

Table 3. Summary of oak leaf shredder egg counts and defoliation forecasts for three districts in 1982 (concluded).

Location	Plot no. or property owner	Mean no. of eggs/38-cm sample		Defoliation forecast for 1983[a]
		1981	1982	
Huronia District (concluded)				
Orr Lake Tract	Danials	4.9	3.5	1
Dufferin Co. Forest	1	5.3	7.9	1
	2	0.4	0.4	1
	3	13.0	24.5	m
	4	11.3	11.8	m
	5	13.3	21.6	m
	6A	10.1	15.9	m
	7	10.4	12.6	m
	8	-	20.2	m
	9	34.0	20.6	m
	10	28.9	21.9	m
	11	14.0	3.5	1
	12	22.0	13.9	m
	13	17.5	4.4	1
	14	12.3	40.5	h
	95	15.8	29.4	h
	Check 1	31.9	35.6	h
	" 2	28.6	21.8	m
	" 3	27.0	32.2	h
Maple District				
Uxbridge Forest	1	20.8	3.2	1
	2	25.1	19.9	m
Niagara District				
Town of Pelham	Iwasykiew	7.3	3.8	1
	Hinan	5.5	0.2	1
	Con VI, Lot 20	-	0.1	1
Township of West Lincoln	Wilkins	6.5	0.4	1
	Hignell	3.1	0.4	1
Town of Lincoln	Balls Falls Cons. Area	4.8	0.9	1
Town of Thorold	Derwinski	3.6	0.2	1
N. Cayuga Township	Martin	4.3	0.1	1

[a] n = nil, 1 = light, m = moderate, h = heavy

Table 4. Results of oak leaf shredder pheromone trapping in three districts in 1982.

Location (Twp)	Plot no. or property owner	Dosage of phero-mone[a]	Total adults captured	Avg no. per trap	Foliar damage (%)
Huronia District					
Awenda Park	9	2	542	108	11
	4	1	1192	238	8
	5	1	763	153	6
	11	1	1036	207	15
Wildman Tract	4	1	546	109	15
	7	1	273	55	20
Midhurst	1	1	430	86	7
Orr Lake Tract	Danials	1	762	152	28
Dufferin Co. Forest	3	1	1032	206	50
	9	1	1182	236	38
	10	3	940	188	56
	7	3	916	183	35
Hendrie	1	2	67	13	5
Maple District					
Uxbridge Forest	1	1	740	148	59
	2	1	659	132	46
Niagara District					
Town of Pelham	Iwasykiw	1	813	203	20
	Hinan	1	968	194	8
	Con VI lot 20	3	163	33	10
Twp of West Lincoln	Wilkins	1	146	36	5
	Hignell	1	360	72	5
Town of Thorold	Derwinski	1	717	143	15
Twp of N. Cayuga	Martin	1	830	166	10

[a] Concentration of pheromone

1. Cap bait (used at all locations in 1981)
2. PVC b2
3. PVC b3

Gypsy Moth, *Lymantria dispar* (L.)

This is the initial report by the Forest Insect and Disease Survey Unit (FIDS) on the gypsy moth in the Central Region. As an introduced pest, the gypsy moth has been the responsibility of the Plant Health Division, Agriculture Canada. This department has in the past monitored and is continuing to monitor the spread of the insect with the aid of pheromone traps which attract male adults of the species. Follow-up search for egg masses is made where moth catches are high.

The first significant record of gypsy moth in the Central Region occurred in 1979 when a single egg mass was found in Mississauga and two were discovered in Oakville following positive male moth catches in these areas. In 1980, high-density trapping in Mississauga and Oakville and the follow-up search for eggs delimited three small infestations--one in Mississauga and two in Oakville. In 1981 there were high trap counts in the urban areas of Toronto, Oakville, Burlington and Hamilton and in the follow-up search, egg masses were recovered at Burlington, Oakville, and Mississauga. Also in 1981, the first egg mass was found in the Niagara Peninsula following high trap counts near campgrounds at Niagara Falls.

To complement the pheromone trapping and egg-mass surveys performed by Agriculture Canada a program of larval detection by trapping was instituted by the FIDS Unit in 1982. Susceptible areas were chosen and burlap traps were then placed on 10 trees at each location. These areas were chosen either because they were forested areas with a proximity to the known infested urban areas or because they had a high content of the gypsy moth's favored host species. The trapping method takes advantage of the fact that late-instar gypsy moth larvae descend the trees to seek hiding places during the day. The larvae shelter under the burlap, which is tied around the bole, and are then easily caught.

In the Central Region the larval traps were deployed at 13 locations and catches of larvae or pupae of gypsy moth were made at three of these locations. At Niagara Falls the traps caught numerous larvae, in spite of the fact that the campgrounds had been treated earlier in the year with the insecticide, Sevin, to control the pest. The resultant defoliation was generally light; however, several small egg masses were detected later in the summer. The larval traps were also set up on susceptible host species in the Wedgewood Park area of Oakville where an incipient infestation was known to exist. Several larvae were collected here but host tree defoliation was negligible. The other location in which a catch was made was Kitchener. This area had a record of positive pheromone trappings, but no larvae or eggs had been found there previously. Defoliation was also negligible at this location. The results of the larval detection survey at the remaining 10 locations were negative. Figure 3 shows locations in which the larval traps were deployed

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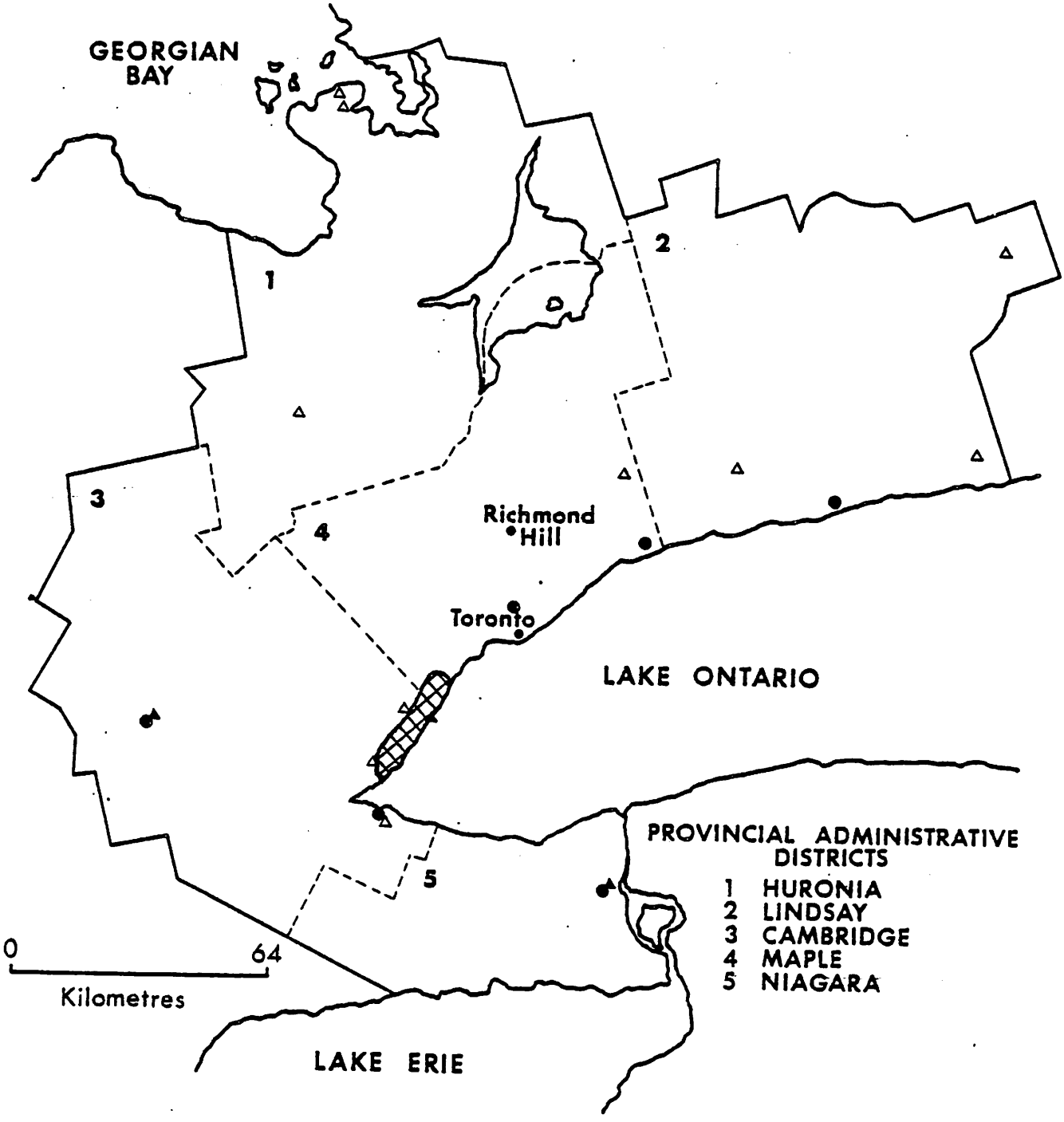

Figure 3. Gypsy Moth, *Lymantria dispar* (L.)

Areas of incipient infestation ▨ or ●

Locations at which burlap larval traps were deployed

negative results . . . . . △

positive results . . . . . ▲

as well as locations of incipient infestation as defined by Agriculture Canada. In addition to the aforementioned areas, newly infested areas were delimited in Toronto, Pickering and Port Hope. At these points egg masses were found following records of high male moth trappings.

Balsam Fir Sawfly, *Neodiprion abietis* complex

This insect was generally found in low numbers. The only exception was an area in King Township, Maple District, where the balsam fir (*Abies balsamea* [L.] Mill.) on approximately 7 ha were moderately damaged. Defoliation ranged from 10% to 60% on infested trees.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

In the Huronia District a single moderate infestation of this pest occurred on regeneration red pine in Tay Township. Elsewhere in the district generally light infestations prevailed. Two areas in Vespra and Orillia townships that were heavily infested in 1981 were devoid of the sawfly this year (Table 5). In the Lindsay District low populations also prevailed, with the most notable areas of damage being in Dummer and Haldimand townships.

Table 5. Summary of redheaded pine sawfly damage at five locations in the Huronia District.

Location (Twp)	Avg ht of trees (m)	Estimated trees/ha	Trees infested (%)	Defoliation[a] (%)
Huronia District				
Vespra	2.2	2500	0	0
Flos	2.4	2000	16	10
Orillia	1.5	1600	0	0
Rama	2.0	2300	4	8
Tay	4.5	2000	60	11

[a] Damage to old foliage only

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

Heavy damage occurred for the third consecutive year in a mature sugar maple stand on the Robertson Tract of the Halton Regional Forest, Cambridge District. Trees of all sizes in approximately 16 ha were affected, with defoliation averaging 60%. In the Huronia District there was moderate damage to understory regeneration in an overmature hardwood stand on Beausoleil Island, Georgian Bay Islands National Park. Elsewhere in the Region the insect was either absent or present at very low levels.

White Pine Weevil, *Pissodes strobi* (Peck)

This perennial pest of white pine again caused considerable tree leader mortality to regeneration, particularly in the Lindsay and Huronia districts. In addition, numerous young Norway spruce (*Picea abies* [L.] Karst.) were affected at the Glencairn Seed Orchard, Huronia District. Results of quantitative sampling are summarized in Table 6.

Table 6. Summary of white pine weevil damage to white pine at three locations in two districts in 1982.

Location (Twp)	Avg ht of trees (m)	Area affected (ha)	Estimated trees/ha	Leaders affected (%)
Huronia District				
Essa	2.2	5	2500	29
Tay	5.0	3	2000	39
Maple District				
Albion	1.4	1	2500	18

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Populations of this pest of larch were reduced from those encountered in 1981. In the Huronia District a total of 15 ha of European larch plantations sustained moderate-to-severe foliar damage. The most notable area of damage was at Canadian Forces Base Borden. Other smaller pockets of damage occurred in Oro, Vespra and Flos townships. In the Cambridge District there was some moderate damage to tamarack in the Luther Marsh area and in Puslinch Township, but otherwise populations were light, as they were in the Lindsay and Maple districts.

Minor Insects

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

Population levels of the walnut caterpillar declined from those which were recorded in 1981. In the Cambridge and Niagara districts only scattered colonies of the pest were found, primarily on open-growing black walnut (*Juglans nigra* L.). In the Maple District a row of walnut trees in the city of Brampton sustained 50% foliar damage, but generally populations were down.

Cherry Scallopshell Moth, *Hydria prunivorata* Ferg.

This insect caused severe damage in the Region for the second consecutive year. Although populations declined to low intensities in the Lindsay District, and remained at low levels in the Huronia District, damage increased in the Maple District. Black cherry (*Prunus serotina* Ehrh.) on the Main Tract of the Durham Regional Forest and in the surrounding area of Uxbridge Township was defoliated, often up to 100%, in approximately 80 ha of hardwood forest (see photo). Light damage prevailed in the remainder of the Maple District.

The larvae of the cherry scallopshell moth feed from within a nest which they construct out of leaves webbed together. Their feeding causes the leaves to brown and this damage starts to become evident by mid-July. The feeding damage results in a premature leaf fall. In the Uxbridge area by mid-August this year most black cherry were leafless. By September, some trees in this area had put out a sparse secondary foliage crop in response to the earlier defoliation.

Table 7. Other forest insects.

Insect	Host(s)	Remarks
Acleris variana (Fern.) Eastern blackheaded budworm	wS	trace population levels in Oro Twp, Huronia District
Altica populi Brown Poplar flea beetle	bPo	pockets of heavy damage in Tiny and Flos twps, Huronia District
Altica sp. prob. *carinata*	elm	high numbers on elm regeneration near Caledon East, Maple District; common at low levels elsewhere

(continued)

Table 7. Other forest insects (continued).

Insect	Host(s)	Remarks
Alsophila pometaria (Harr.) Fall cankerworm	deciduous	high numbers in Brantford Twp, Cambridge District; general increase in Maple and Cambridge districts but declined in Niagara District
Aphrophora cribrata (Wlk.) Pine spittlebug	conifers	increased incidence throughout the Region; particularly heavy in Beverly Twp, Cambridge District
Argyrotaenia quercifoliana Fitch Tortricid oakworm	oak	declined to low in Brantford Twp, Cambridge District; general increase in Huronia, Maple and Niagara districts
Cameraria hamadryadella (Clem.) Solitary oak leafminer	oak	moderate numbers south of Brantford, Cambridge District
Cameraria ulmella (Cham.) Elm leafblotch miner	elm	heavy on ornamental trees in Barrie, Huronia District and on elm regeneration near Ancaster and Paris, Cambridge District
Caulocampus acericaulis MacG. Maple petiole borer	sM	light damage to urban trees in Cambridge and in Erin Twp, Cambridge District
Chrysomela walshi Brown Balsam poplar leaf beetle	bPo	light damage; common in the Borden-Angus area, Huronia District
Coleophora limosipenella DuO. Elm casebearer	elm	low numbers near Kleinburg, Maple District; numerous near Vineland, Niagara Falls District
Conophthorus banksianae McPherson jack pine tip beetle	jP	moderate tip damage in the Palgrave area, Maple District

(continued)

Table 7. Other forest insects (continued).

Insect	Host(s)	Remarks
Conophthorus resinosae Hopk. Red pine cone beetle	rP	numerous affected shoots on understory trees at CFB Borden, Huronia District
Cryptococcus fagisuga Lindinger Beech scale	Be	trace incidence near Holland Landing in East Gwillimbury Twp, Maple District
Datana ministra (Dru.) Yellownecked caterpillar	Ba	Severe defoliation recurred in Clarke Twp, Lindsay District.
Diprion similis (Htg.) Introduced pine sawfly	pine	low populations widespread in the Region
Dioryctria zimmermani (Grt.) Zimmerman pine moth	rP	general decline in populations; occasional moderately infested trees in Uxbridge Twp, Maple District and in Tosorontio Twp, Huronia District
Ectoedemia lindquisti (Free.) Small birch leafminer	wB	approximately 20 ha of heavily damaged trees along shoreline of Georgian Bay in Tiny Twp, Huronia District
Epinotia aceriella (Clem.) Maple trumpet skeletonizer	sM	several locations of moderate damage in the Cambridge and Huronia districts
Erannis tiliaria (Harr.) Linden looper	deciduous	common in the Maple, Niagara and Huronia districts at low levels
Eucosma gloriola Heinr. Eastern pine shoot borer	rP	conspicuous damage to saplings, CFB Borden, Huronia District
Exoteleia pinifoliella (Cham.) Pine needleminer	jP	noticeable damage at CFB Borden and in the Midhurst area, Huronia District

(continued)

Table 7. Other forest insects (continued).

Insect	Host(s)	Remarks
Fenusa pusilla (Lep.) Birch leafminer	wB	heavy damage to ornamentals common throughout the Region; scattered damage to forest trees in Rama, Mara and Baxter twps, Huronia District
Hemichroa crocea (Geoff.) Striped alder sawfly	wB	heavy defoliation on scattered trees, Beausoleil Island, Huronia District
Hylobius radicis Buch. Pine root collar weevil	scP	several pockets of mortality in the Huronia District
Ips pini (Say) Pine engraver	rP	associated with seedling mortality on experimental trees in Vespra Twp, Huronia District
Malacosoma americanum F. Eastern tent caterpillar	deciduous	occasional pockets of heavy damage in the Cambridge District
Melanolophia canadaria Gn. Variable redmarked looper	deciduous	high numbers at Awenda Provincial Park, Huronia District
Neodiprion sertifer (Geoff.) European pine sawfly	pine	occasional colonies throughout the Region; decline to trace incidence in Haldimand Twp, Lindsay District following a virus spray program in 1981
Notodontidae	Ba	Heavy damage recurred in Awenda Provincial Park, Huronia District.
Orgyia leucostigma intermedia Fitch White marked tussock moth	deciduous	high numbers on open-grown trees near Princeton, Cambridge District
Periclista albicollis (Nort.) Oak sawfly	oak	numerous larvae found in the Vivian area, Maple District

(continued)

Table 7. Other forest insects (continued).

Insect	Host(s)	Remarks
Pikonema alaskensis (Roh.) Yellowheaded spruce sawfly	spruce	small pockets of moderate damage near Angus and in Amaranth Twp, Huronia District
Pissodes approximatus Hopk. Northern pine weevil	scP, rP	caused extensive mortality to experimental seedlings in Vespra Twp, Huronia District
Podapion gallicola Riley Pine gall weevil	rP	common on fringe trees, Tiny Twp, Huronia District
Pristiphora geniculata (Htg.) Mountain-ash sawfly	Mo	low numbers common in much of the Region, particularly on ornamentals
Profenusa lucifex (Ross) Oak leafmining sawfly	oak	declined to low levels in the Lindsay District
Pseudexentera cressoniana Clem. Oak olethreutid leafroller	oak	increased incidence in Huronia, Maple and Niagara districts; often associated with other oak insects
Psilocorsis reflexella Clem. Twoleaf tier	deciduous	common in low numbers in much of the Region; conspicuous leaf browning of oak on Beausoleil Island, Huronia District
Rhyacionia buoliana (Schiff.) European pine shoot moth	rP	declined to moderate in the Freeport Tract, Cambridge District
Sericothrips tiliae Hood Basswood thrips	Ba	damage common in the Coldwater area, Huronia District and in the western half of the Maple District

(continued)

Table 7. Other forest insects (concluded).

Insect	Host(s)	Remarks
Symmerista canicosta Francl. Redhumped oakworm	oak	moderate infestation on the north end of Beausoleil Island, Huronia District
Tetralopha asperatella (Clem.) Maple webworm	sM	moderate numbers in Woolwich Twp, Cambridge District
Tlascala reductella Wlk. A locust leaftier	blLoc	Heavy defoliation recurred on hedgerow trees in Uxbridge Twp, Maple District.

TREE DISEASES

Major Diseases

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

The European race of this disease, which was first recorded in 1975 as causing widespread losses in large red pine trees in northern New York state, has yet to be found within Ontario. For several years specific surveys have been done for the detection of this virulent form of the disease. In the Central Region, in 1982, a total of 20 stands were examined extensively for Scleroderris canker, but all results were negative. The North American race of the disease, which is associated with pine regeneration and juvenile stands, was not detected in the Region in 1982.

Diplodia Tip Blight, *Sphaeropsis sapinea* (Fr.) Dyko & Sutt. (formerly *Diplodia pinea* [Desm.] Kickx)

This disease continues to cause damage to Scots pine plantations in the Region. In 1982, the most serious damage was recorded in the Cambridge District (Table 8). In Woolwich Township, the blight has occurred for several years; it was first detected in the fall of 1981 in Puslinch Township, where it has caused 19% mortality, and many more trees are on the verge of dying. The landowner is in the process of clear-cutting the stand. Another area of similar damage was reported from nearby Nassagaweya Township. All of the affected stands were of similar size and immature, but old enough to produce seed cones. Research shows that trees become more susceptible with age and this increased damage is probably related to the buildup of the fungus on seed cones. Although these Scots pine stands have a low timber value, they have an aesthetic and ecological value as they are often on poor agricultural sites.

In 1982, Diplodia tip blight was also collected for the first time on Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco). This collection was from an ornamental tree in the Barrie area, Huronia District.

Table 8. Damage caused by tip blight on Scots pine at two locations in the Cambridge District in 1982.

Location (Twp)	Area (ha)	Host basal area (m^2/ha)	Avg ht of trees (m)	Trees affected (%)	Trees severely affected (%)	Trees dead (%)
Puslinch	17	23	10.5	94	38	19
Woolwich	2	24	13.0	88	46	9

Table 9. Other forest diseases.

Organism	Host(s)	Remarks
Apiognomonia quercina (Kelb.) Hoehn. Oak anthracnose	wO	heavy early damage in the Hamilton-Burlington-Oakville area of the Cambridge District
Apiognomonia veneta (Sacc. & Speg.) (Sacc. & Speg.) Hoehn. Sycamore anthracnose	Sy	heavy on occasional trees in Niagara-on-the-Lake, Niagara District
Discula campestris (Pass.) Arx Anthracnose	sM	moderate infections on roadside trees outside of Hamilton, Cambridge District
Endocronartium harknessii (J.P. Moore) Y. Hirat. Globose gall rust	jP	light infection on mature trees in Hendrie Forest, Vespra Twp, Huronia District
Guignardia aesculi (Pk.) V.B. Stewart Horse chestnut leafblotch	horse chestnut	common along the Niagara Parkway and in the city of St. Catharines, Niagara District
Gymnosporangium globosum Farl. Gall rust	Haw, J	moderate damage near Kleinburg, Maple District, near Creemore, Huronia District and in the southern part of the Cambridge District
Kabatiella apocrypta (Ell. & Ev.) Arx Leaf anthracnose of maple	sM	decreased damage in comparison with previous years; only very light infection through the Region
Kabatiella prunicola (Ell. & Ev.) Arx Leaf anthracnose of cherry	blCh	common along Hwy 400, Tay Twp, Huronia District
Kabatina juniperi Schneider & Arx Juniper tip blight	J	damage to ornamentals at two locations, one in Barrie, Huronia District and one in Pickering, Maple District

(continued)

Table 9. Other forest diseases (concluded).

Organism	Host(s)	Remarks
Melampsora medusae Thuem. Needle rust	Hybrid Po	light leaf damage on research trees, Vespra Twp, Huronia District
Mycosphaerella effigurata (Schw.) House Leaf spot	BlAs	caused browning and premature leaf drop at many locations in the northern part of Huronia District
Mycosphaerella populicola G.E. Thomps. Leaf spot	bPo	decreased damage by this organism throughout most of the Region
Rhizosphaera kalkhoffii Bub. Needle cast	spruce	damage to ornamentals at several locations in urban areas

Diebacks and Declines

Maple Problems

In the recent past considerable publicity has been given to problems of maple. It has often been suggested that a disease organism exists that will cause widespread mortality of maple and comparisons are made with the effect that Dutch elm disease has had on elms. The problem has been variously called decline, blight, dieback or wilt. Because of this publicity and recent problems of maple elsewhere it was decided to do a province-wide survey of maple in 1982.

Maple Decline

Decline of maples, mostly in urban areas, intensified in 1981 in some areas of the province. The general symptoms of this decline are as follows: after leafing out, normally in the spring, the leaves on affected branches wilt, droop and die, and chlorosis and dwarfing of the foliage often occur. Subsequently, large sections of the tree crowns are affected and whole branches and crown sections die by the end of the summer. Mostly sugar maple was affected, but red maple (*Acer rubrum* L.) and silver maple (*A. saccharinum* L.) as well as numerous ornamental varieties of maple were also affected.

In the 1982 survey of urban and rural maples in the Central Region which included mostly roadside trees, no evidence was found of a widespread incidence of the decline as described above. Many trees were observed that had suffered considerable decline but this was cumulative damage that had occurred over several years.

Although many secondary diseases were found a primary fungal cause of declining maples was not detected. Organisms isolated from affected trees included *Steganosporium ovatum* (Pers. ex Mérat) Hughes, *Cytospora* spp., *Polyporus tulipiferus* (Schw.) Overh., *Ganoderma applanatum* (Pers. ex Wallr.) Pat., *Massaria inquinans* (Tode ex Fr.) de N. and *Phellinus igniarius* (L. ex Fr.) Quel. (formerly *Fomes igniarius* (L. ex Fr.) Kickx). The incidence of anthracnose declined from that of previous years although *Discula campestris* (Pass.) Arx was recorded at some locations. Several samples of foliage showed typical symptoms of nutrient deficiencies. No serious insect problems were encountered.

In many instances the deteriorating trees had suffered abuses such as mechanical injuries to stems and branches and soil compaction from road and sidewalk construction, which resulted in root damage. Some trees had also been subjected to less obvious stresses including herbicide and salt damage, sunscald and air pollution. Often maples on side streets are visibly in much better condition than similar trees on the main thoroughfares. Many of the declining trees were extremely large and clearly in old age.

Maple Dieback

This term has generally been used to describe maple deterioration in the forest setting. In recent years maple mortality was recorded in woodlots at several locations in the Huronia District and at one location in the Cambridge District following heavy infestations of the forest tent caterpillar, *Malacosoma disstria* Hbn. This insect has been at very low levels for the past several years and the problem of maple dieback seems to have abated. Woodlot maple trees are generally in much better condition than ornamental maples as no major dieback problem was encountered on woodlot maples in 1982.

Diseases such as cankers caused by *Nectria galligena* Bres. and *Eutypella parasitica* Davidson & Lorenz were present in many woodlots at low levels. An increased incidence of the maple webworm and the maple trumpet skeletonizer was noted in many areas.

Maple Scorch

Scorch occurred in 1982 on both woodlot and ornamental maples. This condition, which causes a necrosis of the leaves, results from rapid leaf transpiration induced by winds during hot, dry periods. It occurs in late spring and early summer. Pockets of scorch damage in

wooded areas were most evident in Tay, Nottawasaga and East Garafraxa townships, Huronia District and in North Dumfries Township, Cambridge District. Damage to ornamental maple occurred at scattered locations throughout the Region.

Maple Seeding

A phenomenon in 1982 which caused much comment was the abnormally heavy seed crop on soft maples. Because of the quantity of seed produced, many trees responded by not producing much foliage and these trees appeared bare for the remainder of the summer after they had shed the seed keys. This is a normal periodic occurrence and should not be harmful to the trees.

Oak Decline

Monitoring of oak plots, established in 1977, was continued for the sixth consecutive year (Table 10). These plots have shown some overall improvement as insect activity has generally decreased in the past few years. No new areas of decline were reported elsewhere in the Region.

Red Pine Mortality

In Otonabee Township, Lindsay District approximately 0.6 ha of a 4-ha red pine stand were dead or dying. This plantation was on an esker and the trees were all in the 15-cm-diameter size class. The soil on the site had a high pH reading and it is believed that the high limestone content resulted in lack of nutrient availability which was the cause of tree mortality. Many of the dead trees were affected by a secondary disease, the pouch fungus, *Polyporus volvatus* Pk.

Abiotic Damage

Salt Damage

Salt, applied to roads to improve winter driving conditions, was again the cause of appreciable tree damage. Affected trees were noticeable along woodlot and plantation edges facing many of the major two- and four-lane highways in the Region. The most serious damage in 1982 occurred to red pine, white pine and eastern white cedar, all of which are highly susceptible. Damage to ornamentals was also evident but this is becoming less noticeable as more salt-tolerant species are being planted along the major thoroughfares.

Special Surveys

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

Dutch elm disease was first found in the province in 1946 in Prescott County, Cornwall District, Eastern Region. By 1950, areas with diseased elms (*Ulmus* spp.) in the Central Region included Peel and Welland counties, with York County being added in 1951. By 1961, all of the Region was within the range of Dutch elm disease. The impact of the disease is well known (see Frontispiece). However, despite the devastation of elm, survivors remain and an abundance of elm regeneration is evident in many areas. FIDS staff conducted a special survey in 1982 to determine the extent of the fungus among residual trees that survived the first wave of the disease. The survey was also done to establish locations of juvenile elm reproduction and to determine the extent of the disease in these stands. In addition, since the fungus is transmitted in North America by two species of bark beetles, the smaller European elm bark beetle, *Scolytus multistriatus* (Marsh.) and the native elm bark beetle, *Hylurgopinus rufipes* (Eich.), survey techniques were employed to define the abundance and distribution of these two beetle species.

Urban disease evaluations were performed at randomly selected locations across the Region (Table 11). The number of trees sampled varied because of the scarcity of elms in some locales, and therefore, a maximum survey time of one hour at each location was imposed. Rural areas were evaluated on a non-random basis and a maximum survey distance of 20 km of roadside was used (Table 12). It should be noted that these counts, as can be surmised from the heights, include many immature trees.

Locations of juvenile elm reproduction were established with the cooperation of personnel of OMNR. In some areas there is a profusion of such elm propagated by the prolific seeding of residual larger trees. Most of these were open areas such as abandoned fields and pastures, which were often moist. Results of the Dutch elm disease survey in these stands are given in Table 13. Juvenile stand classification was limited to stands with elms <10 cm in diameter and >2 m high.

The survey to collect information about the distribution and population levels of the two major vectors of Dutch elm disease in Canada was done by two methods. A sex lure (pheromone) has been developed for the smaller European elm bark beetle, and traps containing the pheromone bait were deployed in areas of elm growth. The traps were changed several times during the summer and the number of adult beetles was recorded. For the native elm bark beetle, elm trap logs were set out in areas of elm growth. The logs were peeled in mid-July and examined for the number and type of bark beetle gallery. (Propagation of the beetle takes place in galleries in the cambium and the galleries of the two beetles are distinctive.) The logs were replaced and the process was repeated in September. Results of the log trapping and the pheromone trapping

Table 10. Summary of oak decline at five locations in the Central Region from 1977 to 1982.

Location	Avg DBH (cm)	Avg ht (m)	Year	Percentage of crown dead (No. of trees) 0-20	21-40	41-60	>60	Tree dead	Oak leaf shredder activity[a]
Central Region - Huronia District									
Tiny Twp Awenda Park	25.9	21.9	1977	54	7	27	12	0	t[b]
			1978	48	5	22	6	4	t
			1979	58	9	3	4	8	t[b]
			1980	61	8	4	4	8	t
			1981	57	14	2	3	8	t
			1982	63	9	1	3	8	t
Tiny Twp Farlain Lake	26.0	22.0	1977	not sampled					s
			1978	"	"				s
			1979	"	"				s
			1980	0	4	45	25	26	s
			1981	0	11	35	25	29	l
			1982	7	30	22	9	32	l
Mulmur Twp Dufferin Co. Forest	28.2	21.0	1977	64	15	20	1	0	s
			1978	64	15	19	1	1	l[b]
			1979	68	15	15	1	1	t
			1980	57	28	13	1	1	l
			1981	43	34	16	2	1	m
			1982	44	39	10	1	2	m

(continued)

Table 10. Summary of oak decline at five locations in the Central Region from 1977 to 1982 (concluded).

Location	Avg DBH (cm)	Avg ht (m)	Year	Percentage of crown dead 0-20	21-40	41-60	>60	Tree dead	Oak leaf shredder activity[a]
				(No. of trees)					
Central Region - Maple District									
Uxbridge Twp	26.1	21.2	1977	42	9	31	18	0	m
Durham Forest			1978	42	9	31	11	7	1
			1979	40	13	26	6	15	m
			1980	38	14	25	7	16	1[b]
			1981	27	22	26	6	19	1
			1982	29	33	12	6	20	m
Lindsay District									
Clarke Twp	22.9	20.6	1977	38	11	32	19	0	1
Durham-Ganaraska			1978	4	36	39	13	8	1
			1979	3	32	41	16	8	1
			1980	2	26	47	13	12	1
			1981	2	26	47	13	12	t
			1982	1	32	44	11	12	n

[a] n = nil, t = trace, 1 = light, m = moderate, s = severe

[b] Aerially sprayed for control of oak leaf shredder

programs are given in Table 14. Other insects that were found in the trap logs but are considered unimportant in the transmission of the Dutch elm disease fungus include the elm borer, *Saperda tridentata* Oliv., bark weevils, *Magdalis* spp. and another borer, *Chrysobothris* sp.

Table 11. Summary of results of Dutch elm disease survey in urban locations in the Central Region in 1982.

Location	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Cambridge District					
Ancaster	6	52	1	0	1.9
Cambridge	5	69	0	0	0
Mount Forest	4	2	0	0	0
Paris	5	19	0	0	0
Huronia District					
Creemore	5	19	1	0	5.0
Orangeville	5	6	0	0	0
Niagara District					
Port Colborne	-	0	0	0	0
Total		167	2	0	1.2

Table 12. Summary of results of Dutch elm disease survey in rural locations in the Central Region in 1982.

Location (Twp)	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Cambridge District					
N. Dumfries	9	149	1	0	0.6
Huronia District					
Essa	13	73	0	0	0
Mara	16	92	8	0	8.0
Niagara District					
Louth	5	132	2	0	1.5
Lindsay District					
Dummer	11	150	0	0	0
Fenelon	13	120	30	0	20.0
Haldimand	10	88	9	3	12.0
Maple District					
Scott	11	98	2	0	1.5
Total		902	52	3	5.7

Table 13. Summary of results of Dutch elm disease survey in juvenile elm stands in the Central Region in 1982.

Location (Twp)	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Cambridge District					
Beverly	3	100	0	0	0
Maryborough	2	100	0	0	0
Huronia District					
Flos	4	100	0	0	0
Mara	7	98	2	0	2.0

(continued)

Table 13. Summary of results of Dutch elm disease survey in juvenile elm stands in the Central Region in 1982 (concluded).

Location (Twp)	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Niagara District					
Humberstone	5	49	1	0	2.0
Niagara	3	150	0	0	0
Lindsay District					
Cartwright	5	148	2	0	1.3
Maple District					
Markham	5	100	0	0	0
Caledon	6	100	0	0	0
Total		945	5	0	0.5

Table 14. Results obtained from pheromone traps set for the smaller European elm bark beetle and trap logs set for the native elm bark beetle.

Location (Twp)	Pheromone traps	Trap logs	
	Total no. of S.E.E.B.B.[a] adults captured	Total no. of galleries	
		S.E.E.B.B.[a]	N.E.B.B.[b]
Huronia District			
Mara	8	0	0
Sunnidale	11	0	1
Maple District			
Vaughan	229	0	0
Cambridge District			
Beverly	125	0	7
Niagara District			
Louth	145	0	0
Lindsay District			
Mariposa	0	6	17
Haldimand	1	3	35

[a] smaller European elm bark beetle

[b] native elm bark beetle

Red Pine Plantation Survey

In 1982 FIDS staff carried out a special survey of red pine plantations throughout southern Ontario. In the Central Region a total of eight plantations were examined to determine the presence and impact of specific insect and disease organisms and to record any other damaging pests that might be present. Two visits were made to each of the locations because of the differences in the occurrence of the various pests. The first visit was scheduled between 1 and 18 June and the second between 26 July and 13 August. Stand selections were made in consultation with OMNR personnel so that a truly random survey could be achieved. At least two stands were to fall into each of the following height strata: 0.5 to 2 m, 2.1 to 6.0 m, and > 6 m.

Specific insect and disease problems that were detected are summarized in Table 15. These include the European pine sawfly, European pine shoot moth, pine false webworm and pine needle rust, *Coleosporium asterum* (Diet.) Syd. Other insects that were searched for but not found were the redheaded pine sawfly and the pine root collar weevil. Other diseases searched for but not found were Scleroderris canker, needle cast, *Lophodermium* sp., Armillaria root rot, and a vascular problem, Verticicladiella disease, *Verticicladiella* sp. The eastern pine shoot borer was detected on 2% and 6% of the trees at the Nottawasaga and Erin locations, respectively. At the Uxbridge plot 2% of the trees were infested with pine spittlebug, and Zimmerman pine moth occurred on 6% of the trees. Also at the Nottawasaga plantation, 8% of the trees were attacked by jack pine budworm, as were 4% of the trees at the Oro Township location. At the latter location the jack pine budworm were feeding in conjunction with spruce budworm.

To determine the extent and occurrence of the pinewood nematode, *Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle, dead and declining trees were sampled but the results were negative.

Red Pine Seed and Cone Pest Survey

As part of a province-wide survey, red pine cones were collected from two Seed Production Areas in the Region. One hundred second-year cones were collected in early July on a random basis throughout the two areas. At the Lynn Tract, Oro Township, Huronia District, 89% of the cones were damaged, with the seed loss amounting to 68% within the damaged cones. At the other location in Haldimand Township, Northumberland County Forest, Lindsay District, 99% of the cones were damaged and within these there was 82% seed loss. The three major insect pests responsible for the damage in both areas were the red pine coneworm, *Eucosma monitorana* Heinr., the red pine cone beetle, and the webbing coneworm, *Dioryctria disclusa* Heinr. No cone diseases were recorded in either area; however, at the Lynn Tract the Zimmerman pine moth, *D. zimmermani* (Grt.), the spruce coneworm, *D. reniculelloides* Mut. & Mun., and a cone resin midge, *Asynapta* sp., did relatively minor damage.

Table 15. Summary of the results of a red pine plantation survey carried out in the Central Region in 1982.

Location (Twp)	Area (ha)	Avg ht of trees (m)	Esti-mated trees per ha	European pine sawfly	European pine shoot moth	Pine false webworm		Needle rust	
				Trees affected (%)	Trees affected (%) (laterals only)	Trees affected (%)	Defolia-tion (%)	Trees affected (%)	Defolia-tion (%)
Lindsay District									
Haldimand	2.5	1.2	2500	5	0	0	0	37	5
Clarke	4.5	5.0	2500	1	0	0	0	78	5
Mariposa	3.0	6.5	2500	0	0	0	0	0	0
Huronia District									
Nottawasaga	10.0	0.9	2500	1	1	23	8	0	0
Oro	5.0	3.6	2500	0	0	73	25	12	2
Maple District									
Albion	4.0	9.2	2000	1	0	0	0	0	0
Uxbridge	2.0	1.5	2500	0	0	1	2	64	7
Cambridge District									
Erin	6.0	2.6	2000	1	0	5	2	88	3