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Southeastern Forest Region, 1968
Status of Insects in the Lindsay
District

Thomson, M.J.

Information Report O-X-83
(Forest Research Laboratory, Ontario Region)



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FOREWORD

The Forest Insect and Disease Survey maintains a continuing interest in improving existing sampling methods and in developing new techniques for rating forest pests and appraising damage. In 1968, a new approach for evaluating incidence and levels of infection of a number of tree diseases was explored. This involved determining degrees of damage in random and non-random plots in relation to the basal area of infected stands, the ultimate objective being to provide information on the impact of the organisms on forest stands in Ontario. Studies during the winter to test the accuracy of the new sampling system will be useful for planning field work in 1969. Improvement of insect survey methods in 1968 was largely directed toward jack-pine budworm sampling with emphasis on egg population studies. To this end, the distribution of egg masses on individual branches and at various crown levels of sample trees was investigated as a basis for determining the nature and size of samples required to assess population levels. The value of these new approaches in disease and insect sampling will be proven with use in forthcoming field seasons.

Marked changes in insect and disease conditions were recorded in large areas of the Province in 1968. A sharp increase in population levels of the spruce budworm and jack-pine budworm occurred in many parts of Ontario. The largest areas of infestation of the spruce budworm were located in the Burchell Lake area in the Port Arthur District, in parts of the Chapleau, Kapuskasing and Swastika districts and in southeastern Ontario. Localized infestations were centered in Parkinson Township in the Sault Ste. Marie District and in Fairbanks Township west of Sudbury. Egg surveys in most of the above areas except Burchell Lake, indicated that infestations will increase in extent in 1969.

The chemical control operation undertaken by the Ontario Department of Lands and Forests against the spruce budworm in the Burchell Lake area dominated insect surveys in western Ontario during several periods from May until September. Technicians were involved in intensive sampling to delineate the area to be treated, to time the spray applications and to assess spruce budworm numbers before and after the control operation.

Infestations of the jack-pine budworm abated somewhat in the Kenora and Fort Frances districts but several years of severe defoliation, particularly on rocky sites, caused considerable crown damage. In parts of the Sault Ste. Marie and Pembroke districts very severe defoliation of both jack pine and red pine was reported. Other insects occurring in particularly high numbers in 1968 included the saddled prominent, larch casebearer and several species of cedar leaf miners.

Devastation of elm by Dutch elm disease continued in southern Ontario and numerous new centers of infection were found throughout a large part of the range of elm in central Ontario. A vector of Dutch elm disease, the smaller European elm bark beetle extended its range eastward along the north shore of Lake Ontario and St. Lawrence River. Hypoxylon canker of poplar proved to be a serious problem in many parts of Ontario. Evaluations revealed particularly high levels of infection in aspen stands in the Sault Ste. Marie and Sudbury districts. Scleroderris canker of pine again caused considerable

mortality in young red pine and jack pine plantations in parts of central and northeastern Ontario. Fomes root rot usually associated with thinning operations, caused varying amounts of mortality in red pine plantations in southern Ontario. Four new centers of infection of this disease were found in Larose forest in the Kemptville District in 1968. Details on the above and other noteworthy insect and disease problems are contained in the report that follows.

J. E. MacDonald

SOUTHEASTERN FOREST REGION

1968

INTRODUCTION

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INTRODUCTION

Southeastern Forest Region

The most noteworthy insects in 1968 in the Southeastern Region were the spruce budworm, European pine sawfly, and the eastern larch beetle. Marked increases in population levels and area of infestations of the spruce budworm occurred in Kemptville and Tweed districts and a pocket of new infestation was discovered in Lindsay District. The range of the European pine sawfly was extended in Tweed and Lindsay districts and the insect was observed more commonly in red-pine plantations in Lindsay District than in previous years. Unusually heavy infestations of the eastern larch beetle were observed in many larch stands in the northern half of Lindsay District.

Surveys were carried out to determine the status of 29 economically important tree diseases. A marked increase in the distribution of Fomes root rot was recorded and an increase in the incidence of Dutch elm disease occurred throughout the region. The cause of deterioration of red pines in three 25 to 35-year-old plantations in the Lindsay District remains unknown.

The field season extended from early May until mid October. During this period a total of 622 insect and disease samples were submitted to the laboratories. A special survey was carried out to determine the specific identification and distribution of a birch leaf miner that was recorded for the first time in Canada in the southwestern part of the region in 1967. Numerous mass collections of important insects, including one containing more than 1,000,000 European pine sawfly larvae, were made for detailed pathological investigations. Approximately 200 extension and service calls pertaining to forest insects and tree diseases were dealt with.

Appreciation is again expressed for the co-operation given to technicians during the field season by Department of Lands and Forests personnel and others.

M. J. Thomson

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

This disease continued to ravage elm stands and roadside trees throughout the region. Incidence of attack was generally higher in 1968 than in 1967, particularly south of a line running east and west between Minden in Lindsay District and Prescott in Kemptville District. Trees near Lake Ontario, Bay of Quinte and St. Lawrence River were most severely attacked. Seventy-two per cent of the trees examined in the city of Brockville showed disease symptoms (Table 1). Most of the elm trees in several small woodlots in the southern parts of Lindsay and Tweed districts were killed by the disease.

TABLE 1

Summary of the Occurrence of Dutch Elm Disease Symptoms
in the Southeastern Region in 1968

Note: Counts were based on examination of 50 trees at each location

Location (township or city)	Per cent of trees with characteristic symptoms
<u>Lindsay District</u>	
Verulam Twp.	28
Digby Twp.	28
Haldimand Twp.	76
Monmouth Twp.	42
City of Peterborough	50
Belmont Twp.	50
City of Cobourg	44
<u>Tweed District</u>	
Marmora Twp.	50
City of Trenton	60
City of Belleville	42
Kennebec Twp.	22
Oso Twp.	24
<u>Kemptville District</u>	
City of Brockville	72
Town of Gananoque	30
Town of Smiths Falls	14
City of Ottawa	4
Kitley Twp.	12
Finch Twp.	14

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

Records show that white pine blister rust is present and is causing considerable damage in virtually all white pine stands in the Southeastern Region.

Surveys in the region in 1968 revealed high and moderate infection levels in Tweed and Kemptville districts respectively, and in the Lindsay District, either moderate or light infection levels were recorded at all sample points (Table 2). Chemical control measures to eradicate Ribes sp., the alternate host of white pine blister rust, were carried out by Department of Lands and Forests personnel in valuable stands of white pine regeneration and in plantations at several points in the Region in 1968.

TABLE 2

Summary of Incidence and Infection Levels of the White Pine Blister Rust at Thirteen Points in the Southeastern Region, 1968

Location (township)	Tree height in feet	Incidence in per cent	Level of infection
<u>Lindsay District</u>			
Hope	15	35.0	Moderate
Hindon	60	26.0	"
Somerville	15	0.0	"
Laxton	8	8.0	Light
Harvey	50	20.0	Moderate
Darlington	45	10.0	Light
<u>Tweed District</u>			
Raglan	30	10.0	High
Pittsburgh	90	7.5	"
Lyndoch	25	15.0	"
Kaladar	50	5.0	"
<u>Kemptville District</u>			
March	45	7.5	Moderate
Charlottenburg	12	17.5	"
Darling	16	12.5	"

Branch and Stem Canker of Spruce, Cytospora kunzei Sacc.

Although found in all three districts of the region in 1968, little change was observed in the overall distribution of this disease.

In the Lindsay District, severe damage continued in a Norway spruce plantation in the Orono Nursery in Clarke Township and a new pocket of trace infection was located in the Victoria County Forest in Somerville Township. Severe damage was again observed on several white and Norway spruce windbreaks in the Frontenac and Lennox and Addington counties in the Tweed District.

In the Kemptville District a single, medium infection persisted in white spruce windbreaks in the Howard G. Ferguson Nursery in Oxford Township. Light infections also occurred in white spruce plantations in Oxford Township and in the Larose Forest in Clarence Township (Table 3).

TABLE 3

Summary of Incidence and Infection of a Spruce Canker Disease
in the Southeastern Region in 1968

Location (township)	Tree height in feet	Incidence in per cent	Level of infection
<u>Lindsay District</u>			
Clarke	30	33	Heavy
Somerville	15	2	Trace
<u>Kemptville District</u>			
Oxford	18	15	Light
Clarence	45	17.5	Light

Fomes Root Rot, Fomes annosus (Fr.) Cooke

A marked extension in the known range of this disease was recorded when infection centers were discovered in the Larose Forest, Kemptville District in the spring of 1968. This record represented an eastward extension of approximately 150 miles. Subsequent investigations during the summer revealed a total of fourteen infection centers in a 300-acre, 30-year-old plantation of red, white, and Scots pine which had been selectively thinned between 1958 and 1962.

In the Lindsay District where the disease has been present for several years two new infection centers were discovered. Severe damage occurred in a small mixed red and white pine plantation along Highway 30 in Brighton Township. The other infection center causing trace damage was located in the Northumberland

County Forest in a mixed red, jack and Scots pine plantation. Light mortality occurred in pockets of infection previously reported in the Northumberland County Forest and in a private plantation in Cartwright Township in Durham County. It is interesting to note that the new infection center discovered in 1968 in the Northumberland County Forest occurred on the edge of an area of 15 acres that was clear cut in 1966 as an experimental control for the disease. Fruiting bodies of the disease and typical damage are shown in the accompanying photograph. Quantitative data for the Lindsay District is summarized below (Table 4).

Spread of the disease is effected by airborne spores. Infection centers are established when spores come in contact with infection courts such as fresh mechanical wounds, windthrow and freshly cut stumps. The fungus then spreads from the infection center through root systems and infects nearby healthy trees.

The probability of a plantation becoming infected can be greatly reduced by saturating infection courts with a 10 per cent solution (1 lb per gallon) of sodium nitrite (NaNO_2) in water.

TABLE 4

Summary of Incidence and Infection Levels of Fomes Root Rot
in the Lindsay District in 1968

Location (township)	Tree height in feet	Incidence in per cent	Infection level
Haldimand	50	62.5	Heavy
Cartwright	30	10.0	Medium
Haldimand	45		Light
Brighton	30	68	Heavy

Hypoxylon Canker of Poplar, Hypoxylon mammatum (Wahl.) Miller

Surveys carried out in aspen stands at numerous locations throughout the region in 1968 revealed that this pathogen continues to cause considerable deterioration and tree mortality in stands of many age and site classes (Table 5).

TABLE 5

Summary of Incidence and Infection Levels of Hypoxylon Canker of Poplar
at Eleven Points in the Southeastern Region, 1968

Location (township)	Tree height in feet	Site class	Incidence in per cent	Infection level
<u>Lindsay District</u>				
Cardiff	30		17.5	Light
Haldimand	55		27.5	Moderate
Glamorgan	30		5.0	Light
Digby	40		7.5	"
Hindon	50		5.0	"
<u>Tweed District</u>				
Elzevir	40		60.0	Heavy
Radcliffe	40		65.0	Moderate
Madoc	25		50.0	"
<u>Kemptville District</u>				
Clarence	20		75.0	Heavy
Darling	50		30.0	Moderate
Hawkesbury	25		26.3	"

Hail Damage

Hail storms caused twig damage and partial defoliation of hardwood stands in the northeastern part of Haliburton County in Lindsay District. Ground surveys in Cardiff and Monmouth townships revealed damage to all species of hardwoods in the area, trembling aspen being the most seriously affected species. Aerial observation also revealed damage in Bruton and Harburn townships north of Cardiff and Monmouth townships.

Deterioration and Recent Mortality in Red Pine Plantations

The cause of deterioration and recent mortality of red pine in 25 to 35-year-old selectively thinned plantations in Hamilton, Clarke and Somerville townships in 1968 was not determined.

The most severe damage occurred in a small roadside plantation south of Bewdely in Hamilton Township where approximately 30 per cent of the trees deteriorated through the summer to the extent that both current and old foliage was conspicuously discoloured by early fall. Approximately 10 per cent tree mortality occurred in this plantation. Similar symptoms of deterioration and a small amount of mortality was recorded in a mixed red and white pine planta-

tion in Clarke Township. Only a small number of affected and recently dead trees occurred in Somerville Township.

Extensive sampling of tree trunks and root systems of dead trees failed to reveal a causal agent, however, a secondary root rotting fungus Fusarium solani (Martius) Appel and Wr. emend Snyder and Hans. was cultured in root samples from two of the three affected areas. Soil sampling revealed a heavy clay-loam soil type in Hamilton and Clarke townships and a light sandy soil type in Somerville Township.

Surveys and sampling will be resumed in 1969 to try to determine the cause of the damage.

TABLE 6

Other Noteworthy Diseases in the Southeastern Region in 1968

Organism	Host(s)	Remarks
<i>Aureobasidium pullulans</i> (d By.) Arn.	rP, Aus P	Light damage and mortality to nursery stock in Orono Nursery. Ornamental Austrian pine in Darlington Provincial Park were lightly infected. Extensive damage to red pine trees on high sites in one plantation in Victoria County Forest
<i>Ciborinia whetzellii</i> (Seaver) Seaver	tA	Foliage disease found throughout the region at trace level of infection. Occasional trees found moderately infected. Disease most common on open and fringe regeneration
<i>Cenangium abietis</i> (Pers.) Rehm	Pines	Present in samples from a red pine plantation in Stanhope Twp., Lindsay District. Dieback and mortality occurred in this plantation. Also found in Austrian pine plantation in Minden Twp., Lindsay District
<i>Coleosporium asterum</i> (Diet.) Syd.	rP	Trace infections found at numerous locations
<i>Cronartium comptoniae</i> Arth.	jP	Five per cent of trees in a natural stand in Torbolton Township, Kemptville District are infected

TABLE 6 (concluded)

Organism	Host(s)	Remarks
<i>Melampsora abietis-canadensis</i> Ludw. ex Arth.	eH	Trace level of this rust occurred on new-growth twigs in Bathurst Township. Infected twigs became deformed before dying
<i>Peridermium</i> sp.	ScP	Six trace level infections occurred in plantations in the Tweed and Kemptville districts
<i>Pollaccia radiosa</i> (Lib.) Bald. & Cif.	tA	Common throughout the region at trace and light levels of infection
<i>Pucciniastrum vaccinii</i> (Wint.) Jorstad	eH	Found at the trace level throughout Kemptville District on hemlock needles

STATUS OF INSECTS IN THE LINDSAY DISTRICT

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Cedar Leaf Miners, Argyresthia spp. and Pulicalvaria thujaella Kft.

Population levels of cedar leaf miners decreased markedly in the southern part of the District where heavy infestations had persisted for several years. Larval mining of the current foliage of eastern white cedar for at least six consecutive years previous to 1968 caused severe thinning of tree crowns and considerable branch and light tree mortality. Tree and branch mortality was more common in stands on shallow sites and in open-grown clumps of cedar.

Spruce Budworm, Choristoneura fumiferana (Clem.)

Although a decrease in population levels of the spruce budworm occurred in Clarke Township, where a light infestation was reported in 1967, appreciable increases in the extent and intensity of infestations were recorded elsewhere in the District.

A new medium infestation caused approximately 28 per cent defoliation of spruce in two 25 to 35-year-old plantations south of Scugog Lake in Cartwright Township. Only small numbers of budworms were found in this area in 1967. Larvae were present in beating tray samples at eight widely-separated points compared with two points in 1967.

An egg count in the infestation in Cartwright Township revealed that moderate defoliation is likely to recur in 1969.

Larch Casebearer, Coleophora laricella Hbn.

Significant increases in numbers of the larch casebearer occurred for the second consecutive year in the District (Table 7).

Unusually high larval populations were recorded in a pocket of tamarack near Rice Lake in South Managhan Township, and near Orono in Clarke Township where a heavy infestation was reported in a European larch stand in 1967 (see map). Severe damage caused conspicuous discolouration of the foliage in these stands by late May. Quantitative sampling at five points elsewhere in the District revealed increases in numbers of casebearers at all but one location.

TABLE 7

Summary of Larch Casebearer Counts in the Lindsay District 1966 to 1968

Note: Counts were based on examination of four 18-inch branch tips from each of four trees at each point.

Location (township)	Tree species	Av. d.b.h. of sample trees in inches	Av. no. of larvae per 18-inch branch tip		
			1966	1967	1968
Asphodel	tL	2	1.0	14.5	17.0
Haldimand	eL	8	0.0	0.5	1.0
South Monaghan	tL	6			53.0
Cardiff	tL	4	0.2	4.0	6.7
Harvey	tL	3	2.2	4.5	8.0
Snowdon	tL	3	0.5	1.1	3.0
Anson	tL	3	0.3	1.0	0.6

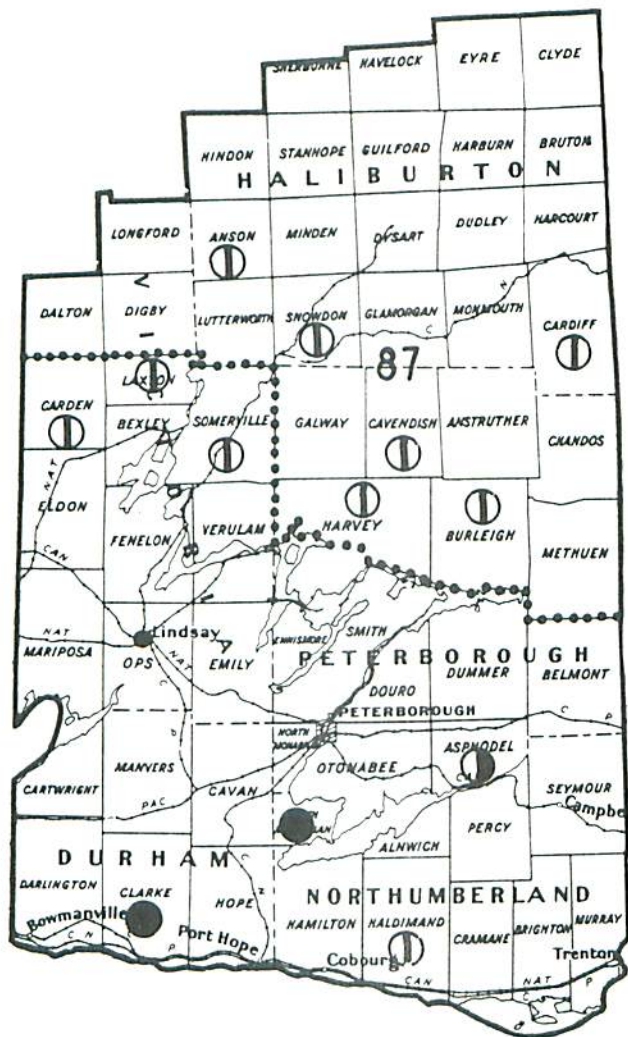
The Eastern Larch Beetle, Dendroctenus simplex Lec.

High populations of this bark beetle caused considerable mortality in larch stands throughout Haliburton County and in the northern parts of Peterborough and Victoria counties in 1968 (see photograph). Generally, mortality was confined to the fringes of larch swamps, but in a few instances occurred in stands growing on high dry sites adjacent to swamps. This bark beetle is not particularly aggressive and usually only attacks trees weakened by other causes. It is probable that drought conditions in 1966 and prolonged flooding in 1967 weakened larch stands to the extent that conditions were favourable for attack by this beetle.

European Spruce Sawfly, Diprion hercyniae (Htg.)

Population levels of this sawfly have remained at a low ebb in the Lindsay District for at least six years. This condition continued in 1968 when numbers of larvae in quantitative samples averaged less than one per tray at all but one sample point (Table 8).

LINDSAY DISTRICT



MILES



LARCH CASEBEARER

Locations of infestations in 1968

Legend

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

TABLE 8

Summary of European Spruce Sawfly Larval Counts in the Lindsay District
1966 to 1968

Note: Counts were based on the average number of larvae per tray on 15 tray samples at each point.

Location (township)	Tree species	Av. d.b.h. of sample trees in inches	Av. no. of larvae per tray sample		
			1966	1967	1968
Stanhope	wS	6	0.3	2.3	0.2
Glamorgan	wS	5	---	1.0	0.8
Cardiff	wS	8	0.6	2.7	4.1
Somerville	nS	6	1.2	1.3	0.7

Eastern Pine Shoot Borer, Eucosma gloriola Heinr.

Population levels and the distribution of this shoot borer increased in 1968. Quantitative sampling at five points revealed marked increases in numbers of attacks on terminal shoots in white pine and red pine plantations in Clarke and Somerville townships (Table 9). Although only small numbers occurred elsewhere, the insect was widely distributed in all counties in the district.

TABLE 9

Summary of Eastern Pine Shoot Borer Attacks in the Lindsay District
in 1967 and 1968

Note: Counts were based on examination of 100 trees at each point.

Location (township)	Tree species	Av. d.b.h. of sample trees in inches	No. of shoots attacked			
			lateral shoots		terminal shoots	
			1967	1968	1967	1968
Clarke	wP	2	95	78	20	38
Somerville	wP	1	4	11	1	6
Verulam	rP	2	---	10	---	15
Hope	rP	1	---	2	---	1
Lutterworth	rP	1	---	20	---	3

Birch Leaf Miner, Fenusa pusilla (Lep.)

Little change occurred in population levels of this insect in 1968. Heavy infestations recurred on ornamental birch trees in the Minden area and on a shelterbelt near Trenton. A medium infestation caused moderate damage to the foliage of understory white birch regeneration in Glamorgan Township. Pockets of light infestation were observed at three widely-separated points elsewhere in the district.

Eastern Tent Caterpillar, Malacosoma americanum (F.)

Larval colonies were observed more commonly in the district than in 1967. However, no appreciable change in population levels occurred except in Haldimand Township where a marked increase in numbers was observed on roadside host trees (Table 10).

TABLE 10

Summary of Eastern Tent Caterpillar Colony Counts
in the Lindsay District 1966 to 1968

Location (township)	Tree species	Number of tents observed per mile of roadside		
		1966	1967	1968
Harvey	cCh	36	4	5
Percy	cCh	0	4	2
Glamorgan	cCh	1	3	2
Lutterworth	pCh	0	10	6
Haldimand	çCh	--	--	27

A Leaf Miner on White Birch, Messa nana Klug

This leaf mining sawfly was first recorded in Canada in 1967 when larvae were found in white birch foliage in Hamilton and Haldimand townships, Lindsay District. Its identity remained unknown until adults were captured in mid-May in 1968.

Surveys carried out in Lindsay and adjoining districts in 1968 revealed a marked increase in population levels in Hamilton and Haldimand townships and small numbers were observed at widely-separated points in Northumberland, Durham and Peterborough counties (see map). Only trace populations were found in the southern parts of the Lake Simcoe and Tweed districts.

The sawfly, of European origin, feeds on many birch species including those native to Ontario. Life history studies carried out through the summer of 1968 showed that damage caused by larval feeding extends from early June until about mid-July.

Balsam-fir Sawfly, Neodiprion abietis complex

Although larval colonies of this sawfly were observed more commonly than in 1967 in the northern parts of Peterborough and Victoria counties and in Haliburton County, defoliation was negligible except at one point. The top third of the crown of balsam fir trees was moderately defoliated in a mixed stand north of Balsam Lake in Bexley Township.

Larval colonies of the late summer population were observed on fringe and open-grown balsam fir trees near Tory Hill in the eastern part of Haliburton County.

Red-headed Pine Sawfly, Neodiprion lecontei (Fitch)

Small pockets of new infestation of this insect were found in the southern part of the district in 1968 (see map). However, a marked decrease in population levels occurred generally in the areas where infestations had persisted for several years in the northern part of the district.

Surveys revealed small scattered pockets of heavy infestation in the northern part of Peterborough County, a medium infestation in Victoria County and light infestations in Haliburton County. Moderate and heavy infestations were common in the above counties in 1967. The decrease in population levels of the sawfly can be attributed mainly to excellent results obtained by chemical control operations in 1967 and 1968. For example, no larval colonies could be found at quantitative sample points in Stanhope and Somerville townships where trees were heavily infested before control measures were carried out in 1967 (Table 11). The effectiveness of the control was illustrated by conditions in an adjacent untreated private plantation where the numbers of infested trees increased by about 40 per cent compared with 1967. Biological control in the form of egg parasitism and a nuclear polyhedrosis virus disease also contributed to the decrease in populations.

Light mortality of red pine averaging 12 feet in height occurred in a roadside planting near Irondale and in a small plantation south of Gooderham where infestations had persisted for several years.

TABLE 11

Summary of Red-headed Pine Sawfly Larval Colony Counts made on Red Pine Trees at Five Points in the Lindsay District, 1967 and 1968

Note: Counts are based on examination of 100 red pine trees at each point.

Location (township)	Av. d.b.h. of sample trees in inches	No. of trees infested		Av. no. of colonies per infested tree	
		1967	1968	1967	1968
Stanhope	1	75	0	1.7	0.0
Lutterworth	2	32	18	1.1	1.0
Hope	1	—	2	—	1.0
Haldimand	1	—	27	—	1.2
Somerville	1	15	1	1.8	1.0
"	1	0	42	0	1.3*

* No chemical control program

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

A marked increase in population levels of N. pratti paradoxicus occurred in Northumberland and Peterborough counties in 1968. Moderate to severe defoliation of jack-pine trees occurred in a 10-acre plantation and a nearby roadside planting two miles north of Trenton in Northumberland County. Pockets of heavy infestation were observed in a small jack pine stand on the north side of Chandos Lake and in a mixed red pine and jack pine plantation in Galway Township, Peterborough County.

Populations of N. pratti banksianae declined for the fifth consecutive year to reach an extremely low ebb. Although jack pine plantations and stands were examined at many points in the district, only seven larval colonies were found. These were confined to fringe trees in a plantation in Dalton Township, Victoria County.

European Pine Sawfly, Neodiprion sertifer (Geoff.)

An extension of the range of this sawfly occurred for the eighth consecutive year in Lindsay District. Larval colonies were found on a roadside planting near Dunsford northeast of Lindsay, approximately ten miles northeast of the boundary established in 1967 (see map).

Marked changes in population levels of the sawfly occurred at numerous points, including four quantitative sample points (Table 12). For example, the numbers of larval colonies decreased at a sample point in a Scots pine plantation in Cartwright Township but increased to heavy infestation levels in a Scots pine plantation in Hope Township. Large numbers of larvae migrated in search of food in the latter area after denuding many trees of all old foliage.

LINDSAY DISTRICT



RED--HEADED PINE SAWFLY

Locations of infestations in 1968

Legend

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

The sawfly was observed more commonly in red pine plantations than in previous years. New infestations were found north of Haydon and south of Glamorgan in Durham County and north of Centreton in Northumberland County. Moderate to severe defoliation of the 1967 foliage occurred in these areas.

A variety of chemical insecticides and a nuclear polyhedrosis virus disease no doubt played an important role in controlling populations in many plantations in 1968. Good control was obtained in many plantations where insecticides were applied shortly after egg hatch occurred. Many virus-killed larval colonies were observed in two Scots pine Christmas tree plantations in Clarke Township, and in an untended 25-acre Scots pine plantation in Cartwright Township. A quantitative sample in the latter plantation revealed that 59 colonies of a total of 100 counted had been killed by disease while larvae were in the early and mid-instars. Small numbers of virus-killed larvae were also found in a new infestation in Hope Township.

TABLE 12

Summary of European Pine Sawfly Larval Colony Counts
in the Lindsay District, 1966 to 1968

Note: Counts were based on the examination of 100 trees at each point.

Location (township)	Tree species	Av. d.b.h. of sample tree in inches	Av. no. of colonies per tree		
			1966	1967	1968
Haldimand	rP	1	21.0	1.1	0.8
Hope	ScP	2			2.4
Clarke	ScP	2	5.5	7.5	0.1
Cartwright	ScP	2	3.6	12.5	1.0

White-pine Weevil, Pissodes strobi (Peck)

Pockets of heavy infestation occurred for the second consecutive year in a Scots pine plantation in Glamorgan Township and in a mixed white pine and red pine plantation in Somerville Township. In the latter township a marked increase in intensity was recorded. A quantitative sample revealed that the numbers of damaged leaders were more than double that of 1967 (Table 13). No appreciable change in numbers occurred at sample points elsewhere in the district.

TABLE 13

Summary of Damage by the White-pine Weevil in the Lindsay District
1966 to 1968

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

Location (township)	Tree species	Av. d.b.h. of sample trees in inches	Per cent of trees infested		
			1966	1967	1968
Somerville	wP	3	-	24	54
Glamorgan	ScP	1	-	24	27
Haldimand	wP	1	-	15	19
Galway	wP	2	9	14	17

Larch Sawfly, Pristiphora erichsonii (Htg.)

A downward trend in population levels of the larch sawfly has occurred each year since 1962 reaching a low ebb in the district in 1968. Small numbers of larval colonies were observed at ten widely-separated points. In each instance the insect was confined to the fringes of tamarack stands or to open-grown trees.

European Pine Shoot Moth, Rhyacionia buoliana (Schiff.)

Population levels of this insect increased in the southern part of the district in 1968. A Scots pine windbreak with trees averaging ten feet in height was severely infested in Darlington Township east of the city of Oshawa. Moderate damage was observed in a Scots pine plantation in the southern part of Hamilton Township. Light to medium infestations occurred on many small highway plantings and windbreaks along the MacDonald-Cartier Freeway between the cities of Trenton and Oshawa. Small numbers occurred on the fringes of plantations at widely-separated points elsewhere in the area.

Smaller European Elm Bark Beetle, Scolytus multistriatus (Marsh.)

A slight increase in the range of the smaller European Elm bark beetle was recorded in 1968. Surveys carried out in September revealed small numbers of the insect in elm trees recently destroyed by Dutch elm disease near the south end of Pigeon Lake in Peterborough County. This represented a spread northward of approximately eight miles from the northern boundary established in 1965.

LINDSAY DISTRICT



EUROPEAN PINE SAWFLY

Known distribution in 1967 and 1968

Legend

Distribution before 1968



Extension in distribution



TABLE 14

Summary of Miscellaneous Insects Collected in Lindsay District in 1968

Insect	Host(s)	Remarks
<i>Acleris variana</i> Fern.	wS	Small numbers at four widely-scattered points
<i>Altica corni</i> Woods	Do	High populations on roadside trees at one point in Cramahe Township
<i>Anacamptis innocuella</i> Zell.	tA	Small numbers on regeneration trembling aspens in Methuen Township
<i>Anoplonyx luteipes</i> Cress.	tL	Low population on fringe tamarack trees near Fenelon Falls
<i>Archippus packardianus</i> Fern.	wS	Small numbers in a white spruce plantation in Cartwright Township
<i>Archippus strianus</i> Fern.	wS	Low population on open-grown white spruce trees in Cardiff Township
<i>Archips cerasivoranus</i> Fitch	cCh	Small numbers of colonies widely distributed throughout the district
<i>Archips fervidana</i> Clem.	rO	Scattered colonies observed on open-grown red oak trees in Dalton Township
<i>Badebecia urticana</i> Hbn.	tA	Trace population in Methuen Township
<i>Datana integerrima</i> G. & R.	bWa,Bu	Severe defoliation observed on black walnut trees at one point in Haldimand Township
<i>Datana ministra</i> Dru.	wB,Ba	Numerous colonies observed on open-grown white birch trees in Eldon Township. Small numbers of colonies at widely scattered points elsewhere in the district

TABLE 14 (continued)

Insect	Host(s)	Remarks
<i>Dichomeris ligulella</i> Hbn.	rO	This rare insect observed in small numbers in the south-eastern part of the district
<i>Dioryctria abietivorella</i> Grt.	rP	Trace population observed in a red pine plantation in Lutterworth Township
<i>Dioryctria reniculella</i> Grt.	wS	Small numbers widely distributed throughout the district
<i>Diprion frutetorum</i> (F.)	ScP	Quantitative sampling at five widely scattered points revealed low populations at each
<i>Diprion similis</i> (Hgt.)	ScP	Trace populations confined to the southern half of the district
<i>Ectropis crepuscularia</i> Schiff.	sM	Trace population observed in the northeastern part of Haliburton County
<i>Elaphidionoides parallelus</i> Newm.	rO	Low populations widely distributed throughout the district
<i>Exoteleia dodecella</i> Linn.	ScP	Small numbers on roadside plantings and in plantations in the southern half of the district
<i>Exoteleia pinifoliella</i> Cham.	jP	Small numbers of mined needles observed at widely scattered points
<i>Galerucella cavicollis</i> Lec.	rCh	Heavy infestation on scattered roadside trees in Emily Township
<i>Heterocampa biundata</i> Wlk.	sM	Small numbers collected from fringe and understory trees in Quilford Township
<i>Heterocampa guttivitta</i> Wlk.	sM	Small numbers in the northeastern part of Haliburton County. (High populations capable of causing severe defoliation of sugar maples)

TABLE 14 (continued)

Insect	Host(s)	Remarks
<i>Hydria prunivorata</i> Ferg.	bCh	Common on understory and fringe trees in Durham and Northumberland counties
<i>Hylurgopinus rufipes</i> Eich.	wE	High populations in areas where dead and dying elms occur throughout the district
<i>Hyperetis amicaria</i> H.-S.	sM	Trace population in the north-eastern part of the district
<i>Hyphantria cunea</i> Dru.	W, wE, bWa	More common than in the previous year
<i>Lambdina fiscellaria</i> <i>fiscellaria</i> Gn.	bF	Trace population in Minden Township
<i>Lepidosaphes ulmi</i> Linn.	wAs	Small pocket of heavy infestation at one point in Haldimand Township
<i>Lithocolletis hamadryadella</i> Clem.	wO	Heavy infestation in Seymour Township and low populations elsewhere in the southern half of the district
<i>Messa populifoliella</i> Town.	tA	Small numbers on open-grown regeneration trembling aspen trees in Methuen Township
<i>Monoctenus fulvus</i> Nort.	eC	Low populations at widely scattered points throughout the district
<i>Nematus latifasciatus</i> Cress.	wB	Trace population in Bruton Township
<i>Nematus limbatus</i> Cress.	W	Scattered colonies on lakeshore and open-grown willow clumps in Belmont Township
<i>Nephoteryx virgatella</i> Clem.	bLo	Severe defoliation observed on small roadside trees in Ops Township south of Lindsay
<i>Nepytia canosaria</i> Wlk.	bF	Small numbers collected at a permanent sample point in Somerville Township

TABLE 14 (continued)

Insect	Host(s)	Remarks
<i>Nymphalis antiopa</i> L.	wE, rE	Small numbers of colonies observed at widely scattered points in the southern half of the district
<i>Orthosia hibisci</i> Gn.	wS	Trace population in Verulam Township
<i>Paleacrita vernata</i> Peck	rE	A pocket of infestation caused approximately 20 per cent defoliation of roadside trees at one point in Durham County
<i>Phratora purpurea purpurea</i> Brown	bPo	Although rare on balsam poplar trees, approximately 10 per cent defoliation of this host occurred at one point in Galway Township
<i>Pikonema alaskensis</i> (Roh.)	wS	Approximately 30 per cent defoliation observed on fringe trees at one point. Small numbers elsewhere in the district
<i>Pikonema dimockii</i> (Cress.)	wS	Trace population at widely scattered points throughout the district
<i>Pineus strobi</i> Htg.	wP	High population observed on a small number of trees in a mixed white and red pine plantation
<i>Pissodes approximatus</i> Hopk.	rP	Trace population in Cramahe Township
<i>Plagiodera versicolora</i> Laich.	W	Light defoliation observed on lakeshore willow trees in Eldon Township
<i>Pristiphora geniculata</i> (Htg.)	eMo	Light defoliation observed on the lower crowns of near mature trees in Clarke Township, scattered colonies on roadside plantings elsewhere in the district

TABLE 14 (concluded)

Insect	Host(s)	Remarks
<i>Profenusa lucifex</i> Ross	rO	Heavy infestations caused conspicuous discoloration of the foliage on host trees in a mixed hardwood stand in Hamilton Township
<i>Profenusa thomsoni</i> (Konow.)	wB	Small numbers observed on regeneration white birch trees in the northeastern part of Haliburton County
<i>Pulicalvaria piceaella</i> Kft.	wS	Trace population observed in Verulam Township
<i>Rhynchaenus rufipes</i> Lec.	W	High populations on lakeshore trees at one point in Eldon Township
<i>Schizura concinna</i> J. E. Smith	bWa	Trace population in Haldimand Township
<i>Semiothisa bicolorata</i> Fabr.	jP	Small numbers observed in a jack pine plantation in Haldimand Township
<i>Tetralopha expandens nephelotella</i> Hlst.	wO	Low populations of this leaf roller observed on open-grown host trees in Bexley Township
<i>Toumeyella numismaticum</i> P. & M.	jP	One tree lightly infested in Methuen Township
<i>Zeiraphera canadensis</i> Mut. and Free.	wS	Small numbers collected in a white spruce plantation near Bobcaygeon
<i>Zeiraphera fortunana</i> Kft.	wS	Light damage caused by this insect observed on fringe trees in Verulam Township