FOREWORD

J. E. MacDonald

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

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

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

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

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

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

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

FOREWORD

J. R. Macdonald

TABLE OF CONTENTS

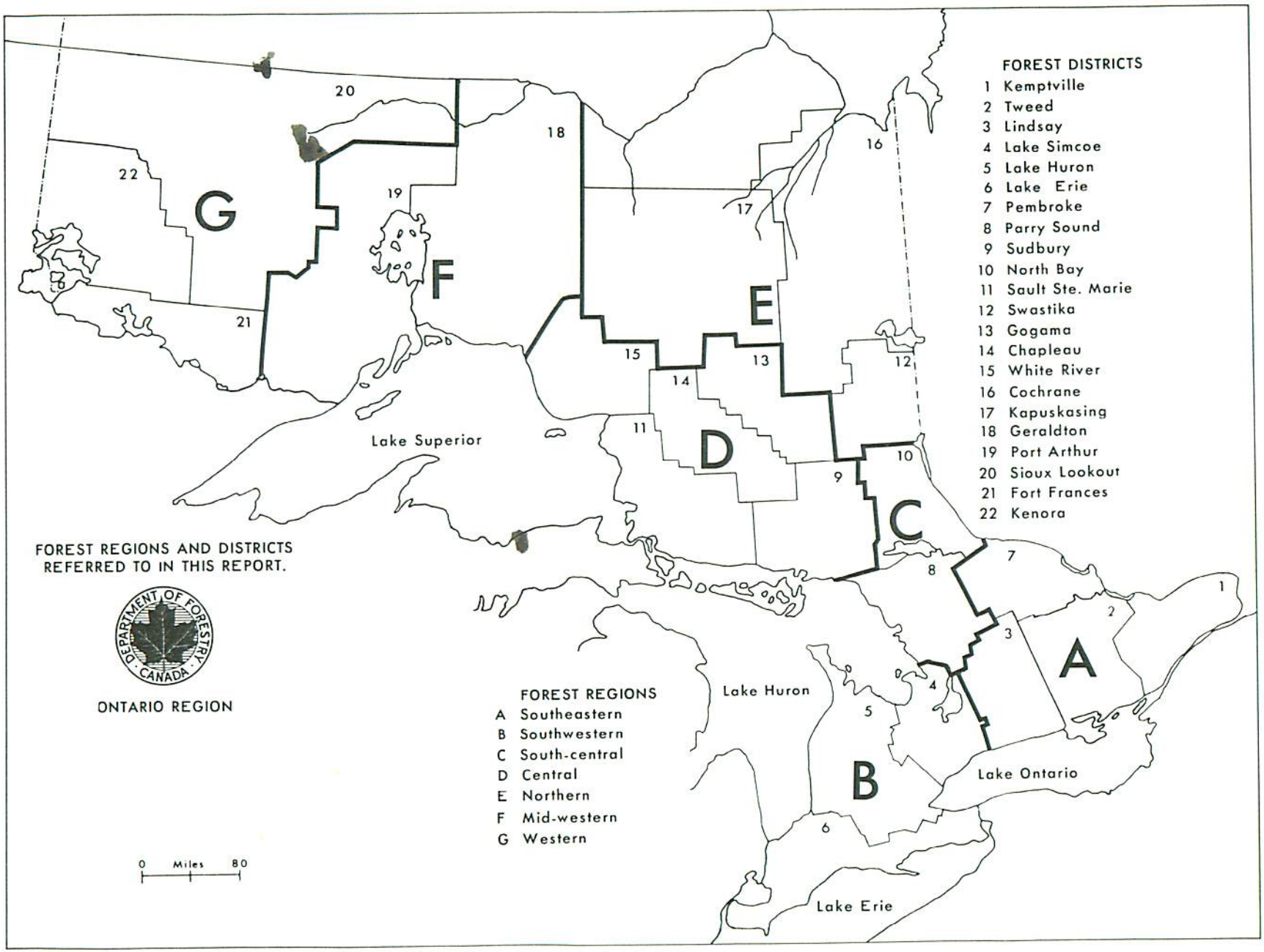
REPORTS OF FOREST RESEARCH TECHNICIANS

Ontario

* Regional Supervisors

1965

Information Report No.	Subject	Author
O-X-5	Forest Insect & Disease Surveys	
	--Lindsay District	W. J. Miller
O-X-6	--Tweed District	F. Livesey
O-X-7	--Kemptville District	J. Hook
O-X-8	--Pembroke District	H. J. Weir
O-X-9	--Lake Simcoe District	A. A. Harnden
O-X-10	--Lake Huron District	R. L. Bowser
O-X-11	--Lake Erie District	J. R. Trinnell
O-X-12	--North Bay District	L. S. MacLeod
O-X-13	--Parry Sound District	C. A. Barnes
O-X-14	--Sault Ste. Marie District	H. G. McPhee
O-X-15	--Sudbury District	J. R. McPhee
O-X-16	--Chapleau District	D. Ropke
O-X-17	--Gogama District	R. A. Trieselmann
O-X-18	--White River District	D. C. Constable
O-X-19	--Cochrane District	H. R. Foster
O-X-20	--Kapuskasing District	G. T. Atkinson
O-X-21	--Swastika District	M. J. Applejohn
O-X-22	--Port Arthur District	K. C. Hall
O-X-23	--Geraldton District	V. Jansons
O-X-24	--Sioux Lookout District	P. E. Buchan
O-X-25	--Kenora District	G. G. Jackson
O-X-26	--Fort Francis District	M. J. Thomson


FOREST DISTRICTS
1 Kemptville
2 Tweed
3 Lindsay
4 Lake Simcoe
5 Lake Huron
6 Lake Erie
7 Pembroke
8 Parry Sound
9 Sudbury
10 North Bay
11 Sault Ste. Marie
12 Swastika
13 Gogama
14 Chapleau
15 White River
16 Cochrane
17 Kapuskasing
18 Geraldton
19 Port Arthur
20 Sioux Lookout
21 Fort Frances
22 Kenora
FOREST REGIONS AND DISTRICTS REFERRED TO IN THIS REPORT.
DEPARTMENT OF FORESTRY CANADA
ONTARIO REGION
FOREST REGIONS
A Southeastern
B Southwestern
C South-central
D Central
E Northern
F Mid-western
G Western
0 Miles 80
Lake Superior
Lake Huron
Lake Ontario
Lake Erie

SOUTHEASTERN FOREST REGION

1965

INTRODUCTION

STATUS OF INSECTS (Regional)

STATUS OF TREE DISEASES (Regional)

STATUS OF INSECTS (District)

INTRODUCTION

Southeastern Forest Region

The forest tent caterpillar, European pine sawfly and birch leaf miner were the most noteworthy insects in the Southeastern Region in 1965. Infestations of these defoliators increased in extent and intensity in one or more districts in the region. The known range of the smaller European elm bark beetle which is an important vector of Dutch elm disease, spread eastward approximately 18 miles in the Tweed District to the boundary of the Kemptville District. The root collar weevil, Hylobius radicis Buch., was found in the Tweed District and collections of the pine tortoise scale were made in the Pembroke District for the first time in recent years.

Forest disease surveys revealed the presence of the fungus Fomes annosus (Fr.) Sacc. in a red pine plantation in the Northumberland County Forest in the Lindsay District. This is the first record of the disease in the region. A new distribution record of Melampsora abietis-canadensis Ludwig. ex Arth. was established in the Kemptville District. Surveys in late summer and in the fall for the camp fire disease Rhizina undulata Fr. produced nil returns except in the Lindsay District.

A total of 1,483 insect and disease collections were made in the region in 1965 compared with 1,173 in 1964. This increase resulted in part, from the assignment of an additional technician to the region in 1965, thus providing a technician for each district. Special studies were carried out on two insects and one rust. One hundred fifty seven service calls were dealt with in 1965, a 50 per cent increase over 1964.

W. J. Miller

Forest Tent Caterpillar, Malacosoma disstria Hbn.

Infestations of this major defoliator of broad-leaved trees increased in size and intensity in Pembroke, Tweed, and Kemptville districts in 1965, but only one colony of larvae was observed in the Lindsay District. The total area of infestation in the region totalled about 2,000 square miles (see map).

In Pembroke District, an extension in the area of light defoliation occurred south and east of the main infestation for a distance of 15 miles beyond the Pembroke-Tweed boundary. Severe defoliation of shade trees occurred in the Town of Pembroke and migrating larvae were observed on the walls of some residences. Heavy infestations persisted along the Ottawa River near Deep River in Rolph and Buchanan townships and around Round Lake in Alice, Fraser, and Richards townships. The infestation near Paugh Lake in Burns Township declined from heavy to moderate intensity. Light infestations were observed in McKay, Sherwood, and parts of Wylie and Petawawa townships.

Three heavy infestations occurred in the Tweed District. One, near Halfway Lake in Radcliffe Township, increased in area to coalesce with scattered pockets of severe defoliation in Bangor Township and new pockets of severe defoliation were found near Arnprior in McNab Township and near Tweed in Kaladar Township. Pockets of light defoliation occurred across the northern part of the district and at one location near Hardwood Lake in Raglan Township. Larvae were found commonly on a variety of hardwoods throughout Lennox-Addington and Frontenac counties.

Moderate to severe defoliation of trembling aspen stands occurred in an area of approximately 300 square miles in Russell, Dundas, Grenville, and Carleton counties in the Kemptville District. Scattered pockets of light infestation were observed in Kenyon, Lanark, Ramsay, Huntley, and Drummond townships.

Pupae were examined at numerous locations in July and August to determine the degree of parasitism and successful adult emergence (see photograph). Results of this survey show little change in the degree of parasitism or in adult emergence during the past three years (Table 1).

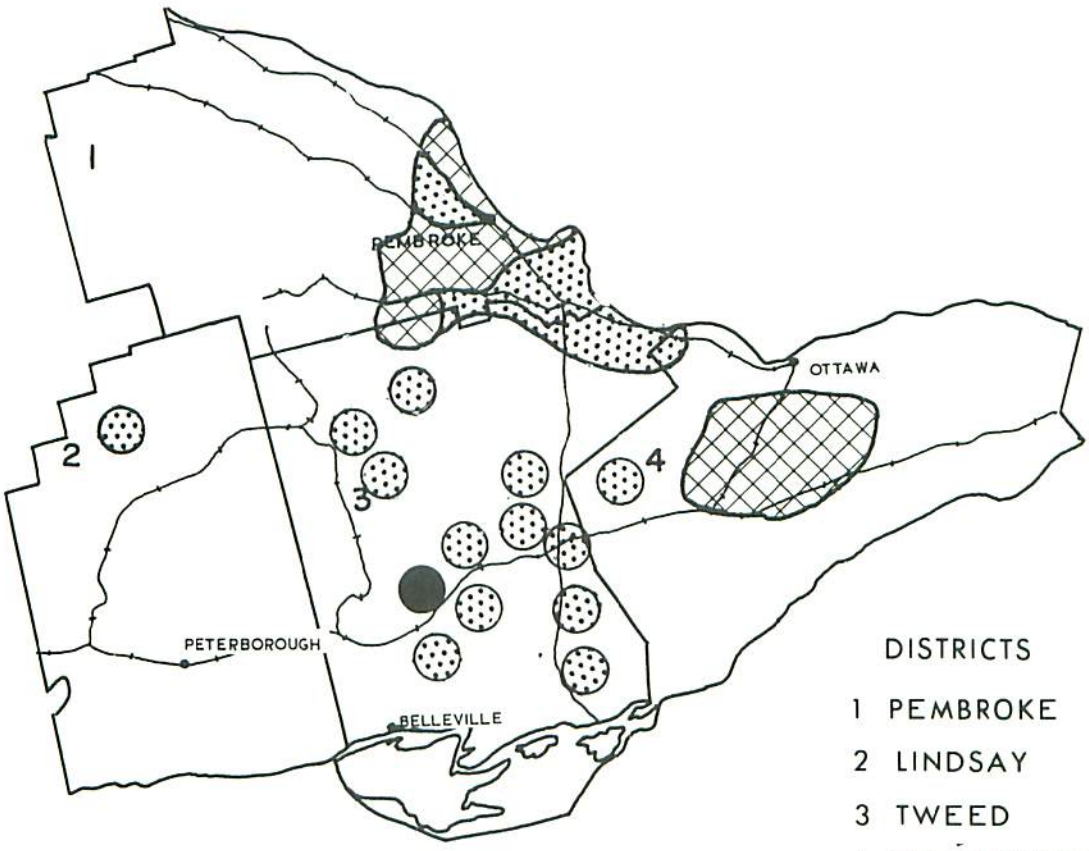
TABLE 1

Summary of Forest Tent Caterpillar Cocoon Dissections in the Southeastern Forest Region from 1963 to 1965

Location	Per cent of cocoons parasitized			Per cent other mortality			Per cent adult emergence		
	1963	1964	1965	1963	1964	1965	1963	1964	1965
Pembroke District									
Alice Twp.	-	62	59	-	2	3	-	36	38
Buchanan Twp.	62	58	59	2	0	16	36	42	25
Burns Twp.	59	63	60	0	0	0	41	37	40
Jones Twp.	49	59	57	1	2	3	50	39	40
Petawawa Twp.	-	41	50	-	0	0	-	59	50
Richards Twp.	53	49	62	5	3	0	42	48	38
Westmeath Twp.	27	43	49	0	3	4	73	54	47
Wilberforce Twp.	-	52	49	-	8	13	-	40	38
Tweed District									
Bangor Twp.	-	48	50	-	2	1	-	50	49
Kaladar Twp.	-	-	31	-	-	2	-	-	67
McNab Twp.	-	-	39	-	-	1	-	-	60
Radcliffe Twp.	-	46	43	-	7	2	-	47	55
Kemptville District									
Cambridge Twp.	-	-	53	-	-	2	-	-	45
Clarence Twp.	-	-	43	-	-	3	-	-	54
Mountain Twp.	-	-	52	-	-	4	-	-	44
S. Plantagenet Twp.	-	9	48	-	0	0	-	91	52

In September egg band counts were taken at 25 locations in the region to forecast population trends and defoliation. These indicate that defoliation will be lighter in the Pembroke District in 1966 except in Buchanan, Burns, and Richards townships. In contrast, an upswing in population levels is forecast in Tweed and Kemptville districts (Table 2).

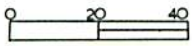
SOUTHEASTERN FOREST REGION



DISTRICTS

1 PEMBROKE
2 LINDSAY
3 TWEED
4 KEMPTVILLE

MILES



FOREST TENT CATERPILLAR

Areas in which defoliation occurred in 1965

Legend

Light defoliation.....

Moderate to severe defoliation.....

TABLE 2

Summary of Forest Tent Caterpillar Egg Band Counts in the Southeastern Forest Region in 1964 and 1965

Location	Av. d.b.h. of sample trees in inches	Av. no. of egg bands per tree		Forecast for
		1964	1965	1966
Pembroke District				
Alice Twp.	3	-	6.0	Heavy
Bromley Twp.	3	-	2.0	Moderate
Buchanan Twp.	10	35.6	3.3	Light
Burns Twp.	10	54.6	1.6	Light
Cameron Twp.	5	0	0	Nil
Dickens Twp.	8	2.6	0.6	Light
Fraser Twp.	10	50.3	19.0	Heavy
Head Twp.	5	4.3	0	Nil
Master Twp.	9	5.0	3.0	Light
Richards Twp.	10	29.6	4.3	Light
S. Algona Twp.	2	-	1.1	Light
Stratton Twp.	4	0	0	Nil
Westmeath Twp.	5	10.6	3.0	Moderate
White Twp.	10	0	0	Nil
Tweed District				
Brudenell Twp.	3	-	0	Nil
Bangor Twp.	5	-	36.9	Heavy
Kaladar Twp.	3	-	12.1	Heavy
McNab Twp.	2	-	1.3	Moderate
Olden Twp.	6	-	0	Nil
Radcliffe Twp.	6	25.3	17.1	Heavy
Kemptville District				
Cambridge Twp.	2	-	7.3	Heavy
Beckwith Twp.	3	-	0	Nil
Osgoode Twp.	3	-	7.0	Heavy
S. Plantagenet Twp.	2	-	9.6	Heavy
Torbolton Twp.	2	-	3.3	Moderate

STATUS OF TREE DISEASES

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

Infection centres were observed more often in the Southeastern Forest Region in 1965 than in 1964. Pockets of infection with small numbers of dead Scots and red pine trees were observed in older plantations in Clarke and Darlington townships, Durham County, Lindsay District.

Numerous dead trees were observed in an infection centre of about 5 acres in a mature stand of red pine trees in Bagot Township, Tweed District. Scattered small pockets of infection occurred on red and Scots pine plantings near the Town of Flinton in Kaladar Township.

Pockets of infection were observed in 18-year old red pine plantings in Cambridge, Bathurst, and Ramsay townships, Kemptville District, and seven, twenty-three and ten trees respectively were killed.

Severe mortality occurred among mature red pine trees in a woodlot in Wilberforce Township, Pembroke District, where 15 of 100 trees examined were dead. In Clancy and Guthrie townships, of 100 trees examined, eight and four jack pine seedlings respectively had been girdled and killed by the shoestring root rot.

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

The Dutch elm disease occurred throughout the Southeastern Region. Incidence of the disease increased at almost all sample points in 1965 compared with 1964 (Table 3). Mortality at most sample points was high in 1965. The heaviest mortality occurred in the southern half of Lindsay District where the disease has persisted for the past nine years (see photograph).

The first record of Dutch elm disease in Algonquin Park was recorded in 1965 when a sample of elm taken in White Township returned a positive result.

TABLE 3

Summary of the Occurrence of Dutch Elm Disease and of the Mortality in the Southeastern Region in 1964 and 1965

District	Township	No. of trees examined	Per cent of trees diseased		Per cent of trees dead	
			1964	1965	1964	1965
Lindsay	Clarke	50	6	4	66	70
	Cramahe	50	6	8	38	44
	Ennismore	50	5	5	6	16
	Hamilton	50	7	6	35	70
	Hope	50	-	0	-	90
	Mariposa	100	-	20	-	78
	Minden	50	5	6	16	24
	Stanhope	50	7	8	16	20
Tweed	Ameliasburgh	100	2	29	10	5*

TABLE 3 (continued)

District	Township	No. of trees examined	Per cent of trees diseased 1964	Per cent of trees diseased 1965	Per cent of trees dead 1964	Per cent of trees dead 1965
Tweed	Madoc-Tudor	100	12	22	20	22
	N. Marysburgh	100	6	35	24	7*
	Portland	50	-	4	-	2
	Thurlow	100	2	6	4	10
Kemptville	Augusta	50	10	8	4	6
	Drummond	50	8	6	2	4
	Goulbourn	50	2	2	2	2
	W. Hawksbury	50	2	0	0	2
Pembroke	Buchanan	93	2	38	2	17
	Fraser	38	-	34	-	3
	Head	51	-	24	-	12
	Maria	75	-	31	-	19
	N. Algona	62	2	21	1	5
	Pembroke	100	-	12	-	2
	Westmeath	59	25	49	22	39
	Wilberforce	25	-	8	-	0

* Dead trees were felled in 1965

Ink Spot of Aspen, Ciborinia whetzelii (Seav.) Seav.

Incidence of the ink spot of aspen was lower in the Southeastern Region in 1965 than in 1964. One patch of heavy infection occurred in Snowdon Township, Lindsay District, where a quantitative sample revealed that 95 per cent of the aspen in an area of approximately 20 acres was infected and approximately 5 per cent of the foliage per tree was diseased (see photograph). Very low levels of the disease prevailed at scattered locations in the remainder of the region.

A Microcyclic Pine Needle Rust, Coleosporium pinicola (Arth.) Arth

A decline in the number of infected jack pine trees occurred in the Southeastern Forest Region in 1965. In Clara Township, Pembroke District the rust remained in approximately the same area as in 1964 with little or no change in incidence.

A marked decline occurred in Petawawa Township, Pembroke District; this was partially due to the removal of host trees in a pulp cutting operation (Table 4).

No infections at sample points in Murchison and Westmeath townships in Pembroke District and in McNab Township in Tweed District, where very light infections occurred in 1964, were observed.

In 1963 and 1964, a total of 24 seedlings consisting of 6 Austrian, 6 Scots, 6 red and 6 lodgepole pine were transplanted directly under heavily infected trees in Clara Township to determine if the rust would infect hard pines other than the known host - jack pine. These seedlings were inspected in July and no evidence of infection was observed. Further examinations will be carried out in 1966.

Observations made in 1965 revealed that needles with two or more infections dropped prematurely while leaves with single infections remained intact at least until September. This indicates that areas of light infection would be inconspicuous.

TABLE 4

Summary of Incidence of Infection and Severity of Infection of Coleosporium pinicola on Jack Pine Trees at Two Locations in the Pembroke District

Location (township)	No. of trees examined			Incidence of infection			Severity of infection		
	1963	1964	1965	1963	1964	1965	1963	1964	1965
Clara	52	60	52	72	93	87	90	75	65
Petawawa	37	42	21	49	64	29	70	35	15

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

Small patches of infection caused by the white pine blister rust fungus were common at scattered locations in the Southeastern Region in 1965. Small patches of heavy infection occurred in Pembroke and Lindsay districts and in the northern half of the Tweed District. A quantitative sample taken in a white pine plantation in Westmeath Township, Pembroke District revealed that 37 per cent of the trees were infected by the rust and 23 per cent were dead.

Fomes Root Rot, Fomes annosus (Fr.) Cke.

Fruiting bodies of this pathogen were found in the Lindsay District for the first time, in September 1965. This represents an eastward extension of the previously known distribution of approximately 60 miles. Patches of tree mortality up to 100 feet in diameter occurred at several locations in one plantation of red and jack pine in the Northumberland County Forest in Haldimand Township (see photograph). Fifty spore traps for detecting the presence of F. annosus were exposed at various locations in the Southeastern Region during the summer of 1965. Results were negative.

"Cedar-apple" Rust, Gymnosporangium juniperi-virginianae Schw.

This organism was common throughout the range of red juniper in the Tweed District, especially on trees growing on abandoned farms in the southern half of the district.

Red cedars and junipers are infected during the summer by windborne spores from the leaves of alternate host trees such as apple, mountain ash, and hawthorn. A two-year development period on juniper is necessary before mature spores are released from golden-brown galls, reaching two inches in diameter, to complete the cycle.

TABLE 5

Summary of Cedar-apple Rust Gall Counts
in the Tweed District in 1965

Township	Av. d.b.h.	No. trees in sample	No. trees infected	No. of galls per tree
Ernestown	1	10	10	50+
Hungerford	1	5	1	12
Huntingdon	2	10	6	100+
Kingston	2	10	10	50+
Loughborough	1	50	50	10
Thurlow	3	10	10	50

Camp Fire Fungus, Rhizina undulata Fr.

Fruiting bodies of this pathogen were discovered in one plantation in the Ganaraska Forest in Clarke Township, Durham County in 1964. In 1965 there were no fruiting bodies found in the above plantation, but some were found in a nearby plantation that had been recently cut and the slash burned. Surveys were conducted throughout the rest of the Southeastern Forest Region in areas that had been burned over in 1964 and in 1965 with negative results.

The disease is known in Europe to occur in areas recently burned over. It is comparatively unknown in Ontario. In the Ganaraska Forest the Scots pine plantation had been clear cut and the slash burned. It was then replanted with red pine in the autumn of 1964. In 1965 a considerable amount of mortality of the young red pine was observed. A quantitative check in the plantation revealed that 57 per cent of the trees were dead. Although it is not conclusive that the trees were killed by R. undulata, it is of some significance that most of the dead trees were found to be in the burned over patches where the fruiting bodies of R. undulata had been found in 1964.

Maple Deterioration

As in 1964 dead and dying maple trees again were observed in 1965, at scattered locations throughout the Southeastern Region (see photograph). In general the incidence of this disease was low and was mainly confined to roadside trees scattered throughout Kemptville, Tweed, and Lindsay districts and in Cobden and Pembroke townships in the Pembroke District. Two exceptions were in Hamilton and Mariposa townships in the Lindsay District where a high incidence occurred. For the most part mortality of maple trees was low (Table 6).

TABLE 6

Summary of the Occurrence of Deterioration and Mortality to Sugar Maple Trees in the Southeastern Region in 1965

Location (township)	Av. d.b.h. of trees in inches	No. of trees examined	Per cent of trees damaged	Per cent of trees dead
Lindsay District				
Asphodel	15	31	13	13
Cavan	16	50	4	0
Darlington	14	50	14	4
Hamilton	12	20	70	5
Hope	20	17	24	6
Mariposa	15	50	58	10
Ops	15	50	40	0
Otonabee	12	50	24	0
Tweed District				
Hungerford	14	30	16	0
Sidney	15	50	28	4
Kemptville District				
Finch	12	50	6	2
Oxford	15	50	4	2

Wind Damage

In September, a tornado-like wind storm struck along the north sides of Red Pine and Kenissis lakes in Sherborne and Havelock townships in Haliburton County. The forest in this area is predominantly hardwood with intermixed and scattered white pine and hemlock. Most trees in the area where the wind struck were windthrown (see photograph). The area of destruction was two and three-quarter miles long and up to one-quarter mile in width. The average width being approximately 500 feet.

TABLE 7

Other Noteworthy Diseases in the Southeastern Region in 1965

Organism	Host(s)	Remarks
Apiosporina collinsii (Schw.) Hoehn	Se, pCh	Infrequent in Clara and Preston twps. Pembroke District.
Aureobasidium pullulans (deBary) Arnaud	jP	During the past four years associated with browning foliage in a small clump of jack pine in Burleigh Twp. Small amounts were found in Bastard Twp.

TABLE 7 (continued)

Organism	Host(s)	Remarks
Coryneum negundinis Berk. & Curt.	moM	First herbarium record. Taken from Minden Twp., Lindsay District.
Coleosporium asterum (Diet.) Syd.	rP	Light infections in Kaladar Twp. Tweed District and Oxford Twp., Kemptville District.
Cytospora chrysosperma (Pers.) Fr.	tA	Low numbers of trees infected throughout the region.
Dermea balsamea (Pk.) Seav.	bF	Occasional infections at one location in Somerville Twp.
Dibotryon morbosum (Schw.) Theiss. & Syd.	Plum & Cherry	Common throughout the South-eastern Region.
Eutypella parasitica Davidson & Lorenz	sM	Occasional cankers in the hardwood forests of Haliburton County.
Guignardia aesculi (Pk.) Stew.	hChe	Severe damage to the foliage of ornamentals throughout Haldimand Twp.
Hypodermella ampla (J. J. Davis) Dearn.	jP	High incidence throughout the Pembroke District.
Hypoxylon pruinatum (Klotsche) Cke.	tA	Cankers common throughout the region with scattered pockets of heavy infection and small numbers of trees killed.
Melampsora abietis-canadensis Ludwig ex Arth.	H	Very light in the Lindsay District. One new distribution record in Cambridge Twp. Kemptville District.
Melampsora medusae Thum.	tL	Medium infections in small areas of Head and Cameron twps. Pembroke District.
Peridermium sp.	scP	A 4-acre plantation near Flinton was severely infected by rust galls on the branches.
Pollaccia elegans Serv.	bPo	Low incidence in Dysart Twp. Lindsay District and in Raglan Twp. Tweed District.
Pollaccia radiosa (Lib.) Bald. & Cif.	tA	Light infections caused by this shoot blight were common throughout the region in 1965. Small pockets of heavy infection occurred at scattered locations. In Snowdon Twp. 70 per cent of the trees in a small area were infected and 50 per cent of the shoots per tree were blighted.
Scoleconectria scolecospora (Bref.) Seav.	bF	Small clumps of trees were infected in Somerville Twp.

TABLE 7 (continued)

Organism	Host(s)	Remarks
Septoria musiva Pk.	bPo	Severe damage to trees in one area in Anstruther Twp. Light damage in Oxford Twp. A small pocket of heavy infection in Raglan Twp.
Steganosporium pyriforme (Hoffm. ex Fr.) Cda.	sM	Found occasionally in Cardiff, Dalton, Haldimand, Preston, and Alice twps. Low incidence in Tweed District.
Wetwood of elm	E	Common in the southern half of the Lindsay District. Very few infections were observed elsewhere in the region.

STATUS OF INSECTS IN LINDSAY DISTRICT

Wm. J. Miller

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

Infestations of these leaf miners increased in area and intensity in 1965 compared with 1964. Heavy infestations persisted throughout the southern half of the district and light infestations occurred in most of the northern half of the district.

Mining and shedding of the foliage for four consecutive years has left the crowns of most of the white cedar trees in the southern half of the district very sparsely foliated (see photograph).

Populations of Pulicalvaria thujaella Kft. and Argyresthia thuiella Pack. were heavier in 1965 than in 1964, but Argyresthia aureoargentella Brower populations were lower.

Larch Casebearer, Coleophora laricella Hbn.

A heavy infestation of this casebearer occurred on a small group of European larch trees in the Provincial tree nursery at Orono. Defoliation was confined largely to the bottom half of the trees. Light infestations were common in the rest of the district. Populations at sample points remained at approximately the same level as in 1964 (Table 8).

TABLE 8

Summary of Larch Casebearer Counts in Lindsay District from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches	Av. no. of larvae per 18-inch branch tip		
		1963	1964	1965
Anson	7	2.0	0.1	0.2
Asphodel	7	3.0	0.6	1.2
Cardiff	7	1.0	0.1	0.3
Dysart	9	0.7	0.1	0.0
Galway	9	1.0	0.0	0.1
Haldimand	9	0.2	0.2	0.2
Hamilton	7	3.9	6.9	4.7
Harvey	7	1.4	0.0	1.0
Minden	9	1.8	0.0	0.0
Snowdon	7	0.5	0.0	0.1
Somerville	7	3.7	0.1	0.1
Stanhope	9	1.2	1.0	0.4

Lace Bugs, Corythucha spp.

A complex of lace bugs occurred on various deciduous trees in the district in 1965. Heavy infestations occurred on yellow birch in small areas in Harburn Township, on oak in Cavendish, Seymour, Brighton, and Murray townships, on elm in most of Seymour Township and on butternut trees in Laxton Township.

The lace bugs collected most frequently in 1965 were: Corythucha ulmi O. & D. on elm, Corythucha elegans Drake on birch, Corythucha pergandei Heidmann on elm and birch and Corythucha arcuata mali Gib. on oak.

Nursery Pine Sawfly, Diprion frutetorum (F.)

Low populations of this sawfly persisted on Scots pine throughout the district in 1965. Variations in numbers in tray samples compared with 1963 and 1964 do not indicate any noteworthy changes in population levels (Table 9).

TABLE 9

Summary of Nursery Pine Sawfly Larval Counts Taken in Lindsay District from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches	Total number of larvae per 15-tray sample		
		1963	1964	1965
Burleigh	3	12	20	1
Cartwright	5	14	40	37
Clarke	4	30	40	7
Cramahe	4	-	12	33
Darlington	4	22	30	0
Fenelon	4	6	17	11
Haldimand	3	10	8	23
Hope	3	8	20	11
Manvers	3	14	17	5
Snowdon	3	7	0	9
Somerville	3	1	0	16

European Spruce Sawfly, Diprion hercyniae (Htg.)

Light infestations occurred on spruce trees throughout the district in 1965. A small increase in population levels occurred at most sample points compared with 1963 and 1964 (Table 10).

TABLE 10

Summary of European Spruce Sawfly Larval Counts in Lindsay District from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches	Total number of larvae per 15-tray sample		
		1963	1964	1965
Carden	14	0	0	2
Cardiff	9	3	4	9
Cartwright	8	14	8	8
Galway	15	20	0	29
Havelock	9	0	12	2
Laxton	17	25	11	34
Sherborne	9	10	8	30
Snowdon	9	5	6	11
Somerville	14	10	12	23
Stanhope	11	5	9	19

Introduced Pine Sawfly, Diprion similis (Htg.)

Light infestations have persisted in Cartwright, Manvers, and Clarke townships in Durham County and in the southern part of Fenelon Township in Victoria County for three consecutive years. No eastward extension of the infestation has occurred in the past two years. Population levels remained at approximately the same level in 1965 as in 1964 except at one location in Manvers Township where a small decline occurred (Table 11).

TABLE 11

Summary of Introduced Pine Sawfly Larval Counts
in Lindsay District from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches	Total number of larvae per 15-tray sample		
		1963	1964	1965
Cartwright	5	30	18	19
Manvers	5	5	13	2
Clarke	4	0	1	2
Fenelon	3	10	3	1

White-pine Shoot Borer, Eucosma gloriola Heinr.

Light infestations became more widespread in the Lindsay District in 1965 than in 1964. The heavy infestation in a white pine plantation in Brighton Township declined to light intensity (Table 12). The closing of the crowns of the trees in this plantation was probably responsible for the decline.

TABLE 12

Summary of Shoot Damage Caused By The White-pine Borer
in Pine Plantations in Lindsay District
from 1963 to 1965

Note: One hundred trees examined at each location.

Location (township)	Tree species	Av. d.b.h. of trees in inches	No. of trees infested in 1965	Av. no. of infested shoots per tree		
				1963	1964	1965
Brighton	wP	7	56	2.6	2.0	1.5
Clarke	rP	4	18	1.0	1.0	1.0
Haldimand	rP	4	2	0.0	0.0	1.0

Birch Leaf Miner, Fenusa pusilla (Lep.)

Heavy infestations of this insect persisted in scattered clumps of young white birch throughout the district in 1965. Populations were heavier at most sample points than in 1964 (Table 13).

TABLE 13

Summary of Birch Leaf Miner Damage in Lindsay District
1963 to 1965

Note: Counts were based on the examination of 100 leaves taken at random from three white birch trees at each location.

Location (township)	Per cent of leaves mined			Total no. of mines		
	1963	1964	1965	1963	1964	1965
Brighton	8	5	8	12	8	8
Clarke	11	6	9	44	10	14
Eyre	4	2	75	8	6	150
Harburn	2	50	50	4	151	150
Havelock	2	4	10	5	9	16

Pales Weevil, Hylobius pales Boh.
Northern Pine Weevil, Pissodes approximatus Hopk.

Heavy infestations, and severe damage caused by these root and stump weevils, occurred on pines in Durham and Northumberland counties in 1965. The damage was caused by the adult weevils feeding on the tender bark of the branches and twigs and flagging resulted. In many Christmas tree plantations in infested areas, the discoloured foliage reduced the quality and number of marketable trees.

The infestations were mainly in plantations where Christmas trees had been harvested in recent years.

Eastern Tent Caterpillar, Malacosoma americanum (F.)

Heavy infestations occurred on fencerows in Harvey and Lutterworth townships. Light infestations were observed commonly in the rest of the district. Populations increased in 1965 compared with 1964, particularly in Harvey and Lutterworth townships (Table 14).

TABLE 14

Summary of Eastern Tent Caterpillar Colony Counts
in Lindsay District 1963 to 1965

Location (township)	No. of tents observed per mile of roadside		
	1963	1964	1965
Glamorgan	2	1	5
Guilford	2	1	1
Harvey	47	58	130
Lutterworth	46	42	104
Manvers	0	0	2
Minden	92	38	52
Percy	3	2	11
Snowdon	10	23	2

Balsam-fir Sawfly, Neodiprion abietis complex

Light infestations of this sawfly persisted at scattered locations in the Lindsay District. The highest numbers were observed in Manvers Township, where light infestations occurred in approximately 500 acres of pole-sized balsam fir. In past years two separate larval populations occurred in early summer and in mid-summer but in 1965 only the early summer population was present.

Red-headed Pine Sawfly, Neodiprion lecontei (Fitch)

Pockets of heavy infestation of this sawfly occurred in red pine plantations and in scattered clumps of jack pine in Haliburton and Peterborough counties and in the Victoria County forest in Somerville Township. Defoliation in most instances was in excess of 50 per cent in plantations and frequently as high as 100 per cent on individual trees. Light infestations occurred at scattered locations in Haliburton and Peterborough counties and in the northern part of Victoria County. Two small pockets of light infestation were observed in Hope and Clarke townships in Durham County.

Black-headed Jack-pine Sawfly, Neodiprion pratti banksianae Roh.

A small pocket of heavy infestation of this sawfly occurred on jack pine in Belmont Township, Peterborough County. Very light infestations and small numbers of colonies were found in scattered groups of jack pine in Minden Township in the western part of Haliburton County, in Dalton Township in the northern part of Victoria County, and in Chandos Township in Peterborough County. Population levels declined in Dalton Township from an average of 7.4 colonies per tree in 1964 to 1.2 colonies per tree in 1965.

A Jack-pine Sawfly, Neodiprion pratti paradoxicus Ross

Small pockets of heavy infestation occurred on jack pine in Burleigh, Anstruther and Chandos townships in Peterborough County and in Glamorgan Township in Haliburton County. A small pocket of light infestation was observed in Dysart Township, Haliburton County. In Anstruther Township 100 per cent of the jack pine trees at one sample point were infested with an average of 2.4 colonies per tree.

European Pine Sawfly, Neodiprion sertifer (Geoff.)

Infestations of this sawfly extended across the southern three-quarters of Durham County and through Haldimand and Hamilton townships in Northumberland County. This represented a three-fold increase in the area of infestation compared with 1964. Areas of heavy infestation occurred in a small part of Cartwright Township, almost all of Darlington Township and a small part of the west side of Clarke Township. Small pockets of heavy infestation also occurred in Scots pine plantations in Haldimand and Hamilton townships (see map).

Larval populations within the areas of heavy infestation were very high. At one location in Darlington Township a 15-acre plantation of Scots pine had an average of 19.2 colonies of larvae per tree and every tree was infested (Table 15).

Control measures using insecticides in individual plantations were for the most part very successful. In 1965 a polyhedral virus was introduced in heavy infestations with good results. Large numbers of diseased and dead larvae were collected for virus multiplication to provide larger amounts of the virus for distribution in 1966.

TABLE 15

Summary of European Pine Sawfly Colony Counts
in Lindsay District 1963 to 1965

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

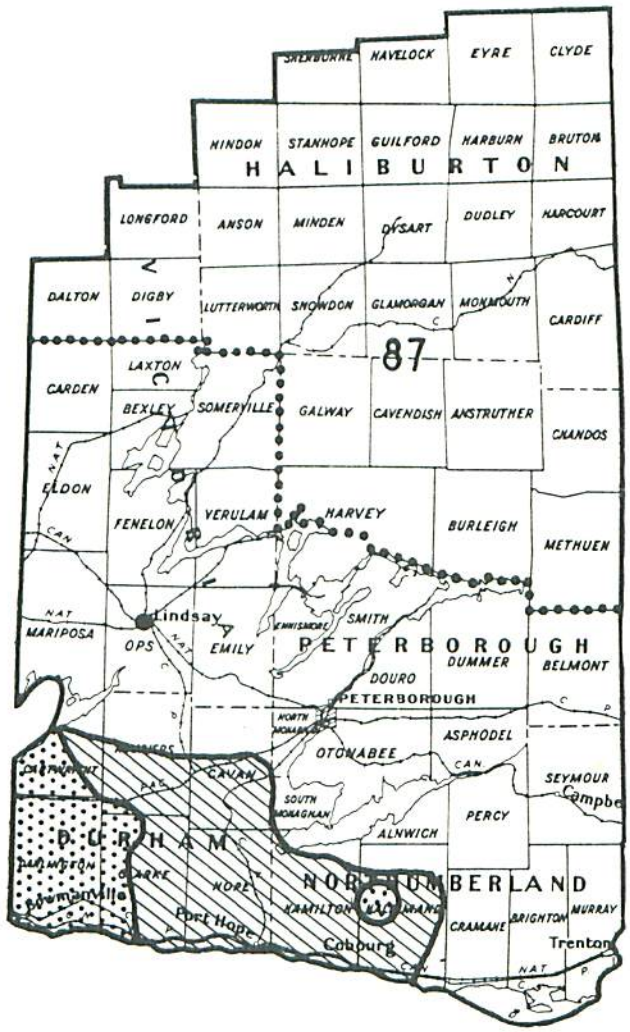
Location (township)	No. trees infested 1965	Average no. of colonies per tree 1963	1964	1965
Darlington	0	.45	2.50	0.00
Darlington	100	-	-	19.20
Haldimand	100	.15	.00	10.00
Cartwright	5	.25	8.52	0.20

White Grubs, Phyllophaga Spp.

In Lindsay District white grubs are mainly an agricultural problem. However, in some parts of Ontario they are a serious pest in tree nurseries and in new plantations.

White grubs have a 3-year life cycle and severe damage usually occurs in the year after the eggs are laid. June beetles (adults of white grubs) are plentiful in the third year. The beetles feed on the foliage of deciduous trees after emerging from the ground, then mate and lay eggs in the sod. The eggs hatch and the grubs feed on shallow roots. Damage is most severe in the second year when the grubs feed on the roots of plants throughout the summer. There is very little feeding in the third year before the grubs develop into beetles, and complete the 3-year cycle.

LINDSAY DISTRICT



MILES

20 10 0 20 40

EUROPEAN PINE SAWFLY

Areas in which infestations occurred in 1964 and 1965

Legend

Area of infestation 1964..

Area of infestation 1965..

Populations of white grubs were very heavy in the Lindsay District in 1965. Adult beetles were numerous in mid-summer and caused considerable defoliation to deciduous trees at scattered locations. There was little or no damage to the roots of trees in nurseries and plantations.

White-pine Weevil, Pissodes strobi (Peck)

Heavy infestations of this weevil occurred in pine plantations in Galway Township in Peterborough County, in Dalton Township in Victoria County and in a small pocket of ornamental pines in Guilford Township, Haliburton County. Scattered pockets of medium infestation occurred in Harvey and Chandos townships in Peterborough County. Light infestations were common in the rest of the district. Populations of the weevil were very low in the county forests managed by the Department of Lands and Forests. This was no doubt the result of control measures taken by departmental personnel in the past few years.

Populations of the weevil were heaviest on Scots and white pine in plantations in Galway and Dalton townships. A quantitative sample was taken in a 100-acre plantation in Galway Township containing 45 per cent white pine, 45 per cent Scots pine, 8 per cent red pine, and 2 per cent jack pine. None of the red or jack pine trees were attacked by the weevil but 58 per cent of the Scots pine and 30 per cent of the white pine were infested (Table 16).

TABLE 16

Summary of Damage by the White-pine Weevil
in Lindsay District in 1964 and 1965

Note: One hundred trees were examined at each location.

Location (township)	Av. d.b.h. of trees in inches	Tree species	Degree of shade	Per cent of trees weevilled 1964	1965
Galway	3	scP	open	-	58
"	3	wP	"	-	30
"	3	rP	"	-	0
"	3	jP	"	-	0
Dalton	2	scP	"	10	27
Harvey	2	wP	"	-	15
Chandos	2	wP	"	-	15
Stanhope	3	wP	40	2	5
Hamilton	4	wP	25	3	2

Larch Sawfly, Pristiphora erichsonii (Htg.)

Population levels of this sawfly were lower in 1965 than in recent years. However, two heavy infestations persisted on large European larch in plantations in the Northumberland and Durham county forests. Light infestations occurred in small areas of tamarack in Galway, Manvers, Lutterworth, and Somerville townships. Individual larval colonies were found at widely-scattered locations in the rest of the district.

Heavy mortality of late instar larvae occurred in one plantation in Haldimand Township where large numbers of dead larvae were found on the ground around the base of the trunk of every tree examined. Samples of dead larvae were sent to the Insect Pathology Research Institute in Sault Ste. Marie to determine if disease was responsible for the mortality of the insects but none was found. It is probable that the mortality in 1965 will result in lower populations at this location in 1966.

European Pine Shoot Moth, Rhyacionia buoliana (Schiff)

A heavy infestation of this shoot moth occurred in a 10-acre red pine plantation in Cramahe Township, Northumberland County. This infestation has persisted for the past four years and has caused considerable distortion of the crowns of host trees. One hundred per cent of the trees examined in 1965 and 80 per cent of the bud clusters were infested by overwintering larvae. This compares with 1964 when 100 per cent of the trees and 87 per cent on the bud clusters were infested. Medium and light infestations persisted on roadside pine plantings in Clarke and Darlington townships.

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

The known areas of infestation of the smaller European elm bark beetle, Scolytus multistriatus (Marsh.) spread northward into Peterborough and Victoria counties in 1965. The infestation extended approximately 13 miles northward from Lake Scugog to Manilla in Mariposa Township, and approximately 16 miles northward from Rice Lake to the City of Peterborough. From this point eastward the area of new infestation tapered southward to the north boundary of the 1964 infestation near Norwood in Asphodel Township. No increase in the area of infestation was observed east of Norwood in 1965 (see map).

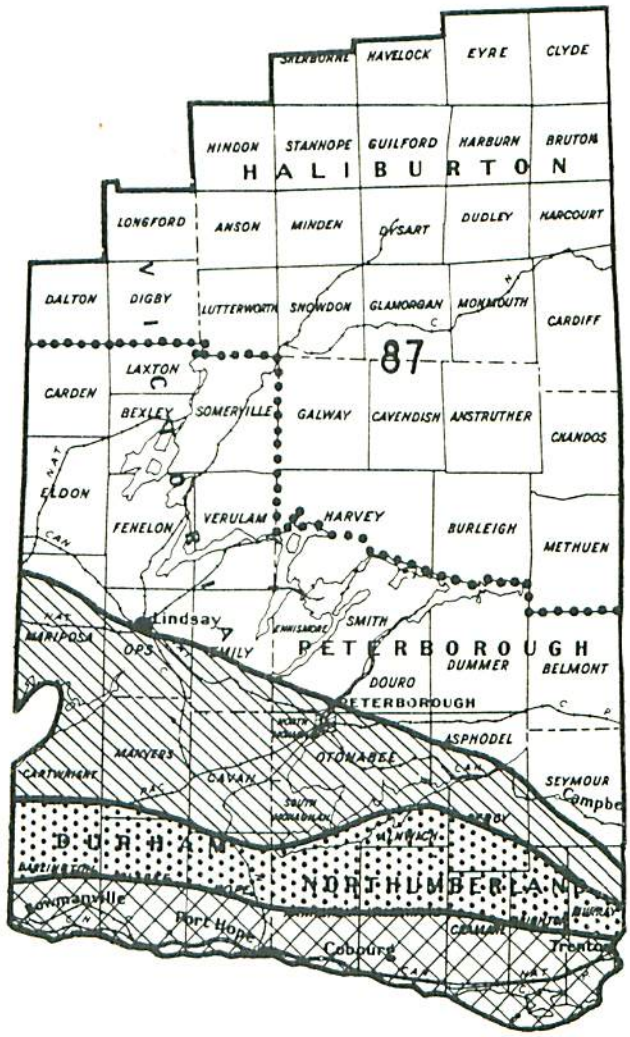
Populations of the native elm bark beetle, Hylurgopinus rufipes Eich. were heavy throughout the district in 1965. The heaviest infestation was in Asphodel Township, Peterborough County where 148 beetle galleries per square foot of the inner surface of the bark were counted on elm sample logs.

TABLE 17

Summary of Miscellaneous Insects Collected
in Lindsay District

Insect	Host(s)	Remarks
Acleris cornana McD.	Do	Light infestation in a small area of Percy Twp.
Adelges abietis Linn.	wS	Heavy infestation in 5 acres of spruce in Manvers Twp.
Adelges lariciatus (Patch)	wS	Small numbers in Stanhope, Dysart, Monmouth, and Anstruther twps. Heavy at one location in Monmouth Twp.

LINDSAY DISTRICT



MILES

20 10 0 20 40

SMALLER EUROPEAN ELM BARK BEETLE

Known range of distribution

Legend

In 1961.....

In 1963.....

In 1965.....

TABLE 17 (continued)

Insect	Host(s)	Remarks
Anacampsis innocuella Zell	ltA	Medium infestations in small areas of Hindon, Sherborne, Somerville, and Burleigh twps. Small numbers in Chandos Twp.
Altica corni Woods	Do	Light infestation in small patches in Percy Twp.
Aphrophora parallela Say	scP	Heavy infestations in Hamilton and Cavan twps. Light infestations in Dalton and Anson twps. Small numbers in the rest of the district.
Archips cerasivoranus Fitch	eCh	Heavy infestations in small areas of Mariposa and Hope twps. Very light in the rest of the district. A quantitative sample in Mariposa Twp. gave 149 tents per mile of roadside.
Archips fervidana Clem.	rO	Light infestation at one location in Haldimand Twp. Small numbers were found in Clarke and Manvers twps.
Baliosus ruber Web.	Ba	Light infestation in Curve Lake Indian Reserve in Smith Twp. Decreased from a heavy infestation in 1964.
Caripeta divisata Wlk.	bF	Small numbers found at balsam fir plot 804 in Somerville Twp.
Cecidomyia verrucicola (O.S.)	Ba	Heavy infestation in small patches in Hamilton Twp.
Chrysopeleia ostryaella Cham.	I	Light infestation at one location in Brighton Twp.
Coleophora ulmifoliella MacD.	E	Heavy infestations in Cobourg in Haldimand Twp. and in Clarke Twp. Light infestation in one small patch of elm in N. Monaghan Twp.
Colopha ulmicola (Fitch)	E	Light infestation at one location in Haldimand Twp.
Corthylus punctatissimus (Zimm.)	sM	Small amounts found at scattered locations in Stanhope, Cartwright, and Otonabee twps.
Croesia semipurpurana Kft.	O	Medium infestation in approximately 10 acres of oak in the Durham County Forest.
Conophthorus coniperda Sw.	wP	Light populations in scattered plantations of wP in the county forests.
Conophthorus resinosae Hopk.	rP	Light populations in red pine plantations throughout the district.

TABLE 17 (continued)

Insect	Host(s)	Remarks
Ecdytolopha insiticiana Zell.	Lo	Heavy infestations in small clumps of locust trees in Brighton, Cramahe, and Haldimand twps. in Northumberland County.
Elaphidionoides parallelum Newm.	rO	Light infestations in Victoria, Haliburton, and Northumberland counties. In Lutterworth Twp., Victoria County there were 140 branches cut from one tree by the twig pruner.
Eriophyidae on wP	wP	Light infestations throughout the district on understory white pine.
Exoteleia dodecella Linn.	scP	Heavy infestation in a 20-acre plantation in Cramahe Twp.
Fenusa ulmi Sund.	E	Heavy infestation on wyche elms in the town of Cobourg and on white elms in N. Monaghan Twp.
Feralia jocosa Gn.	bF	Light infestations in small patches of balsam fir in Somerville and Minden twps.
Gonioctena americana Schaeff.	tA	Very light infestations in small patches in Anstruther and Dysart twps.
Gretchena delicatana Heinr.	I	Light infestations in Stanhope Twp. The district-wide infestation reported in 1964 has declined to a very low level in 1965.
Hydria prunivorata Fern.	bCh	Heavy infestation in a small area in Glamorgan Twp. Light at scattered locations in the rest of the district.
Hyphantria cunea Dru.	wAs	Very small numbers occurred throughout the district. The counts at all sample points in the district were one tent per mile of roadside or less.
Lambdina fiscellaria fiscellaria Gn.	bF	Very small numbers were found in tray samples at bF plot 804 in Somerville Twp.
Lithocolletis hamadryadella Clem.	wO	Heavy infestation in 200 acres in Hamilton Twp. Northumberland County.
Lithocolletis salicifoliella Chamb.	tA	Heavy infestation on a few trees in the Provincial tree nursery at Orono. Light infestations in small patches in Seymour Twp.

TABLE 17 (continued)

Insect	Host(s)	Remarks
Monoctenus fulvus (Nort.)	eC	Low populations throughout the district. The highest population check was in Garden Twp. where 7 larvae were recovered from 15 tray samples.
Nematus spp. (see Phyllocolpa spp.)		
Neodiprion nanulus nanulus Schedl.	rP	Light infestation on roadside trees in Chandos Twp.
Neodiprion pinetum (Nort.)	wP	Small numbers of colonies found in Somerville, Cavendish, and Snowdon twps.
Phyllocolpa spp.	Po	Light infestations were common throughout the Lindsay District in 1965. Populations were lighter than in 1964. The highest infested leaf count being 25% of the leaves infested, in Stanhope Twp.
Phytagromyza populicola (Hal.)	lPo	Heavy infestations on clumps of Lombardy poplar throughout the district.
Pikonema alaskensis (Roh.)	wS	Heavy infestation at one location in Minden Twp. Light infestations in small patches in Manvers and Cartwright twps. Very small numbers in the rest of the district.
Pristiphora geniculata (Htg.)	Mo	Small patches of heavy infestation occurred in Hope, Hamilton, and Haldimand twps. Populations otherwise declined to a very low level in 1965.
Profenusa thomsoni (Konow)	wB	Heavy infestation on regeneration white birch in small areas of Darlington Twp.
Pseudexentera oregonana Wlshm.	tA	Light infestations in small areas in Chandos and Anstruther twps.
Schizolachnus piniradiatae (Dav.)	rP	Heavy infestations in plantations in Asphodel, Guilford, and Methuen twps. Light in the rest of the district.
Setoptus jonesi (Keifer)	rP	Heavy infestation in 20 acres of red pine plantation in Stanhope Twp. Almost all of the current years foliage on approximately 70 per cent of the trees in the plantation was damaged.