

CAN
Fo
46-14
O-X
44

ADCQ

Status of Insects in the Sudbury
District

McPhee, J.R.

Information Report
(Forest Research Laboratory, Ontario Region)

O-X-44

Information Report No.	Subject	Author
O-X-34	Forest Insect & Disease Surveys	
	--Lindsay District	W. J. Miller
O-X-35	--Tweed District	F. Livesey
O-X-36	--Kemptville District	J. Hook
O-X-37	--Pembroke District	R. A. Trieselmann
O-X-38	--Lake Simcoe District	A. A. Harnden
O-X-39	--Lake Huron District	R. L. Bowser
O-X-40	--Lake Erie District	J. R. Trinnell
O-X-41	--North Bay District	L. S. MacLeod
O-X-42	--Parry Sound District	C. A. Barnes
O-X-43	--Sault Ste. Marie District	H. G. McPhee
O-X-44	--Sudbury District	J. R. McPhee
O-X-45	--Chapleau District	D. Ropke
O-X-46	--Gogama District	W. Ingram
O-X-47	--White River District	D. C. Constable
O-X-48	--Cochrane District	H. R. Foster
O-X-49	--Kapuskasing District	G. T. Atkinson
O-X-50	--Swastika District	M. J. Applejohn
O-X-51	--Port Arthur District	K. C. Hall
O-X-52	--Geraldton District	V. Jansons
O-X-53	--Sioux Lookout District	P. E. Buchan
O-X-54	--Kenora District	H. J. Weir
O-X-55	--Fort Francis District	M. J. Thomson

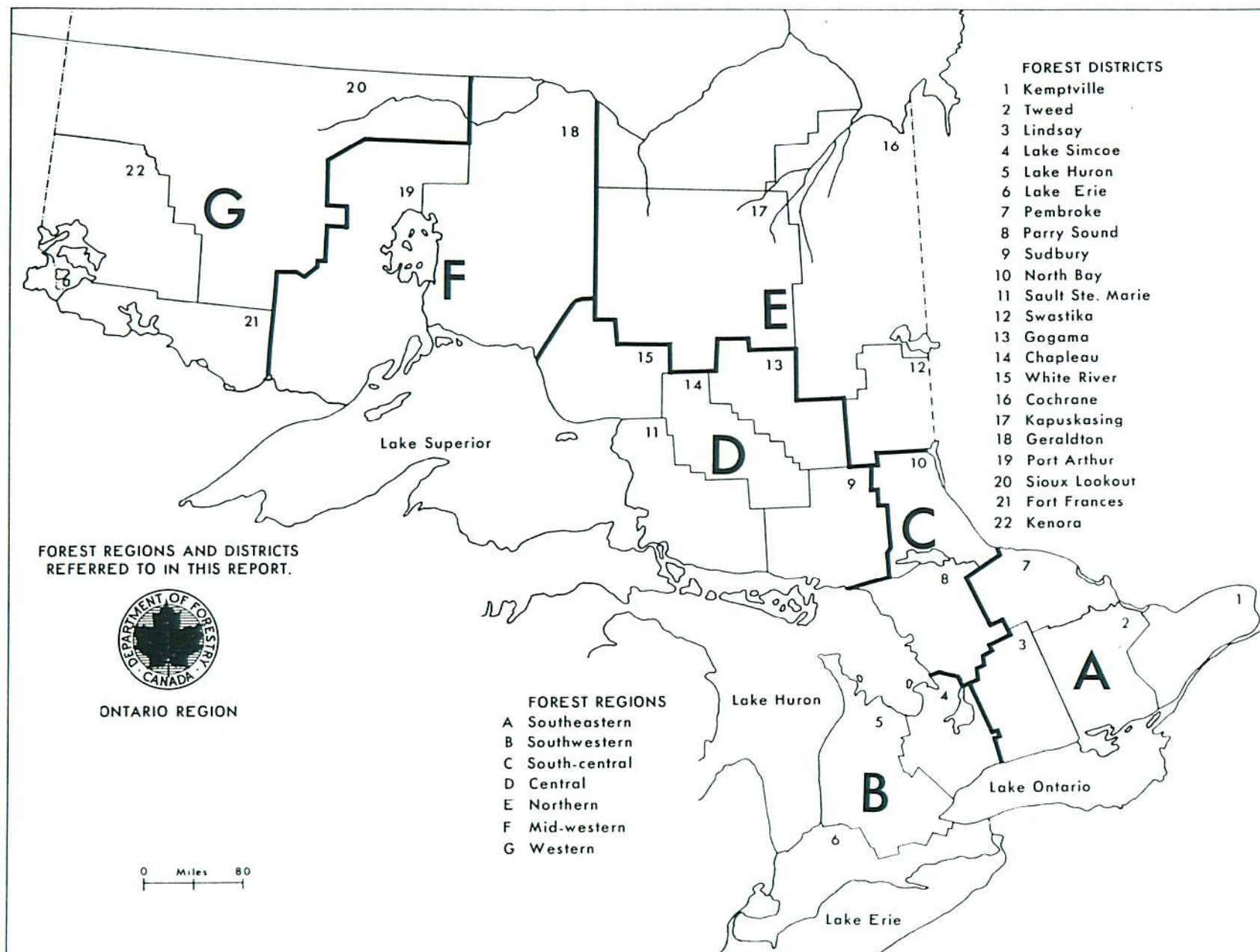
TABLE OF CONTENTS

REPORTS OF FOREST RESEARCH TECHNICIANS

Ontario	Page
Foreword, J. E. MacDonald	
A. <u>SOUTHEASTERN FOREST REGION</u>	<u>A1-56</u>
Lindsay District, Wm. J. Miller *	A 9
Tweed District, F. Livesey	A 22
Kemptonville District, J. Hook	A 34
Pembroke District, R. Trieselmann	A 43
B. <u>SOUTHWESTERN FOREST REGION</u>	<u>B1-47</u>
Lake Simcoe District, A. A. Harnden*	B 15
Lake Huron District, R. L. Bowser	B 27
Lake Erie District, J. R. Trinnell	B 39
C. <u>SOUTH-CENTRAL FOREST REGION</u>	<u>C1-30</u>
North Bay District, L. S. MacLeod*	C 7
Parry Sound District, C. A. Barnes	C 18
D. <u>CENTRAL FOREST REGION</u>	<u>D1-56</u>
Sault Ste. Marie District, H. G. McPhee*	D 11
Sudbury District, J. R. McPhee	D 19
Chapleau District, Deter Ropke	D 29
Gogama District, W. Ingram	D 39
White River District, D. C. Constable	D 48
E. <u>NORTHERN FOREST REGION</u>	<u>E1-41</u>
Cochrane District, H. R. Foster*	E 9
Kapuskasing District, G. T. Atkinson	E 23
Swastika District, M. J. Applejohn	E 30
F. <u>MIDWESTERN FOREST REGION</u>	<u>F1-26</u>
Port Arthur District, K. C. Hall*	F 8
Geraldton District, V. Jansons	F 18
G. <u>WESTERN FOREST REGION</u>	<u>G1-44</u>
Sioux Lookout District, F. E. Buchan*	G 12
Kenora District, Harvey J. Weir	G 27
Fort Frances District, M. J. Thomson	G 37

Photographs

* Regional Supervisors



FOREWORD

J. E. MacDonald

A prolonged period of drought, extending from May until August, seriously affected the growth and survival of forest stands on shallow sites and in plantations, particularly in central and southern Ontario. This was evidenced in August when hardwoods on rocky sites in many areas turned brown and shed their foliage. Serious losses of conifers planted in 1966 were reported in the Sault Ste. Marie, Lake Huron, Lake Simcoe and Lindsay districts.

Intensive surveys were carried out in 1966 to determine the distribution and incidence of Scleroderris canker of pine and of Dutch elm disease. These revealed that Scleroderris canker is widely distributed in northern Ontario. Incidence and tree mortality was highest in young red and jack pine plantations, however, significant losses of jack pine reproduction were also observed in several areas. Incidence of the disease was low in southern Ontario. Dutch elm disease is well established throughout southern Ontario and in localized areas in North Bay and Sudbury districts in northern Ontario. The incidence of infection was particularly high in the Toronto, London and Windsor areas. Over 50 per cent of the elm trees in many areas in southwestern Ontario were infected and the disease has taken a heavy toll of trees in older areas of infection.

Noteworthy changes in the extent and intensity of infestations of the forest tent caterpillar and jack pine budworm occurred in 1966. Weather conditions in the spring brought about a collapse of the forest tent caterpillar outbreak that had occurred over a vast area in Sioux Lookout, Kenora and Port Arthur districts in recent years. Heavy infestations persisted in Fort Frances District and in numerous areas in central and southeastern Ontario, but no outstanding changes in their extent and intensity occurred. Forest tent caterpillar defoliation forecasts for 1967 are contained in the district reports that follow.

Jack pine budworm infestations were reported in three widely-separated parts of Ontario. The largest of these occurred in the western part of Fort Frances and Kenora districts. Pockets of infestation occurred in the southern part of Sault Ste. Marie District and on Manitoulin Island.

The European pine sawfly continued to be a serious pest in pine plantations in southern Ontario. Since its discovery in a Scots pine plantation on Manitoulin Island in 1965, it has been found in five additional plantations on the Island. The results of control measures using virus sprays to contain the sawfly in this northern location will be followed with interest in 1967.

Expansion of the forest research program of the Department of Forestry and Rural Development in Sault Ste. Marie and the establishment of new positions in the Insect and Disease Survey Section has resulted in many changes of duties for Survey technicians. Five new district technicians will be required for the 1967 field season and numerous district re-assignments will be made. A list of technicians and their district assignments will be issued to key personnel of the Department of Lands and Forests and Industry early in the field season.

STATUS OF INSECTS IN THE SUDBURY DISTRICT

		Page
Spruce Budworm	<u>Choristoneura fumiferana</u> (Clem.)	D 19
Larch Casebearer	<u>Coleophora laricella</u> (Hbn.)	D 19
European Spruce Sawfly	<u>Diprion hercyniae</u> (Htg.)	D 20
White Pine Shoot Borer	<u>Eucosma gloriola</u> Heinr.	D 20
Birch Leaf Miner	<u>Fenusa pusilla</u> (Lep.)	D 21
Aspen Blotch Miner	<u>Lithocolletis salicifoliella</u> (Cham.)	D 21
Eastern Tent Caterpillar	<u>Malacosoma americanum</u> (F.)	D 21
Western Tent Caterpillar	<u>Malacosoma pluviale</u> (Dyar)	D 22
Red-headed Pine Sawfly	<u>Neodiprion lecontei</u> (Fitch)	D 22
Red Pine Sawfly	<u>Neodiprion nanulus nanulus</u> Schedl.	
and		
Black-headed Jack-pine Sawfly	<u>Neodiprion pratti banksianae</u> Roh.	D 23
European Pine Sawfly	<u>Neodiprion sertifer</u> (Geoff.)	D 23
Red-headed Jack-pine Sawfly	<u>Neodiprion virginianus</u> complex	D 24
Yellow-headed Spruce Sawfly	<u>Pikonema alaskensis</u> (Roh.)	D 24
Balsam Shoot-boring Sawfly	<u>Pleroneura borealis</u> Felt	D 24
Poplar Leaf Roller	<u>Pseudexentera oregonana</u> Wlshm.	D 25
Summary of Miscellaneous Insects		D 25

J. R. McPhee

Spruce Budworm, Choristoneura fumiferana (Clem.)

A marked increase occurred generally in the population levels of this insect. A heavy infestation occurred on the upper crowns of mature balsam fir trees in a woodlot in Cosby Township on the eastern boundary of the district. Light infestations were observed in a mixed stand of balsam and white spruce in Balfour Township and on large open-grown white spruce in Allan Township on Manitoulin Island. In the remainder of the district larvae were found commonly, particularly in balsam stands in the northwestern part of the district. A summary of larval counts in beating samples is shown in Table 5.

TABLE 5

Summary of Spruce Budworm Larval Counts in the Sudbury District
in 1966

Location (township)	Host	Av. d.b.h. of host trees in inches	Total no. of larvae per 15-tray sample
Allan	wS	8	71
Balfour	wS	8	31
Balfour	bF	4	102
Nairn	bF	6	7
Hallam	bF	5	3
Salter	wS	8	8

Larch Casebearer, Coleophora laricella Hbn.

Population levels of this insect remained low. Minor changes in numbers occurred at sample points in Dill and Hallam townships (Table 6)

TABLE 6

Summary of Larval Counts of the Larch Casebearer
in the Sudbury District from 1964 to 1966

Note: Counts are based on the examination of four 18-inch branch tips
from four trees at each location.

Location (township)	Av. d.b.h. of trees in inches in 1966	Av. no. of larvae per 18-inch branch		
		1964	1965	1966
Dill	4	4.1	4.0	5.2
Hallam	4	2.5	5.5	1.5
Cascaden	3	3.0	0.5	0.8
Delamere	3	0.5	0.7	0.1

European Spruce Sawfly, Diprion hercyniae (Htg.)

Surveys revealed a general increase in population levels of this sawfly except in Bigwood and Hagar townships where numbers declined compared with 1965 (Table 7).

TABLE 7

Summary of European Spruce Sawfly Larval Counts in September
on White Spruce Trees in Sudbury District
from 1964 to 1966

Location (township)	Av. d.b.h. of trees in inches in 1966	Total no. of larvae per 15-tray sample		
		1964	1965	1966
Hallam	6	15	3	31
Billings	6	10	28	52
Salter	8	17	4	27
Denison	5	7	5	10
Balfour	6	13	7	38
Bigwood	8	140	205	160
Hagar	5	4	50	48

White Pine Shoot Borer, Eucosma gloriola Heinr.

The incidence of attack on leaders of jack pine by this shoot borer was comparable to 1965. Light shoot damage recurred in young plantations and on regeneration at several locations. Counts of damaged leaders at sample points are given in Table 8.

TABLE 8

Summary of Terminal Shoot Damage by the White Pine Shoot Borer
in Sudbury District from 1964 to 1966

Note: 100 jack pine trees were examined at each location.

Location (township)	Av. d.b.h. of trees in inches in 1966	Per cent of leaders infested		
		1964	1965	1966
Merritt	2	8	13	8
Hart	1	4	0	1
Norman	2	23	4	4
119	2	2	6	10
Moncrieff	2	-	-	7

Spruce Budworm, Choristoneura fumiferana (Clem.)

A marked increase occurred generally in the population levels of this insect. A heavy infestation occurred on the upper crowns of mature balsam fir trees in a woodlot in Cosby Township on the eastern boundary of the district. Light infestations were observed in a mixed stand of balsam and white spruce in Balfour Township and on large open-grown white spruce in Allan Township on Manitoulin Island. In the remainder of the district larvae were found commonly, particularly in balsam stands in the northwestern part of the district. A summary of larval counts in beating samples is shown in Table 5.

TABLE 5

Summary of Spruce Budworm Larval Counts in the Sudbury District
in 1966

Location (township)	Host	Av. d.b.h. of host trees in inches	Total no. of larvae per 15-tray sample
Allan	wS	8	71
Balfour	wS	8	31
Balfour	bF	4	102
Nairn	bF	6	7
Hallam	bF	5	3
Salter	wS	8	8

Larch Casebearer, Coleophora laricella Hbn.

Population levels of this insect remained low. Minor changes in numbers occurred at sample points in Dill and Hallam townships (Table 6)

TABLE 6

Summary of Larval Counts of the Larch Casebearer
in the Sudbury District from 1964 to 1966

Note: Counts are based on the examination of four 18-inch branch tips
from four trees at each location.

Location (township)	Av. d.b.h. of trees in inches in 1966	Av. no. of larvae per 18-inch branch		
		1964	1965	1966
Dill	4	4.1	4.0	5.2
Hallam	4	2.5	5.5	1.5
Cascaden	3	3.0	0.5	0.8
Delamere	3	0.5	0.7	0.1

European Spruce Sawfly, Diprion hercyniae (Htg.)

Surveys revealed a general increase in population levels of this sawfly except in Bigwood and Hagar townships where numbers declined compared with 1965 (Table 7).

TABLE 7

Summary of European Spruce Sawfly Larval Counts in September
on White Spruce Trees in Sudbury District
from 1964 to 1966

Location (township)	Av. d.b.h. of trees in inches in 1966	Total no. of larvae per 15-tray sample		
		1964	1965	1966
Hallam	6	15	3	31
Billings	6	10	28	52
Salter	8	17	4	27
Denison	5	7	5	10
Balfour	6	13	7	38
Bigwood	8	140	205	160
Hagar	5	4	50	48

White Pine Shoot Borer, Eucosma gloriola Heinr.

The incidence of attack on leaders of jack pine by this shoot borer was comparable to 1965. Light shoot damage recurred in young plantations and on regeneration at several locations. Counts of damaged leaders at sample points are given in Table 8.

TABLE 8

Summary of Terminal Shoot Damage by the White Pine Shoot Borer
in Sudbury District from 1964 to 1966

Note: 100 jack pine trees were examined at each location.

Location (township)	Av. d.b.h. of trees in inches in 1966	Per cent of leaders infested		
		1964	1965	1966
Merritt	2	8	13	8
Hart	1	4	0	1
Norman	2	23	4	4
119	2	2	6	10
Moncrieff	2	-	-	7

Birch Leaf Miner, Fenusa pusilla (Lep.)

A marked increase in population levels of this leaf miner was observed in 1966. Severe leaf damage occurred on young open-grown white birch trees along roads, in old fields and on rocky sites throughout the southern part of the district. In many instances leaf mining exceeded 75 per cent (Table 9). Damage to the foliage of larger trees was negligible in all areas examined. Scattered pockets of light to severe leaf mining were observed in the northern part of the district where the insect has rarely been found in recent years.

TABLE 9

Summary of Birch Leaf Miner Counts on White Birch Trees
in Sudbury District in 1966

Note: 100 leaves from three trees were examined at each location.

Location (township)	Per cent of leaves mined
Dill	96
Killarney	100
Bleazard	84
Gilbert	23
Salter	90
B	42

Aspen Blotch Miner, Lithocolletis salicifoliella Cham.

Heavy infestations that had persisted in the northern part of the district from 1961 to 1964 and declined to scattered pockets of medium to heavy infestation in 1965, subsided in 1966. Only a few mined leaves were observed on aspen reproduction at widely-separated locations.

Eastern Tent Caterpillar, Malacosoma americanum (F.)

This caterpillar occurred commonly in the southern part of the district. It was most abundant in Bigwood, Appleby and Merritt townships and on Cloche and Manitoulin islands where clumps of cherry were heavily infested. (Table 10).

TABLE 10

Summary of Eastern Tent Caterpillar Colony Counts on Host Shrubs
in Sudbury District in 1965 and 1966

Location	Host	Sampling Unit	No. of colonies per sampling unit	
			1965	1966
Bigwood Twp.	pCh	sq. chain plot	40	18
Bidwell Twp.	cCh	one mile of roadside	20	24
Appleby Twp.	pCh	one mile of roadside	24	44
Merritt Twp.	pCh	one mile of roadside	10	18
Cloche Island	cCh	one mile of roadside	-	50

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

Little change occurred in the status of this insect. Colony counts along roadsides showed a small increase in Hanmer Township and a decline in Telfer Township (Table 11). Elsewhere in the district population levels remained very low.

TABLE 11

Summary of Western Tent Caterpillar Colony Counts on Pin Cherry
in Sudbury District in 1965 and 1966

Note: Counts based on number of colonies counted in one measured mile of roadside at each location

Location (township)	No. of colonies per sampling unit	
	1965	1966
Telfer	10	4
Hanmer	6	14
Scadding	-	4
G	2	2

Red-headed Pine Sawfly, Neodiprion lecontei (Fitch)

Small increases in numbers of colonies of this sawfly occurred but infestation intensities were about the same as in 1965. Red pine windbreaks along Highway 17 between Walford and Webbwood were attacked more frequently and an increase in numbers of heavily infected trees was observed in a 75-acre red pine plantation on Cockburn Island. Severe defoliation of red pine recurred in a small plantation in the Spanish River Indian Reserve south of Massey. Counts of larval colonies are summarized in Table 12.

TABLE 12

Summary of Red-headed Pine Sawfly Colony Counts on Red Pine
in Sudbury District in 1965 and 1966

Location	No. of trees examined	Av. height of trees in feet in 1966	No. of trees infested		Av. no. of colonies per infested tree	
			1965	1966	1965	1966
Cockburn Island	100	5	50	50	3	3.5
Hallam Township	20	10	10	10	8	7.7
Spanish River Reserve	50	6	37	45	2.7	2.5

Red Pine Sawfly, Neodiprion nanulus nanulus Schedl.
and

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

High population levels of these sawflies persisted in several areas. Moderate to severe defoliation of exposed jack-pine trees recurred along lakeshores and roads in the K.V.P. West Branch Spanish River Limits and in the Onaping and Wanapitei lake areas. Light infestations and scattered colonies were observed in jack-pine stands at numerous other locations. Neodiprion nanulus nanulus caused light defoliation of large individual red pine trees at several points in the northwestern part of the district and in red pine plantations in Nairn and Burwash townships.

The two species were found on jack pine at all sample points except Cloche Island where only Neodiprion nanulus nanulus was observed (Table 13).

TABLE 13

Colony Counts of Jack and Red Pine Sawflies on Ten Jack Pine Trees
at Each Location in Sudbury District
From 1964 to 1966

Location	Av. d.b.h. of trees in inches in 1966	Av. no. of colonies per tree		
		1964	1965	1966
Nairn Township	6	6.0	6.0	4.0
Hanmer Township	5	3.0	2.4	3.0
Rathburn Township	4	0.3	0.8	0.5
Cloche Island	4	2.0	1.5	1.8
Shakwa Lake	5	3.5	3.8	4.8

European Pine Sawfly, Neodiprion sertifer (Geoff.)

Intensive surveys in June revealed an increase in population levels and a spread in the range of this sawfly on Manitoulin Island, the most northerly known area of distribution in Ontario. Infestations reported in Scots pine plantations in Carnarvon and Dawson townships in 1965 increased in intensity. New infestations were detected in a 75-acre Scots pine plantation in Gordon Township and in a 5-acre plantation in Sandfield Township. Although counts of larval colonies at these locations averaged less than one per tree the insect was well distributed throughout the plantations (Table 14).

Experimental control using a virus disease initiated by the Insect Pathology Research Institute in co-operation with the property owner was successful in preventing serious defoliation. However, discovery of the sawfly in untreated areas indicates that it will recur on the Island in 1967. The danger of a northward spread to jack pine growing areas still exists.

The suggestion that this sawfly was introduced to Manitoulin Island on infested nursery stock was substantiated in June when hatched eggs and larvae were found on young trees planted a month previously.

TABLE 14

Summary of European Pine Sawfly Colony Counts on Scots Pine
on Manitoulin Island, Sudbury District in 1966

Location (township)	Av. height of trees in feet	No. of trees examined	Total no. of colonies	Av. no. of colonies per tree
Carnarvon	6	500	3104	6.2
Dawson	5	725	650	.89
Sandfield	5	1000	16	.02
Gordon	5	5500	287	.05

Red-headed Jack-pine Sawfly, Neodiprion virginianus complex

Population levels of this insect remained about the same except near Burnt Island where a heavy infestation reported on jack pine in 1965 subsided. An unusually heavy infestation persisted for the fourth consecutive year in a small jack pine plantation in Burpee Township on Manitoulin Island. A larval count averaged 25 colonies per tree on 10 trees averaging four inches d.b.h. Many trees were completely stripped of old foliage. A heavy infestation recurred for the second year in a jack pine windbreak along Highway 17 near Webbwood where an average of 7.6 colonies per tree was counted on 10 trees averaging three inches d.b.h. Severe defoliation was observed in individual open-grown trees at several other points in the district.

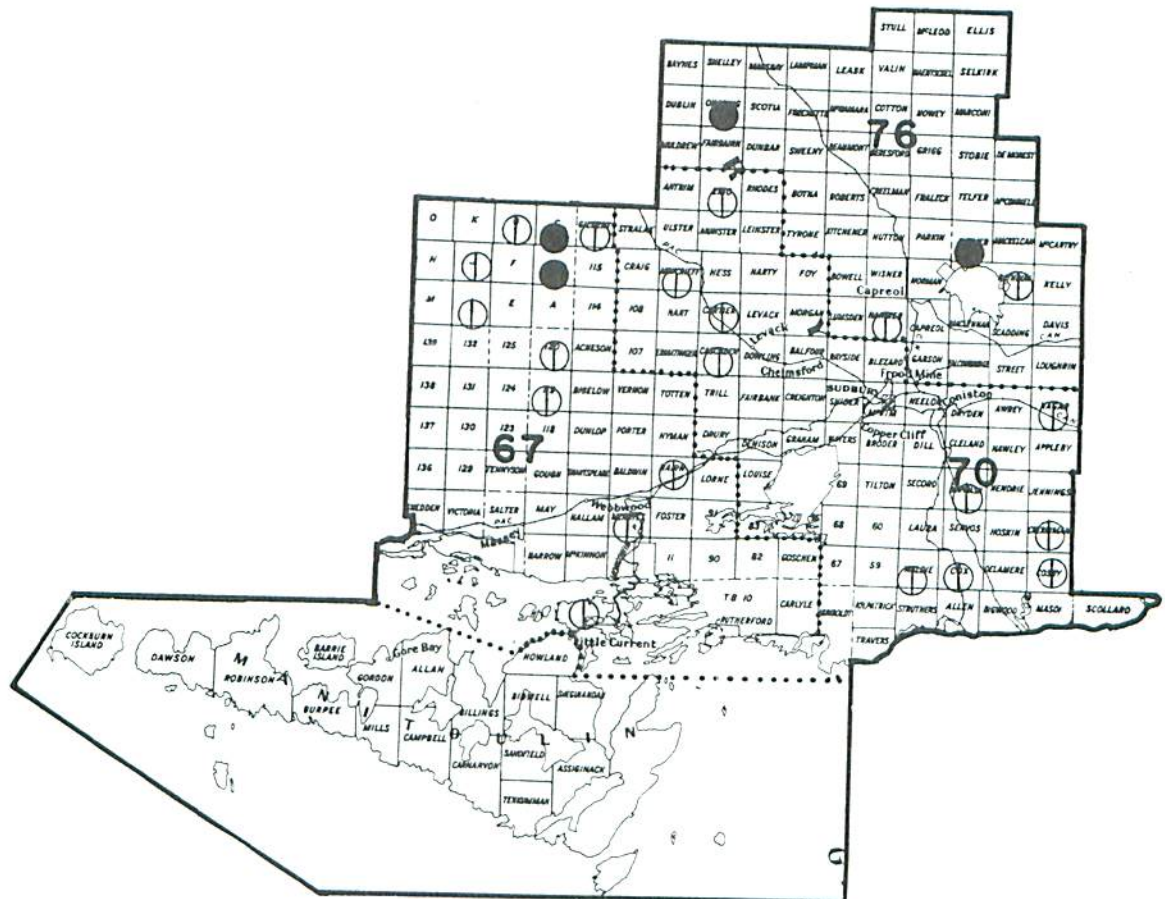
Yellow-headed Spruce Sawfly, Pikonema alaskensis Roh.

Population levels of this pest of open-grown spruce were comparable to 1965. Moderate-to-severe defoliation occurred on scattered trees in white spruce plantations in Merritt, Burwash and Burpee townships and on Cockburn Island. Single or groups of small open-grown white and black spruce trees frequently suffered severe damage along roads, lakeshores and in old fields. Elsewhere, the insect occurred on most spruce sampled but damage was light or negligible.

Balsam Shoot Boring Sawfly, Pleroneura borealis Felt

Population levels of this bud mining insect were low for the second consecutive year, interrupting the biennial occurrence of infestations that had been observed in recent years. This interruption probably resulted from late spring frosts in 1964 that severely damaged the new shoots of balsam and greatly reduced larval populations. Quantitative sampling results were negative at sample points except in Hallam Township where four per cent of the new shoots were mined.

SUDBURY DISTRICT



RED PINE SAWFLY

and

BLACK-HEADED JACK-PINE SAWFLY

Locations where pockets of defoliation
occurred in 1966

Legend

Light defoliation ①

Moderate to severe defoliation ●

Poplar Leaf Roller, Pseudexentera oregonana Wlshm.

A sharp decline in infestations of this leaf roller occurred in 1966. Numerous heavy infestations reported on pole-sized aspen stands in the southern part of the district in 1965 declined to light intensity. Although the insect occurred commonly in the southern part of the district, infestations were generally restricted to small pockets or clumps of aspen on the fringe of stands. Larval parasitism was extremely high in Nairn, Dowling and Hallam townships where heavy infestations had persisted since 1963.

TABLE 15

Summary of Miscellaneous Insects Collected
in Sudbury District

Insect	Host(s)	Remarks
<i>Adelges abietis</i> Linn.	WS	Heavy infestation on small scattered trees in a plantation on Cockburn Island, in Carnarvon and Burpee twps. on Manitoulin Island and in the Espanola area
<i>Adelges strobilobius</i> Kalt.	BS	Single tree in plantation at Burwash severely attacked
<i>Agrilus liragus</i> Bart. & Br.	Hybrid Po	Sucker growth severely attacked in plantation in Burpee Twp., Manitoulin Island
<i>Anisota rubicunda</i> Fabr.	SM	Scattered colonies on Cockburn Island
<i>Aphrophora parallela</i> (Say)	scP	Heavy infestations in plantations on Manitoulin Island
<i>Archips cerasivoranus</i> (Fitch)	cCh	Heavy infestation on clumps of cherry on west end of Manitoulin Island
<i>Caulocampus acericaulis</i> MacG.	SM	Pocket of heavy infestation in Billings Twp., Manitoulin Island
Cecidomyidae	rP	Light infestation on wind break along Highway 17 in Hallam Twp.
<i>Cecidomyia balsamicola</i> Vock.	bF	Numerous pockets of light infestation in northern part of district
<i>Choristoneura pinus</i> Free	jP	Scattered trees in Scots pine plantations on Manitoulin Island heavily infested. Light infestations observed in many jack-pine stands in remainder of district
<i>Conophthorus resinosae</i> Hopk.	rP	Light damage to new shoots of trees along Highway 17 near Cutler. Average of 15 infested shoots per tree counted on 10 trees averaging 30 feet in height

TABLE 15 (continued)

Insect	Host(s)	Remarks
<i>Croesia semipurpurana</i> (Kft.)	rO	Pocket of heavy infestation in Gordon Twp., Manitoulin Island
<i>Epinotia solandriana</i> Linn.	wB	Pockets of medium infestation in Balfour and Hallam twps., light infestations in Cosby and Gordon twps.
<i>Eriophyes</i> sp	tA	Pockets of heavy infestation in Merritt and Graham twps; also prevalent at numerous other locations
<i>Exoteleia pinifoliella</i> Cham.	JP	Light needle mining persisted on Cloche Island and in Carnarvon Twp., Manitoulin Island
<i>Fenusa dohrnii</i> (Tischb.)	Al	Light leaf mining at several scattered points
<i>Gonioctena americana</i> Schaef.	tA	Pockets of moderate to severe defoliation of roadside reproduction observed in Aylmer and Dowling twps. Light defoliation occurred at numerous points in northwestern part of district
<i>Hyphantria cunea</i> Dru.	Elm, wB	Scattered colonies in Howland Twp., rarely found elsewhere in district
<i>Hylobius</i> sp. (prob. <i>radicis</i>)	Sc P	Numerous trees attacked in plantation in Balfour Twp.
<i>Leucanthiza dircella</i> Braun	Leatherwood	Severe leaf mining on shrubs on Cockburn Island
<i>Monoctenus fulvus</i> (Nort.)	eC, juniper	Quantitative sampling in Robinson and Billings twps., Manitoulin Island showed totals of 3 and 2 larvae respectively on 15 beating tray samples at each location
<i>Nymphalis antiopa</i> Linn.	W, tA	Scattered colonies along Massey Tote Road in Twp. 129. Single colonies observed at several other locations
<i>Neodiprion abietis</i> complex	bF	Rarely found in district, single colony in Moncrieff Twp.
<i>Neodiprion swainei</i> Midd.	JP, rP	A light infestation reported on a small island in the south end of Onaping Lake in 1965 increased to heavy intensity in 1966 and spread to scattered trees along shorelines of the mainland

TABLE 15 (continued)

Insect	Host(s)	Remarks
<i>Operophtera bruceata</i> Hlst.	sM, rO	Heavy infestation reported on Great Duck Island in 1965 subsided
<i>Orgyia leucostigma</i> A. & S.	Elm, mM, Mo	Heavy infestation on ornamental and shade trees in City of Sudbury and Town of Espanola
<i>Phyllocolpa</i> sp.	tA	Heavy infestation on reproduction in Nairn Twp. Light infestation prevalent in most of remainder of district
<i>Pineus similis</i> Gill.	WS	Scattered trees heavily infested in plantation in Burwash and Dawson twps. Light damage to small groups of trees at several other points
<i>Pineus</i> sp.	scP	Heavy infestation on scattered trees in plantation in Gordon Twp., Manitoulin Island
<i>Profenusa thomsoni</i> (Konow)	wB	Less prevalent in district than in 1965. Scattered leaves mined at a few locations
<i>Pulicalvaria piceaella</i> (Kft.)	WS	Light needle mining in Burwash and Hagar twps.
<i>Pulicalvaria thujaella</i> (Kft.)	eC	Light infestation observed frequently through southern part of district
<i>Recurvaria</i> sp.	eH	Light needle mining in Curtin Twp.
<i>Rhyacionia adana</i> Heinr.	scP	Light infestation in small plantation in Delamere Twp. Av. of 3 infested shoots per tree counted on 10 trees averaging 3 feet in height
<i>Rhyacionia buoliana</i> (Schiff.)	rP	Infestations on Cockburn and Manitoulin islands declined to small numbers
<i>Schizura concinna</i> J.E. Smith	W, tA, Ap	Moderate-to-severe defoliation of individual hosts at scattered points in the southern part of the district

TABLE 15 (continued)

Insect	Host(s)	Remarks
<i>Sparganothis directana</i> Wlk.	c, Ch	Heavy infestation on clumps of cherry in Allan Twp., Manitoulin Island
<i>Sternochaetus lapathi</i> (Linn.)	W	Prevalent on shrubs at numerous locations
<i>Toumeyella numismaticum</i> P. McD.	jP, scP	Light infestation in Scots pine plantation in Merritt Twp. Individual hosts attacked at several other points
<i>Trisetacus alborum</i> Keifer	wP, rP	Small white pines heavily infested in Cox, Servos and Moncrieff twps. Severe damage on one large red pine in Servos Twp.
<i>Zeiraphera ratzeburgiana</i> Ratz.	wS	Heavy infestation persisted on open-grown white spruce on Manitoulin Island and in Balfour, Cosby, Graham and Secord twps. Small numbers observed frequently elsewhere