Status of Insects in the Sudbury District

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Information Report O-X-15
(Forest Research Laboratory, Ontario Region)

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.

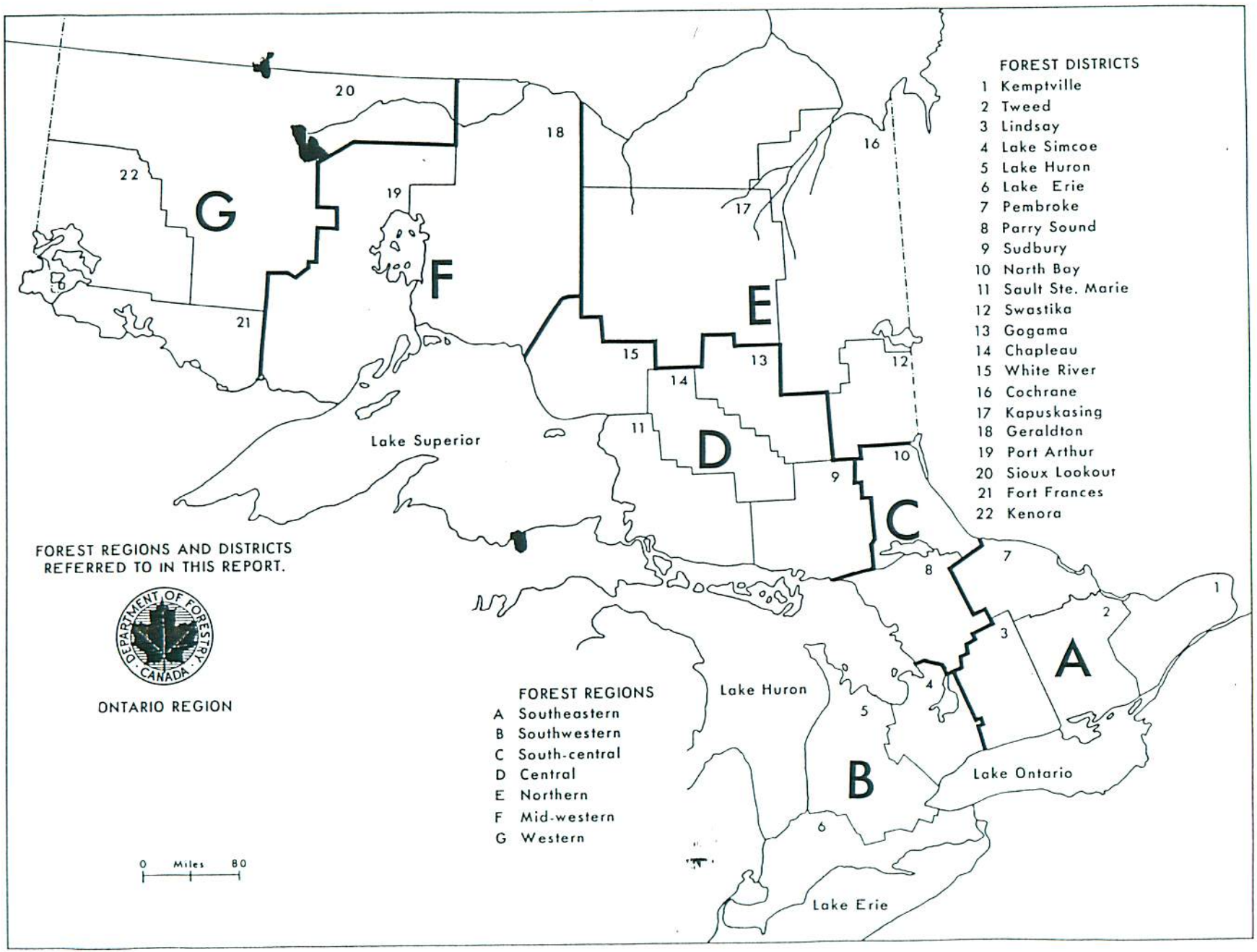
For the third consecutive year low temperatures in the spring caused considerable mortality of the current year's shoots of balsam fir and white spruce at many locations in Ontario. Continued cold weather throughout the summer delayed the development of many insects and in some instances larvae failed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


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

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* Regional Supervisors

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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
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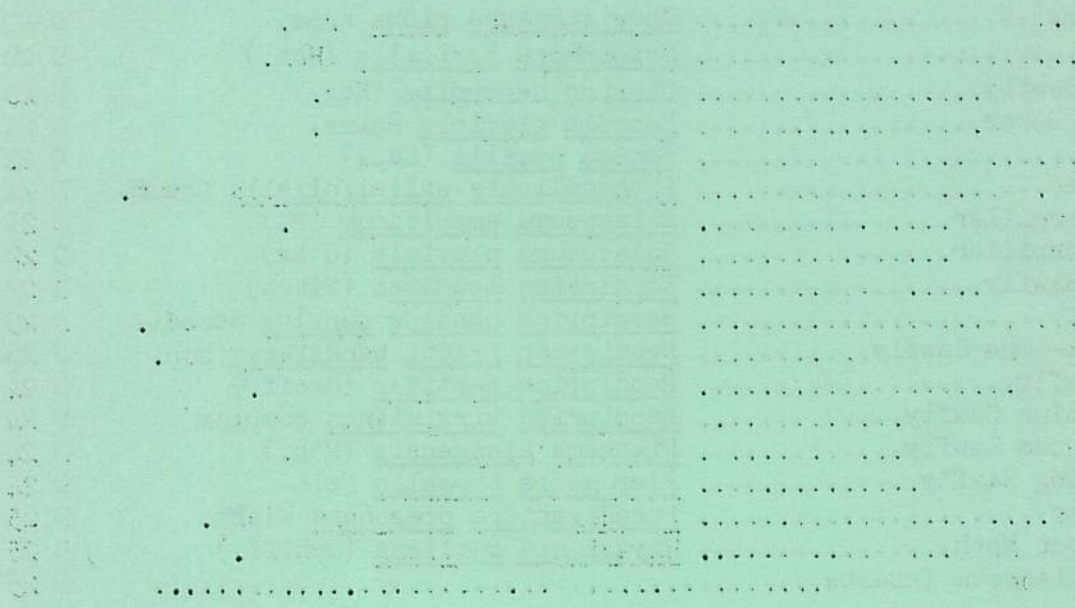
STATUS OF INSECTS IN THE SUDBURY DISTRICT

J. R. McPhee



Jack-pine Budworm, Choristoneura pinus Free.

A sharp increase in population levels of this insect occurred in 1965. Pockets of medium infestation were observed in jack pine stands on Cloche Island and in Nairn Township. Light infestations were recorded in Rathbun, Aylmer, Hanmer, Moncreiff, and Hart townships. Small numbers of larvae were found in most of the jack pine stands examined in the district.

Larch Casebearer, Coleophora laricella Hbn.

Population levels of this insect were similar to those reported in the past three years except in Hallam Township where sampling revealed a small increase in numbers (Table 5).

TABLE 5

Summary of Larval Counts of the Larch Casebearer
in the Sudbury District from 1963 to 1965

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 1965	Av. no. of larvae per 18-inch branch		
		1963	1964	1965
Dill	4	3.0	4.1	4.0
Hallam	4	3.0	2.5	5.5
Cascaden	3	1.0	3.0	0.5
Delamere	3	0.8	0.5	0.7

European Spruce Sawfly, Diprion hercyniae (Htg.)

Surveys revealed declines in population levels of this insect in the western and central parts of the district in 1965. In contrast, numbers were much higher at sample points in the eastern part of the district and on Manitoulin Island than in 1964 (Table 6). Although occasional larvae have been found in the northern half of the district in recent years, numbers have been consistently lower than further south.

TABLE 6

Summary of European Spruce Sawfly Larval Counts in September
on White Spruce Trees in Sudbury District
from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches in 1965	Total no. of larvae per 15-tray sample		
		1963	1964	1965
Hallam	8	25	15	3
Billings	6	52	10	28
Salter	8	23	17	4
Denison	6	9	7	5
Balfour	10	10	13	7
Bigwood	8	12	140	205
Hagar	5	16	4	50

White Pine Shoot Borer, Eucosma gloriola Heinr.

Population trends of this shoot-boring insect varied in 1965. For example, a marked decline in jack pine leader damage was evident at two sample points whereas increases occurred in others (Table 7). Shoot damage was generally light and mainly confined to jack pine. However, a few red pine trees in Burwash Township and small white pine trees in Hoskin Township were infected.

TABLE 7

Summary of Terminal Shoot Damage by the White Pine Shoot Borer in Sudbury District from 1963 to 1965

Note: 100 jack pine trees were examined at each location

Location (township)	Av. d.b.h. of trees in inches in 1965	Per cent of leaders infested 1963	1964	1965
Merritt	2	10	8	13
Hart	2	26	4	0
119	3	14	2	6
Norman	2	11	23	4
Aylmer	2	-	0	1

Birch Leaf Miner, Fenusa pusilla (Lep.)

High population levels of this leaf miner persisted on open-grown white birch regeneration in several areas in 1965. Pockets of severe leaf damage recurred in the Sudbury area, along Highway 69 from Sudbury to the French River, along the Killarney Highway and in the Spanish River Reserve south of Massey. Clumps of light-to-medium infestation occurred at several other locations in the southern part of the district. In the northern part of the district light leaf mining was observed only on small open-grown trees at a few points.

Aspen Blotch Miner, Lithocolletis salicifoliella Cham.

A marked decline in infestations of this leaf miner was observed in 1965. Only scattered groups of trembling aspen trees were heavily infested where extensive areas of heavy infestation had persisted for four consecutive years. Numerous pockets of light infestation occurred elsewhere in the northern part of the district. The insect was rarely found in the southern part of the district.

Parasitism was extremely high in areas where heavy infestation persisted. Examination of pupae revealed that more than 90 per cent of the insects had been parasitized. A high degree of parasitism in 1964 was probably responsible for the decline in 1965.

Eastern Tent Caterpillar, Malacosoma americanum (F.)

A further increase in population levels of this insect occurred in the southern part of the district except on Cloche and Manitoulin islands where infestations declined compared with 1964. The highest numbers of colonies were counted in Bigwood

Township in Division 70 and on islands in the North Channel south of Massey and Spanish (Table 7). As in 1964, the insect was most abundant near forest tent caterpillar infestations.

TABLE 7

Summary of Eastern Tent Caterpillar Colony Counts on Host Shrubs in Sudbury District in 1964 and 1965

Location	Host	Sampling Unit	No. of colonies per sampling unit 1964	1965
Bigwood Twp.	pCh	Sq. chain plot	27	40
Bidwell Twp.	cCh	one mile of roadside	46	20
Appleby Twp.	pCh	" " " "	10	24
Hallam Twp.	cCh	" " " "	16	10
North Channel	Ribes sp.	Sq. chain plot	-	40

Western Tent Caterpillar, Malacosoma pluviale (Dyar)

This insect increased in abundance in the northeastern part of the district in 1965. Tents were more numerous than in 1964 on pin cherry and small white birch along roadsides through the Poupore Lumber Company Limits north of Wanapitei Lake and in the Capreol area. The sharp decline in the number of colonies at a sample point in G Township probably resulted from road-widening operations that destroyed a large proportion of the host species (Table 8).

TABLE 8

Summary of Western Tent Caterpillar Colony Counts in Sudbury District in 1964 and 1965

Location (township)	Sampling unit	No. of colonies per sampling unit 1964	1965
Telfer	1 mile of roadside	5	10
Capreol	1 mile of roadside	0	6
G	1 mile of roadside	8	2

Red-headed Pine Sawfly, Neodiprion lecontei (Fitch)

Little change in the status of this sawfly was observed compared with 1964. Clumps of heavy infestation recurred in a 75-acre red pine plantation on Cockburn Island, in windbreaks along Highway 17 near Webbwood and in a 2-acre plantation in the Spanish River Reserve south of Massey. Defoliation approximated 75 to 100 per cent on infested trees ranging from 2-to-8 feet in height. Scattered trees that were stripped of foliage in these areas in 1964 died in 1965. Elsewhere in the district single larval colonies occurred on red pine at several widely-separated points. Counts of larval colonies are summarized in Table 9.

TABLE 9

Summary of Red-headed Pine Sawfly Colony Counts on Red Pine in Sudbury District in 1964 and 1965

Location	No. of trees examined	Av. height of trees in feet in 1965	No. of trees infested		Av. no. of colonies per infested tree	
			1964	1965	1964	1965
Cockburn Island	100	4	50	50	2	3
Hallam Township	10	8	8	10	5	8
Spanish River Reserve	50	4	25	37	2	2.7
Salter Township	100	3	3	0	1	0

Red Pine Sawfly, Neodiprion nanulus nanulus Schedl.

A further increase in abundance of this insect occurred in most of the district in 1965. Light infestations persisted in jack pine stands on Cloche Island, in Nairn, Rathbun, and Hanmer townships and in parts of a red pine plantation at Nairn. Light-to-moderate defoliation of scattered red pine trees was observed at several points in the northwestern part of the district and northeast of Wanapitei Lake in Norman and Parkin townships. Elsewhere in the district pockets of light defoliation occurred more frequently than in 1964 (see map).

The most noteworthy increase in numbers occurred on Cloche Island where 90 per cent of the larval colonies examined were N. nanulus nanulus Schedl. compared with about 50 per cent in 1964 (see account on N. pratti banksianae Roh.)

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

This sawfly occurred on jack pine in many parts of the district as shown on the accompanying map. Pockets of moderate to severe defoliation of exposed trees persisted along lakeshores and roads in the K.V.P. West Branch Spanish River Limits and in the Onaping and Wanapitei lake areas. However, defoliation inside stands was negligible. Elsewhere in the district pockets of light infestation or scattered larval colonies occurred commonly.

As in recent years, two other sawfly species, N. nanulus nanulus and N. pratti paradoxicus were generally found in association with N. pratti banksianae. A summary of larval colony counts shown in Table 10 includes all three species.

TABLE 10

Colony Counts of Jack Pine Sawflies on Ten Jack Pine Trees at Each of Five Locations in Sudbury District From 1962 to 1965

Location	Av. d.b.h. of trees in inches in 1965	Av. no. of colonies per tree			
		1962	1963	1964	1965
Hanmer Township	4	15	25	3.0	2.4
Nairn "	8	5.5	5.2	6.0	6.0
Rathbun "	4	2.4	1.0	0.3	0.8
Cloche Island	4	2.2	1.7	2.0	1.5
Shakwa Lake	6	5.5	6.0	3.5	3.8

European Pine Sawfly, Neodiprion sertifer (Geoff.)

This sawfly was accidently introduced to North America from Europe at least 40 years ago. It was found near Windsor in 1939 and gradually spread northeastward across southern Ontario, and northward to the Bruce Peninsula. The discovery of the insect on Manitoulin Island in 1965 represented the first known distribution record in northern Ontario.

Heavy infestations occurred in two Scots pine Christmas tree plantations. These were located in Dawson Township on the western end of the island where 40 per cent of the trees in a 10-acre plantation were infested and in a 10-acre plantation near Mindemoya in Carnarvon Township where 95 per cent of the trees were infested. Defoliation of infested trees was generally moderate-to-severe, particularly on the fringes of the plantations (see photograph).

Records show that the favoured hosts of this sawfly in Ontario are Scots and red pine. However, scattered jack pine growing adjacent to these species have been severely defoliated in southwestern Ontario. A further northward spread of infestations would establish the insect in extensive merchantable stands of jack pine. Although it is not known whether it would reach infestation proportions in such stands, this possibility is a matter of grave concern. Therefore it is expected that the Ontario Department of Lands and Forests and the Canada Department of Forestry co-operatively will attempt the containment of this sawfly on Manitoulin Island in 1966, through biological and chemical control. At time of writing final arrangements are pending.

Red-headed Jack-pine Sawfly, Neodiprion virginianus complex

A general increase in population levels of this sawfly occurred on jack pine in the district in 1965. An unusually heavy infestation persisted in a small plantation in Burpee Township on Manitoulin Island where an average of 28.5 colonies per tree was counted on 10 trees averaging 20 feet in height. New pockets of heavy infestation occurred near Burnt Island and on a windbreak along Highway 17 near Webbwood where 6.5 colonies per tree were counted on 10 trees averaging 15 feet in height. In the remainder of the district colonies were observed more frequently than in recent years.

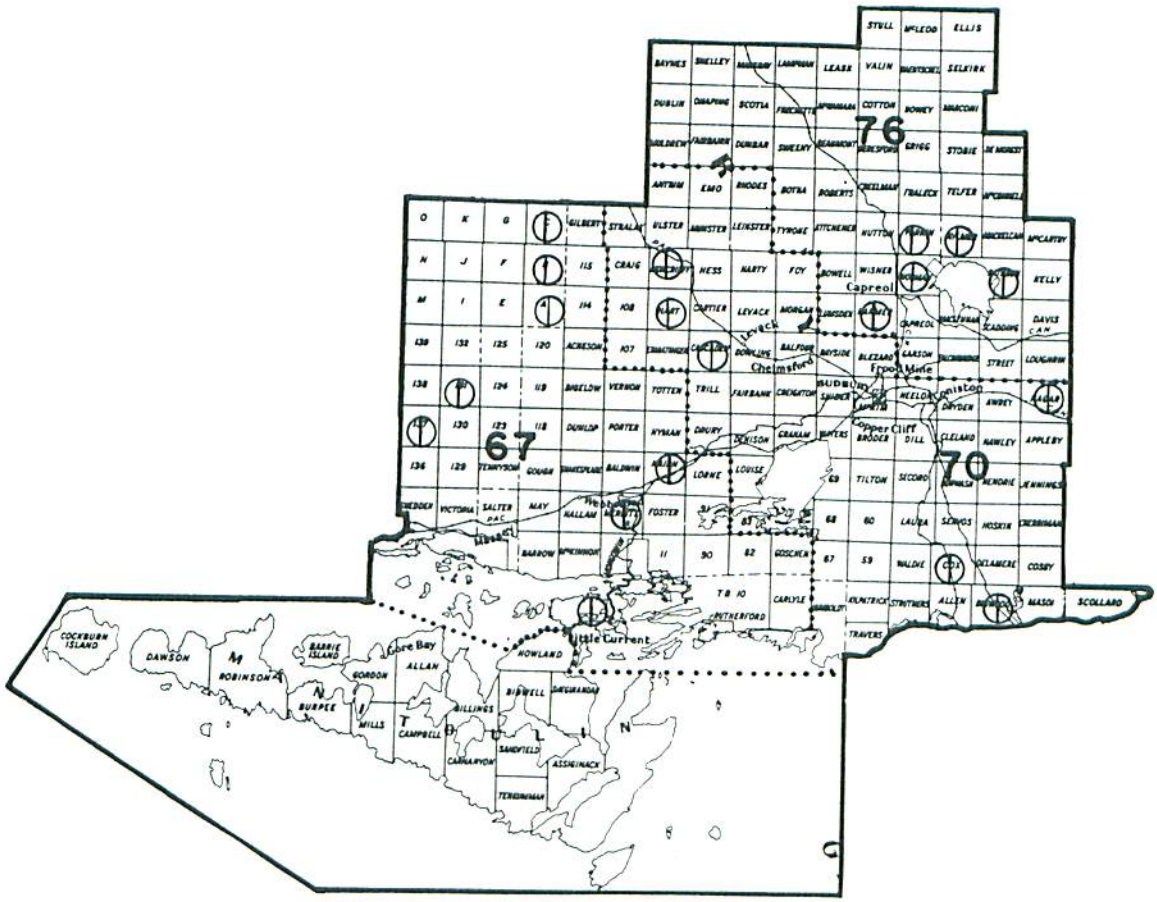
Yellow-headed Spruce Sawfly, Pikonema alaskensis Roh.

Population levels remained about the same as in 1964. Moderate-to-severe defoliation of small scattered white spruce trees occurred in plantations on Cockburn Island, in Burpee Township on Manitoulin Island, and in Merritt and Burwash townships. Elsewhere in the district, individual white and black spruce trees along roads and lakeshores and in old fields suffered light to severe defoliation.

Balsam Shoot-boring Sawfly, Pleroneura borealis Felt

In accord with the biennial occurrence of this insect, population levels were much lower in the district than in 1964. Thus, counts of damaged shoots were negative at all but two sample points (Table 11).

SUDBURY DISTRICT



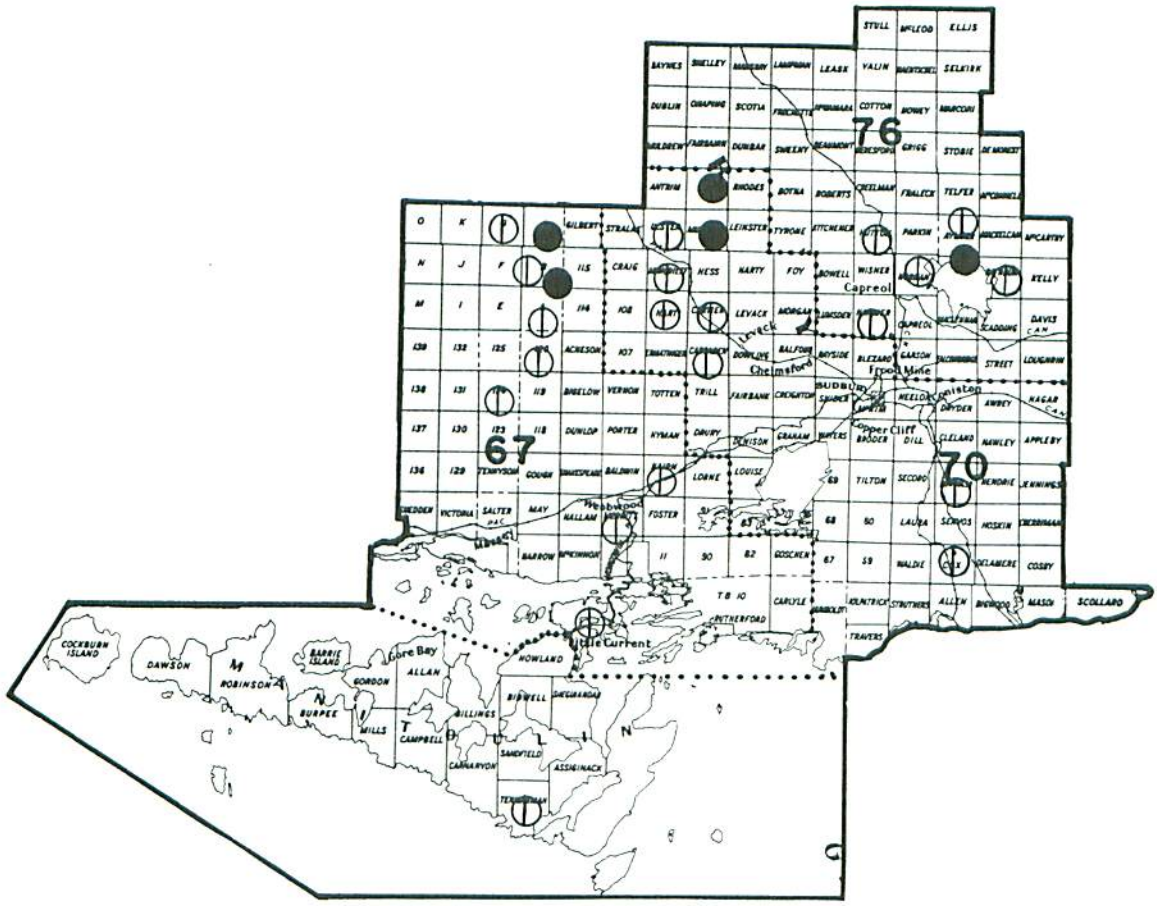
RED PINE SAWFLY

Locations where pockets of infestation occurred in 1965

Legend

Light infestation..... ①

SUDBURY DISTRICT



MILES

0 20 40

BLACK-HEADED JACK PINE SAWFLY

Locations where pockets of infestation occurred in 1965

Legend

Light infestation..... ◐

Heavy infestation..... ●

TABLE 11

Summary of Balsam-fir Shoot-boring Sawfly Counts
in Sudbury District from 1963 to 1965

Location (township)	Av. d.b.h. of trees in inches in 1965	Per cent of shoots mined		
		1963	1964	1965
Bigwood	3	1.0	24.5	0.0
Secord	2	1.9	5.3	0.0
Salter	3	0.0	1.7	0.0
Hallam	3	0.5	13.7	4.0
Moncreiff	3	7.0	11.5	0.9
A	4	1.8	2.4	0.0
Mills	3	-	5.6	0.0

Poplar Leaf Roller, Pseudexentera oregonana Wlshm.

This leaf roller was abundant for the fourth consecutive year, particularly in the southern half of the district where moderate-to-severe defoliation occurred at many points. The heaviest infestations occurred in Hallam, Secord, and Balfour townships where up to 90 per cent defoliation was observed. In the northern part of the district and on Manitoulin Island infestations were generally light.

European Pine Shoot Moth, Rhyacionia buoliana (Schiff.)

The heavy infestation reported in a small red pine plantation in Mills Township on Manitoulin Island for the past three years declined to light intensity in 1965 and the insect occurred in small numbers in Burpee Township. A heavy infestation persisted in a larger red pine plantation on Cockburn Island for the fourth consecutive year. The insect has not been found elsewhere in the district.

TABLE 12

Summary of Miscellaneous Insects Collected
in Sudbury District

Insect	Host(s)	Remarks
Acrobasis betulella Hlst.	wB	Light infestation in Rayside Twp.
Adelges abietis Linn.	wS	Moderate to severe damage on small groups of trees.
Adelges lariciatus Patch	wS	Light infestation on scattered trees.
Adelges strobilobius Kalt.	bS	Pocket of light infestation in Attlee Twp.
Anisota rubicunda Fabr.	sM	One colony found on Cockburn Island.
Anomoea laticlavia Frost	ecCh	Light defoliation of shrubs in Burpee Twp.
Archips cerasivoranus (Fitch)	cCh	Clumps of heavy infestation in Victoria and Baldwin twps.

TABLE 12 (continued)

Insect	Host(s)	Remarks
Bucculatrix canadensisella Cham.	wB	Infestations virtually disappeared, light skeletonizing at Sudbury and Onaping Lake.
Choristoneura fumiferana (Clem.)	bF, wS	Found in small numbers.
Dasyneura balsamicola (Lint.)	bF	Pockets of light infestation on reproduction.
Datana ministra Dru.	wB, Ap	Single colonies.
Dioryctria abietivorella Grt.	wS	Light infestation in cones on scattered trees.
Disonycha alternata Ill.	W	Severe defoliation of shrubs in Laura Twp.
Epinotia cruciana Linn.	W	Heavy infestation on shrubs in Servos Twp.
Epinotia solandriana Linn.	wB	Individual or small groups of trees suffered light to severe damage.
Eriophyes populi Nal.	tA	Pockets of heavy infestation in Moncrieff and Graham twps.
Exoteleia pinifoliella Cham.	jP	Pockets of light needle mining.
Fenusa dohrnii (Tischb.)	Al	Light leaf mining at scattered points.
Gonioctena americana Schaef.	tA	Moderate to severe defoliation of aspen reproduction in Twp. 131, scattered colonies at other locations.
Gretchena delicatana Heinr.	I	Heavy infestation on scattered trees in Tehkummah and Allan twps; light in Burwash Twp.
Hylurgopinus rufipes Eich.	E	One tree heavily infested in Assiginack Twp.
Hyphantria cunea Dru.	W	Single colonies in Hallam Twp. and on Cockburn Island.
Leucanthiza dircella Braun	Leatherwood	Severe leaf mining on understory shrubs on Cockburn Island.
Monoctenus fulvus (Nort.)	eC	Found only on Manitoulin Island where sampling in Billings and Robinson twps. showed totals of 5 and 16 larvae respectively on 15 beating mat samples at each point.
Nematus limbatus Cress.	W	One colony found in Jennings Twp.
Nematus spp.	tA	See Phyllocolpa spp.
Nematus ventralis Say	Hybrid Po	One colony found in Burpee Twp.
Neodiprion abietis complex	bF	Infestation on Manitoulin Island virtually disappeared, only one colony found.
Neodiprion maurus Rohwer	jP	One colony found in Burpee Twp.
Neodiprion pratti paradoxicus Ross	jP	Scattered colonies found in association with N. nanulus nanulus and N. pratti banksianae.

TABLE 12 (continued)

Insect	Host(s)	Remarks
Neodiprion swainei Midd.	jP	Light infestation persisted on small island in Onaping Lake where average of 6 colonies per tree counted on 10 trees averaging 3 inches d.b.h.
Nycteola frigidana Wlk.	W	Clumps of heavy infestation at several points.
Nymphalis antiopa Linn.	W, tA, E	Scattered colonies at widely separated points.
Operophtera bruceata Hlst.	sM, rO, I	Moderate to severe defoliation on Great Duck Island.
Pikonema dimmockii (Cress.)	wS	Small numbers found in beating map samples.
Phyllocolpa spp. (leaf-folding sawfly)	tA	Medium-to-heavy infestation on clumps of trembling aspen reproduction on Manitoulin Island. Pockets of light infestation at many other points.
Pineus similis Gill.	wS	Severe damage on one tree in Burpee Twp., scarcely found elsewhere.
Profenusa thomsoni (Konow)	wB	Light leaf mining observed frequently throughout the district.
Pseudexentera cressoniana Clem.	rO	Heavy infestation on scattered trees in Secord Twp., light in Struthers Twp.
Pterocomma populifoliae (Fitch)	tA	Heavy infestation on scattered pockets of reproduction in the Wanapitei Lake area.
Recurvaria thujaella Kft.	eC	Light leaf mining at scattered locations.
Rhabdophaga swainei Felt	wS, bS	Infested buds found in small numbers at numerous points, counts of damaged buds negative at sample points.
Rhyacionia adana Heinr.	jP, scP	Light infestation in small scP plantation in Delamere Twp., average of 4.5 infested shoots per tree counted on 10 trees averaging 3 ft. in height.
Rhyacionia frustrana Comst.	jP	Sharp declines in population levels, only small numbers found.
Schizura concinna J. E. Smith	Po, Ch, W, Ap	Scattered colonies observed.
Sternochaetus lapathi (Linn.)	W	Severe damage to scattered shrubs in McKim and Secord twps.
Toumeyella numismaticum P. McD.	jP	Single trees heavily infested in Cascaden and Cosby twps.
Trisetacus alborum Keifer	rP, wP	Occasional trees heavily infested in Servos Twp.

TABLE 12 (continued)

Insect	Host(s)	Remarks
Zeiraphera ratzeburgiana Ratz.	wS	Clumps of open-grown trees heavily infested in Cosby and Balfour twps. and on Manitoulin Island.
Zellaria haimbachi Busck.	jP	Pockets of light infestation at several points.