

FOREST INSECT AND DISEASE SURVEYS
IN THE EASTERN SURVEY REGION, 1972

(FOREST DISTRICTS: PEMBROKE, PARRY SOUND,
NORTH BAY AND SWASTIKA)

L. S. MACLEOD AND H. D. LAWRENCE

GREAT LAKES FOREST RESEARCH CENTRE
SAULT STE. MARIE, ONTARIO

INFORMATION REPORT O-X-176

CANADIAN FORESTRY SERVICE
DEPARTMENT OF THE ENVIRONMENT

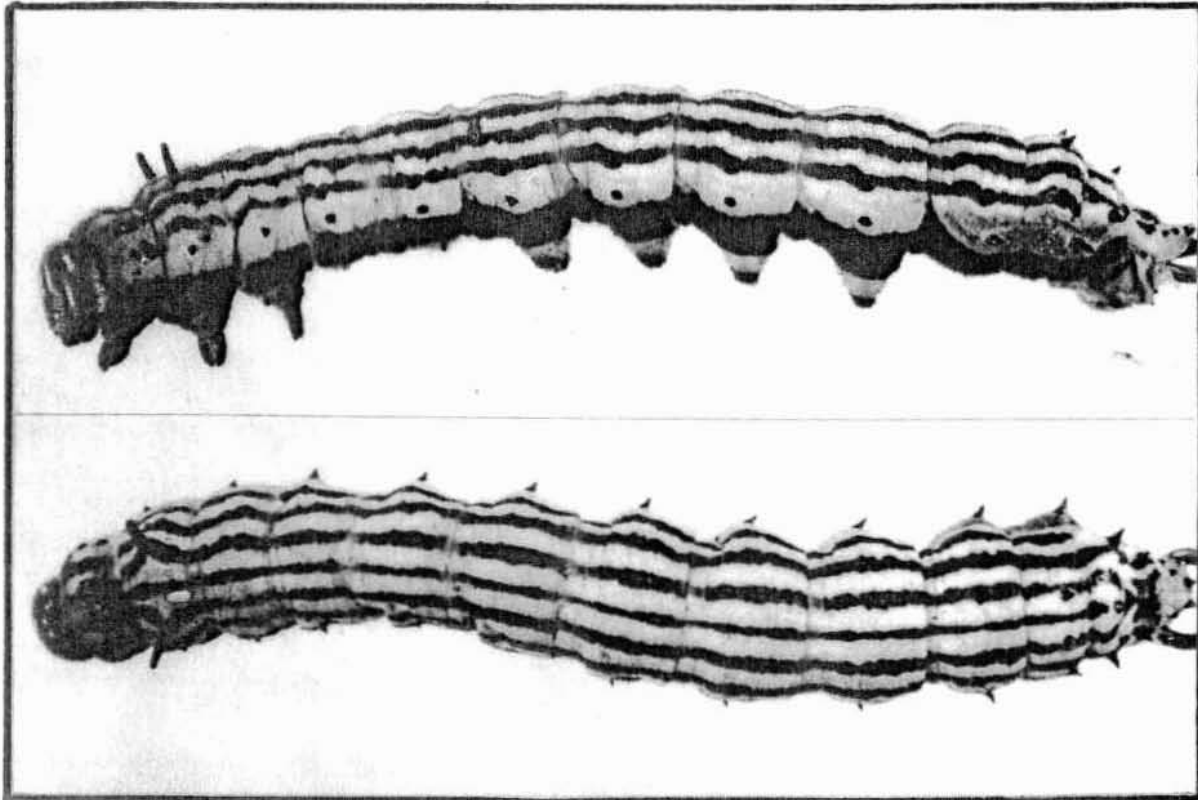
APRIL 1973

*Copies of this report may be obtained
from*

*Director,
Great Lakes Forest Research Centre,
Canadian Forestry Service,
Department of the Environment,
Box 490, Sault Ste. Marie, Ontario.*

ACKNOWLEDGEMENT

The excellent cooperation extended by personnel of the Ministry of Natural Resources during the 1972 field season is gratefully acknowledged.



Frontispiece. Two views of a green-striped mapleworm,
Anisota rubicunda Fabr.

SURVEY HIGHLIGHTS

The early 1972 field season was characterized by warm, dry weather in May followed by a wet, cool summer. Severe frosts in late May and in mid-June resulted in widespread damage to the current foliage of a wide variety of tree species and influenced forest insect population levels within the Region.

The spruce budworm continued to predominate as the most serious pest of spruce-fir stands in the Eastern Survey Region. Although no major extensions of infestation occurred, severe defoliation was common, and top killing and tree mortality are becoming evident in some areas. Jack-pine budworm infestations declined to moderate levels but poplar stands over huge areas were again severely defoliated by a complex of insects of which the large aspen tortrix was the principal defoliator. The forest tent caterpillar again appeared in significant numbers and heavy infestations are forecast for several areas in 1973. Large areas were heavily infested with the birch skeletonizer and the green-striped mapleworm caused severe defoliation, particularly in the North Bay District. Although balsam-fir sawfly infestations declined sharply, repeated defoliation over several years has resulted in considerable top killing in the Pembroke District. Pine sawflies caused little damage in 1972 except for persistent defoliation of jack pine stands by the Swaine sawfly in the northern part of the Region.

Root rot surveys of spruce and fir were expanded to include jack pine, and various pathogens were cultured from the sampling program. Considerable time was devoted to evaluating the impact of the Scleroderris canker in jack pine stands and assessing the current status of other important tree diseases in the Region.

L.S. MacLeod
Supervisor
Eastern Survey Region

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INSECTS

Green-striped Mapleworm, *Anisota rubicunda* Fabr.

Defoliation by the mapleworm continued to increase in extent and intensity in the North Bay District. Two separate, heavy infestations caused severe defoliation of red maple (*Acer rubrum* L.) and sugar maple (*A. saccharum* Marsh.) in the southern and eastern parts of Division 71. The larger infestation was centered east of Sand Dam in the townships of Blyth, Merrick, Notman and Stewart. The smaller infestation occurred south of McConnell Lake in Clarkson and Garrow townships (see Appendix, Fig. A1). Light defoliation was observed at many points in Wyse, Jocko, Poitras and Butler townships.

Populations were lower in the Pembroke District but pockets of moderate-to-severe defoliation persisted in Maria and Head townships and in an area of approximately 5 square miles north of Lake Traverse. The insect was not found in the Parry Sound or Swastika districts.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Defoliation of white birch (*Betula papyrifera* Marsh.) stands by this insect increased appreciably in the Region over that of 1971 (see Appendix, Fig. A2). Complete skeletonizing occurred over approximately three quarters of the North Bay District with moderate damage in the remainder. In the Swastika District, severe defoliation was confined to the northwestern part of the district in the Matheson, Monteith and Shillington areas. Light-to-moderate infestations were observed throughout the remainder of the district.

Only minor changes in infestation boundaries were noted in the Parry Sound and Pembroke districts. The western boundary of the Parry Sound infestation extended to Georgian Bay while the eastern boundary of the Pembroke infestation diminished by approximately one quarter of the area infested in 1971.

Large Aspen Tortrix, *Choristoneura conflictana* Wlk.

Infestations of the large aspen tortrix continued to expand in the northern part of the Region and new areas of severe defoliation were located at several points in 1972. In the Swastika District severe defoliation occurred in the Matheson-Val Gagne area and pockets of heavy infestation were observed in Holmes and Lawson townships for the first time in the current outbreak. The infestation on the south shore of Lake Abitibi expanded appreciably as did the three infestations in the southern part of the Swastika Division (see Appendix, Fig. A3). Although changes in the Kirkland Lake-Quebec Border infestation were minor, defoliation of trembling aspen (*Populus tremuloides* Michx.) throughout the area was severe.

New areas of severe defoliation occurred near Field and along the Sturgeon River in Clary, Armagh and Sheppard townships in the North Bay District. The McConnell Lake infestation in the north-eastern part of the North Bay Division expanded to the south and west in 1972. Heavy moth flights were observed at many locations in both of the above districts in late July and early August and subsequent examination of aspen stands showed that high numbers of eggs were present, indicating the probability of recurring infestation in 1973.

Moderate-to-severe defoliation occurred in a relatively small area south of Opeongo Lake in the Pembroke District. No infestations were observed in the Parry Sound District.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts have been included with those of other survey regions in a special information report by G.M. Howse *et al.* (0-X-173). This report provides the reader with a complete description and analysis of developments concerning the spruce budworm situation in Ontario in 1972 and gives infestation forecasts for the Province for 1973.

Jack-pine Budworm, *Choristoneura pinus pinus* Free.

Infestations of the jack-pine budworm which have persisted for 5 consecutive years in the Pembroke, Parry Sound and North Bay districts declined appreciably in 1972. Extensive mortality and top killing of jack pine (*Pinus banksiana* Lamb. [= *P. divaricata* (Ait.) Dumont]), particularly in stands on poor sites, have occurred in all districts (Fig. 1).

In the Pembroke District, only low numbers of the budworm were found at sampling locations. Although infestation boundaries remained much the same as in 1971 in the Parry Sound District, population levels were much lower. Moderate-to-severe defoliation recurred over most of Wallbridge Township and in the northern part of Harrison Township, and light-to-moderate defoliation was observed south of Illfed Lake in Wilson and McKenzie townships.

Population levels continued to decline in the North Bay District. Small pockets of light infestation persisted at several points in Bertram and Latchford townships in the Lake Nipissing-French River area but little current defoliation was observed. The budworm was found in small numbers in Badgerow, Haddo and MacPherson townships. No infestations were located in the Swastika District at any time during the current outbreak.

Jack-pine Budworm, *Choristoneura pinus pinus* Free.



Fig. 1. Jack pine trees killed by repeated defoliation by the jack-pine budworm near the French River, Parry Sound District.

Cone Beetles, *Conophthorus coniperda* (Schz.) and *C. resinosae* Hopk.

High populations of these insects were again present in young and mature red pine (*Pinus resinosa* Ait.) and eastern white pine (*P. strobus* L.) stands at many points in the North Bay District. Damage was conspicuous, particularly in mature and overmature stands in shoreline reserves and on islands on Temagami, Jumping Caribou, Rabbit, Snake, White Bear and Anima Nipissing lakes.

In the Pembroke District, high populations caused widespread mortality of the current shoots of red pine in Wylie, Buchanan, Rolph, Bronson, Stratton, McKay and Petawawa townships. Light damage was also observed at many points throughout the remainder of the district. Stands in the Parry Sound and Swastika districts were largely unaffected by the insect.

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

Population levels of this insect were high throughout the eastern part of the Pembroke District and red oak (*Quercus rubra* L.) stands in Buchanan, Petawawa, Wylie, McKay, Fraser, and Richards townships were moderately defoliated. Lightly defoliated trees were also observed at many points in the North Bay District.

Birch Leaf Miner, *Fenusa pusilla* (Lep.)

This leaf miner was found in white birch stands in varying degrees of infestation from the southern part of the Parry Sound District to Lake Abitibi in the Swastika District. Severe mining of foliage again occurred in Strong, Machar and Chapman townships, in Parry Sound District and in the North Bay, Redbridge and Balsam Creek areas of the North Bay District.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

A pronounced increase in population levels of the forest tent caterpillar occurred in the New Liskeard-Thorneloe area of Swastika District. Although poplar stands were heavily infested with the large aspen tortrix, *M. disstria* contributed substantially to the severe defoliation which resulted in the townships of Dymond and Harley. Small numbers of larvae were observed in aspen stands in Bowman Township near Matheson, in James Township near Elk Lake and in Otto Township south of Swastika. A small area of light infestation occurred in Strathcona Township near Temagami in the North Bay District and wandering larvae were observed in Dunnet, Badgerow and Coleman townships. Egg counts made in September indicate that extensive defoliation can be expected in the New Liskeard-Earlton area in 1973. This could

mark the beginning of another outbreak similar to that which spread through the North Bay and Swastika districts in the 1950's. Single larvae were observed at several locations in the Parry Sound and Pembroke districts.

Balsam-fir Sawfly, *Neodiprion abietis* complex

Population levels of the balsam-fir sawfly declined sharply in the Pembroke District where heavy infestations have been present since 1966. Moderate defoliation was observed at several locations in Ross and Bromley townships but at all other sampling points only low numbers of insects were found.

Scattered colonies were found in North Himsworth and South Himsworth townships in the Parry Sound District. The insect was found only in beating samples in the North Bay and Swastika districts.

Red-headed Pine Sawfly, *Neodiprion lecontei* (Fitch)

Sharp increases in population levels of this sawfly were noted in red pine plantations in and around the city of North Bay where moderate and severe defoliation occurred. Extensive defoliation was also observed in roadside plantings in Peck Township, Pembroke District.

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

Roadside plantings, established in the spring of 1972 by the Ministry of Transportation and Communications in Muskoka and Sherbourne townships, Parry Sound District, were heavily infested with this introduced sawfly. Intensive control measures were carried out but there is a possibility that the insect has become established in the district. The sawfly was not found elsewhere in the Region.

Swaine Jack-pine Sawfly, *Neodiprion swainei* Midd.

The intensity and extent of Swaine sawfly infestations in the North Bay and Swastika districts remained relatively unchanged in 1972. High populations persisted in Wallis and Banks townships in the Swastika District and in Whitson and Klock townships in the North Bay District. Jack pine trees on islands and shorelines were again severely defoliated on Lady Evelyn, Willow Island, Rabbit and Temagami lakes.

White Pine Weevil, *Pissodes strobi* (Peck)

High populations of the white pine weevil were observed at numerous locations in all four districts. In plantings in McLaren Township, North Bay District, quantitative sampling showed that 8% of red pine, 12% of white pine and 4% of white spruce (*Picea glauca* [Moench] Voss) were weeviled. In open plantations weeviling ranged from 8% on jack pine to 58% on white pine in the Pembroke District and averaged approximately 15% in plantations in the Parry Sound and Swastika districts.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

In 1971 high populations of this sawfly caused widespread defoliation of tamarack (*Larix laricina* [Du Roi] K. Koch) in the Swastika and North Bay districts. In 1972 population levels declined sharply and only scattered colonies were found. The sudden decrease may have been initiated by severe frosts which occurred on June 10 and 11 in both districts.

In contrast, the sawfly increased in numbers in the Pembroke District. Stands around the Pembroke airport, Petawawa Township, were severely defoliated. Moderate-to-severe defoliation was observed in Rolph, Wilberforce and Sherwood townships. In the Parry Sound District, the only notable infestation occurred southeast of South River in Joly Township where moderate defoliation recurred in 1972.

Table 1. Other noteworthy insects

Insect	Host(s)	Remarks
<i>Acleris variana</i> Fern.	bF, wS	few larvae in beating samples, North Bay District
<i>Acrobasis betulella</i> Hlst.	wB	populations higher than usual in North Bay and Swastika districts
<i>Adelges strobilobius</i> Kalt.	bS	varying numbers in most stands in Region
<i>Anchylopera discigerana</i> Wlk.	yB	high populations in southern part of North Bay District
<i>Anisota virginiensis</i> Dru.	rM, rO	severe defoliation of 15-acre stand of red oak at Driftwood Park, Pembroke District and several moderately defoliated trees, North Bay District
<i>Aphrophora parallela</i> (Say)	jP, wS, bS	high numbers in several stands in North Bay and Swastika districts
<i>Archips cerasivoranus</i> (Fitch)	rP	High numbers persisted in pine plantation, North Bay District.
<i>Cecidomyia reeksi</i> Vock.	jP	appreciable twig mortality at many points in Region
<i>Cinara banksiana</i> (P. & T.)	jP	heavy on reproduction in Brewster Twp, Swastika District
<i>Coleophora laricella</i> Hbn.	tL	moderate discoloration of larch stands in northern part of North Bay and southern part of Swastika districts
<i>Compsolechia niveopulvella</i> Cham.	Po	widely distributed throughout the Region
<i>Dasineura balsamicola</i> (Lintn.)	bF	common, particularly on young trees at many points in North Bay and Swastika districts

(continued)

Table 1. Other noteworthy insects (continued)

Insect	Host(s)	Remarks
<i>Dioryctria reniculella</i> Grt.	wS	common throughout the southwestern part of North Bay District
<i>Diprion frutetorum</i> (F.)	rP	new distribution records in South Himsworth Twp, Parry Sound District, and in Peck, Wilberforce and Westmeath twp, Pembroke District
<i>Diprion similis</i> (Htg.)	ScP	new distribution records in Wood, Morrison and Muskoka twp, Parry Sound District
<i>Energia decolor</i> Wlk.	tA	Although found in all districts, populations declined sharply from 1971.
<i>Epinotia solandriana</i> Linn.	wB	light infestations at several points in central and southern parts of North Bay District
<i>Eucordylea resinosae</i> Free.	rP	common in most stands examined in the North Bay District
<i>Eucosma gloriola</i> Heinr.	rP, ScP	heavy shoot mortality in plantations in Strong Twp, Parry Sound District
<i>Exoteleia pinifoliella</i> (Cham.)	jP	numerous on young trees in the southern part of North Bay District
<i>Gonioctena americana</i> (Schaeef.)	tA	heavily defoliated reproduction at several points in the Parry Sound and Pembroke districts
<i>Heterarthrus nemoratus</i> (Fall.)	wB	light mining common in the North Bay and Swastika districts
<i>Hyphantria cunea</i> Dru.	bAs, wE, wB, W	Populations increased in the southern part of North Bay District; levels were very low in all other districts.

(continued)

Table 1. Other noteworthy insects (continued)

Insect	Host(s)	Remarks
<i>Ips pini</i> Say	rP	heavy infestation in MNR seed orchard in Head Twp, Pembroke District
<i>Lecanium corni</i> Bouche	Hon, sM	heavy twig mortality in Sinclair and McClintock twp, Parry Sound District
<i>Lithocolletis ontario</i> Free.	tA	population increases evident in all districts
<i>Malacosoma americanum</i> F.	pCh	Population levels increased throughout the insect's range in North Bay District.
<i>Malacosoma californicum pluviale</i> Dyar	wB, Ch	population increases evident in Swastika District
<i>Mayetiola piceae</i> (Felt)	wS	heavily infested trees in Perry and Lount twp, Parry Sound District and in Alice Twp, Pembroke District
<i>Neodiprion nanulus nanulus</i> Schedl	rP, jP	low population levels in all districts
<i>Neodiprion pinetum</i> (Nort.)	wP	severe defoliation of trees on islands in Cowper Twp, Parry Sound District
<i>Neodiprion pratti banksianae</i> Roh.	jP	only scattered colonies found in the Region
<i>Nymphalis antiopa</i> L.	W, E, tA	widely distributed in all districts
<i>Oenerostoma strobivorum</i> Free.	rP, wP	high populations in the northern part of North Bay District, particularly in the Lady Evelyn Lake area
<i>Phenacaspis pinifoliae</i> (Fitch)	jP, rP	high populations at numerous points in the Region
<i>Pikonema alaskensis</i> (Roh.)	wS, bS	severe defoliation of wind-breaks and plantations in Dymond, Harris, Casey, Harley and Cane twp, Swastika District

(continued)

Table 1. Other noteworthy insects (concluded)

Insect	Host(s)	Remarks
<i>Plagiodera versicolora</i> Laich	W	High numbers recurred in the southeastern part of Pembroke District.
<i>Pristiphora geniculata</i> (Htg.)	Mo	defoliated trees common throughout the Region, particularly in the Swastika District
<i>Profenusa thomsoni</i> (Konow)	wB	light-to-moderate mining in North Bay and Swastika districts
<i>Rhabdophaga swainei</i> Felt.	wS, bS	numerous in most stands in North Bay and Swastika districts
<i>Tetralopha asperatella</i> Clem.	sM	common in the southern parts of Pembroke and Parry Sound districts
<i>Toumeyella numismaticum</i> (P. & M.)	jP	heavily infested trees at many points in all districts
<i>Zelleria haimbachi</i> Busck	jP	high numbers on young trees at many locations in North Bay and Swastika districts

TREE DISEASES

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

Inspection of a jack pine plantation in Burt Township, Swastika District revealed patches of tree mortality over an area of approximately 50 acres. Subsequent sampling and evaluation showed a heavy infection level with mortality of 33%. No other organisms were found in samples from the plantation.

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

Although no significant increase in the northward spread of this pathogen was detected in 1972, increasing numbers of white elm (*Ulmus americana* L.) trees continued to die in the Pembroke, Parry Sound and North Bay districts. In the last-named district, heaviest mortality occurred along the Veuve and Sturgeon rivers, particularly in the Sturgeon Falls, Verner, Warren and Hagar areas. The disease has not yet been found in the Swastika District.

Ink Spot of Aspen, *Ciborinia whetzeli* (Seaver) Seaver

This foliage disease was more prevalent than in recent years in the Pembroke and Parry Sound districts. In Buchanan Township, Pembroke District incidence in trembling aspen stands was 85% and in Wallbridge Township, Parry Sound District incidence was 100% with infection levels ranging from light to moderate in these areas. Light-to-moderate infection levels were also observed in Mowat, Henvey, Nipissing and Monteith townships, Parry Sound District and in Hagarty Township, Pembroke District. The disease was of little consequence in the North Bay and Swastika districts in 1972.

Sweetfern Blister Rust, *Cronartium comptoniae* Arth.

Evaluations in jack pine stands in 1970 and 1971 showed that incidence and infection levels ranged from 10 to 45% and from moderate to high, respectively, in the North Bay and Swastika districts. Although specific stands were not evaluated in 1972, observations indicated that the disease was present at approximately the same levels in these districts.

In the Parry Sound and Pembroke districts, the pathogen was seldom encountered except in three stands in Maria, Richards and Harrison townships where evaluations in 1970 showed moderate infection levels.

White Pine Blister Rust, *Cronartium ribicola* J.C. Fisch.

This important disease of white pine was again widely distributed in all districts of the Region. Infection levels varied from light to moderate and dead tops and branches were conspicuous at many locations. Evaluations carried out in Barron and Stafford townships, Pembroke District showed incidence levels of 23% and moderate infection levels.

A Needle Cast of Jack Pine, *Davisonmycella ampla* (Davis) Darker

Light infection levels of this disease were commonly observed in the Pembroke, North Bay and Swastika districts. Incidence reached a high of 95% in Buchanan Township, Pembroke District.

A Needle Cast of Spruce, *Isthmiella crepidiformis* (Darker) Darker

This foliage disease was more common in 1972, particularly in the Pembroke District where evaluations showed incidence levels of 75 and 80% in Clara and Head townships, respectively.

Cone Rust, *Melampsora abietis-canadensis* C.A. Ludwig ex Arth.

Hemlock cones in the Parry Sound and Pembroke districts were commonly infected with this rust. Infection levels varied widely in different stands. Moderate infection levels were noted in Freeman and Wood townships, Parry Sound District and in Hagarty and Masters townships, Pembroke District.

Leaf and Twig Blight, *Pollaccia radiosa* (Lib.) Bald. & Cif.

Damage by this organism was common on trembling aspen reproduction at numerous locations in the Parry Sound and Pembroke districts. Although incidence was high, evaluations showed that trace and light infection levels were general.

Root and Butt Rots

Surveys were initiated in 1971 to determine the distribution and cause of root and butt rots in spruce and fir stands in the Region. This program was continued in 1972 and extended to include jack pine stands which revealed stand openings or showed evidence of declining vigor. Root and butt rot samples were submitted from nine locations

and sampled stands were evaluated for diseases. The following pathogens were isolated: *Polyporus tomentosus* Fr., *Armillaria mellea* (Vahl ex Fr.) Kummer, and *Scytinostroma galactina* (Fr.) Donk.

Scleroderris Canker of Pine, *Gremmeniella abietina* (Lagerb.) Morelet
(= *Scleroderris lagerbergii* Gremmen)

In 1972 an attempt was made to delineate areas in which this disease was causing more or less continuous infection in the Region. Evaluations were carried out in these areas and the results obtained are shown in Table 2. As in past years, tree mortality was confined to plantations, the organism not having been found in natural stands.

Table 2. Summary of incidence and infection level of the Scleroderris canker of pine in the Eastern Survey Region

Location (Twp)	Tree height (ft)	Host	Level of incidence (%)	Level of infection
North Bay District				
Bastedo	6	rP	2	trace
French	6	rP	85	trace
Swastika District				
Arnold	6	jP	77	trace
Parry Sound District				
McMurrich	8	rP	92	moderate
Proudfoot	10	aP	100	heavy
Stisted	15	rP	78	trace

Porcupine Damage

Girdling of branches and stems by porcupines was noted at several locations in the Pembroke and Parry Sound districts. Moderate damage occurred in a mature white pine stand and in a red pine plantation at the Petawawa Forest Experiment Station, Pembroke District. Damaged balsam fir (*Abies balsamea* (L.) Mill.) trees were also observed in Head Township, Pembroke District, and in Machar Township, Parry Sound District.

Frost Damage



Fig. 2 & 3 showing severe foliar damage on black ash.

Frost Damage



Fig. 4. Severe killing of current balsam-fir foliage.



Fig. 5. Heavy damage in white spruce plantation.

Frost Damage

Severe frosts, with minimum temperatures as low as 22°F, were recorded at weather stations throughout the Region on the nights of June 10 and 11. Heavy damage to both coniferous and deciduous foliage resulted (Fig. 2-5). In the Pembroke and Parry Sound districts, the principal species affected were balsam fir, white spruce and black ash (*Fraxinus nigra* Marsh.). Frosts were more severe in the North Bay and Swastika districts where poplar, maple, spruce, balsam fir and in some cases pine were moderately to severely damaged.

Table 3. Summary of incidence and severity of frost damage in the Eastern Survey Region

Location (Twp)	Tree species	Incidence (%)	Severity
Swastika District			
Armstrong	tA	100	moderate
Brethour	bPo	100	heavy
Walker	tA	100	light
North Bay District			
Bastedo	wS	60	trace
Bucke	bPo	100	moderate
French	bF	100	moderate
Gillies Limit	lA	100	moderate
Merrick	rM	100	moderate
Merrick	sM	100	moderate
Parry Sound District			
McMurrich	wS	100	moderate
Ryerson	wS	100	moderate
Pembroke District			
Clara	bAs	100	heavy

Semimature Tissue Needle Blight

This disease which injures the semimature tissues of white pine needles and causes the distal part of the needles to die, caused moderate-to-severe discoloration of white pine trees in the Pembroke and Parry Sound districts. An area of severe damage occurred in a strip approximately 10 miles wide along Georgian Bay extending from the

French River to the southern border of the Parry Sound District. Pockets of conspicuous discoloration occurred in the remainder of the district and at many points in the Pembroke District. Light damage was also observed in the Mattawa area of the North Bay District.

Wind Damage

In the early summer a violent wind storm, in the Thomas Lake area of Dickson Township, Pembroke District left an erratic pattern of uprooted and broken trees southeastward to Foys Lake in Guthrie Township. In some areas the swaths of blowdown were one-quarter mile wide, particularly on the northwest side of Foys Lake where the most extensive damage occurred.

Winter Drying

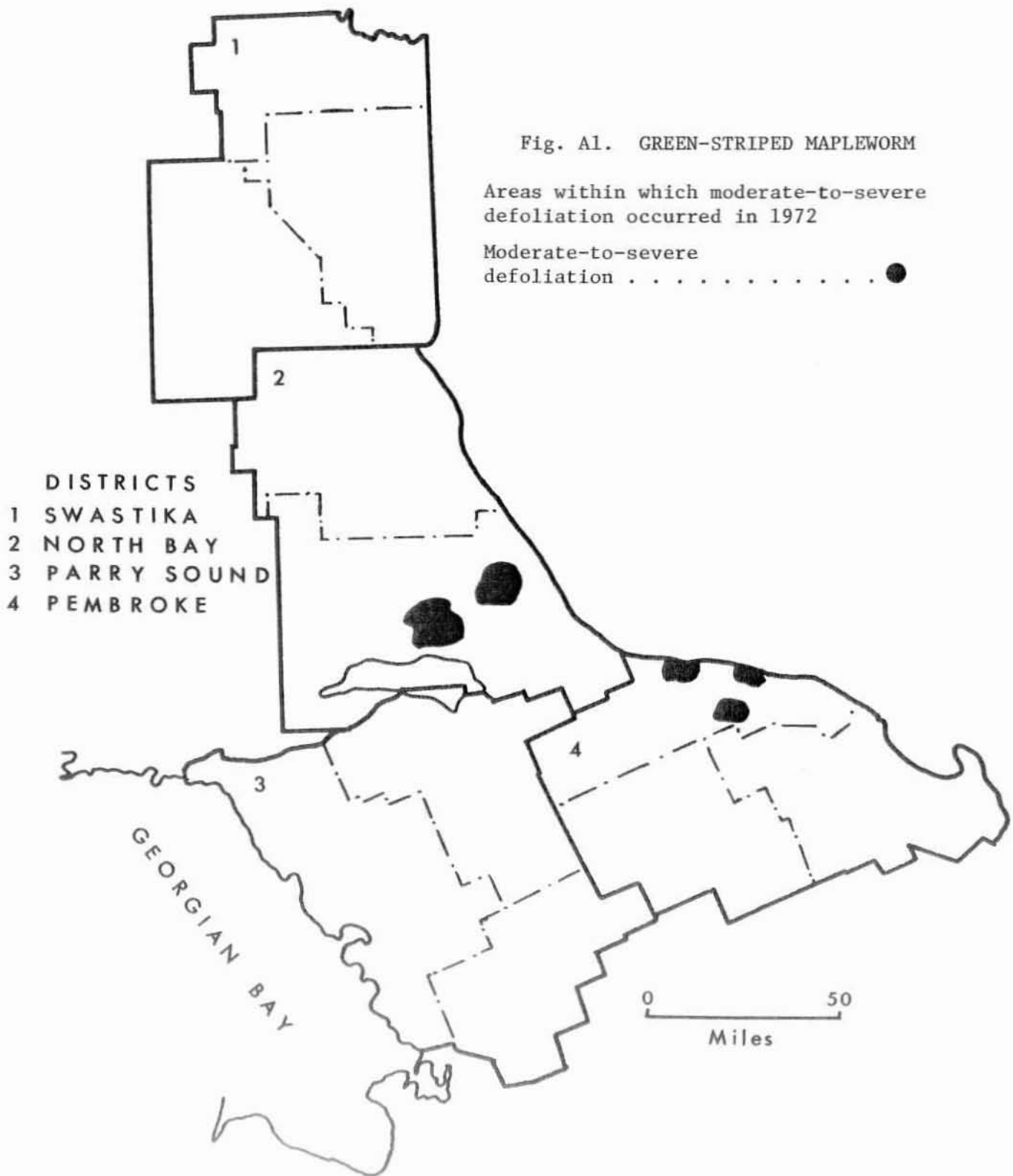
Pronounced discoloration by winter drying was widespread in the Region in 1972. In the North Bay and Swastika districts, open plantations of white, red, and jack pines and mature white pines along lakeshores were severely affected. In the districts of Parry Sound and Pembroke, the condition was most noticeable on Scots pine (*Pinus sylvestris* L.) plantations and on white pine along lakeshores and other exposed sites in the western half of Algonquin Park.

Table 4. Other noteworthy diseases

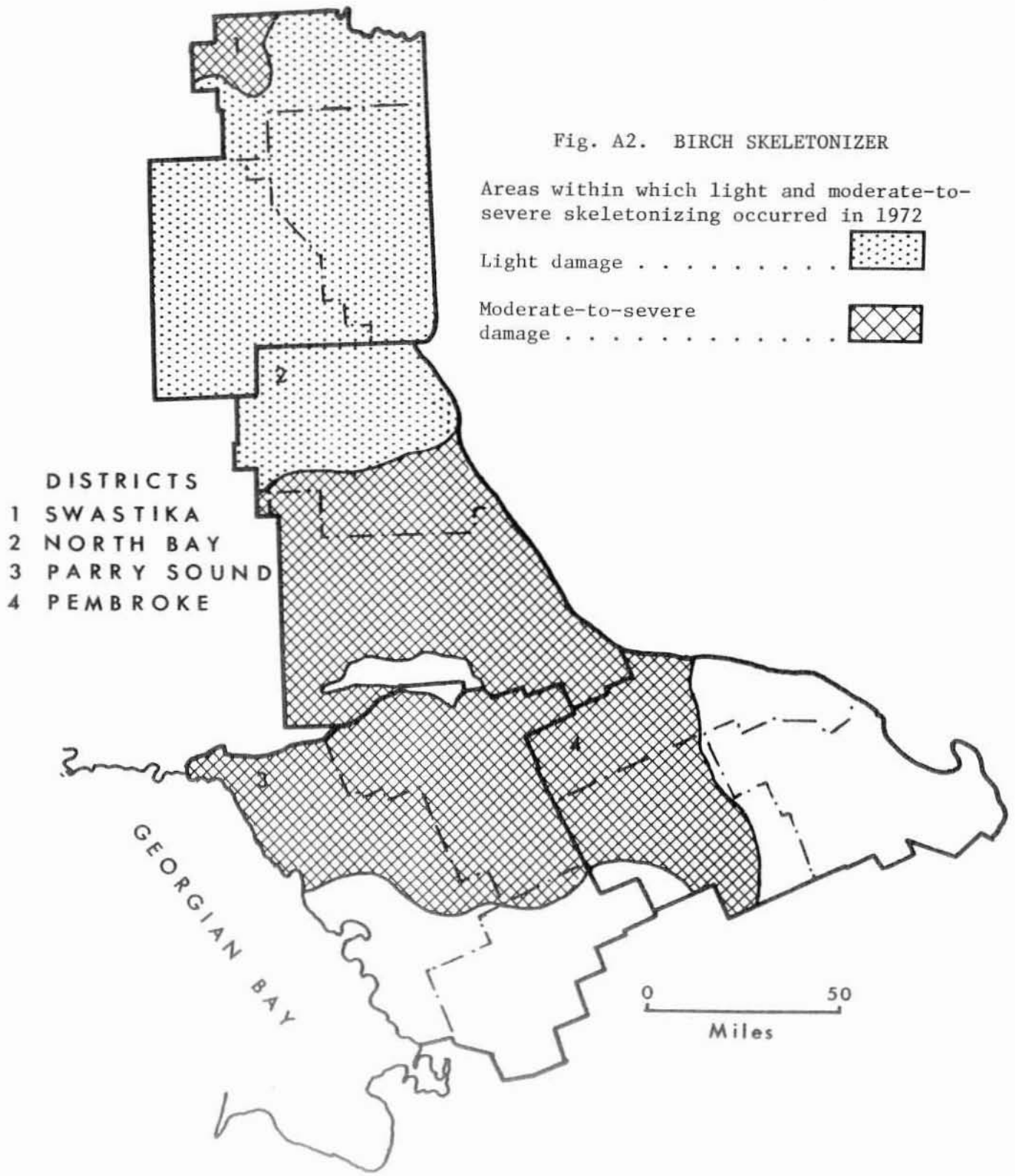
Organism	Host(s)	Remarks
<i>Cytospora chrysosperma</i> Pers. ex Fr.	bPo	branch mortality in stand on the southern outskirts of North Bay
<i>Endocronartium harknessii</i> (J.P. Moore) Y. Hiratsuka	jP	Frequently observed on stems and branches throughout the Region.
<i>Linospora tetraspora</i> G.E. Thomps.	bPo	discolored foliage common in the southern part of the Region
<i>Lirula nervata</i> (Darker) Darker	bF	heavy needle cast on several trees in Wylie and Head twp, Pembroke District
<i>Melampsora medusae</i> Thuem.	tA	heavy fruiting at many points in the southern part of the Region, particularly in McMurrich Twp, Parry Sound District

APPENDIX

EASTERN SURVEY REGION



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