FOREST INSECT AND DISEASE SURVEYS IN THE NORTHERN REGION OF ONTARIO, 1977

L. S. MACLEOD, H. J. EVANS AND J. HOOK

GREAT LAKES FOREST RESEARCH CENTRE

SAULT STE. MARIE, ONTARIO

CANADIAN FORESTRY SERVICE

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

Defoliation of white spruce windbreaks caused by the yellowheaded spruce sawfly, *Pikonema alaskensis* (Roh.), at the Swastika Tree Nursery.

Mortality of jack pine leader caused by the eastern pineshoot borer, *Eucosma gloriola* Heinr.

SURVEY HIGHLIGHTS

An early spring with high temperatures and little rainfall advanced insect development in 1977. Late frosts in June caused appreciable damage to foliage without apparent effect on insect populations. The severity of frost damage within the Region varied with geographic location and tree species but discoloration and damage were evident over a large area.

With the expansion of the infestation northward, the spruce budworm remained the most serious problem affecting spruce-fir stands in the Region. Balsam fir mortality increased appreciably and white spruce mortality was recorded for the first time in the current outbreak. Details are combined with those of other regions in a separate report (see text).

The forest tent caterpillar infestation in the northern districts caused severe damage to aspen foliage over an area of 28 490 km^2 (11,000 $mi.^2$). The area of aspen leafroller damage remained approximately the same as in 1976 but the intensity of this infestation abated somewhat.

An unusual development was the sudden occurrence of heavy infestation by an insect relatively uncommon to the Region. This insect, identified as the fruit tree leafroller, caused moderate-to-severe defoliation to white birch stands in parts of four districts. Another insect, the eastern pineshoot borer, spread considerably and infestations occurred in four districts.

The disease program for 1977 dealt with the major diseases that recur and fluctuate annually. A detailed examination of regeneration trembling aspen stands, involving sampling for root and basal stem disorders and foliage diseases that affect these young stands, was undertaken.

L. S. MacLeod
Supervisor

ACKNOWLEDGMENTS

The assistance and cooperation of personnel from the Ontario Ministry of Natural Resources in all districts of the Region during the field season were invaluable and are gratefully acknowledged.

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INSECTS

Fruit Tree Leafroller, *Archips argyrospilus* (Wlk.)

The spectacular increase in population levels of this insect in the southern part of the Region suggests a huge influx of adult moths in the summer of 1976. As the name implies, this leafroller is usually found on fruit tree species. However, Forest Insect Survey records show that birch (*Betula* sp.) is also a common host.

In 1977 defoliation of white birch (*Betula papyrifera* Marsh.), the primary host in the Region, occurred over a huge area comprising parts of the districts of Chapleau, Gogama, Timmins and Kirkland Lake (see Appendix, Fig. A1). Damage was clearly discernible from aircraft, and in areas where white birch formed the major component in stands, severe defoliation resulted (Fig. 1). Numerous pockets of damage were observed outside the main infestation. These smaller areas of defoliation varied in size and were widely scattered from near the Wawa-Chapleau district boundary in the west to the Quebec border on the east. Several other deciduous species were defoliated to a lesser degree. Willow (*Salix* sp.), mountain maple (*Acer spicatum* Lam.), red maple (*Acer rubrum* L.), yellow birch (*Betula alleghaniensis* Britton), and chokecherry (*Prunus virginiana* L.) were often heavily defoliated, especially when growing in association with white birch.

High numbers of adult moths recovered from light traps operated at Chapleau and Remi Lake indicate a potential for an infestation in 1978.

Maple Leafroller, *Cenopis acerivorana* Mack. (formerly *Cenopis pettitana* Rob.)

During 1976 this insect caused heavy damage to maple (*Acer* sp.) in parts of the Chapleau District. This appears to have been a one-year infestation because in 1977 population levels were greatly reduced. The collapse of this infestation is probably natural because the leafroller is usually found farther south. Light defoliation was evident this year at only a few locations in Cassidy, Green and Cosens townships southwest of Chapleau. Elsewhere very few larvae were collected.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts have been included with those of other regions in a special report by Howse et al. (Report O-X-280). This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1977 and gives infestation forecasts for the province for 1978.

Larch Casebearer, *Coleophora laricella* Hbn.

In 1976 quantitative sampling showed only low population levels of the larch casebearer in the Kapuskasing, Cochrane, Timmins and Kirkland Lake districts. Examination of tamarack (*Larix laricina* [Du Roi] K. Koch) stands showed little change in populations in these districts in 1977. The casebearer was not found in other districts in the Region.

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson

High numbers of this insect again caused conspicuous damage in jack pine (*Pinus banksiana* Lamb.) plantations in the Kirkland Lake and Timmins districts. Quantitative sampling showed that damage remained approximately the same as in 1976 with 30% of the trees affected and an average of four attacks per infested tree. Light damage occurred in Muskego and Foleyet townships in the Chapleau District and shoot mortality was common through the Chapleau and Gogama districts.

Spruce Coneworm, *Dioryctria reniculelloides* Mut. & Mun.

A marked increase in population levels of the spruce coneworm was evident in several districts. Occurrence was widespread and at some points the coneworm outnumbered the spruce budworm. Heavy damage to the white spruce (*Picea glauca* [Moench] Voss) cone crop was recorded in the seed production area in Burt Township, Kirkland Lake District, in Kenogaming Township, Timmins District, in Reeves, Heenan and Genier townships, Chapleau District, in Marquette Township, Gogama District and in Freele Township, Cochrane District. Minor damage to black spruce (*Picea mariana* [Mill.] B.S.P.) trees was noted at several locations.

Poplar Gall Mite, *Eriophyes* sp.

The infestation of gall mites which caused such striking damage to trembling aspen (*Populus tremuloides* Michx.) foliage in the Earlton-New Liskeard area in 1976 declined appreciably in 1977. Although the dwarfed, shrunken foliage caused by the mites was still highly visible through this area and common at many other locations in the Kirkland Lake and Timmins districts, populations were much lower and no extensive damage resulted.

Eastern Pineshoot Borer, *Eucosma gloriola* Heinr.

Eastern pine shootborer infestations recurred at substantially increased levels through Chapleau and Gogama districts. Quantitative sampling showed significantly higher numbers at most points (Table 1). High populations also occurred in the Kirkland Lake and Timmins districts where branch and leader damage (see Frontispiece) was extensive in jack pine plantations.

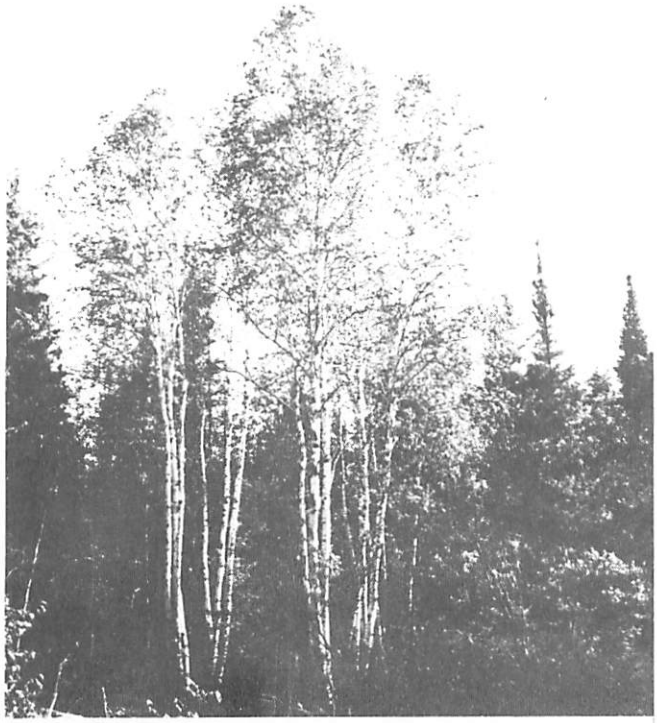

Figure 1

Defoliation of white birch caused by the fruit tree leafroller, *Archips argyrospilus* (Wlk.).

Figure 2

Frost damage to white spruce at Chapleau.

Table 1. Summary of leader damage on jack pine by the eastern pineshoot borer in four districts in 1977 (counts based on the examination of 100 trees at each location).

Location (Twp)	Avg height (m)[a]	Leaders affected (%) 1976	1977
Chapleau District			
Dalmas	1.4	0	3
Busby	2.5	0	0.5
Dupuis	2.4	5	9
Murdock	3.0	0	4
Deans	2.6	5	9
Lloyd	2.4	0	5
Arbutus	2.2	8	21
Fawn	1.7	10	14
Muskego	1.5	-	2
Neelands	2.9	-	12
Gogama District			
Roblin	2.6	8	15
Noble	2.8	2	10
Benneweis	2.4	21	23
Kirkland Lake District			
Dunmore	1.5	-	21
Bowman	1.8	-	6
McEvay	2.1	-	8
Sharpe	1.8	-	12
Timmins District			
Thorneloe	2.1	-	7
Timmins	1.8	-	3

[a] 1 m = 3.28 ft

Birch Leafminer, *Fenusa pusilla* (Lep.)

First generation leafminers caused near-complete defoliation of white birch trees in urban, rural and forested areas at many locations in the Kirkland Lake and Timmins districts. Successive defoliation has caused pronounced deterioration of large trees in Kirkland Lake and Gowganda. Extremely severe defoliation occurred in several hectares of white birch immediately east of Charlton and second generation miners caused severe discoloration and loss of foliage at several points in Evanturel, Dack and Eby townships in the Kirkland Lake District.

Conversely, a general decline in numbers and defoliation was noted in other districts of the Region. Damage was confined to regeneration and small fringe trees in Margaret and Panet townships in the Chapleau District and in Garvey and Jack townships in Gogama District.

American Aspen Beetle, *Gonioctena americana* (Schaef.)

Moderate-to-severe defoliation of aspen (*Populus* sp.) recurred at many locations throughout the Region. Damage was confined mainly to the upper third of the tree crowns in regeneration type stands but smaller trees, particularly those on the fringes of stands, were often completely defoliated. Small pockets of defoliation were evident in the Iroquois Falls area, Cochrane District, in Fauquier Twp, Kapuskasing District and in the townships of Cabot, Togo and Noble in the Gogama District. Similar damage occurred through the central part of Kirkland Lake District and at several points in the districts of Timmins and Chapleau.

Aspen Leafblotch Miner, *Lithocolletis ontario* Free.

Sporadic infestations of the leafblotch miner caused moderate-to-severe defoliation of sapling-sized aspen in Langlois and Fitzsimmons townships, Chapleau District and in Marquette and Arden townships, Gogama District. Although aspen regeneration supported high populations in other districts of the Region no extensive defoliation was observed.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Excellent May weather resulted in the early flushing of aspen foliage and created ideal conditions for the survival and development of the forest tent caterpillar infestation in the northern part of the Region. This marked the fourth consecutive year in which the infestation increased in size and intensity.

Moderate-to-severe defoliation occurred from McMillan and Arnott townships, Hearst District, northeast to Horden Township on the Moose River, Moosonee District (see Appendix, Fig. A2). Most of the Kapuskasing District and approximately one-half of the Cochrane District were included within the infestation boundaries. Two smaller outbreaks occurred: in Wicksteed Township in the southwestern part of the Hearst District and in Shuel and Kohler townships on the Hearst-Geraldton district border. The infestation totalled 28 490 km^2 (11,000 $mi.^2$) representing an increase of 3 320 km^2 (1,295 $mi.^2$) over 1976.

In the southern districts of the Region only occasional colonies or wandering larvae were encountered and no significant defoliation was observed, except at Kap-Kig-Iwan Provincial Park in the Kirkland Lake District where light defoliation was general.

Egg-band surveys made at 12 locations outside the infestation suggest a potential for expansion southward toward Abitibi Lake and southwest of Smooth Rock Falls in the Cochrane District (Table 2). Unless adverse weather conditions precipitate a collapse of the Hearst-Kapuskasing-Cochrane infestation, severe defoliation may be expected in those areas in 1978.

Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex

Jack pine trees in plantations and small trees of natural origin were infested with this sawfly for the third consecutive year. The insect was prevalent in all districts of the Region except the Moosonee District. Light defoliation was the general rule but at many widely dispersed locations small groups and single trees were often severely damaged.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Heavy damage to white and black spruce trees in plantations, snow hedges, windbreaks and ornamentals recurred through the northern and eastern parts of the Region (see Frontispiece).

Severe defoliation of ornamentals occurred in Hearst, Kapuskasing and Opasatika and on trees along Highway 11 from the Geraldton-Hearst district border to Iroquois Falls. Considerable mortality of white spruce approximately 1 m (3.28 ft) in height resulted from 3 successive years of defoliation in the Driftwood area in the Cochrane District. In the Timmins and Kirkland Lake districts high populations were general and severe defoliation common, particularly on snow hedges along Highway 11 from Englehart to New Liskeard and on spruce windbreaks at the Swastika Forest Station.

Table 2. Summary of forest tent caterpillar egg-band counts on trembling aspen in five districts in 1977 and infestation forecasts for 1978.

Location (Twp)	Avg DBH of trees (cm)[a]	No. of trees sampled	Total no. of egg bands	Infestation forecast for 1978
Hearst District				
Gourlay	11	3	0	nil
Kohler	11	3	2	light
McCoig	15	3	3	light
Kapuskasing District				
Fergus	15	3	2	light
Fenton	18	3	2	light
Fauquier	15	1	83	severe
Cochrane District				
Scapa	15	3	2	light
Steele	18	3	3	light
Freele	18	3	2	light
Swartman	18	3	0	nil
Stimson	18	3	4	light
Sydere	18	3	15	moderate
Calvert	11	3	1	light
Colquhoun	6	1	6	moderate
Timmins District				
Little	15	3	9	light
German	15	3	0	nil
Kirkland Lake District				
Kerns	15	3	0	nil
Pense	14	3	0	nil
Casey	15	3	1	light
Harley	13	3	2	light
Evanturel	15	3	5	light
Playfair	14	3	0	nil
Bowman	12	3	0	nil
Taylor	14	3	0	nil

[a] 1 cm = 0.39 in.

White Pine Weevil, *Pissodes strobi* (Peck)

Relatively stable population levels of this pest persisted in 1977. Most plantations of spruce and pine were infested to some degree. Leader damage ranged from 1 to 18% (Table 3).

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

For the second consecutive year, tamarack suffered moderate-to-severe damage in the districts of Hearst, Kapuskasing and Cochrane. There were numerous small pockets of severe defoliation along Highway 11 from Hearst to Iroquois Falls. Moderate damage occurred along the Wade Lake and Quebec border roads, Cochrane District. European larch (*Larix decidua* Mill.) planted at the Tree Improvement Centre in Fauquier Twp, Kapuskasing District was also moderately defoliated. Only occasional colonies of these sawflies were collected in the more southerly districts and defoliation was either negligible or very light. No damage was observed in the Moosonee District.

Mountain Ash Sawfly, *Pristiphora geniculata* (Htg.)

Severe defoliation of mountain ash (*Sorbus* spp.) was general in all districts. Ornamental trees were particularly susceptible and were heavily damaged in urban areas through the Region. Repeated defoliation over a number of years has resulted in considerable deterioration of mountain ash along the Chain of Lakes Road in Kapuskasing District and along the Wade Lake Road in the Cochrane District.

Aspen Leafroller, *Pseudexentera oregonana* Wlshm.

Although the intensity of infestation decreased somewhat in 1977 and the resulting defoliation was less severe, the area infested by this leafroller was virtually the same as in 1976 (see Appendix, Fig. A3). The infestation totalled approximately 14 800 km^2 (5,710 $mi.^2$) in parts of the Kapuskasing, Cochrane, Timmins and Kirkland Lake districts. Within the area that was lightly to moderately defoliated it was not unusual to see small groups of trembling aspen almost completely defoliated while nearby trees were all but untouched. In the Gogama District pockets of moderate damage occurred in the townships of Burrows, Kemp and Cabot and low numbers were observed at numerous other locations through the Region.

Several other species of leafrollers comprising approximately 10% of the total population contributed to the defoliation. In the Kapuskasing-Smooth Rock Falls area the infestation was overlapped by the forest tent caterpillar infestation, and this complicated the evaluation of damage caused by each species.

Table 3. Summary of tree damage caused by the white pine weevil in seven districts in 1976 and 1977 (counts based on the examination of 100 trees at each location).

Location (Twp)	Host	Avg height (m)[a]	Trees weeviled (%)	
			1976	1977
Cochrane District				
Potter	wS	2.1	4	2
Calder	bS	2.1	4	4
Kapuskasing District				
Fauquier	wS	1.8	12	1
Casselman	bS	2.1	8	2
Cummings	wS	1.8	10	6
Guerney	bS	2.1	6	10
Fergus	wS	2.1	7	9
Hearst District				
Way	bS	1.8	8	9
Mead	bS	1.8	3	1
Lowther	bS	2.1	-	5
Timmins District				
Thorneloe	jP	2.2	3	5
Jamieson	jP	1.9	1	2
Timmins	jP	1.6	4	3
Kirkland Lake District				
Dunmore	jP	1.6	7	8
Bowman	jP	1.9	2	4
McEvay	jP	2.2	7	3
Evanturel	wP	1.9	12	18
Sharpe	jP	1.8	-	3
Burt	jP	1.0	-	14
Gogama District				
Benneweis	jP	2.4	8	4
Noble	jP	2.8	1	0
Roblin	jP	2.6	0	0
Chapleau District				
Deans	jP	2.6	1	1
Dupuis	jP	2.6	6	7
Dalmas	jP	1.4	2	5
Fawn	jP	1.7	3	3
Lloyd	jP	2.4	0	2
Arbutus	jP	2.2	2	5
Muskego	jP	1.5	0	1
Neelands	jP	2.9	-	4

[a] 1 m = 3.28 ft

Table 4. Other forest insects

Insect	Host(s)	Remarks
Acrobasis betulella Hlst. Birch tubemaker	wB	Increased population levels for the second consecutive year caused appreciable damage at many points in the southern part of the Region.
Altica ambiens alni Harr. Alder flea beetle	Al	one point of heavy leaf skeletonizing along the Esher-Healey Road in Strathearn Twp, Chapleau District
Aphrophora parallela (Say) Pine spittlebug	jP	common throughout the Region; pockets of high numbers in Arnold, Marter, McCool and Munro twp, Kirkland Lake District
Archips cerasivoranus (Fitch) Uglynest caterpillar	cCh	high numbers of nests in New Liskeard area, Kirkland Lake District and at one location in Daoust Twp, Chapleau District
Bucculatrix canadensisella Cham. Birch skeletonizer	wB	collected in trace numbers, Ogilvie Twp, Gogama District
Calosoma frigidum Kby. Ground beetle	tA	numerous predators in leaf-roller infestation in the Englehart area, Kirkland Lake District
Cecidomyia reeksi Vock. Jack pine resin midge	jP	moderate twig damage in Sewell Twp, Timmins District; common at many other locations in the Region
Choristoneura conflictana Wlk. Large aspen tortrix	tA	occasionally found in low numbers in association with other leafrollers

(continued)

Table 4. Other forest insects (continued)

Insect	Host(s)	Remarks
Choristoneura rosaceana Harr. Obliquebanded leafroller	deciduous	contributed substantially to defoliation caused by other leafrollers, especially on birch and aspen
Chrysomela spp. Leaf beetles	bPo	light damage at numerous locations, particularly in the Foleyet area, Chapleau District
Compsolechia niveopulvella Poplar leafroller	tA	light defoliation at many points in Kirkland Lake and Timmins districts; several other species found at the same locations
Corythucha elegans Drake Willow-and-poplar lace bug	W	extensive damage by this lace bug on some species of willow (*Salix* sp.) in the Chapleau and Gogama districts
Dichelonyx sp. Leaf chafer	tA, wB	high numbers of adult beetles caused light defoliation of regeneration in Beauchamp, Mickle and Armstrong twp, Kirkland Lake District
Enargia decolor Wlk. Aspen twinleaf tier	tA	general increase in populations in the southern part of the Region
Enargia infumata Grt. Owlet moth	wB	increased numbers at many points in the districts of Gogama, Chapleau, Timmins and Kirkland Lake
Epinotia nisella criddleana Kft. Aspen leafroller	tA	low numbers in association with other leafrollers on aspen in Timmins and Kirkland Lake districts
Erannis tiliaria Harr. Linden looper	deciduous	occasionally collected in the Chapleau District, but numbers fewer than in the previous year

(continued)

Table 4. Other forest insects (continued)

Insect	Host(s)	Remarks
Halisidota maculata Harr. Spotted tussock moth	deciduous	light populations on Manitoba maple (*Acer negundo* L.) and in some cases heavy damage to willow in the Chapleau urban area
Hyphantria cunea Dru. Fall webworm	deciduous	numerous webs on pin cherry (*Prunus pensylvanica* L.f.) and alder (*Alnus* sp.) along the Lesage Lake Road in Silk Twp, Chapleau District
Lecanium sp. Lecanium scale	deciduous	increased incidence noted on black ash (*Fraxinus nigra* Marsh.) and mountain maple (*Acer spicatum* Lam.) in the Chapleau District and on aspen in Kirkland Lake and Timmins districts
Lithocolletis nipigon Free. Balsam poplar leafblotch miner	bPo	severe mining of trees of all ages west of Hearst to Geraldton District border
Malacosoma californicum pluviale Dyar Western tent caterpillar	deciduous	wide distribution through most of the Region along roads and in cutover areas
Mindarus abietinus Koch. Balsam twig aphid	wS, bF	high numbers on spruce seedlings in the Chapleau nursery
Monochamus sp. Sawyer beetles	bS, bF	high populations of adults caused mortality of seed trees or advance growth left in cutovers on Spruce Falls Pulp and Power Co. limits, Kapuskasing District, north of the town of Kapuskasing
	wS, jP	heavy feeding by adults caused appreciable twig injury in stands adjacent to cutover areas in Corkill Twp, Kirkland Lake District and in Vrooman Twp, Gogama District

(continued)

Table 4. Other forest insects (continued)

Insect	Host(s)	Remarks
Neodiprion compar (Leach) Pine sawfly	jP	single colony found in Benneweis Twp, Gogama District
Neodiprion nanulus nanulus Schedl Red pine sawfly	rP, jP	numerous colonies at Biscotasing, Chapleau District; very low levels through the remainder of the Region
Neodiprion pratti banksianae Roh. Jack pine sawfly	jP	occasional colonies found in the Kirkland Lake District
Petrova albicapitana (Busck.) Northern pitch twig moth	jP	common in most jack pine plantations with some branch mortality in Kirkland Lake District
Phratora purpurea purpurea Brown Aspen leaf beetle	tA	unusually high numbers in Pacaud and Armstrong twp, Kirkland Lake District; common at many other points
Pleroneura brunneicornis Roh. Balsam shootboring sawfly	bF	heavily infested trees at many points in the southern part of Timmins District and in the northern part of Kirkland Lake District
Profenusa thomsoni (Konow) Ambermarked birch leafminer	wB	light mining in most stands, Kirkland Lake and Timmins districts; common regeneration in Hearst and Cochrane districts
Rhyacionia adana Heinr. Pine tip moth and *Rhyacionia sonia* Miller Yellow jack pine shoot borer	jP	extensive damage to new shoots of young trees at many points in Kirkland Lake and Timmins districts

Table 4. Other forest insects (concluded)

Insect	Host(s)	Remarks
Sciaphila duplex Wlshm. Poplar leafroller	tA	low numbers on regeneration near Wade Lake, Quebec Border Road, Cochrane District
Tetralopha aplastella Hlst. Aspen webworm	tA	common through the central part of Kirkland Lake District and in Gogama and Chapleau districts
Toumeyella numismaticum (P. & M.) Pine tortoise scale	jP	single trees and small groups of trees heavily infested in several stands in Macklem and Thorneloe twp, Timmins District and in Sandy, Evans and Murdock twp, Chapleau District
Xylomges dolosa Grt. Aspen caterpillar	tA, bPo	low numbers in many poplar stands; more common in Harley and Flavelle twp in Kirkland Lake District
Zelleria haimbachi Busck. Pine needle sheathminer	jP	light defoliation of current year's foliage common in most stands, Kirkland Lake and Timmins districts
Zeugophora sp. Poplar blackmine beetle	Po	observed often at widely separated locations, Kirkland Lake and Timmins districts

TREE DISEASES

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

This destructive organism continued to cause extensive mortality of elm (*Ulmus* sp.) through the southern and central parts of the Kirkland Lake District, particularly along the Wabi, Blanche and Englehart rivers. The disease has not been detected in any of the other districts in the Region.

Needle Rust of Spruce, *Chrysomyxa ledi* (Alb. & Schw.) d By. and *Chrysomyxa ledicola* Lagh.

Damage by this foliage rust of spruce varied considerably through the Region in 1977. Incidence was usually high but the defoliation level was normally very low, ranging only up to 10% on a few occasions (Table 5). Heaviest damage was recorded on natural regeneration and on the lower branches of overstory trees in stands growing on extremely moist sites. These areas abound with Labrador tea (*Ledum groenlandicum* Oeder), the alternate host of the disease.

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

Damage by this foliage disease was confined to the districts of Chapleau and Gogama, and there, defoliation was generally very light except in Churchill Township, Gogama District where moderate damage prevailed (Table 6).

A Needle Rust of Jack Pine, *Coleosporium asterum* (Diet.) Syd.

Only two areas of light foliar damage were observed in the Region. In Avon Township, Cochrane District and in Studholme Township, Hearst District 100% of young jack pine were infected but defoliation was only 10%. Elsewhere, the rust was observed at very low levels through the Chapleau and Gogama districts and in the central part of the Kirkland Lake District.

Leaf and Twig Blight, *Venturia macularis* (Fr.) Müller & Arx

Incidence of this pathogen was rather sporadic and infection levels were low in most districts of the Region. At some locations where disease evaluations were made, relatively high numbers of trees were affected but foliar damage was light (Table 7).

Table 5. Summary of spruce needle rust appraisals in seven districts in 1977.

Location (Twp)	Host	Area affected (ha)[a]	Defoliation level (%)	Trees affected (%)
Gogama District				
Garvey	bS	20	6	100
Regan	bS	2	10	100
Chapleau District				
Birch	bS	5	2	50
Busby	bS	5	3	90
Kelso	bS	1	10	100
Arbutus	bS	12	4	80
Muskego	bS	10	3	60
Kirkland Lake District				
Dunmore	bS	5	1	100
Benoit	bS	2	1	100
Grenfell	bS	1	1	100
Arnold	bS	1	1	100
Hincks	bS	2	1	100
Yarrow	bS	1	1	100
Timmins District				
Blackstock	bS	1	1	100
Evelyn	bS	1	1	100
German	bS	2	1	100
Hearst District				
McMillan	bS	200	5	30
Kendall	wS	200	8	50
Cochrane District				
Sydere	wS	80	10	60
Kapuskasing District				
Fauquier	bS	60	8	60

[a] 1 ha = 2.47 acres.

Table 6. Summary of ink spot of aspen in the Chapleau and Gogama districts in 1977.

Location (Twp)	Area affected (ha)[a]	Defoliation level (%)	Trees affected (%)
Chapleau District			
Halsay	15	2	40
Caouette	10	8	60
Foleyet	5	2	25
Deans	10	2	15
Osway	5	10	75
Margaret	6	2	20
Bounsall	2	5	50
Gogama District			
Churchill	1	30	95
McMurchy	25	10	80
Garvey	10	12	75
Noble	15	15	60

[a] 1 ha = 2.47 acres.

Abiotic Damage to Jack Pine

Plantations of jack pine in some areas of Chapleau and Gogama districts showed conspicuous browning of foliage and dead buds in early spring of 1977. These regenerating clear-cut areas were all on extremely dry sandy soils. Affected trees ranged in height from recently planted stock to 6 m. At none of the locations could disease pathogens be found, and this indicates that the damage was likely abiotic. Some of the desiccated foliage is suggestive of drought damage because of the intensely dry summer of 1976. In some locations damage first appeared in the late summer of that year. Elsewhere the browning was more likely caused by winter drying. This winter kill results from warm temperatures in early spring when the remaining snow on the lower parts of the tree prevents translocation of water to the tops of trees. Also this damage was more evident in low-lying areas where heavier snowfall would accumulate.

Severest damage occurred in the Sultan area, Chapleau District and east from there to the Dividing Lake area, Gogama District. Incidence ranged up to 100% and foliage damage up to 50%. The number of trees with the new foliage affected in the form of killed buds varied but was usually light. In extreme instances light mortality was evident.

Table 7. Leaf and twig blight evaluations in trembling aspen (*Populus tremuloides* Michx.) stands in six districts in 1977.

Location (Twp)	Area affected (ha)[a]	Tree ht (m)[b]	Trees affected (%)	Defoliation (%)
Cochrane District				
Freele	100	3	20	1
Avon	100	3	80	5
Kapuskasing District				
Slack	300	3.1	30	2
Eilber	300	3	40	2
Hearst District				
Studholme	20	3.2	40	2
Kirkland Lake District				
Doon	8	3	2	0.7
Chapleau District				
Chappise	50	2.6	38	5.0
Keith	60	2.2	53	5.4
Kalen	10	3.3	5	1.0
Brutus	10	2.3	36	4.0
Gogama District				
Invergarry	10	3.7	49	5.2

[a] 1 ha = 2.47 acres

[b] 1 m = 3.28 ft

Frost

Heavy frosts caused appreciable damage to developing foliage in all districts in the Region. Records from five weather stations showed that during the first two weeks of June temperatures as low as -2°C occurred several times and a low of -12°C was reached on June 12. Damage was widespread and variable. In the Cochrane, Kapuskasing, Hearst, Timmins and

Kirkland Lake districts balsam poplar (*Populus balsamifera* L.) and willow exhibited the most spectacular discoloration and many other deciduous species were affected to a lesser degree. Occasionally the new shoots of balsam fir (*Abies balsamea* [L.] Mill.) and white spruce were killed but generally little damage to conifers resulted. Conversely, in Chapleau and Gogama districts appreciable damage to white spruce (Fig. 2) and balsam fir occurred at many locations, particularly on young trees on exposed sites. Some damage to rising 3-0 nursery stock was also observed at the Chapleau Tree Nursery.

Table 8. Summary of frost damage evaluations at 12 locations in 1977.

Location (Twp)	Host	Tree ht (m)[a]	Area affected (ha)[b]	Trees affected (%)	Defoliation level (%)
Kirkland Lake District					
Benoit	tA	7	40	84	17
Tudhope	bPo	12	2	100	60
Beatty	bPo	16	2	100	50
Timmins District					
Matheson	tA	5	3	75	10
Stock	bPo	24	3	100	50
Chapleau District					
Eisenhower	bF	10	50	95	65
Sadler	wS	0.3	10	87	26
Manning	wS	1.0	15	97	40
Lerwick	wS	1.0	5	100	50
Gogama District					
Cabot	wS	1.5	5	90	10
Noble	wS	1.0	10	100	10
Benneweis	wS	0.5	3	75	10

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Root Rot of Aspen

In 1977 a province wide survey to determine the presence of root rots in aspen stands was initiated. In the Northern Region, 15 randomly selected plots were established and sampled (Table 9). Stem samples were restricted to the base of the tree, a maximum of 20 cm above the ground line. The ghost moth (*Sthenopis quadriguttatus* Grt.), believed to be a factor in root rot infection, was recovered from trees on nine of the 15 plots.

Table 9. Summary of root rot evaluations at 15 locations.

Location (Twp)	Stem defect (%)		Root defect (%)	
	Stain	Rot[a]	Stain	Rot[a]
Chapleau District				
Chappise	20	0	60	20
Keith	30	0	20	50
Kalen	40	0	20	20
Brutus	30	0	30	20
Gogama District				
Invergarry	60	10	40	40
Hearst District				
Studholme	70	20	10	0
Cochrane District				
Freele	60	10	20	10
Avon	30	20	30	40
Kapuskasing District				
Slack	40	0	30	30
Eilber	80	0	20	40
Kirkland Lake District				
Doon	40	0	20	20
Bowman	70	0	40	30
Hearst	50	10	30	20
Timmins District				
Denton	20	10	40	0
Macklem	30	0	30	10
Regional Avg	45	5	29	23

[a] Rot includes some stain

Table 10. Other forest diseases

Organism	Host(s)	Remarks
Arceuthobium pusillum Pk. Eastern dwarf mistletoe	bS	newly affected areas recorded in Topham and Fawn twp, Chapleau District
Armillaria mellea (Vahl ex Fr.) Kummer Armillaria root rot	jP	common in most pine plantations; moderate at one point, Cane Twp, Kirkland Lake District
Cronartium comptoniae Arth. Sweetfern blister rust	jP	high incidence, Willison Twp, Kirkland Lake District
Davisomycella ampla (Davis) Darker Needle cast	jP	trace infection at many points in the southern part of the Region
Endocronartium harknessii (J.P. Moore) Globose gall rust	jP	light branch mortality, Clifford Twp, Kirkland Lake District
Hypoxylon mammatum (Wahl.) Miller Hypoxylon canker of poplar	tA	3% of saplings affected in a regeneration stand, Kalen Twp, Chapleau District
Phacidium abietis (Dearn.) Reid & Cain Snow mold	bF	common on understory trees, Chapleau and Gogama districts
Sirococcus strobilinus Preuss. Shoot blight of conifers	rP	recurring damage to understory regeneration, Hutcheon Twp, Chapleau District
Uncinula salicis (DC.) Wint. Powdery mildew	Po, W	moderate damage at many points in the Region
Venturia populina (Vuill.) Fabric Leaf and twig blight	bPo	light damage commonly occurred on young trees

The following diseases were evaluated in recent years and no important change was observed in 1977.

Cronartium coleosporioides Arth. complex - Stalactiform rust

Cronartium commandrae Pk. - Commandra rust

Cronartium ribicola J. C. Fischer - White pine blister rust

Gremmeniella abietina (Lagerb.) Morelet
(≡ *Scleroderris lagerbergii*) Gremmen - Gremmeniella (≡ scleroderris) canker of pine

APPENDIX

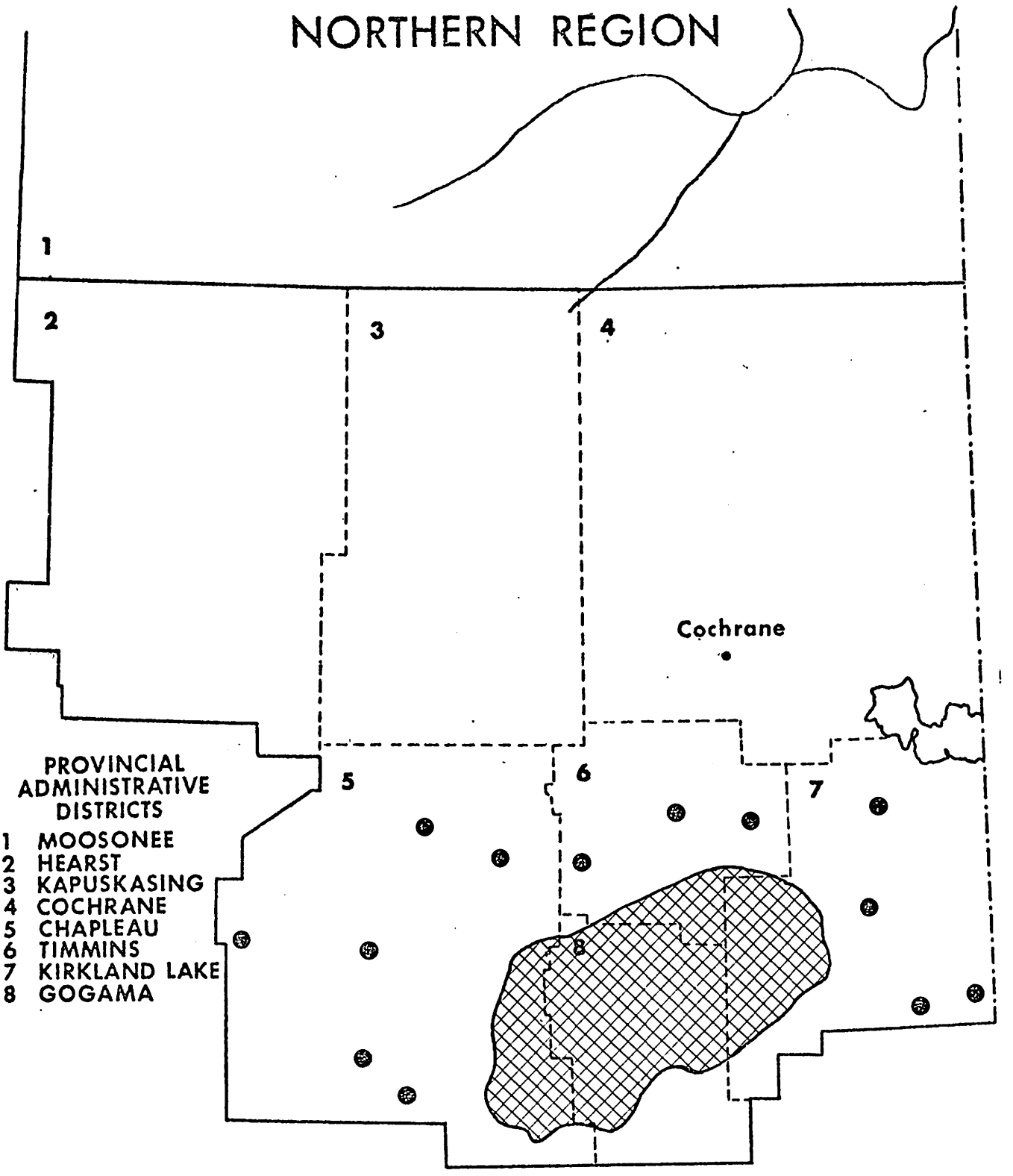

Fig. A1. FRUIT TREE LEAFROLLER

Areas within which moderate-to-severe defoliation of white birch occurred in 1977

or

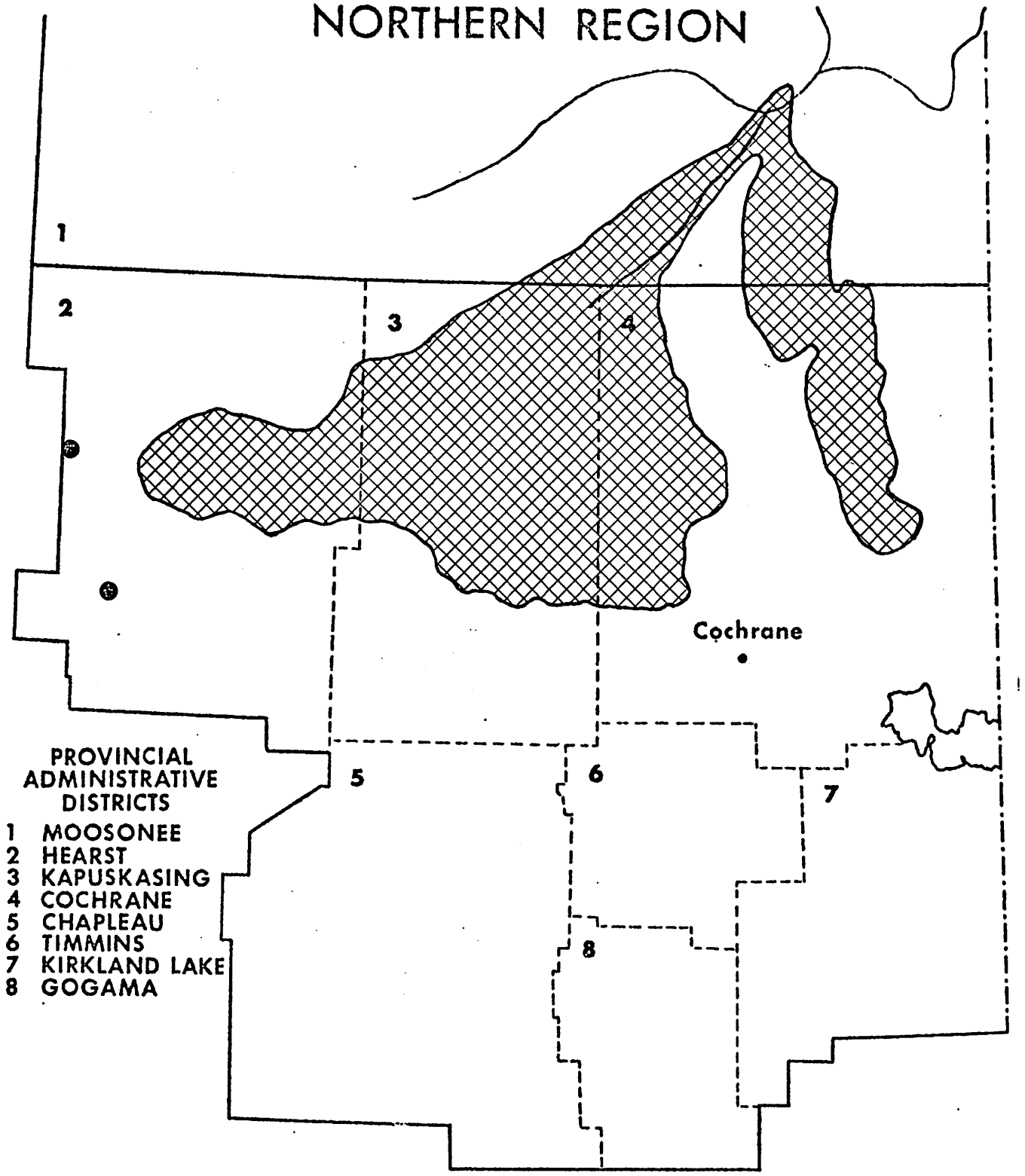

Fig. A2. FOREST TENT CATERPILLAR

Areas within which moderate-to-severe defoliation of trembling aspen occurred in 1977

or

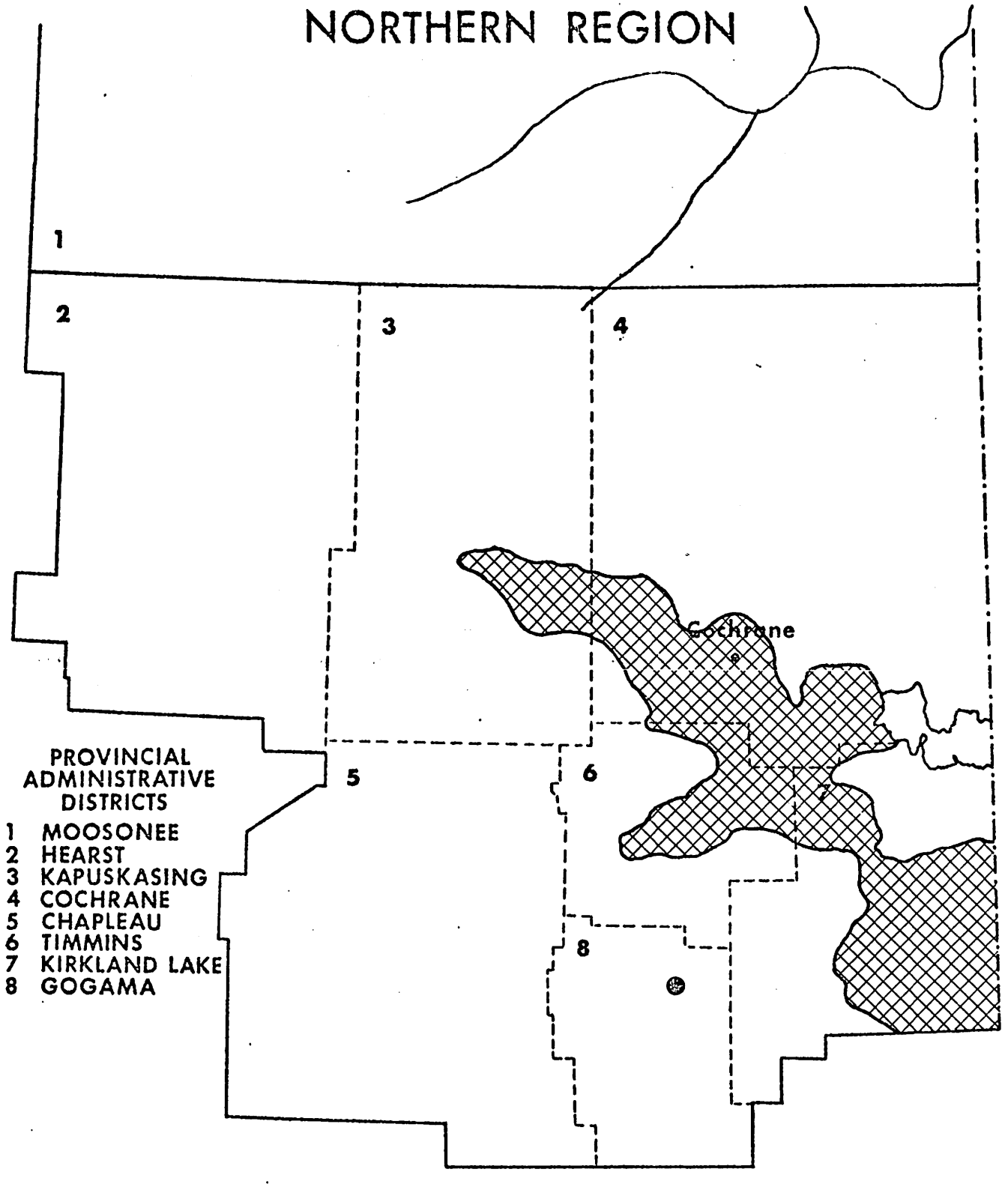

Fig. A3. ASPEN LEAFROLLER

Areas within which moderate-to-severe defoliation of trembling aspen occurred in 1977

or