Results of forest insect and disease surveys in the NORTHERN REGION of Ontario, 1978

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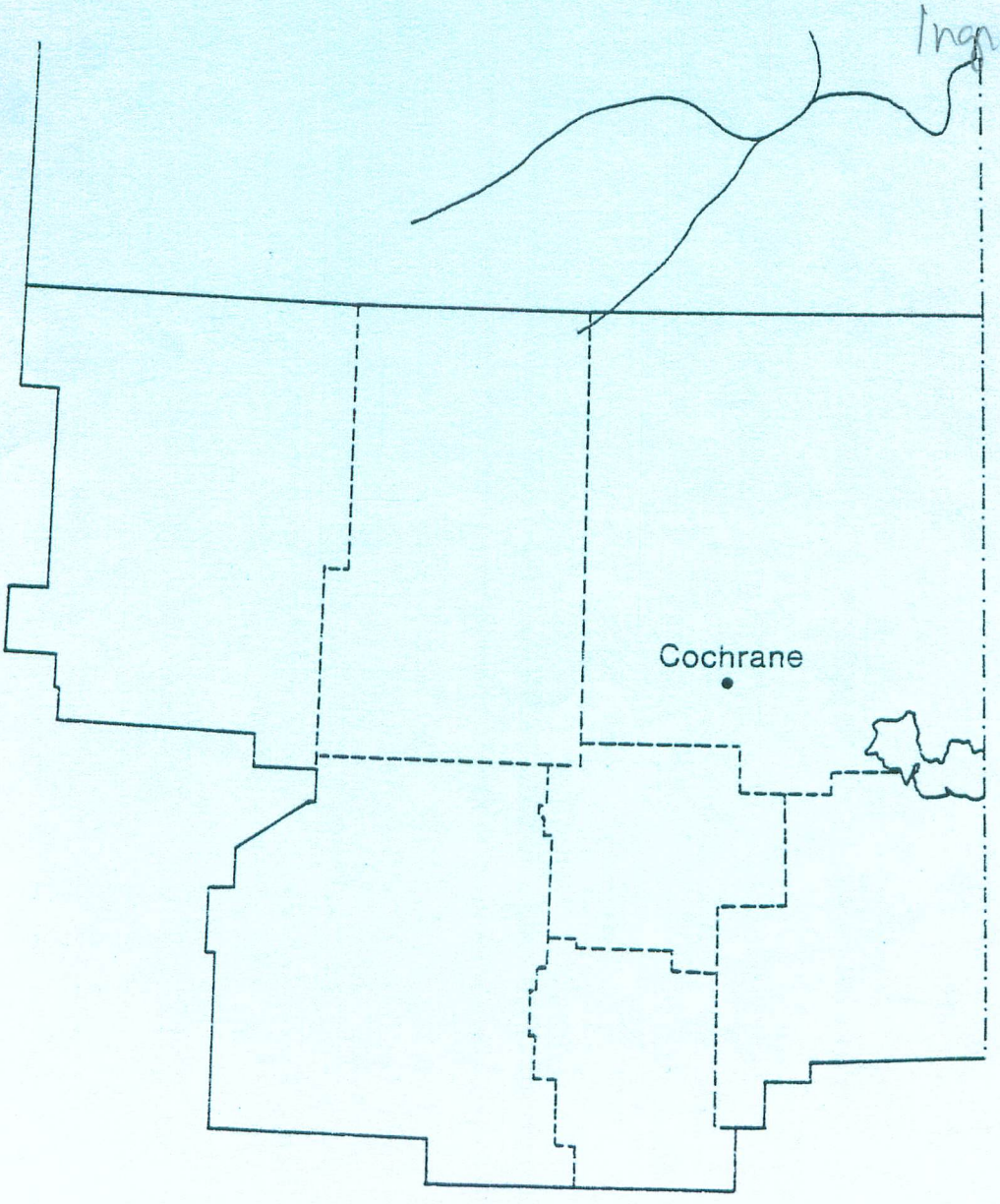

CARRIED OUT BY THE GREAT LAKES FOREST RESEARCH CENTRE IN CO-OPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

SURVEY HIGHLIGHTS

The severity of weather damage varied considerably but foliar discoloration and damage were evident to some degree in all districts in the Northern Region. Early spring weather in 1978 warmed gradually with no drastic extremes in temperature. In June, however, severe frosts, hail and freezing rain (see Frontispiece) caused appreciable foliar damage and population levels of the principal defoliators generally remained unaffected.

The spruce budworm infestation continued to expand and the northern boundary extended as far as the junction of the Missinaibi and Mattagami rivers in the Moosonee District. Heavy infestations are again forecast for 1979. Mortality of balsam fir increased markedly, particularly in the older parts of the outbreak.

Only minor changes in extent and intensity of the forest tent caterpillar infestation occurred in the northern districts of the Region and egg-band sampling indicates that severe defoliation will recur in 1979. Aspen leafroller damage abated appreciably and was mainly confined to the Timmins and Kirkland Lake districts.

Sawyer beetles caused heavy damage to mature jack pine stands in Chapleau, Gogama, and Cochrane districts and mortality of jack pine leaders by the eastern pineshoot borer was common in plantations in several districts.

Two extremely heavy infestations of adult flies prompted many inquiries in the Region. In late May and June huge flights of March flies, Bibionidae, blackened the shorelines of lakes in the southern part of the Kirkland Lake District. Later in July, the fly *Hydrotaea scambus* (Zett.) appeared in spectacular numbers in the Clute, Cochrane and Foleyet areas. Neither species affects forest trees.

In addition to normal surveillance for major diseases, a detailed survey of white spruce plantations was carried out. This was part of a province-wide survey to determine whether or not a chlorotic condition present in the North Central Region was general in other regions. Although some chlorotic trees were found the condition was not a major problem in the Region.

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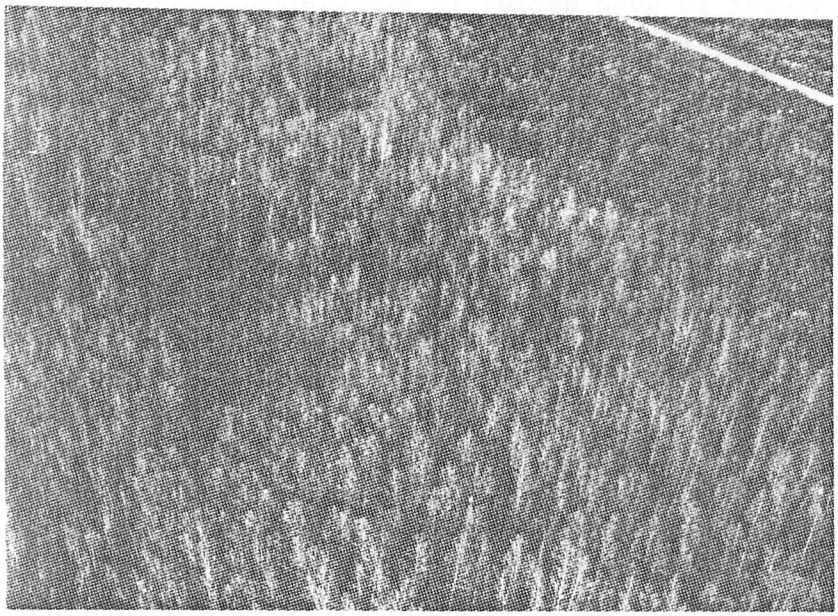
Frontispiece



Defoliation of trembling aspen caused by the forest tent caterpillar, *Malacosoma disstria* Hbn., in the Hearst area.

Sleet damage to conifers in early June in the Kapuskasing District.

INSECTS

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

Although the intensity of infestation of this insect declined considerably from the levels attained in 1977, light-to-moderate defoliation of white birch (*Betula papyrifera* Marsh.), red maple (*Acer rubrum* L.), trembling aspen (*Populus tremuloides* Michx.), cherry (*Prunus* sp.) and willow (*Salix* sp.) was general in most districts of the Region. Small pockets of white birch were again severely defoliated at many points in the western part of the Kirkland Lake District. Moderate damage to aspen foliage occurred in Dundonald Township, Cochrane District, to white birch foliage in the Ivanhoe-Foleyet area, and in Wadsworth Township, Chapleau District. Similar damage to white birch was observed along Highway 144 north of Gogama.

Poplar Leaf Beetle, *Chrysomela* sp.

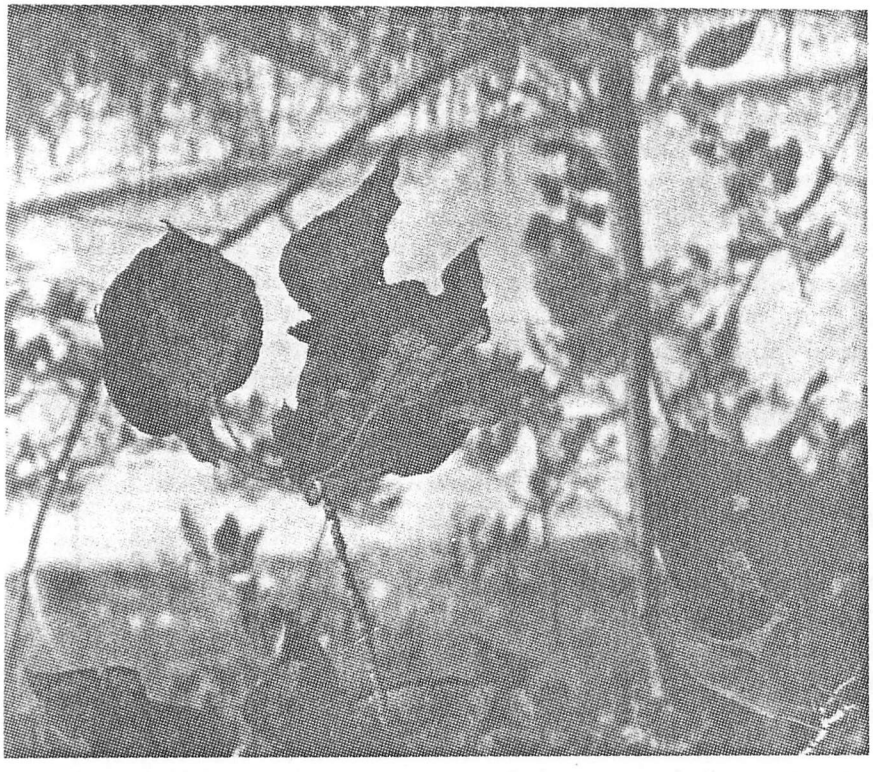
A marked increase in population levels of this leaf beetle was evident in several districts of the Region. The most severe damage occurred on balsam poplar (*Populus balsamifera* L.) in the Foleyet area and in Strathearn and Wadsworth townships, Chapleau District. Light-to-moderate defoliation was observed on regeneration at many points along the Chain of Lakes Road and in Parnell and Sankey townships, Kapuskasing District; and in Sewell, Keefer, Hillary and Denton townships in the Timmins District (see photograph).

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

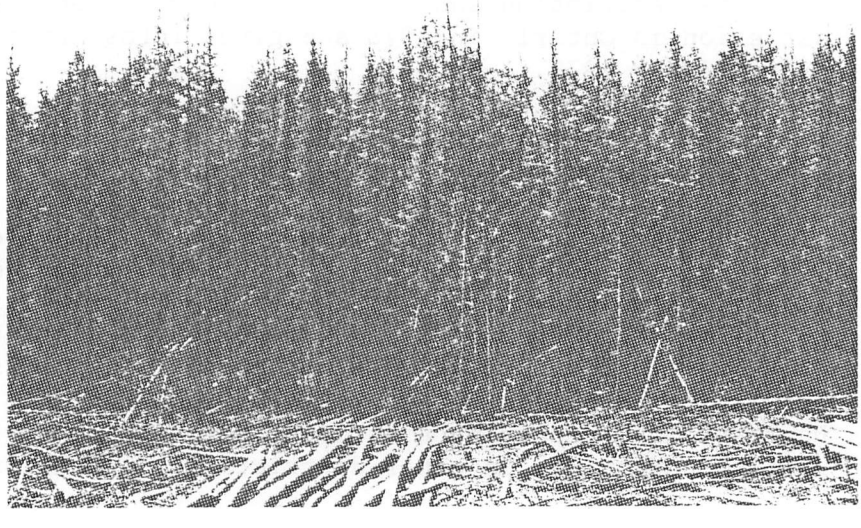
The results of damage surveys, population sampling, and egg-mass counts have been included with those of other regions in a special report by G.M. Howse et al. (Report O-X-300). This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1978 and gives infestation forecasts for the province for 1979.

Larch Casebearer, *Coleophora laricella* Hbn.

Records kept annually at a permanent sample point in Fauquier Township, Kapuskasing District, show that a high population of casebearers persisted there from 1971 to 1975. The infestation collapsed completely in 1976 and since then few casebearers have been found. In 1978 quantitative sampling at monitoring stations showed very low population levels in Cochrane and Hearst districts and all counts were negative in Kapuskasing District. Defoliation by this species was of little consequence in other districts of the Region.



Leaf skeletonizing of balsam poplar by leaf beetles, *Chrysomela* sp.



Damage to residual stand of jack pine by sawyer beetles, *Monochamus* sp., along cutover edge.

Jack Pine Tip Beetle, *Conophthorus banksianae* McPherson

High population levels of this beetle caused conspicuous damage in jack pine (*Pinus banksiana* Lamb.) plantations in the Timmins and Kirkland Lake districts. In one plantation in Thorneloe Township, Timmins District, 40% of the trees were infested with an average of 5 attacks per tree. Quantitative sampling in Kirkland Lake District showed that incidence of attack ranged from 8 to 15%. Similar damage was recorded in Opasatika Township, Kapuskasing District, and light damage was observed frequently through the range of jack pine in other districts of the Region.

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

High numbers of the coneworm were again present in almost all spruce sample locations in the Region. Apparently unaffected by the paucity of white spruce (*Picea glauca* [Moench] Voss) cones in 1978, the insect added substantially to the defoliation caused by the spruce budworm. Populations were particularly heavy in spruce stands in Reeves and Blamey townships, Chapleau District, in Sewell and Kenogaming townships, Timmins District, in the seed production area and tree nursery, Burt Township, Kirkland Lake District and at the Tree Improvement Centre, Fauquier Township, Kapuskasing District.

Poplar Gall Mite, *Eriophyes* sp.

Although populations declined appreciably in 1977 a general resurgence of this mite occurred in 1978. The dwarfed, shrunken foliage of infested trees was highly conspicuous through trembling aspen stands in several townships in the southeastern part of the Kirkland Lake District. Similar foliage damage was common through the districts of Kapuskasing, Hearst and Cochrane, particularly on aspen regeneration in stands which had been severely defoliated by the forest tent caterpillar.

Eastern Pineshoot Borer, *Eucosma gloriola* Heinr.

The eastern pineshoot borer was again present in varying numbers in most jack pine plantations examined throughout the districts of Chapleau, Gogama, Kirkland Lake and Timmins. Population levels were comparable with those of 1977 and the numbers of infested leaders ranged from 2% to 22% (Table 1). This is the third consecutive year of major damage in this part of the Region; few insects were observed prior to 1976.

Table 1. Summary of leader damage on jack pine by the eastern pineshoot borer in four districts in 1978 (counts based on the examination of 100 trees at each location).

Location (Twp)	Avg height (m)[a]	Leaders affected (%)	
		1977	1978
Chapleau District			
Dalmas	1.5	3	22
Murdock	3.0	4	4
Deans	2.7	9	4
Lloyd	2.7	5	2
Arbutus	2.4	21	20
Fawn	1.8	14	17
Muskego	1.7	2	2
Neelands	3.0	12	15
Gogama District			
Roblin	2.0	15	15
Noble	2.8	10	8
Benneweis	2.5	23	19
Jack	1.2	-	7
Kirkland Lake District			
Dunmore	1.8	21	19
Bowman	1.8	6	7
McEvay	2.1	8	9
Sharpe	2.1	12	7
Burt	1.8	-	9
Timmins District			
Timmins	2.1	3	6

[a] 1 m = 3.28 ft

Birch Leafminer, *Fenusa pusilla* (Lep.)

First-generation leafminers caused extensive and severe defoliation of white birch trees in urban, rural and forested areas through several districts. Successive defoliation has caused pronounced deterioration of larger trees and predisposed many to attack by borers, particularly in urban areas. Severe defoliation was common in Kirkland Lake and Timmins districts with heavy damage to ornamentals in Swastika, Larder Lake,

and Timmins and at numerous cottages on lakes through both districts. Heavy damage was also noted along Highway 681 from Hornepayne south through Larkin Township, Hearst District, and at the public beach in Cochrane. Light defoliation was common throughout the range of birch in other districts in the Region. Refoliation of severely defoliated trees was observed at several locations, a probable result of the abundant rainfall in 1978.

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

Damage by this beetle was common in aspen stands at numerous locations through the Region. Although severe defoliation was mainly confined to regeneration type stands, light defoliation occurred on 18 m (60 ft) aspen in Studholme Township, Hearst District. Moderate-to-severe damage was reported at many locations through Chapleau and Gogama districts where the beetle has been the principal defoliator of aspen in recent years. Similar defoliation occurred through the central and western parts of the Kirkland Lake District where defoliation often exceeded 90% on small trees. Smaller areas with varying degrees of defoliation were observed at several points in the Timmins District.

Aspen Leafblotch Miner, *Lithocolletis ontario* Free.

Light-to-moderate infestations of this leafminer were general through aspen stands in Chapleau, Gogama, Timmins and Kirkland Lake districts. In Beaton Township, Hearst District, approximately 75% of regeneration was affected and conspicuous discoloration resulted.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Minor fluctuations in the extent of the forest tent caterpillar infestation occurred in the northern part of the Region. Heavy frosts in early June contributed to a reduction of defoliation in the southern part of the Moosonee District and in the northern parts of Cochrane and Kapuskasing districts.

Moderate-to-severe defoliation extended from McMillan and Arnott townships in Hearst District northeast to Parr Township in the Moosonee District (Fig. 1). The southern boundary ran southeasterly to Little Township in the Timmins District, then north through Cochrane and up along the Yesterday River. Small pockets of defoliation occurred outside the main body of infestation in Hearst, Moosonee and Cochrane districts (see Frontispiece).

Large flights of adult moths were observed at many locations through Hearst, Kapuskasing and Cochrane districts; numerous adults were collected in a light trap operated at Remi Lake near the centre of the main infestation.

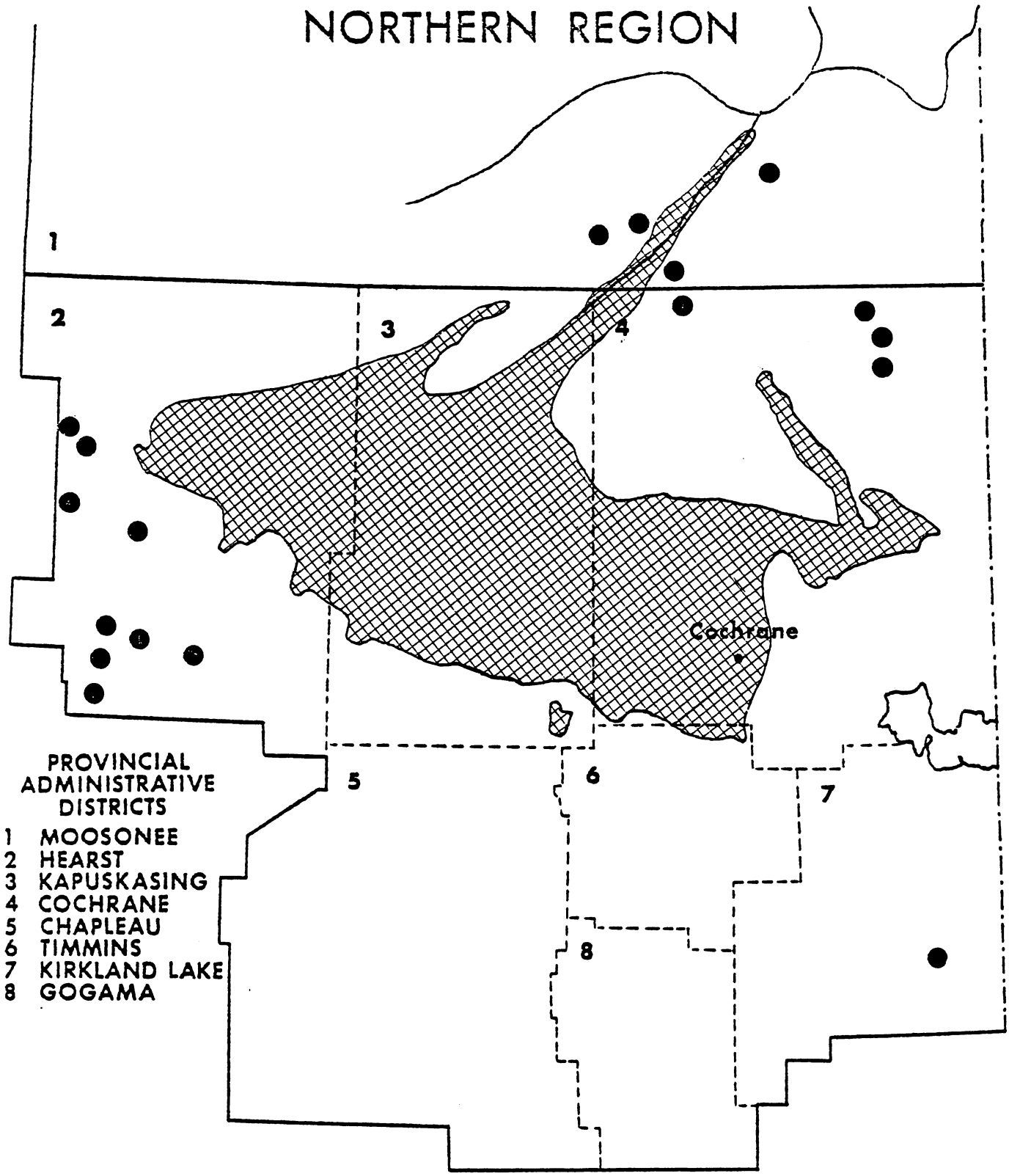


Fig. 1. FOREST TENT CATERPILLAR

Areas within which moderate-to-severe defoliation of trembling aspen occurred in 1978.

or ●

A small area of light-to-moderate infestation has persisted at Kap-Kig-Iwan Provincial Park, Kirkland Lake District for three years and will probably expand somewhat in 1979. A new area of severe defoliation is expected south of Lake Abitibi in Garrison Township (see Table 2). Egg-band counts made at 18 locations outside the main infestation suggest a potential for expansion southeast of Cochrane towards Lake Abitibi.

Sawyer Beetles, *Monochamus* spp.

Logs on storage dumps and accumulations of logging slash created ideal conditions for a buildup of sawyer beetle populations in several districts. Considerable branch and tree mortality resulted from adult feeding, particularly in jack pine and black spruce (*Picea mariana* [Mill.] B.S.P.) stands adjacent to these operations (see photograph).

Heaviest damage to mature jack pine occurred in stands bordering cutovers in Ogilvie and Invergarry townships, Gogama District, in Chappise Township, Chapleau District and in Freele Township, Cochrane District. In these areas almost total branch mortality occurred for up to a maximum of 5 metres (16 ft) around the perimeter of the stands. In Freele Township damage was heaviest in those stands facing east. Some branch mortality of black and white spruce (*P. glauca* [Moench] Voss) also occurred in the Tree Improvement Centre in Fauquier Township, Kapuskasing District, where thinning and topping operations were carried out.

In Ecclestone Township, Kapuskasing District, adult beetles seriously damaged black spruce seed trees left in clear-cut areas.

Sawyer beetle activity was general in spruce budworm-killed stands of balsam fir (*Abies balsamea* [L.] Mill.) at many points in the Region. This will probably increase as more dead fir becomes available, resulting in damage to living trees by adult feeding.

Redheaded Jack Pine Sawfly, *Neodiprion virginianus* complex

Following three years of relative abundance, population levels of this sawfly declined abruptly in 1978. Light defoliation occurred at one location in Garvey Township, Gogama District, but only scattered colonies were observed in other districts of the Region.

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

Heavy defoliation of white and black spruce plantations, snow hedges, ornamentals and open grown trees persisted in the southeastern part of the Region. Snow hedges along Highway 11 from Englehart to

Table 2. Summary of forest tent caterpillar egg-band counts on trembling aspen in five districts in 1978 and infestation forecasts for 1979.

Location (Twp)	Avg DBH of trees (cm)[a]	No. of trees sampled	Total no. of egg bands	Infestation forecast for 1979
Hearst District				
McCoig	13	3	1	light
Lowther	15	3	2	light
Kapuskasing District				
Abbott	27	3	1	light
Seaton	13	3	0	nil
Cochrane District				
Kennedy	14	3	27	heavy
Steele	14	3	3	light
St. John	18	2	14	moderate
Adair	14	3	0	nil
Laughton	16	1	18	heavy
Kirkland Lake District				
Evanturel	13	3	12	moderate
Garrison	18	1	36	heavy
Beatty	13	3	0	nil
Taylor	15	3	0	nil
German	13	3	0	nil
Kerns	15	3	2	light
Casey	13	3	1	light
Harley	13	3	3	light
Timmins District				
Little	15	3	0	nil

[a] 1 cm = 0.39 in.

New Liskeard, Kirkland Lake District, were heavily infested with the sawfly and considerable tree mortality occurred. Spruce windbreaks at the Swastika Forest Station were sprayed, preventing a recurrence of the severe defoliation experienced there in 1977. Moderate damage occurred in white spruce plantations in Sankey Township, Kapuskasing District, and in Calder Township, Cochrane District. Severe damage has resulted from repeated defoliation of white spruce plantations along Highway 11 near Driftwood, Cochrane District. Light damage occurred at many locations through the Chapleau, Gogama and Timmins districts, particularly on ornamentals in urban areas.

White Pine Weevil, *Pissodes strobi* (Peck)

This perennial pest of pine and spruce plantations was found in varying numbers throughout the Region. Leader damage ranged from 1 to 22% (Table 3).

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

A general decline in population levels of the larch sawfly was evident in 1978. One heavy infestation persisted in a 5-ha (12-acre) stand in McCoig Township, Hearst District, where defoliation reached 100%, but at all other locations only scattered colonies were observed and little defoliation resulted.

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

Little change in damage by this sawfly was noted in the Region. Severe defoliation of mountain ash (*Sorbus* spp.) was general in most districts, particularly in urban areas. Heavy damage occurred in Elgie Township, Hearst District, just south of Negagamisis Provincial Park and south of Kapuskasing along the Chain of Lakes Road. Second generation larvae were observed still feeding in mid-September.

Aspen Leafroller, *Pseudexentera oregonana* Wlshm.

A further decline in the intensity of this leafroller infestation was noted in the Cochrane, Timmins and Kirkland Lake districts. In the Cochrane District the infestation was confined to the area surrounding the south and east sides of Frederickhouse Lake. This infestation extended into the Timmins District west of Barber's Bay to the South Porcupine area (Fig. 2). Moderate defoliation persisted in the southeastern part of the Kirkland Lake District where large aspen stands lost approximately 50% of their foliage. Within these stands many individual trees were completely defoliated. Light-to-moderate damage also occurred in the Swastika-Larder Lake area and in several townships in the vicinity of Matheson.

Table 3. Summary of tree damage caused by the white pine weevil in seven districts in 1977 and 1978 (counts based on the examination of 100 trees at each location).

Location (Twp)	Host	Avg height (m)[a]	Trees weeviled (%)	
			1977	1978
Cochrane District				
Potter	wS	2.5	2	1
Calder	bS	2.5	4	8
Fournier	wS	1.5	-	1
Kapuskasing District				
Fauquier	wS	1.8	1	2
Cummings	wS	2.5	6	4
Fergus	wS	2.5	9	2
Sankey	wS	2.5	-	2
Hearst District				
Way	bS	2.0	9	3
Mead	bS	2.5	1	1
Lowther	bS	3.0	5	1
Timmins District				
Thorneloe	jP	2.7	5	6
Timmins	jP	2.1	3	12
Kirkland Lake District				
Burt	jP	1.8	14	13
Dunmore	jP	1.8	8	9
Bowman	jP	1.8	4	4
McEvay	jP	2.7	3	5
Evanturel	wP	1.8	18	22
Sharpe	jP	2.1	3	6
Gogama District				
Roblin	jP	2.0	0	1
Noble	jP	2.8	0	1
Benneweis	jP	2.5	4	4
Jack	jP	1.2	-	2
Chapleau District				
Dalmas	jP	1.5	5	2
Murdock	jP	3.0	1	1
Deans	jP	2.7	1	1
Lloyd	jP	2.7	2	0
Arbutus	jP	2.4	5	2
Fawn	jP	1.8	3	2
Muskego	jP	1.7	1	0
Neelands	jP	3.0	4	0

[a] 1 m = 3.28 ft

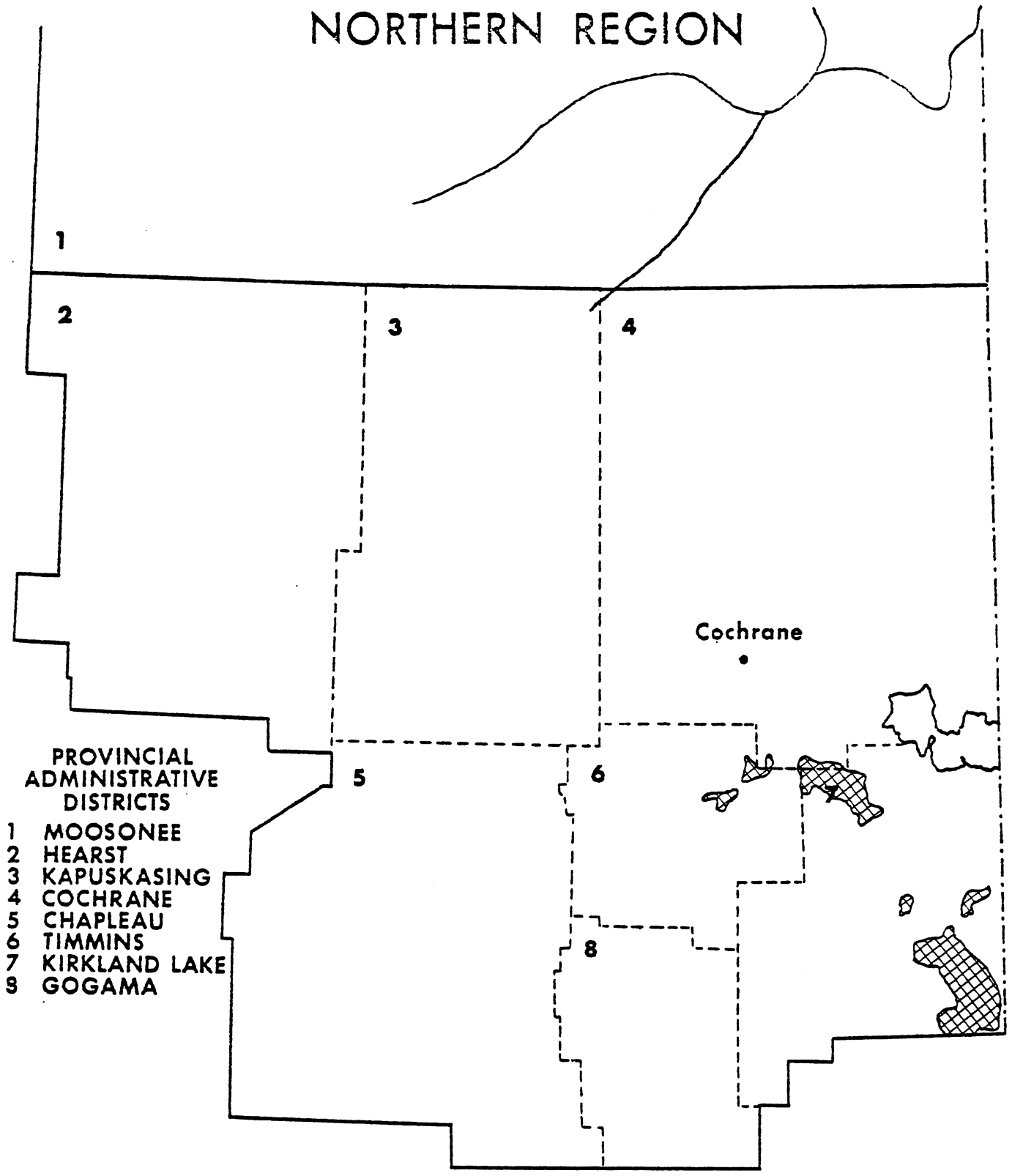


Fig. 2. ASPEN LEAFROLLER

Areas within which moderate-to-severe defoliation of trembling aspen occurred in 1978 . .

Table 4. Other Forest Insects.

Insect	Host(s)	Remarks
Acrobasis betulella Hlst. Birch tubemaker	wB	high numbers common; occasional trees heavily defoliated in Cochrane, Kapuskasing, Timmins, Kirkland Lake districts; generally light in Chapleau and Gogama districts
Altica ambiens alni Harr. Alder flea beetle	Al	severe defoliation in Strathearn Twp, Chapleau District
Aphrophora cribrata (Wlk.) Pine spittlebug	bF, jP, S	common through Region; high numbers in central part of Kirkland Lake District and in Sherlock Twp, Chapleau District
Archips cerasivoranus (Fitch) Uglynest caterpillar	eCh	numerous tents in Casey Twp, Kirkland Lake District
Bibionidae March flies	-	huge numbers on lake shores in southern part of Kirkland Lake District
Cecidomyia reeksi Vock. Jack pine resin midge	jP	light-to-moderate twig damage at many points in Kirkland Lake and Timmins districts
Cenopis acerivorana Mack. Maple leafroller	M	very low numbers through Gogama and Chapleau districts
Choristoneura conflictana Wlk. Large aspen tortrix	tA	contributed substantially to aspen defoliation by several species of leafrollers; heavy defoliation in Colquhoun Twp, Cochrane District
Choristoneura rosaceana Harr. Obliquebanded leaf roller	deciduous	widespread incidence through Region, often associated with other leaf rollers
Chrysomela mainensis mainensis Bech. Alder leaf beetle	Al	moderate defoliation in Windego Twp, Chapleau District

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
Cinara sp.	jP, wS	heavily infested trees in young plantations in Dalmas, Esther, Fawn, Genier, Manning, Chapleau, Edith and Dupuis twp, Chapleau District
Corythucha elegans Drake Willow-and-poplar lace bug	W	extensive damage to some species of willow in Chapleau and Gogama districts
Enargia decolor Wlk. Aspen twinleaf tier	tA	very common through Timmins, Kirkland Lake and Chapleau districts
Erannis tiliaria Harr. Linden looper	deciduous	low numbers through southern part of Chapleau District
Eupareophora parca (Cress.) Spiny ash sawfly	bAs	lightly defoliated stands common in Timmins and Kirkland Lake districts
Halisidota maculata Harr. Spotted tussock moth	deciduous	light defoliation of several species near Chapleau
Hydrotaea scambus (Zett.)		huge numbers of these flies (Family: Muscidae) in the Clute-Cochrane and Foleyet areas
Hylobius sp.	scP, bS	mortality attributed to this species in Magladery Twp, Kapuskasing District, and in Fournier and Colquhoun twp, Cochrane District
Lecanium sp. Scale	moM	High numbers caused twig mortality at Deynes Lake, Chapleau District.
Malacosoma californicum pluviale Dyar Western tent caterpillar	deciduous	widely distributed through the Region, particularly in Chapleau, Gogama and Kirkland Lake districts

(continued)

Table 4. Other forest insects (continued).

Insect	Host(s)	Remarks
Mindarus abietinus Koch. Balsam twig aphid	wS	common in plantations in Chapleau District and at the Chapleau tree nursery
Nematus limbatus Cress. Willow sawfly	W	severe defoliation in Chapleau and Shearer twp, Kapuskasing District
Neodiprion nanulus nanulus Schedl Red pine sawfly	rP	a few colonies at Biscotasing, Chapleau District
Neurotoma inconspicua (Nort.) Plum webspinning sawfly	pCh	numerous tents in the Foleyet area, Chapleau District
Petrova albicapitana (Busck.) Pitch nodule moth	jP	common in regeneration stands and plantations; some branch mortality at several points
Phratora purpurea purpurea Brown Aspen leaf beetle	tA	high incidence through Chapleau, Timmins and Kirkland Lake districts; moderate damage at Five Mile Park, Chapleau District
Pineus similis Gill Ragged spruce gall aphid	wS	common in plantations through Hearst and Kapuskasing districts
Pissodes approximatus Hopk. Northern pine weevil	wS	high numbers in dead tops of trees in plantation, Clute Twp, Cochrane District. Original damage was caused by sawflies.
Pityokteines sparsus Lec. Balsam fir bark beetle	bF	varying population levels observed in many stands recently killed by spruce budworm infestations

(continued)

Table 4. Other forest insects (concluded).

Insect	Host(s)	Remarks
Profenusa thomsoni (Konow) Ambermarked birch leafminer	wB	light mining general at many points in Timmins, Kapuskasing, Chapleau and Kirkland Lake districts
Rhyacionia sonia Miller Yellow jack pine shoot borer	jP	appreciable shoot mortality in plantations and regeneration at many points in Timmins and Kirkland Lake districts
Rhychaenus pallidior (Leng) Alder leafmining weevil	wB, Al	low numbers in Fournier and Colquhoun twp, Cochrane District
Syneta sp.	jP	Adult beetles caused extensive damage to outplanted tubelings in Bompas Twp, Kirkland Lake District.
Tetralopha aplastella Hlst. Aspen webworm	tA	very common through the southern part of the Region; light defoliation at numerous locations
Toumeyella numismaticum (P. & M.) Pine tortoise scale	jP	single and small groups of trees heavily infested; occasional tree mortality
Zelleria haimbachi Busck Pine needle sheathminer	jP	a pronounced decline in populations compared with recent years in the Kirkland Lake and Timmins districts

TREE DISEASES

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

The only district of the Region with any appreciable amounts of elm (*Ulmus* spp.), the host tree, is the Kirkland Lake District where extensive mortality caused by Dutch elm disease continues in the southern and central areas. However, no significant range extension occurred in 1978.

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

Although of widespread occurrence, foliar damage caused by these spruce foliage rusts remained relatively low in 1978. Areas where the defoliation level did reach the light-to-moderate category were few and usually involved only small pockets of such damage (Table 5). In addition to these, one area of ornamental blue spruce (*Picea pungens* Engelm.) in the urban area of Cochrane was heavily damaged.

Table 5. Summary of spruce needle rust appraisals at five locations in 1978.

Location (Twp)	Host	Area affected (ha)[a]	Defoliation level (%)	Trees affected (%)
Kapuskasing District				
McCrea	wS	10	30	8
Hearst District				
Lowther	bS	100	2	5
Cochrane District				
Adanac	wS	10	18	15
Fournier	wS	5	19	24
Calder	wS	14	8	5

[a] 1 ha = 2.47 acres

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

Incidence of this foliage disease of aspen increased dramatically in 1978. Occurrence was widespread throughout the Region; however, seriously damaged areas were sporadic. Defoliation levels varied considerably through the seven districts where the disease was present with the heaviest levels being recorded in the Chapleau and Gogama districts (Table 6). Large areas of the brown foliage caused by the ink spot were aerially detected at three inaccessible locations. Data for these stands, two in the Hearst District and one in the Chapleau District, are rated as moderately defoliated with a high percentage of trees affected (Table 6).

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

This needle rust was fairly common in the Region, particularly at the northern extremity of the jack pine range. Both artificial and natural regeneration were affected but in all situations current infection was restricted to the lower portion of the host tree. Heaviest damage occurred in Sargeant Township, Cochrane District, where defoliation averaged 18%. Light defoliation was recorded in Hermon Township, Kapuskasing District, and in Larkin Township, Hearst District. In other parts of the Region foliar damage was light or absent.

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

This disease of aspen regeneration was again present through much of the Region. Foliar damage was usually light. When present, however, the disease usually kills the leading terminal; thus most of the affected trees (Table 7) suffered height reduction.

Frost

For the second consecutive year late frosts were recorded at numerous locations in early June throughout the Region. The resultant injury was manifested in the new growth of the coniferous tree species which displayed a sudden curling and reddening of the new shoots. The most serious damage occurred in juvenile plantations of white spruce where the unseasonably cold temperatures had a marked effect on the current year's tree development (Table 8). Balsam fir was also highly susceptible to the frost. Small trees in low lying areas and on exposed sites suffered the heaviest damage. Of the hardwoods, black ash (*Fraxinus nigra* Marsh.) was the species most commonly affected, particularly in the Timmins and Kirkland Lake districts. Symptoms were shrivelled and blackened foliage; however, in many instances the affected trees refoliated later in the season.

Table 6. Summary of ink spot of aspen evaluations in seven districts in 1978.

Location (Twp)	Area affected (ha)[a]	Trees affected (%)	Defoliation level (%)
Timmins District			
Shaw	2	50	5
Kirkland Lake District			
Eby	1	20	4
Marriott	2	5	1
Ossian	2	10	2
McVittie	1	10	2
Gross	2	10	10
Chapleau District			
Lloyd	1	100	30
Lerwick	5	60	5
Keith	10	20	8
Caouette	2	100	40
Strom	2	100	30
Reeves	100+	high	moderate
Gogama District			
Champagne	1	10	40
Churchill	1	65	10
Noble	15	30	4
Cochrane District			
Fournier	10	5	5
Hearst District			
Lowther	20	20	3
Larkin	200	80	10
Beaton	7	80	2
Bayfield	100+	high	moderate
Lascelles	100+	high	moderate
Kapuskasing District			
Swanson	10	25	6
Lisgar	100	40	3
Bourinot	5	25	4
Fauquier	4	20	2

[a] 1 ha = 2.47 acres

Table 7. Leaf and twig blight evaluations in trembling aspen stands in five districts in 1978.

Location (Twp)	Area affected (ha)[a]	Tree ht (m)[b]	Trees affected (%)	Defoliation (%)
Chapleau District				
Foleyet	5	2.7	80	8
Keith	10	3.0	40	5
Edith	10	2.7	30	2
Gogama District				
Jack	10	2.0	20	2
Hearst District				
Arnott	100	2.0	62	15
Gourlay	100	1.8	15	5
Kirkland Lake District				
Gross	100	1.8	70	10
Playfair	2	2.7	25	10
Ossian	10	1.8	100	75
Davidson	5	1.8	50	25
Timmins District				
Robb	4	2.1	100	10
Little	10	1.8	100	60
Evelyn	30	1.8	100	75

[a] 1 ha = 2.47 acres

[b] 1 m = 3.28 ft

Table 8. Summary of frost damage evaluations of white spruce in six districts in 1978.

Location (Twp)	Tree ht (m)[a]	Area affected (ha)[b]	Trees affected (%)	Defoliation (%)
Chapleau District				
Muskego	0.4	20	67	10
Manning	1.1	185	85	13
Oates	0.9	240	80	15
Busby	0.8	250	95	12
Lerwick	1.3	25	80	5
Carew	0.7	25	45	5
Cochrane District				
Calder	1.4	14	100	53
Fournier	1.0	5	100	20
Gogama District				
Noble	1.1	233	98	20
Benneweis	0.7	40	83	15
Kapuskasing District				
Fauquier	3.9	3	30	6
McCrea	2.5	2	2	12
Teetzel	2.0	5	100	84
Kirkland Lake District				
Stock	2.1	1	75	25
Burt	2.4	112	100	50
Timmins District				
Little	1.0	4	70	50

[a] 1 m = 3.28 ft

[b] 1 ha = 2.47 acres

Spruce Chlorosis

In 1977 two plantations north of Nipigon near Limestone Lake of the North Central Region developed a condition known as "spruce chlorosis". Affected trees showed reduced growth, particularly of terminal portions, and had chlorotic foliage ranging from faded green to yellow. On the other hand, unaffected trees, both planted and natural, had normal growth and a healthy green color. At the present time the cause of the condition has not been defined, but tree reaction to the drought condition of 1975 and 1976, mineral deficiencies and Armillaria root rot (*Armillaria mellea* [Vahl ex Fr.] Kummer) are considered to be contributing factors.

Surveys for similar conditions in the Northern Region this past summer proved negative. Six of the eleven plantations examined did show some form of chlorosis; however, in these situations the chlorosis was not typical of the condition described above. Several of these locations were re-visited by Great Lakes Forest Research Centre pathologists (Drs. H.L. Gross and R.D. Whitney) in early September and the consensus was that a great deal of the chlorosis was due to Armillaria root rot and was not like the Limestone Lake condition.

Higher levels of chlorosis were recorded in the districts of Gogama, Chapleau and Hearst. The largest number of chlorotic trees in Carew Township, Chapleau District, and in Benneweis Township, Gogama District (Table 9) were on dry, exposed sites and the condition was not general throughout the plantations. Similarly in Lowther Township, Hearst District, the chlorotic trees were confined to a low area of the plantation and did not reflect the general condition of the entire plantation.

In all plantations sampled, spruce budworm and frost damage were by far the most destructive agents. White pine weevil, yellowheaded spruce sawfly and needle rusts also caused damage but to a lesser degree.

Winter Drying

Extensive damage by this abiotic condition was evident in the spring and early summer over much of the Region. Most serious damage ensued in the southern districts (Table 10). The foliar damage in more northerly points was of a less destructive nature. The most severely affected species was pine. White pine (*Pinus strobus* L.) and red pine (*Pinus resinosa* Ait.) were the hardest hit with jack pine being slightly more resistant to winter-kill. Eastern white cedar (*Thuja occidentalis* L.) also sustained injury in varying degrees but the browning was most noticeable on exposed sites such as along lake shores.

Table 9. Summary of the chlorotic spruce survey in the Northern Region in 1978.

Location (Twp)	Tree ht (m)[a]	Degree of Chlorosis		
		Faded green (%)	Yellow (%)	Dead (%)
Chapleau District				
Manning[b]	1.1	24.7	1.3	0.7
Oates	0.9	0	0	0
Lerwick[b]	1.3	12.1	0	0
Carew	0.7	12.0	6.7	0.7
Gogama District				
Noble[b]	1.1	20.7	1.3	0
Benneweis[b]	0.7	16.7	5.3	0
Kapuskasing District				
Fauquier	3.9	0	0	0
McCrea[b]	6.0	18.0	8.7	0
Cochrane District				
Calder	1.4	3.0	1.3	0
Fournier	1.0	0.7	0	0
Timmins District				
Little	1.0	0	0	0

[a] 1 m = 3.28 ft

[b] denotes presence of *Armillaria mellea*

Table 10. Summary of winter drying evaluations at fourteen locations in 1978.

Location (Twp)	Host	Area affected (ha)[a]	Trees affected (%)	Defoliation level (%)
Chapleau District				
Dalmas	jP	60	62	18
Cull	jP	100	55	15
Kalen	jP	20	50	10
Genier	jP	75	55	15
Esther	jP	20	10	15
Gogama District				
Benneweis	jP	30	20	15
Timmins District				
German	rP	3	100	30
Kirkland Lake District				
Arnold	jP	5	85	25
Beauchamp	wP	15	75	30
Gross	jP	5	75	20
Nordica	wP	10	50	10
Cane	jP	25	100	10
Morrisette	jP	5	100	10
McEvay	jP	10	100	10

[a] 1 ha = 2.47 acres

Hail Damage

A hailstorm in the Hearst-Kapuskasing area in the winter of 1977-78 resulted in two large strips of hail damage on conifer foliage in the area. Near Kapuskasing a small area in Torrance Township suffered damage but the extent of the damage was hard to discern in the cut-over areas. Around Calstock, Hearst District, the damage could be easily followed across Studholme, Stoddart, Irish, Way and Shetland townships before it was masked by the heavy cut-over area around Jogues. Branch ends were dead up to 46 cm in length. These flags on the trees made the damage appear quite heavy when detected during aerial reconnaissance later in the summer.

The hailstorm travelled in a direction of south 46° east, damaging all but the southeast side of the affected trees; the strip varied from

1/2 mile to 1 mile wide at spots. Incidence of damage over all affected species was 8% largely because the black spruce was virtually unaffected. Species most affected were white spruce 66%, white cedar 92% and balsam fir 100%.

Table 11. Other forest diseases.

Organism	Host(s)	Remarks
Arceuthobium pusillum Pk. Eastern dwarf mistletoe	bS	moderate number of brooms in a low-lying stand, Osway Twp, Chapleau District
Armillaria mellea (Vahl ex Fr.) Kummer Shoestring root rot	wS, bS	common occurrence in white spruce plantations and also present in the plus-tree black spruce stand, Birch Twp, Chapleau District
Cronartium coleosporioides Arth. Stalactiform rust canker	jP	branch infection common in Panet Twp, Chapleau District, and in Benneweis Twp, Gogama District; stem cankers present at Swastika Forest Station, Kirkland Lake District
Cronartium ribicola J.C. Fisch. White pine blister rust	wP	eleven percent of hedgerow affected near Compartment 21 in the Tree Improvement Centre, Kapuskasing District
Davisomycella ampla (J.J. Davis) Darker Needle cast of jack pine	jP	foliar damage high in Little Twp, Timmins District
Endocronartium harknessii (J.P. Moore) Y. Hiratsuka Globose gall rust	jP	common incidence in plantations at locations in Thorneloe Twp, Timmins District, and in Harmon Twp, Kapuskasing District
Gremmeniella abietina (Lagerb.) Morelet Scleroderris disease	rP	newly affected areas were located in Wakami Park, Chapleau District and in Invergarry Twp, Gogama District

(continued)

Table 11. Other forest diseases (continued).

Organism	Host(s)	Remarks
Isthmiella crepidiformis (Darker) Darker Needle cast of spruce	bS	prevalent in most stands in the Timmins and Kirkland Lake districts
Leptostroma sp. Needle cast	jP	heavy foliage damage in Evelyn and Thorneloe twp, Timmins District, and in Munro Twp, Kirkland Lake District
Melampsora medusae Thuem. Needle rust	tA, tL	light-to-moderate infections on aspen at many points in the southern part of the Kirkland Lake District and at one location in the Chapleau District; trace levels on larch
Melampsora sp.	W	common in many areas of the Region; particularly heavy in cut-over stands, Holloway Twp, Kirkland Lake District
Phacidium abietis (Dearn.) Reid & Cain Snow blight of balsam fir	bF	many locations of recurring damage in the Chapleau District
Polyporus tomentosus Fr. Red root and butt rot	bS	approximately 20% of trees affected in the plus-tree black spruce stand, Birch Twp, Chapleau District
Pucciniastrum epilobii Otth Fir needle rust	bF	trace amounts observed in the Chapleau District
Septoria populicola Pk. Septoria leaf spot	bPo	pockets of heavy infection in the Shillington-Val Gagne-Matheson area of the Kirkland Lake District and in Shannon Twp, Hearst District
Sirococcus strobilinus Preuss Shoot blight	rP	Damage remains confined to one small pocket in Hutcheon Twp, Chapleau District.

(continued)

Table 11. Other forest diseases (concluded)

Organism	Host(s)	Remarks
Venturia populina (Vuill.) Fabric. Leaf and twig blight of poplar	bPo	common throughout the Region in low amounts; heaviest in Shannon Twp, Hearst District
Herbicide damage	jP	heavy damage along Hwy 807, Cochrane District, and along Hwy 631, Hearst District
Salt damage	jP	heavy mortality along Hwy 11 near Porquis Jct, Clergue Twp, Cochrane District

The following diseases had no important change in status in 1978.

Chrysomyxa arctostaphyli Diet. - Spruce broom rust
Cronartium comandrae Pk. - Comandra blister rust
Cronartium comptoniae Arth. - Sweet-fern blister rust
Hypoxylon mammatum (Wahl.) J.H. Miller - Stem canker of aspen
Melampsorella caryophyllacearum Schroet. - Fir broom rust