Results of forest insect and disease surveys in the ALGONQUIN REGION of Ontario, 1981

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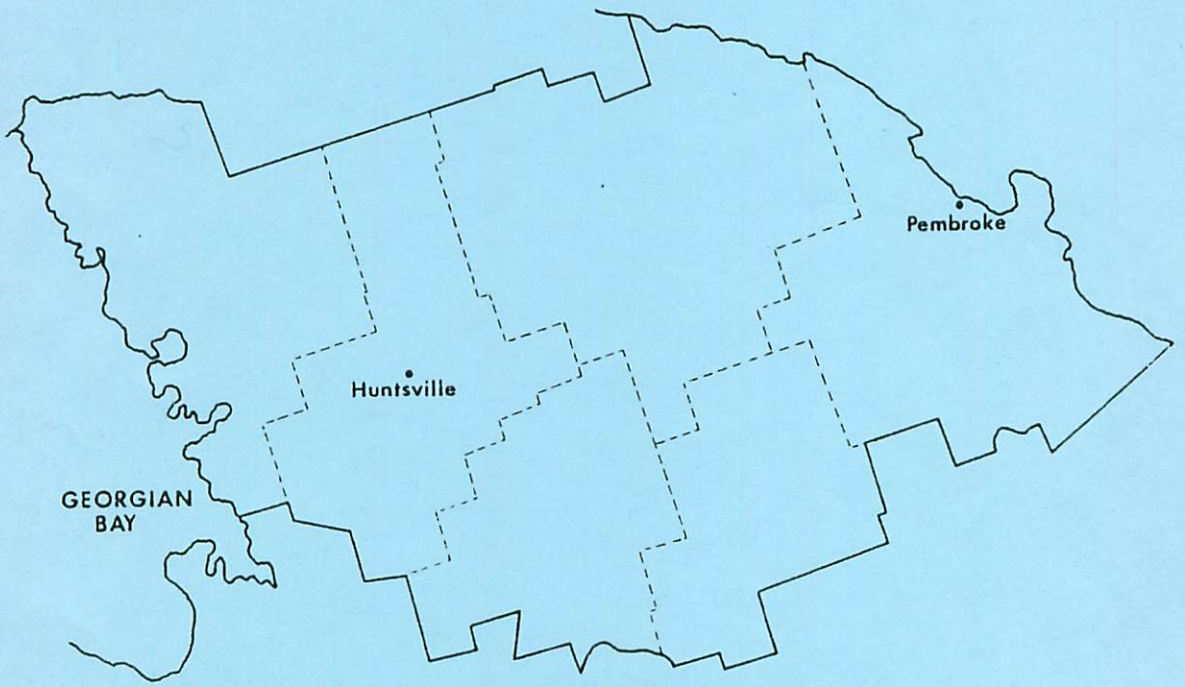


CARRIED OUT BY THE GREAT LAKES FOREST RESEARCH CENTRE IN CO-OPERATION WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

SURVEY HIGHLIGHTS

The following is a comprehensive report on insect and disease conditions in the Algonquin Region in 1981.

A change in staff occurred in the Region with Mr. H. Brodersen replacing Mr. H. J. Evans who was transferred. Mr. Brodersen is responsible for survey work in Algonquin Park, Bancroft and Pembroke districts.

Spruce budworm emergence this year was about 2 weeks earlier than in 1980; it began on or before 23 April. Budworm populations generally declined in the eastern districts, but pockets of severe defoliation persisted in the western and northern portions. A virus spray program, to combat the redheaded pine sawfly, was repeated by the Ontario Ministry of Natural Resources (OMNR) and the Forest Pest Management Institute (FPMI) of the Canadian Forestry Service. Many hardwood defoliators increased in numbers, especially the redhumped oakworm and poplar flea beetle. Oak leaf shredder damage remained low. Damage to larch stands by the larch casebearer declined, as did pine false webworm populations. Cedar leafminers increased in the Minden District but declined elsewhere.

An aerial and ground survey for the European race of Scleroderris canker again proved negative. Sugar maple stands surveyed in the Parry Sound and Bracebridge districts showed no incidence of sapstreak disease. A total of 12 white spruce plantations across the Region were examined for the presence and impact of insects and diseases and the impact of pests on white spruce flower and cone production was also determined.

The format of the Table of Contents has been altered slightly this year to simplify the rating scheme for both insects and diseases. Generally speaking, major insects and diseases are those previously listed in categories A and B, and minor insects and diseases are those previously listed in Category C.

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Other Forest Insects/Diseases (Tables)

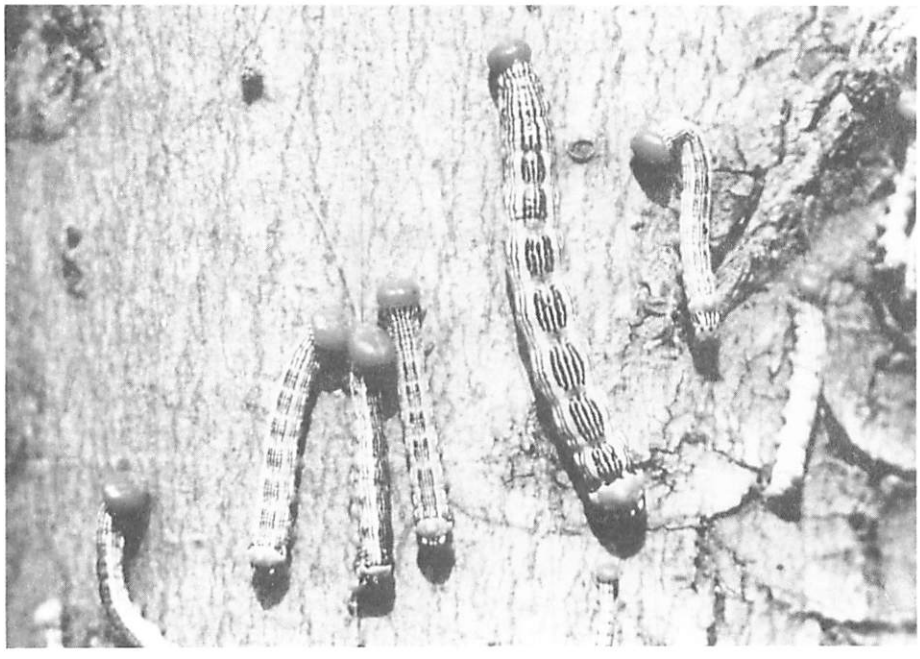
These tables provide information on two types of pest: 1) those which are of minor importance and have not been known to cause serious damage to forest trees, and 2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1981.

The authors wish to thank OMNR personnel and private individuals for their assistance and cooperation during the field season.

H. J. Weir

H. Brodersen

Frontispiece



Larvae of the redhumped oakworm (*Symmerista canicosta* Francl.)

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INSECTS

Major Insects

Pine False Webworm, *Acantholyda erythrocephala* (Linn.)

Populations varied considerably in most plantations surveyed throughout the Region. In the Minden District light defoliation was observed on 3 m red pine (*Pinus resinosa* Ait.) trees in a 5 ha plantation in Somerville Township. Colony counts in Burleigh Township, Bancroft District declined from 94% of the trees infested in 1980 to a few trees in 1981. In Wollaston Township, Bancroft District, 80% of the trees were infested in a 2 ha red pine plantation, although defoliation remained low. A hedgerow of 1.5 m red pine in Faraday Township, Bancroft District had high populations for the second consecutive year. Trace damage was observed in several other plantations throughout the Region.

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. canadensis* Free., *A. thuiella* Pack., and *Pulicalvaria thujaella* (Kft.)

There was a slight population increase in the southern part of Minden District and a further decline in the southern townships of Bancroft District and in the Cobden-Renfrew area of Pembroke District.

Continued severe browning of eastern white cedar (*Thuja occidentalis* L.) was observed in approximately 50,000 ha in the southern part of Carden, Laxton, Somerville and Galway townships, and in most of Harvey Township, Minden District. A slight increase in branch tip and complete-tree mortality in a 3 ha woodlot in Harvey Township was reported in 1980. As in previous years, *A. thuiella* was the species most commonly found.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts will be included with those of other Regions in a special report to be published later this year. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1981 and will give infestation forecasts for the province for 1982.

Larch Casebearer, *Coleophora laricella* (Hbn.)

There was an almost complete collapse of infestations throughout the Region in 1981. In 1980, pockets of tamarack (*Larix laricina* [Du Roi] K. Koch) were severely defoliated in Bracebridge, Minden and Parry Sound districts. In 1981, tree mortality was observed where defoliation had occurred in 1980. In Perry and Stisted townships, Bracebridge District, 13 trees 21 m high and 11 trees 17 m high, respectively, were killed. Trace infestations were observed at a few scattered locations in the remainder of the Region.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

High populations continued in the Bracebridge District. Lower populations were observed in Parry Sound and Bancroft districts.

In Watt Township, Bracebridge District, of 150 trees examined in a 3 ha white pine (*Pinus strobus* L.) plantation, 200 laterals on 135 trees were attacked but only 10 leaders were infested. In Macaulay Township examination of 150 red pine trees in a 1 ha plantation revealed that 161 laterals and one leader of 114 trees were infested. Low populations were observed elsewhere in the Region. Usually only lateral shoots are attacked and consequently there is little effect on tree growth.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Throughout the Region damage levels remained relatively unchanged from those of the previous year. Severe browning of white birch (*Betula papyrifera* Marsh.) persisted along Highway 11 between Bracebridge and Sundridge for the fourth consecutive year. Moderate browning was noted in Glamorgan Township, Minden District. In the Pembroke and Bancroft districts heavily infested trees were found at many widely scattered locations. Infestations were restricted mainly to open-growing regeneration in the 2-6 m height class. Light browning was observed in Canisbay and Stratton townships, Algonquin Park District and at numerous other locations in the Region.

Fall Webworm, *Hyphantria cunea* (Dru.)

Population levels of this pest varied considerably throughout the Region. Numbers of unsightly feeding nests increased to high levels on a variety of deciduous hosts across most of the southern part of the Minden District. In Pembroke District, trace levels were found on semi-mature black ash (*Fraxinus nigra* Marsh.) in Buchanan, Petawawa and Wilberforce townships. As feeding injury normally occurs late in the growing season and usually on fringe trees, this insect is not considered a serious pest except when it attacks orchard and shade trees.

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)

Light defoliation of sugar maple (*Acer saccharum* Marsh.) was observed in Ridout, Bethune, Proudfoot, Sinclair and Franklin townships in the eastern part of the Bracebridge District. This is the first time the insect has been reported in this area since a heavy infestation was recorded in 1968 and 1969. Some tree mortality and decline were attributed to this previous infestation.

Balsam Fir Sawfly, *Neodiprion abietis* complex

The districts of Algonquin, Pembroke and Bancroft experienced a marked decline in populations of this sawfly from the previous year. A few pockets of semimature balsam fir (*Abies balsamea* [L.] Mill.) suffered trace-to-low foliar damage in Wilberforce Township, Pembroke District.

Historically, populations have fluctuated considerably over the past 30 years with the exception of 1967 through 1973. During this period populations remained high in the southeastern part of the Pembroke District; as a consequence, there was crown damage and some tree mortality of white spruce (*Picea glauca* [Moench] Voss) throughout the Bonnechere Valley.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Populations declined in most of the Region, but moderate infestations persisted in Joly, McLean and Macaulay townships, Bracebridge District (Table 1). In 1980, a total of 96 plantations throughout the Region comprising 539.8 ha of planted red pine were treated by ground and aerial application of a nuclear polyhedrosis virus, and in some cases a mixture of virus and malathion. As a follow-up in 1981, in 60 red pine plantations with a total area of 467.4 ha, virus provided by FPMI was sprayed with ground equipment at a concentration of 20 ml of virus to every 4 L of water and an application rate of approximately 22 L per ha. In most instances, the 1980 project in which only virus was used was a success, whereas in 1981 the virus and malathion mixture was not as successful. Post-spray surveys carried out in plantations treated in 1980 and 1981 showed a decided reduction in populations (Fig. 1).

Jack Pine Sawfly, *Neodiprion pratti paradoxicus* Ross

Moderate-to-severe damage to jack pine (*Pinus banksiana* Lamb.) was limited to a few locations in the Region, and single colonies were observed at several other locations. High populations caused moderate-to-severe defoliation of immature fringe trees in Airy Township, Algonquin Park District and of pole-sized trees in Gratton Township, Pembroke District. Forty 6 m trees were affected at the former location and fifty 10 m trees at the latter; defoliation ranged from 30% to 50% (see Frontispiece). On four 3 m trees in a 1 ha private plantation in Minden Township, Minden District defoliation was 75%. Single colonies were observed in Buchanan, Hagarty and Lyndock townships, Pembroke District and in Blair and Mowat townships, Parry Sound District. No larvae were found in the 13 ha plantation in North Algona Township, Pembroke District, where control by aerial spraying was carried out in 1980.

Table 1. Summary of redheaded pine sawfly colony counts made at 12 locations in the Algonquin Region in 1981 (counts based on the examination of 100 red pine trees at each location).

Location (Twp)	Avg ht of sample trees (m)	Estimated trees per ha	Total no. of colonies	Defoliation (%)	Area affected (ha)
Bancroft District					
Carlow	2	2,500	2	.5	.4[a]
Wollaston	4	2,500	1	.5	1.2
Monteagle	1	2,500	5	.5	3.6[a]
Bracebridge District					
Joly	2	2,990	67	5	2.4[a]
Strong	4	2,990	1	.5	1.2
Machar	4	2,990	3	.5	.5
McLean	2	2,990	73	10	4.0
Macaulay	2	2,990	37	10	.2
Minden District					
Laxton	4	1,800	1	.5	2.0
Pembroke District					
Westmeath	2	2,500	12	.5	4.0
Ross	1	2,500	2	.5	7.0
Bromley	2	2,500	1	.5	.8

[a] Sprayed with virus in 1981

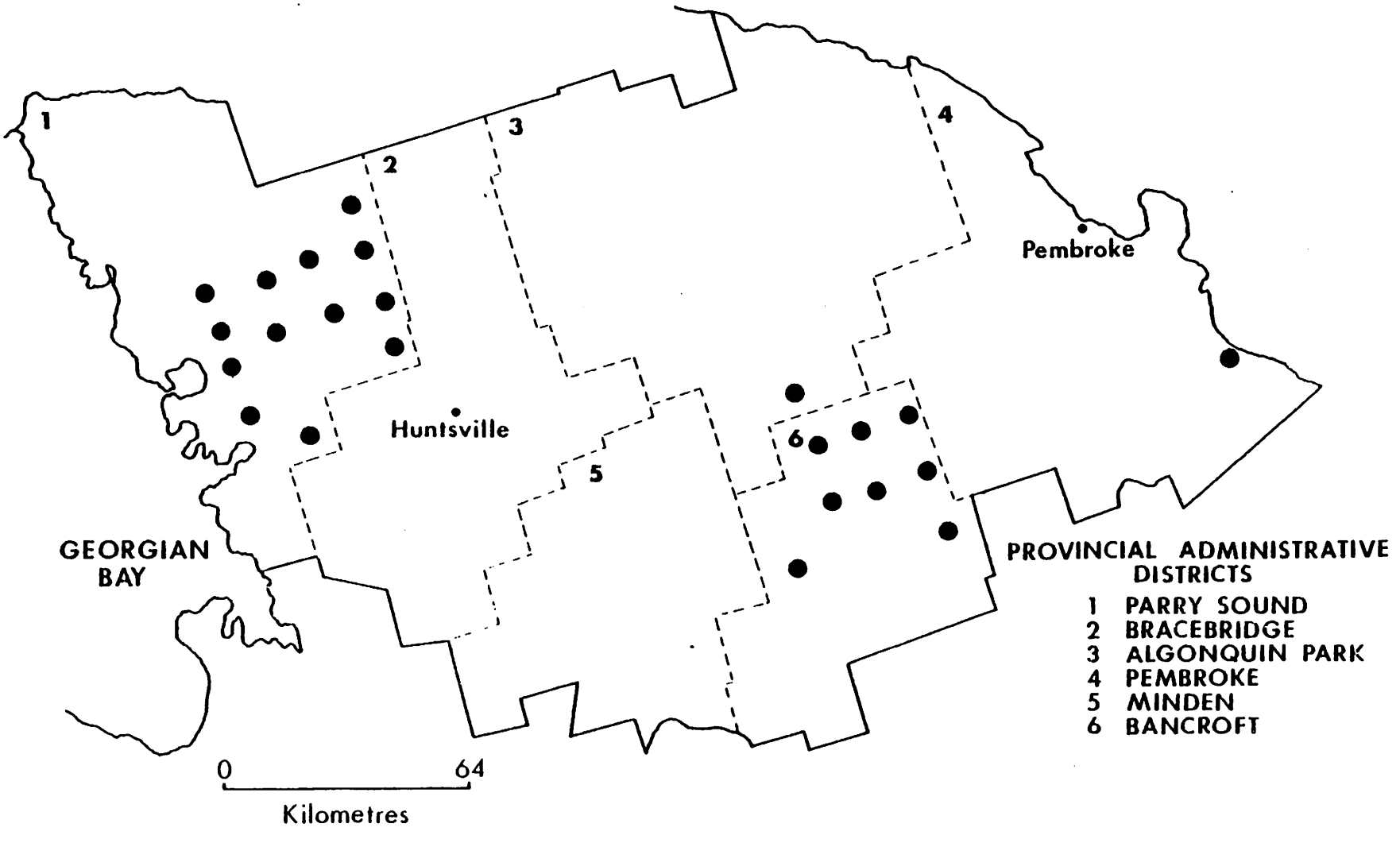

Figure 1. Redheaded pine sawfly (*Neodiprion lecontei* [Fitch])

Locations in which nuclear polyhedrosis virus was applied by ground treatments . . . . . ●

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

Populations remained low at all locations surveyed in the Region. Low numbers persisted in Macaulay Township, Bracebridge District on approximately 1 ha of 2 m roadside Scots pine (*Pinus sylvestris* L.). This year marked the first time that this insect was recorded north of Bobcaygeon in the Minden District: it was found on mugho pine (*Pinus mugo* Turra) in Minden Township. Populations in 0.5 ha of 2 m hybrid pine (Scots-Austrian) in Ross Township, Pembroke District remained low following a spray project in 1980. Approximately 1 ha of roadside mugho pine in Monteagle and Dungannon townships, Bancroft District, averaged less than one colony for every 10 trees.

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

Moderate levels of spruce defoliation were recorded in the Bancroft District, while elsewhere in the Region populations declined to low levels.

Several successive seasons of moderate-to-severe defoliation along Highway 648 in Cardiff Township, Bancroft District have caused extensive crown damage to 1-2 m white spruce natural regeneration. Usually three or four years of severe defoliation will kill young, open-grown trees.

As a control measure, OMNR personnel hand-sprayed planted white spruce with malathion in several provincial parks in Bracebridge and Parry Sound districts.

White Pine Weevil, *Pissodes strobi* (Peck)

Damage to white pine regeneration varied throughout the Region. Most surveys were conducted in perennially infested plantations. Damaged leaders ranged from a low of 1% in a 1 ha plantation of white pine in Snowdon Township, Minden District, to a high of 90% in natural regeneration in Wollaston Township, Bancroft District. The results of annual surveys to show population fluctuations are recorded in Table 2.

Pine Tortoise Scale, Toumeyella parvicornis (Ckll.)

There was a further increase in populations of this scale in Blair Township, and a new, light infestation was observed in Mowat Township, Parry Sound District. Examination of 150 jack pine trees 2 m high in a hedgerow in Blair Township in 1980 and 1981 showed an increase in heavily infested trees from 19% to 41%, and an increase from 3% to 6% in tree mortality. In Mowat Township only one infested tree was observed.

Table 2. Summary of damage caused by the white pine weevil in white pine plantations or regeneration in 11 locations in the Algonquin Region in 1981 (based on the examination of 150 trees at each location).

Location (Twp)	Avg ht of sample trees (m)	Estimated trees per ha	Trees weeviled 1981 (%)	Area (ha)
Algonquin Park District				
Fitzgerald	1.5	-	8	0.5
Sproule	0.5	-	4	0.5
Bancroft District				
Dungannon	2	-	60	0.5
Monteagle	2	-	50	0.5
Bracebridge District				
Muskoka	7	-	4	2
Proudfoot	9	2,500	25	0.3
Minden District				
Carden	2	-	37	6
Snowdon	1.5	1,500	1	1
Parry Sound District				
McKeller	2	2,550	10	1.5
Pembroke District				
Alice	1.5	-	28	1
Ross	2	-	10	0.5

Minor Insects

Poplar Flea Beetle, *Altica populi* Brown

Damage by this pest continued to increase through most of the Region. Severe browning of foliage followed by premature leaf drop during the first two weeks of August accounted for high levels of defoliation in numerous townships in the Bracebridge, Parry Sound and Minden districts.

Balsam poplar (*Populus balsamifera* L.) stands in Somerville Township, Minden District sustained high populations for the second consecutive year. Most balsam poplar stands observed in the Pembroke, Bancroft and Algonquin Park districts showed varying degrees of damage; however, premature leaf drop was not as pronounced. Low populations of the American aspen beetle (*Gonioctena americana* [Schaef.]) and the poplar leaf beetle (*Chrysomela* sp.) were common in the Pembroke and Bancroft districts in conjunction with the poplar flea beetle.

Pine Needle Midge, *Contarinia* sp.

The high populations of this needle midge reported in 1980 declined to low levels in 1981. Damage was confined exclusively to low-value Scots pine plantations and hedgerows in the Bancroft District. The only exception was in Sherwood Township, Pembroke District where hedgerow Scots pine had trace foliar damage.

A total of less than 1 km of hedgerow was seriously affected by this pest.

Yellownecked Caterpillar, *Datana ministra* (Drury)

Severe defoliation of white birch was recorded on several offshore islands in Georgian Bay near Pointe au Baril in the Parry Sound District. As a rule, this insect is not considered a serious forest pest as damage is confined to a few localized trees. This is the first survey record of this insect in the Parry Sound District.

Oak Leafmining Sawfly, *Profenusa lucifex* (Ross)

Damage to ornamentals and stands of oak (*Quercus* spp.) increased in an area of approximately 25 ha in Harvey Township, Minden District. Counts at two locations in the area showed an increase in the percentage of leaves mined from 43 and 65 in 1980 to 83 and 93 in 1981. The major host was white oak (*Q. alba* L.), but red oak (*Q. rubra* L.) and bur oak (*Q. macrocarpa* Michx.) were also heavily infested.

Redhumped Oakworm, *Symmerista canicosta* Francl.

Severe defoliation of mature red oak and other deciduous hosts, covering an area of approximately 7,100 ha, was noted on numerous islands, including Franklin, Shawanaga, Hertzburg and the Oak Islands, between Parry Sound and Pointe au Baril in the Parry Sound District. This is the first survey record of the insect (see Frontispiece) in the Parry Sound District, and although populations are generally light, sometimes they become heavy enough to cause severe defoliation in isolated

locations. In addition to this insect the following less important insects were observed feeding on the foliage.

Insect	Host
Oak leaffolder (*Anchylopera burgessiana* Zell.)	red oak
Polyphemus moth (*Antheraea polyphemus* [Cram.])	cherry
Sawfly (*Arge* sp.)	willow
Pale tussock moth (*Halysidota tessellaris* [J.E. Smith])	willow
Oak leaftier (*Psilocorsis quercicella* Clem.)	red oak
Aspen webworm (*Tetralopha aplastella* [Hlst.])	aspen
Striped oak webworm (*T. expandens* [Wlk.])	red oak

Table 3. Other forest insects.

Insect	Host(s)	Remarks
Anchylopera burgessiana Zell. Oak leaffolder	rO	low populations on Shawanaga Islands in Georgian Bay
Aphrophora cribrata (Wlk.) Pine spittlebug	scP, wP	trace populations at widely scattered locations in Bancroft, Minden and Pembroke districts
Archips cerasivoranus (Fitch) Uglynest caterpillar	ecCh	low numbers common in rural areas of all districts
Arge sp. Sawfly	W	single colony on Shawanaga Island, Georgian Bay
Cenopis pettitana (Rob.) Maple basswood leafroller	Ba	trace numbers at scattered locations throughout the Region
Cephalcia sp. Webspinning sawfly	rP	trace incidence in Wilberforce Twp, Pembroke District; Wollaston Twp, Bancroft District; and Macaulay Twp, Bracebridge District
Chrysomela sp. Leaf beetle	bPo	trace damage on mature trees in Westmeath and Gratton Twp, Pembroke District

(continued)

Table 3. Other forest insects (continued).

Insect	Host(s)	Remarks
Croesia semipurpurana (Kft.) Oak leaf shredder	rO	light damage throughout range of host in Bancroft, Bracebridge and Pembroke districts
Ctenucha virginica (Charp.) Dusky bluebodied moth	rP	trace incidence on small plantation tree, Herschel Twp, Bancroft District
Dioryctria zimmermani (Grt.) Zimmerman pine moth	wP	trace level in McKay Twp, Algonquin Park District
Epinotia aceriella (Clem.) Maple trumpet skeletonizer	sM	moderate damage to ornamentals at one location in Ridout Twp, Bracebridge District
Eufidonia notataria Wlk. Conifer looper	eH	few larvae in Cavendish Twp, Minden District
Fenusa ulmi Sund. Elm leafminer	wE	high populations at one location in McNab Twp, Pembroke District
Gonioctena americana (Schaef.) American aspen beetle	tA, bPo	trace damage on widely scattered trees in the Region
Halysidota tessellaris (J.E. Smith) Pale tussock moth	W	low populations on islands in Georgian Bay
Monoctenus sp. Cedar sawfly	ewC	trace levels in Alice Twp, Pembroke District
Neodiprion nanulus nanulus Schedl. Red pine sawfly	rP	low populations in plantations in Burleigh Twp, Bancroft District
Paraclemensia acerifoliella (Fitch) Maple leafcutter	sM	light defoliation of semi-mature trees in Harvey Twp, Minden District
Phratora purpurea purpurea Brown Aspen skeletonizer	tA	moderate levels at several locations in McNab Twp, Pembroke District

(continued)

Table 3. Other forest insects (concluded).

Insect	Host(s)	Remarks
Pineus similis (Gill.) Ragged spruce gall adelgid	wS	low damage on ornamentals in Buchanan Twp, Pembroke District
Pineus sp. Adelgid	wP	trace populations in young plantations in Cardiff Twp, Bancroft District and Alice Twp, Pembroke District
Pristiphora erichsonii (Htg.) Larch sawfly	tL	population decline in Pembroke, Algonquin Park and Bancroft districts
Pristiphora geniculata (Htg.) Mountain-ash sawfly	aMo	light defoliation on ornamental trees in urban areas in Bancroft, Bracebridge and Minden districts
Pseudexentera oregonana Wlshm. Aspen leafroller	tA	low foliar damage general in the Region
Pulicalvaria piceaella (Kft.) Orange spruce needleminer	wS	foliar damage common at varying levels in the Region

TREE DISEASES

Major Diseases

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

In 1981, field observations showed that a large number of immature white elm (*Ulmus americana* L.) trees in the 10 to 15 cm diameter class were succumbing to this pathogen in Bracebridge, Minden, Parry Sound and Pembroke districts. Surveys were carried out in these areas to determine the percentage of currently infected trees (Table 4). Currently infected trees were considered to be those showing typical symptoms of this disease.

Table 4. Summary of incidence of Dutch elm disease on white elm at four locations in the Algonquin Region in 1981 (based on the examination of 1.6 km of roadside trees).

Location (Twp)	Avg DBH (cm)	No. of trees examined	No. of trees infected[a] (%)	No. of trees healthy (%)
Bracebridge District				
Brunel	11	63	19.1	80.9
Minden District				
Snowdon	10	92	22.8	77.2
Parry Sound District				
McKellar	10	60	21.7	78.3
Pembroke District				
Bagot	13	40	47.5	52.5

[a] Based on trees showing symptoms of current infection

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

Trembling aspen (*Populus tremuloides* Michx.) surveyed throughout the Region showed high incidence levels of infection with trace-to-low foliar damage. Results for approximately 150 ha of aspen stands that were evaluated in 1981 are given in Table 5.

Table 5. Summary of foliar damage to trembling aspen caused by ink spot disease in the Algonquin Region in 1981 (based on the examination of 150 trees at each location).

Location (Twp)	Avg ht of trees (m)	No. of trees infected (%)	Foliar damage (%)	Area affected (ha)
Algonquin Park District				
Head	8	72	4	50
Bancroft District				
Mayo	11	100	4	15
Minden District				
Glamorgan	4	100	4	10
Parry Sound District				
Blair	7	100	4	25

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

An annual aerial and ground survey was again carried out in the Algonquin Region in an effort to detect the European race of this fungus (Fig. 2), but no evidence of it was found.

Numerous other plantations were surveyed in May and June to determine distribution of the native race of *G. abietina*. All of these surveys proved negative with the exception of two 5 ha red pine plantations in Joly and Stisted townships, Bracebridge District where only trace damage was observed. The severity and spread of this disease has been reduced, largely by means of the sanitation programs carried out by OMNR in Bracebridge and Parry Sound districts.

Shoot Blight, *Venturia macularis* (Fr.) Müller & Arx

Trace damage was common on aspen regeneration through most of the Region. Approximately 80 ha of regeneration examined in 1981 showed damage levels ranging from 4% in Machar Township, Bracebridge District to 85% in Buchanan Township, Pembroke District. Open-grown aspen regeneration was the preferred host in all locations.

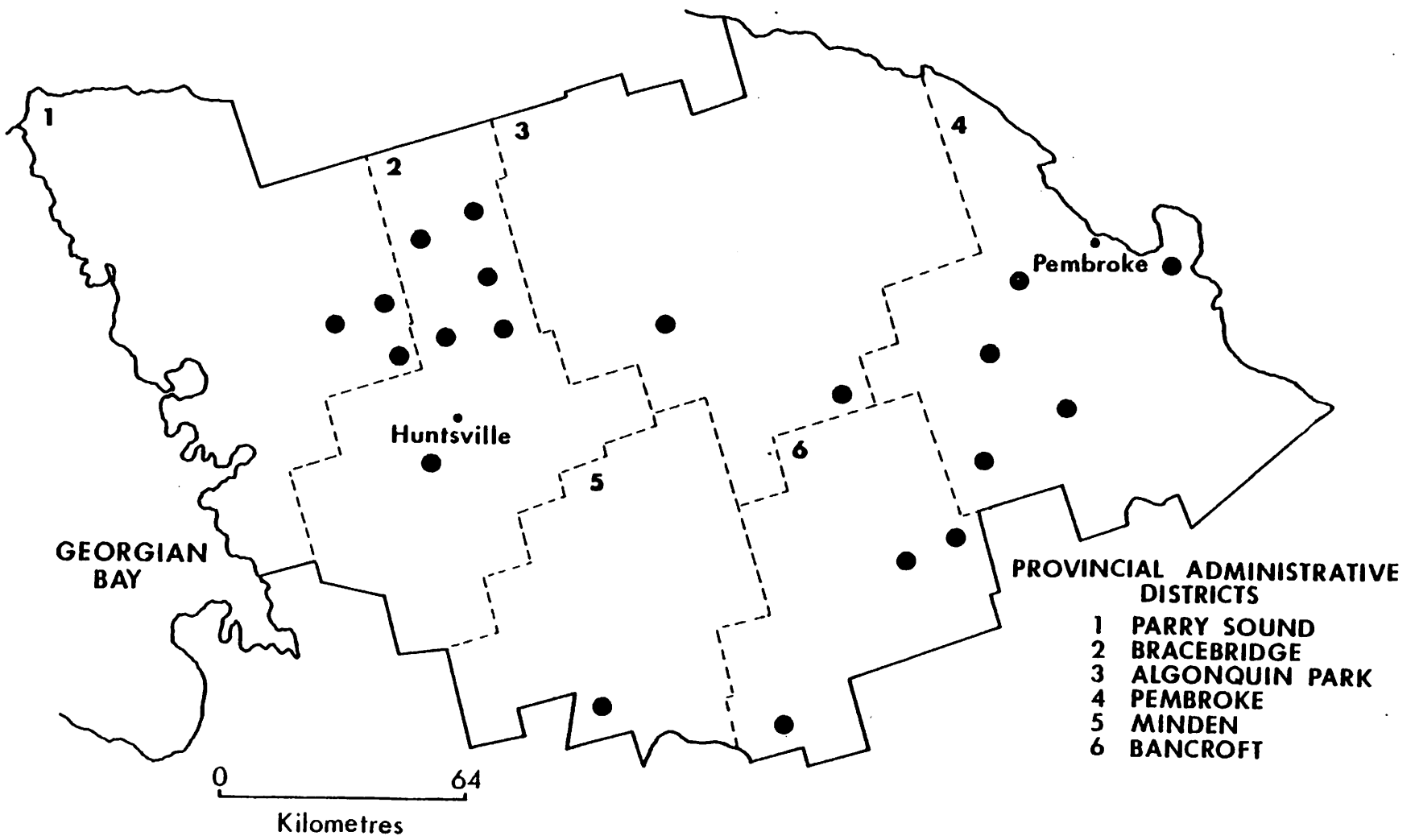

Figure 2. Scleroderris canker (*Gremmeniella abietina* [Lagerb.] Morelet)

Locations in which surveys were made to determine the presence or absence of the European race of *G. abietina* . . . . . ●

Table 6. Other forest diseases.

Organism	Host(s)	Remarks
Catenuloxyphium sp. Sooty mould	wP	low incidence on a single ornamental in Dungannon Twp, Bancroft District
Coleosporium asterum (Diet.) Syd. Pine needle rust	rP	light foliar damage levels on 40% of one plantation examined in Minden Twp, Minden District, and trace incidence on young pine in Ross Twp, Pembroke District
Cronartium sp. Blister rust canker	jP	trace damage to open-grown trees in White Twp, Algonquin District
Cytospora sp. Canker	W	moderate damage to plantation trees in Mowat Twp, Parry Sound District
Diplodia sp. Root rot	aP	moderate damage to young weakened plantings (cause unknown) in Ryerson Twp, Parry Sound District
Diplodina sp. No common name	bO	identified on a 100 ha stand of sparsely foliated trees (cause unknown) in Wallbridge Twp, Parry Sound District
Linospora sp. No common name	W	moderate foliar damage to young ornamentals in Mowat Twp, Parry Sound District
Lophodermium sp. Needle cast	rP	light damage to young ornamentals in Mowat Twp, Parry Sound District
Melampsora paradoxa Diet. & Holw.	tL	light damage to old foliage in Monteagle, Carlow and Bangor Twps, Bancroft District

(continued)

Table 6. Other forest diseases (concluded).

Organism	Host(s)	Remarks
Venturia inaequalis (Cke.) Wint. Apple scab	Ap	severe damage to several ornamentals in Minden Twp, Minden District
Therrya fuckelii (Rehm) Kijala	rP	trace incidence on seed production trees in Head Twp, Algonquin District

Diebacks and Declines

Oak Decline

Monitoring plots were established in 1977 to record the rate of decline in the vigor of red oak stands in the Bracebridge and Pembroke districts.

Observations to date in monitored plots indicate a decline in vigor, but with no significant mortality in the first 5 years (Table 7).

Table 7. Data for oak decline on monitoring plots, Algonquin Region 1977-1981 (based on the re-examination of 100 tagged trees at each location).

Location (Twp)	Avg DBH of sample trees (cm)	Area affected (ha)	Year	Percentage of crown dead				Tree dead
				0-20	21-40	41-60	>60	
Bracebridge District								
Macaulay	20	4	1977	17	44	29	10	-
			1978	3	43	44	8	2
			1979	0	27	60	11	2
			1980	0	27	54	15	4
			1981	1	8	69	17	5
Pembroke District								
Alice	16	4	1977	44	45	11	0	-
			1978	43	55	12	0	0
			1979	28	58	13	1	0
			1980	16	65	17	2	0
			1981	9	34	55	2	0
Wylie	16	3	1977	26	43	30	1	-
			1978	8	54	37	1	0
			1979	4	48	44	4	0
			1980	2	43	48	6	1
			1981	2	43	48	6	1

Abiotic and Animal Damage

Hail Damage

A severe hailstorm in early June completely defoliated about 900 ha of semimature aspen in Guilford Township, Minden District. Although defoliation was severe, trees refoliated and no apparent tree damage was observed.

Salt Damage

Severe tree and shrub damage was again prevalent along major highways throughout the Region. Less damage was observed along secondary highways, although severe damage occurred on curves and at intersections.

Winter Drying

Drying of foliage by transpiration during warm, sunny days in late winter caused light damage to exposed pine and white cedar at numerous locations. Particularly high damage to ornamental Austrian pine (*Pinus nigra* Arn.) was noted in Airy and Canisbay townships, Algonquin Park District and on Scots pine in Stisted Township, Bracebridge District. Trace damage to eastern white cedar was observed in Pembroke District.

Porcupine Damage

The tips of larch trees in numerous areas in Macaulay, McLean and Monck townships, Bracebridge District were moderately damaged by porcupines girdling the stems.

Special Surveys

White Spruce Plantation Survey

In a continuing effort to assess insect and disease problems in high-value stands, 11 white spruce plantations in height classes <2 m, 2-6 m, and >6 m were evaluated in 1981.

Two visits were scheduled for each stand selected in order to sample a broader spectrum of pests, and to examine flower and cone problems. On the second visit, increment borings were taken from 10 trees in each plot in the >6 m height class. No butt or root rots were observed in these borings. The following insects and diseases were searched for at each location.

Visit 1 (10 June - 6 July)

Insects

1. Spruce budworm
2. Spruce coneworm (*Dioryctria reniculelloides* Mut. & Mun.)
3. Shootworm (*Zeiraphera* sp.)

Diseases

1. Chlorosis
2. Broom rusts
3. Mistletoe
4. Frost injury
5. Armillaria root rot (*Armillaria mellea* [Vahl ex Fr.]) Kumm.)
6. Mortality - recent

Visit 2 (21 July - 25 July)

Insects

1. Spruce budworm and coneworm defoliation
2. Yellowheaded spruce sawfly
3. White pine weevil

Diseases

1. Needle rusts
2. Stand openings, in conjunction with a root rot survey
3. Cone rusts

Table 8 summarizes the pests identified from the above lists; any pest not included in the table was not found in the plantations.

Figure 3 shows the locations of stands surveyed across the Region.

Miscellaneous pests identified incidental to the surveys include:

1. Orange spruce needle miner - 60% of semimature white spruce suffered trace damage levels in Gratton Twp, Algonquin District.

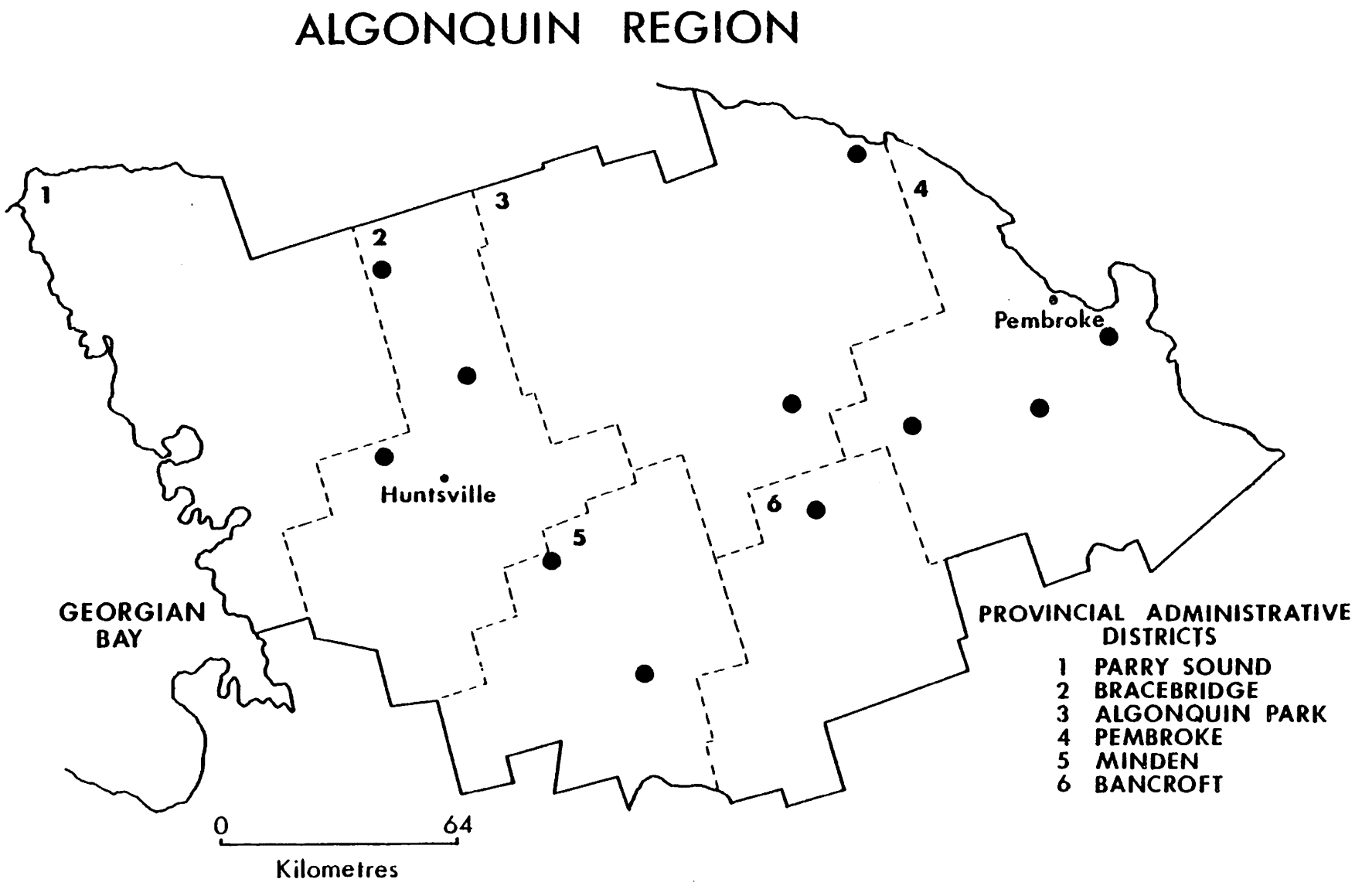

Figure 3. High-value plantation surveys

Locations in which white spruce (*Picea glauca* [Moench] Voss) plantations were surveyed in 1981 . . . . . ●

2. Eastern spruce gall aphid - trace incidence and damage in young white spruce in Sherwood Twp, Pembroke District

3. Spruce gall adelgid - low incidence and damage on semi-mature white spruce in Stisted Twp, Bracebridge District

4. Needle rust - trace incidence; trace damage on young trees in Machar Twp, Bracebridge District

Sapstreak Disease, *Ceratocystis coerulescens* (Munch) Bak.

In a special survey carried out in sugar maple bushes in 1981, this disease was not detected. Problems observed in these surveys included Eutypella canker (*Eutypella parasitica* Davidson and Lorenz), mechanical damage, compaction, and tapping wounds. Stands examined were in Bracebridge, Minden and Parry Sound districts.

Seed and Cone Pests of White Spruce

In 1981 surveys were undertaken to determine the pests that cause damage to white spruce flowers and mature white spruce cones. In this survey the first collection of 231 female flowers was made on 22 May to determine damage by spruce budworm and other insects and the second collection of 100 mature cones was made on 4 August to identify the insects that feed on seeds, among other things. Table 9 summarizes damage-causing insects in two groups: 1) Lepidoptera and 2) all other insects.

An inspection of flowers from the one location revealed that most of the damage recorded was caused by insects from the order Lepidoptera while damage to seed cones was caused primarily by insects from the order Diptera, with the most important being the spruce cone maggot (*Hylemya anthracina* [Czerny]) in the Pembroke District.

Other Seed and Cone Pest Surveys

As a result of requests by OMNR district personnel, two other cone damage surveys showed that 40% of the red pine cone crop in a Seed Production Area (SPA) in Head Township, Algonquin District were damaged by the red pine cone beetle (*Conophthorus resinosae* Hopk.) and 43% of the white pine cone crop in a seed orchard in Cavendish Township, Minden District were damaged by *C. coniperda* McPherson.

Table 8. Summary of damage to white spruce plantations surveyed in the Algonquin Region in 1981.

Location (Twp)	Estimated trees per ha	Avg tree ht (m)	Avg DBH (cm)	Stand size (ha)	Percentage of trees affected by			Avg defoliation by spruce budworm and spruce coneworm	White pine weevil leaders attacked (%)	Incidence (%)	Damage (%)
					spruce budworm	spruce coneworm	spruce shootworm				
Algonquin District											
Gratton	1,700	11	18	3	0	0	0	0	0	0	0
Head	4,000	2.9	3	1.5	0	0	0	0	1	0	0
Wicklow	500	9	17	5	100	0	50	5	0	0	0
Bracebridge District											
Bethune	2,990	6.4	6.4	4	95	0	0	5	0	0	0
Machar	2,990	1.4	1.3	5	59	0	0	5	0	0	0
Stisted	2,990	6.7	7.6	3	0	5	0	5	0	0	0
Minden District											
Snowdon	2,990	1	1.0	2	0	0	0	0	0	5	10
Pembroke District											
Sherwood	2,700	2.2	3	3.5	0	0	0	0	0	0	0

Table 9. A summary of the percentages of damaged white spruce flowers collected on 22 May and damaged white spruce cones collected on 5 August.

Location (Twp)	No. of flowers examined	Flowers damaged (%)	No. of flowers damaged by[a]		No. of cones examined	Cones damaged (%)	No. of cones damaged by[a]	
			Lepidoptera	Other Insects			Lepidoptera	Other Insects
Pembroke District								
Wylie	231	34	58	13	100	69	31	64

[a] Damage to an individual flower or cone may be caused by more than one insect.