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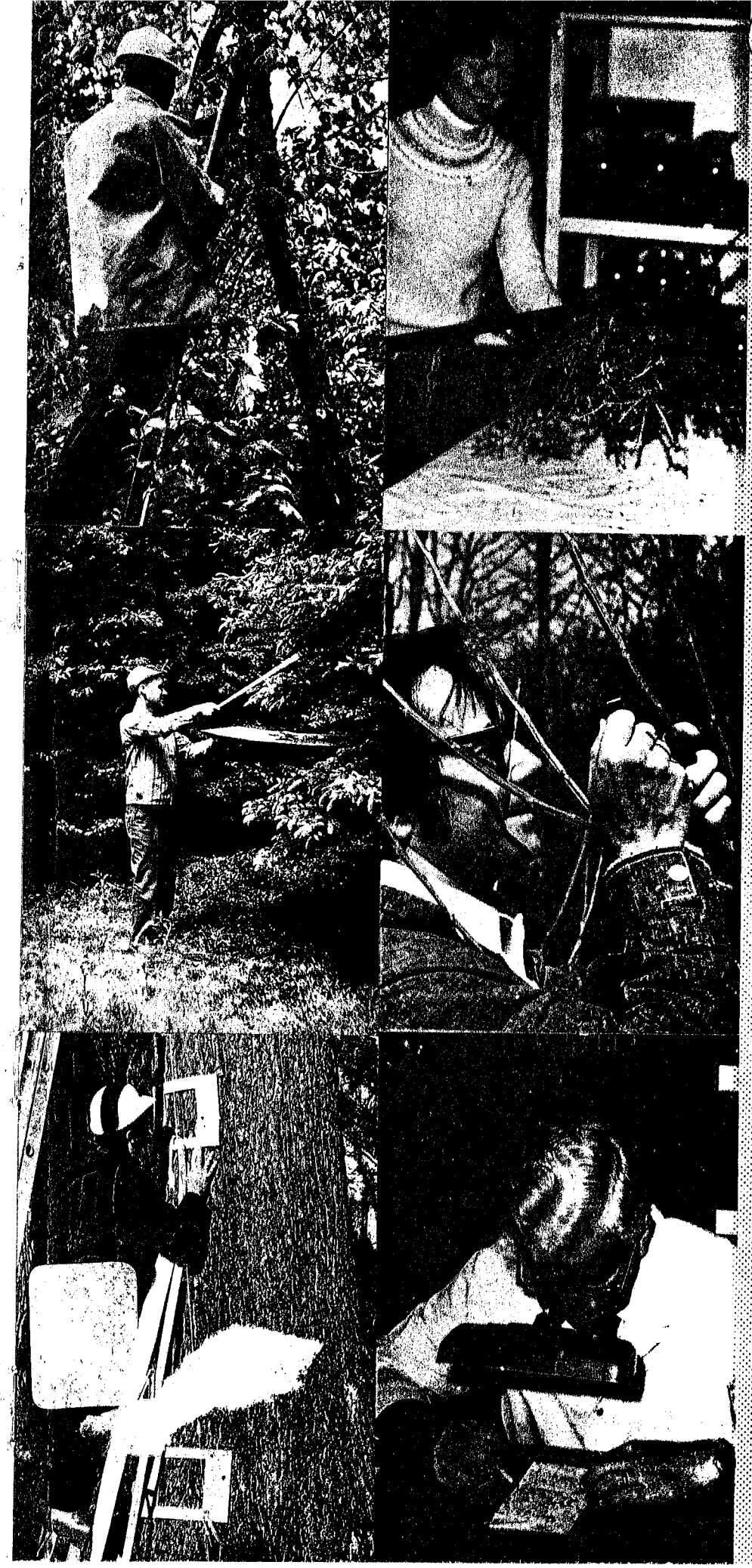

FOREST PEST CONDITIONS IN THE MARITIMES IN 1978 WITH AN OUTLOOK FOR 1979

BY
L.P. MAGASI

MARITIMES

MARITIMES FOREST RESEARCH CENTRE

The Maritimes Forest Research Centre (MFRC) is one of six regional establishments of the Canadian Forestry Service, within Environment Canada. The Centre conducts a program of work directed toward the solution of major forestry problems and the development of more effective forest management techniques for use in the Maritime Provinces.

The program consists of two major elements - research and development, and technical and information services. Most research and development work is undertaken in direct response to the needs of forest management agencies, with the aim of improving the protection, growth, and value of the region's forest resource for a variety of consumptive and non-consumptive uses; studies are often carried out jointly with provincial governments and industry. The Centre's technical and information services are designed to bring research results to the attention of potential users, to demonstrate new and improved forest managment techniques, to assist management agencies in solving day-to-day problems, and to keep the public fully informed on the work of the Maritimes Forest Research Centre.

FOREST PEST CONDITIONS IN THE MARITIMES IN 1978 WITH AN OUTLOOK FOR 1979

by

Laszlo P. Magasi

Maritimes Forest Research Centre

Fredericton, New Brunswick

Information Report M-X-98

Canadian Forestry Service

Environment Canada

1979

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ABSTRACT

This report reviews the status of forest insects and tree diseases in the Maritimes Region in 1978 and gives, for some pests, a forecast of conditions for 1979. Eight economically important forest insects of conifers, six of hardwoods, two tree diseases, and abiotic injuries are discussed in some detail; others are listed in tabular form. More detailed information is available on request from the Maritimes Forest Research Centre.

RESUME

Ce rapport passe en revue les conditions relatives aux divers insects et maladies des arbres dans la Région des Maritimes en 1978 et présent un aperçu des conditions prévue pour quelques uns des ces organismes nuisibles en 1979. L'auteur discute en quelques détail huit insects de conifére. d'importance économique, six insects des feuillus, deux malades des arbres, et des blessures abiotique.. D'autres sont énumerés en form tabulaire. De plus amples renseignements sont disponibles sur demande au Centre de Recherches Forestières des Maritimes.

ACKNOWLEDGMENTS

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Information contributed by the Pest Detection Officers of the New Brunswick Department of Natural Resources and the Nova Scotia Department of Lands and Forest and others is also acknowledged.

INTRODUCTION

One of the objectives of the Forest Insect and Disease Survey is to monitor forest insect and disease conditions and to report on the status of the important and most common pests. In the Maritimes, this information is published in Seasonal Highlights, Special Reports on pests of particular interest, Information Reports, and in the Annual Report of the Forest Insect and Disease Survey.

This report outlines forest pest conditions in 1978 with an outlook on conditions expected in 1979. It aims to provide forest managers with information on pest conditions early enough to be considered in management decisions before the start of the 1979 field season. Only those insects and diseases that were widespread and caused considerable concern in 1978 are discussed in detail. Others of localized or of lesser importance are presented in tabular form. More information on specific conditions will be provided, upon request, from the Maritimes Forest Research Centre.

IMPORTANT FOREST PESTS

Spruce Budworm, *Choristoneura fumiferana* (Clem.)--Different aspects of the spruce budworm "picture" investigated in 1978 are discussed briefly under separate headings.

Defoliation and forecast and the results of spray operations in New Brunswick in 1978 are summarized in this report. Detailed information is available from Mr. E.G. Kettela of the Maritimes Forest Research Centre.

In New Brunswick, defoliation of balsam fir and spruce stands occurred on slightly more than 810 000 ha (2 million acres). Defoliation was severe on 450 000 ha (1.1 million acres), moderate on 219 000 ha (541,000 acres) and light on 141 000 ha (349,000 acres). Aerial surveys revealed extensive areas of moderate to severe defoliation throughout the unsprayed areas in the western two thirds of Charlotte County, immediately south and north of Fredericton, throughout the Saint John River

Valley, from Squaw Cap to Campbellton in Restigouche County, in northern Northumberland County, and in many patches in Gloucester, Kent, Westmorland, Albert, Kings, Queens, and Sunbury counties (Fig. 1). The total affected area is about 202 000 ha (500,000 acres) more than in 1977 but considerably smaller than in 1975 when 3.5 million ha (8.7 million acres) were classed as severely or moderately defoliated. An increase in budworm populations in 1979 is forecast based on egg-mass surveys, and 3.2 million ha (7.8 million acres) of the province's susceptible forests are classified in the moderate to severe hazard categories.

On mainland Nova Scotia, defoliation was severe on 76 000 ha (187,000) acres), moderate on about 32 000 ha (almost 79,000 acres) and light on almost 15 000 ha (36,000 acres) (Fig. 2). This total area of defoliation is about 48 000 ha (117,000 acres) smaller than in 1977. The reduction occurred in Pictou, Antigonish, and Guysborough counties. Severe defoliation occurred in the area north of Lower Economy, Colchester County on 6 000 ha (14,000 acres) and on almost 69 000 ha (170,000 acres) in Cumberland County. Both of these represent substantial increases in area from 1977.

On Cape Breton Island, current defoliation was severe over 376 000 ha (930,000 acres), moderate on 69 000 ha (170,000 acres) and light with many small patches of moderate or severe defoliation on 199 000 ha (493,000 acres). The area of severe defoliation in 1978 was only about one half of that in 1977. High spruce budworm larval populations found in the spring decreased in many areas as a result of various factors such as parasites, diseases, and, most important on the Central Highlands, lack of food. Severe defoliation is expected in 1979 on the mainland in Colchester, Cumberland, and Antigonish counties and, as a result of a large moth flight, in parts of Kings and Annapolis counties. On Cape Breton Island, in spite of lower egg-mass counts than in 1977, about 688 000 ha (1.7 million acres) are still in the extremely high infestation category, about 40 000 ha (100,000 acres) in the central area of the Highlands are infested only lightly but "the trees are in such severely defoliated condition and poor vigor that it is surprising that the budworm deposited any eggs".

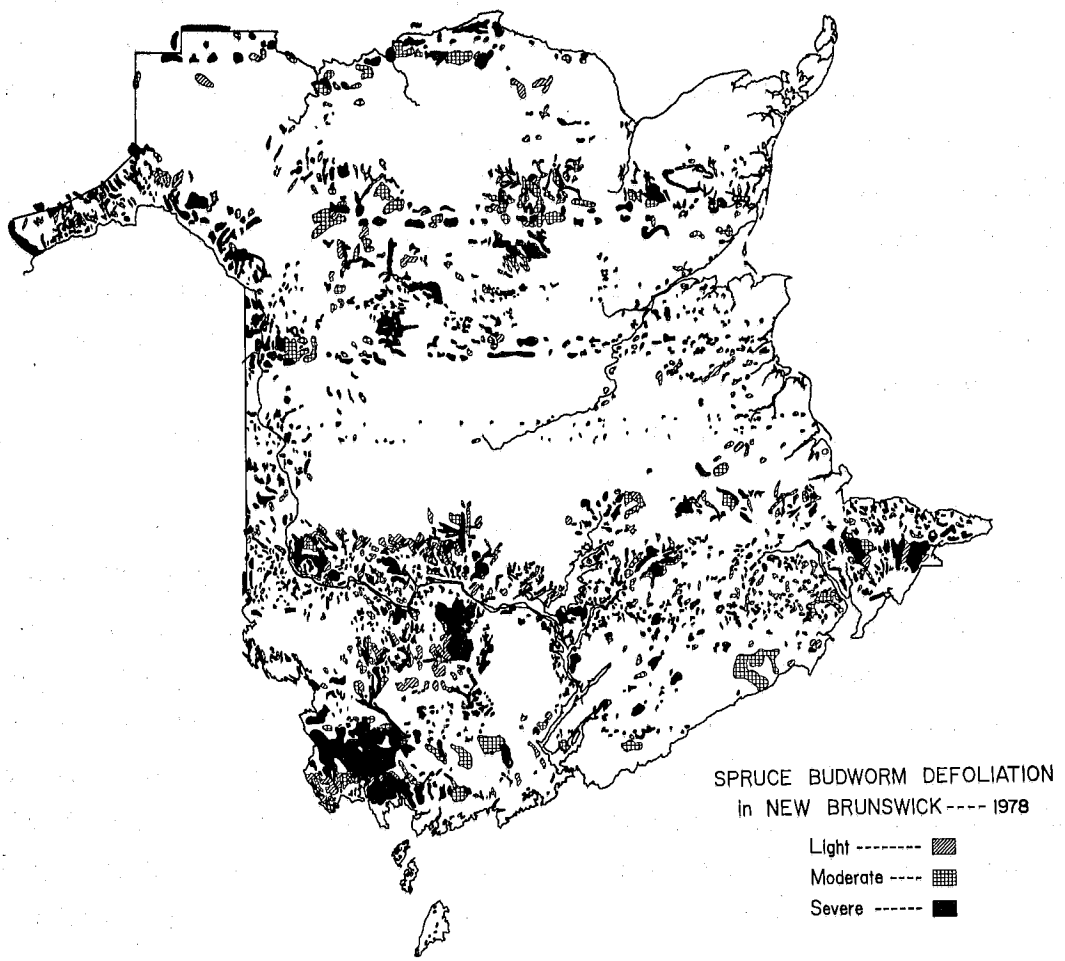

Fig. 1.

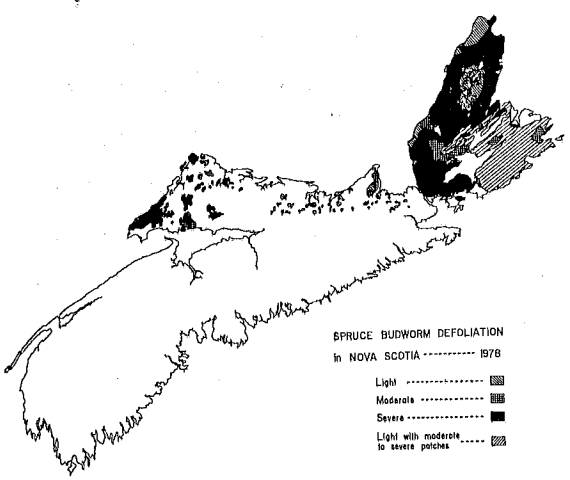

Fig. 2.

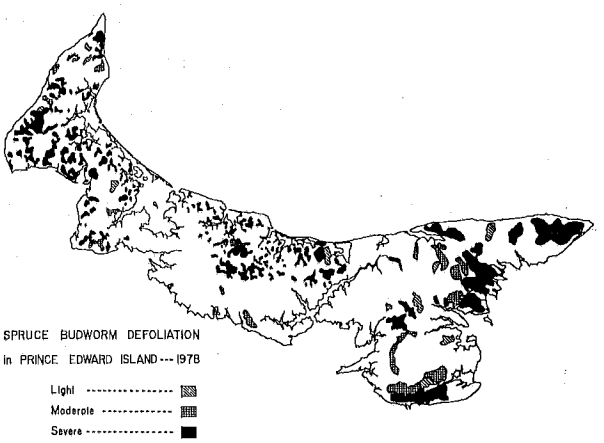

Fig. 2a.

In Prince Edward Island, defoliation occurred over 122 000 ha (300,000 acres) of fir and spruce forests, a decrease from 138 000 ha (341,000 acres) in 1977. The area of severe defoliation increased, however, from about 70 000 ha (172,000 acres) in 1977 to almost 85 000 ha (210,000 acres) in 1978. In addition, defoliation was moderate on about 27 000 ha (66,000 acres) and light on almost 10 000 ha (25,000 acres) (Fig. 2a). The patchy nature of defoliation is indicative of the broken nature of the forest on Prince Edward Island. An increase is predicted in infestations in Prince and Queens counties in 1979 and a decrease in populations in Kings County.

Condition of trees, as a result of spruce budworm outbreaks, was examined in two areas in Nova Scotia in 1978.

On Cape Breton Island the current outbreak began in 1974. A special survey conducted in 1978 on 106 sample plots (Fig. 3) has been reported in detail (Magasi 1978, M-X-95). That study, showed that over 25% of the balsam fir is dead on the Central Highlands, another 10% is dying, and over 50% is severely defoliated. Damage to balsam fir on the Lowlands at less than 150 m elevation is about one half as much as on the Highlands and fir at elevations higher than 150 m is in an intermediate position. Mortality in fir-spruce stands is comparable to that of balsam fir, except in low-lying areas where spruce bark beetle attacks also caused tree mortality. It can be estimated that there are about 6.3 million m^3 (2.8 million cords) of dead fir-spruce wood on Cape Breton Island, 3.6 million m^3 (1.6 million cords) were killed by the spruce budworm during the last year. Another 1.6 million m^3 (700,000 cords) of wood are expected to die in 1979.

In Cumberland County, a similar survey in 26 preselected stands (Fig. 4) showed that 14.1% of balsam fir (present on 20 of the plots) was dead, 9.2% for at least two years. However, on those plots where balsam fir suffered severe defoliation by spruce budworm for at least five years since 1971 the mortality averaged 40.1%. On the basis of the survey, it can be estimated that there are over 272 000 m^3 (120,000 cords) of dead balsam fir in Cumberland County. More mortality is expected in 1979 especially in the area east of New Salem on the Fox River Road.

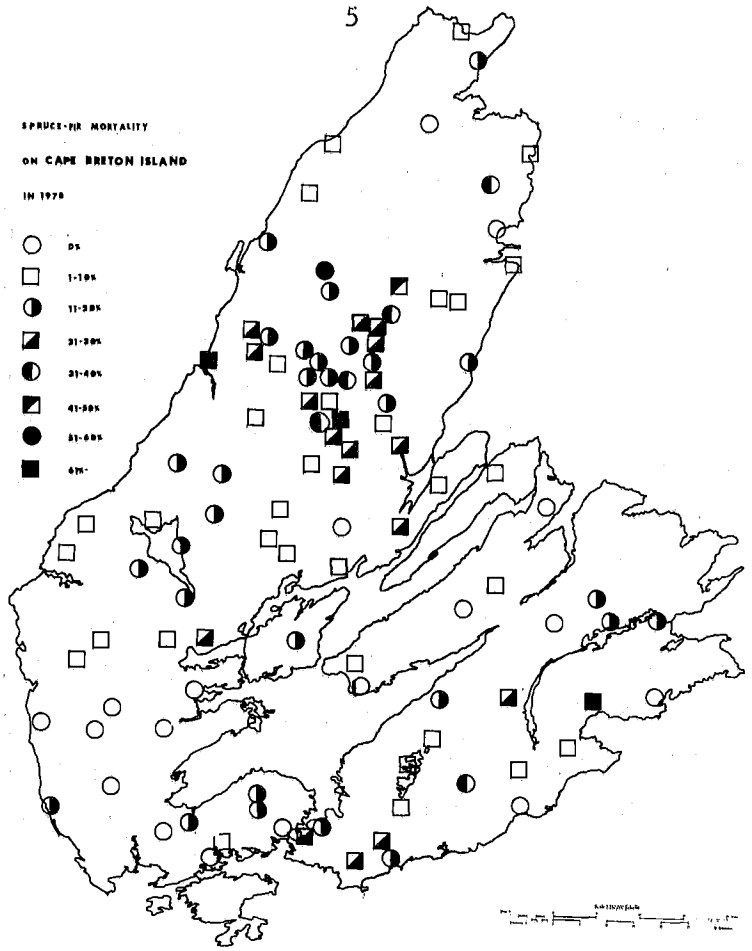
SPRUCE-FIR MORTALITY
ON CAPE BRETON ISLAND
IN 1978
0%
1-10%
11-20%
21-30%
31-40%
41-50%
51-60%
61%-

Fig. 3.

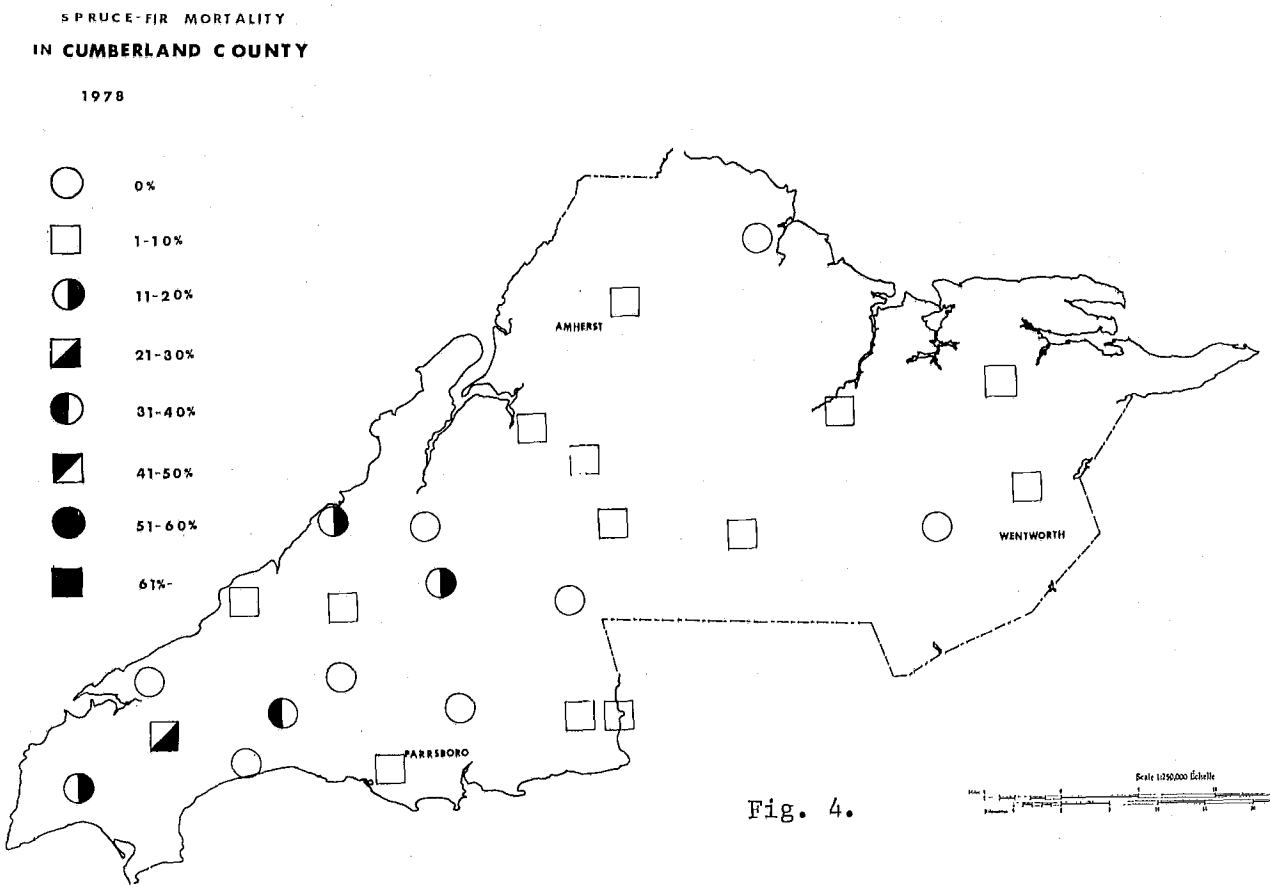
SPRUCE-FIR MORTALITY
IN CUMBERLAND COUNTY
1978
0%
1-10%
11-20%
21-30%
31-40%
41-50%
51-60%
61%-
AMHERST
WENTWORTH
PARRSBORO

Fig. 4.

Secondary insects and decay fungi play a role in the deterioration of trees weakened by repeated spruce budworm defoliation. Investigations have been started in both Nova Scotia and New Brunswick into the type of insects (bark beetles, woodwasps, and other wood-boring insects) and decay fungi attacking the trees; in relation to the timing of their entrance into the trees in terms of tree conditions, and their effect in hastening tree death and subsequent deterioration. Preliminary observations indicate a relationship between the secondary organisms and the eventual fate of the budworm-defoliated trees, but results are not yet available.

Natural control agents of the spruce budworm, both parasites and diseases, and their role and behavior during a budworm outbreak are monitored. The results of the spruce budworm parasite survey during the last three years indicate little difference in the level of parasitism between sprayed and unsprayed areas or between unsprayed areas in different provinces (Table 1).

Table 1. Level of spruce budworm parasitism in the Maritime Provinces

	Percent larval and pupal parasitism		
	1976	1977	1978
Sprayed - New Brunswick	13.9	16.1	12.7
Unsprayed - New Brunswick	12.1	10.1	10.4
Unsprayed - Nova Scotia, Prince Edward Island	10.3	12.6	16.5

Data were collected for the first time in 1978 for assessing diseases of the spruce budworm in the same areas where parasitism was investigated. The baseline data obtained this year do not allow conclusions, however incidence of microsporidia was high in the Cape Breton Island area where spruce budworm populations declined by 97.9% between the 4th-instar larval and the pupal stages. Incidence of the

disease ranged from 40 to 68% and could have been a factor in the population decline.

Spruce Beetle, *Dendroctonus rufipennis* (Kirby)--This insect has killed patches of trees in spruce stands over much of Nova Scotia in the past several years. At Amherst Point, Cumberland County, most of the spruce trees are dead over a 17-ha (43-acres) area; trees continued to die from spruce beetle attack in the Belmont-Debert-Glenholme blowdown area and at Portapique Mountain, Colchester County; and almost 80% of merchantable-size spruce are dead in a stand near Deep Cove, Cape Breton County. Spruce beetles are especially numerous on Cape Breton Island, destroying appreciable amounts of merchantable timber. The insect was found at 15 of 52 preselected stands with at least 20% spruce content (Table 2). About 294 000 m^3 (130,000 cords) are dead from beetle damage and another 367 000 m^3 (162,000 cords) are living but infested. All trees infested with this insect should be harvested. Spruce will continue to die in 1979 especially in areas where trees are in a weakened condition from repeated spruce budworm defoliation.

Table 2. Percent of merchantable spruce volume on Cape Breton Island affected by spruce beetle in stands with at least 20% spruce, fall 1978

County	Plots		Infested		Dead	
	No. examined	Beetles present	Living	Moribund	Infested	Other cause
Inverness	11	1	-	-	0.6	4.5
Victoria	17	6	6.4	0.4	3.4	5.4
Cape Breton	12	4	11.7	5.0	15.7	6.4
Richmond	12	4	11.5	-	8.0	8.2

Eastern Larch Beetle, *Dendroctonus simplex* Lec.--Larch trees, weakened from repeated defoliation by either the larch sawfly or

the spruce budworm, continued to die from beetle attacks, especially in the central and eastern parts of Nova Scotia and Prince Edward Island and the southern half of New Brunswick (Fig. 5). This is the first recorded outbreak in the Region in at least 25 years. To assess damage, trees were examined at 99 preselected locations in the Region. Most of these were at or near plots used in 1975 to assess the condition of larch, and had been selected because they contained at least 20% larch and were distributed on the basis of provincial inventory volumes. Larch mortality has increased in Nova Scotia since 1975 especially in areas where the beetle was found (Table 3). At some of the areas where infestations were detected in 1977 (11 in Nova Scotia and 1 in Prince Edward Island) 59% of the trees are dead (69% of volume) and a further 19% are infested.

It is estimated that the insect has killed about 478 300 m^3 (211,133 cords) of larch, most of it (about 400 000 m^3) in eastern and central Nova Scotia. This wood, unless harvested, will soon decay.

The infestation is expected to continue in 1979 and cause additional mortality especially where trees are in a weakened condition.

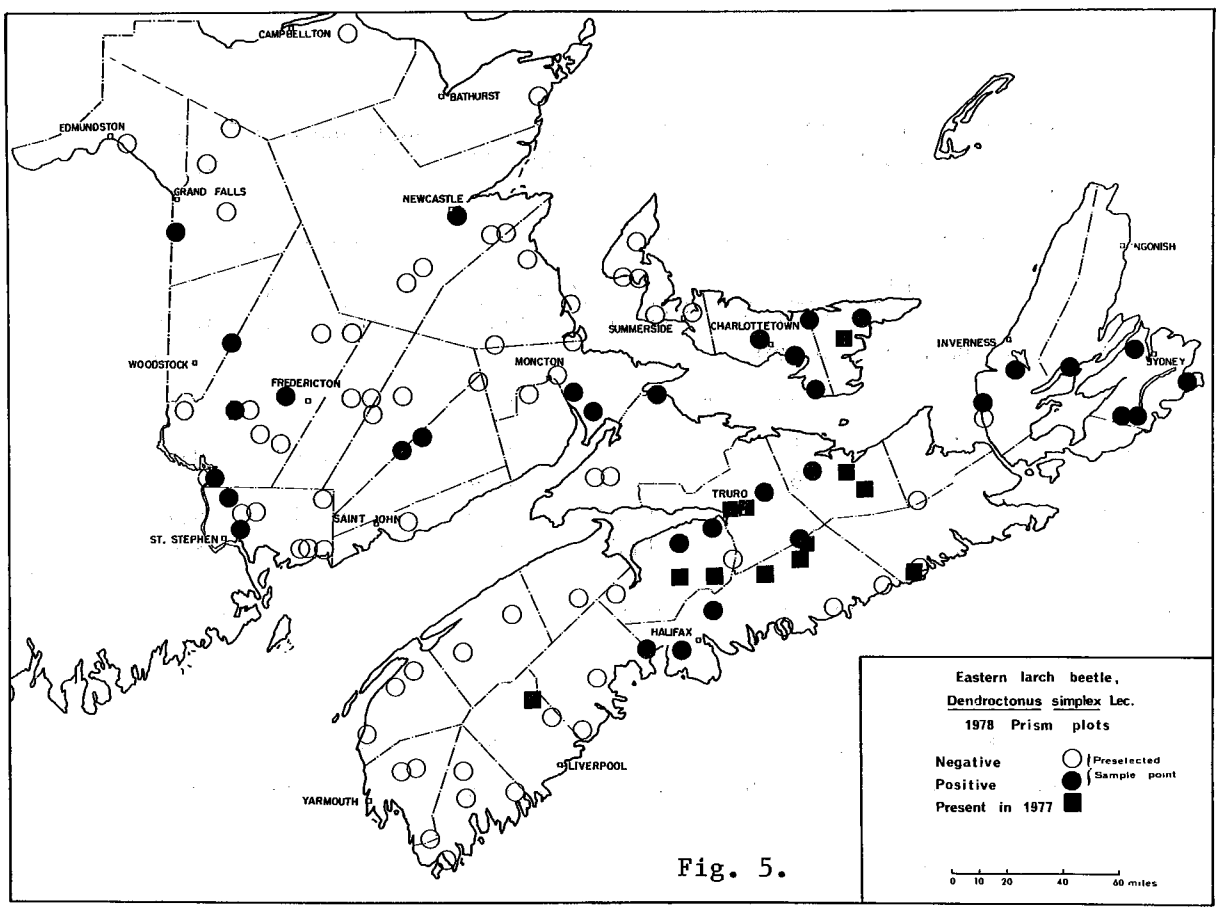

Fig. 5.

Table 3. Condition of larch constituting at least 20% of the stand at preselected locations

	Beetle infested			Beetle not present		
	No. of plots	Trees %*	Merchantable Volume %	No. of plots	Trees %	Merchantable Volume %
NOVA SCOTIA	16			26		
Healthy		53.9	45.3		94.9	98.0
Living infested		4.6	10.2		-	-
Dying infested		6.2	8.3		-	-
Dead from beetle		22.3	29.6		-	-
**Dead from other causes		13.1**	6.6		5.1	2.0
Larch composition of stand	45% of trees, 64 m^3/ha			64% of trees, 56 m^3/ha		
PRINCE EDWARD ISLAND	5			5		
Healthy		46.2	48.7		100	100
Living infested		-	-		-	-
Dying infested		-	-		-	-
Dead from beetle		25.0	29.6		-	-
**Dead from other causes		28.7**	21.7		-	-
Larch composition of stand	60% of trees, 82 m^3/ha			65% of trees, 67 m^3/ha		
NEW BRUNSWICK	12			35		
Healthy		84.3	85.1		97.1	98.4
Living infested		2.4	3.1		-	-
Dying infested		0.7	1.2		-	-
Dead from beetle		3.4	6.1		-	-
**Dead from other causes		9.2**	4.5		2.9	1.6
Larch composition of stand	53% of trees, 121 m^3/ha			56% of trees, 107 m^3/ha		

* All percentage figures are based on the number of merchantable trees and volumes per acre.

** Total mortality in 1975 was 3% in Nova Scotia, 33% on Prince Edward Island, and 8% in New Brunswick.

Standard Error for percent of larch volume infested at the preselected plots where the beetle was found in Nova Scotia, Prince Edward Island, and New Brunswick $\pm$ 8.1, $\pm$ 3.8, and $\pm$ 1.9, respectively, with 68% confidence limits; of the volume dead from beetle damage, the standard error is $\pm$ 6.2, $\pm$ 3.8, and $\pm$ 1.6.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)--This insect caused severe or moderate defoliation on groups or scattered larch trees along the south shore of Nova Scotia from Lunenburg to Yarmouth and inland to New Germany and Caledonia (Fig. 6). Elsewhere in the Province defoliation was patchy and usually very light; the largest area of light defoliation occurred between Glendale and Blue Mills in Inverness County. No noticeable defoliation was detected in New Brunswick or Prince Edward Island.

No new large-scale infestations are predicted for 1979 in the region.

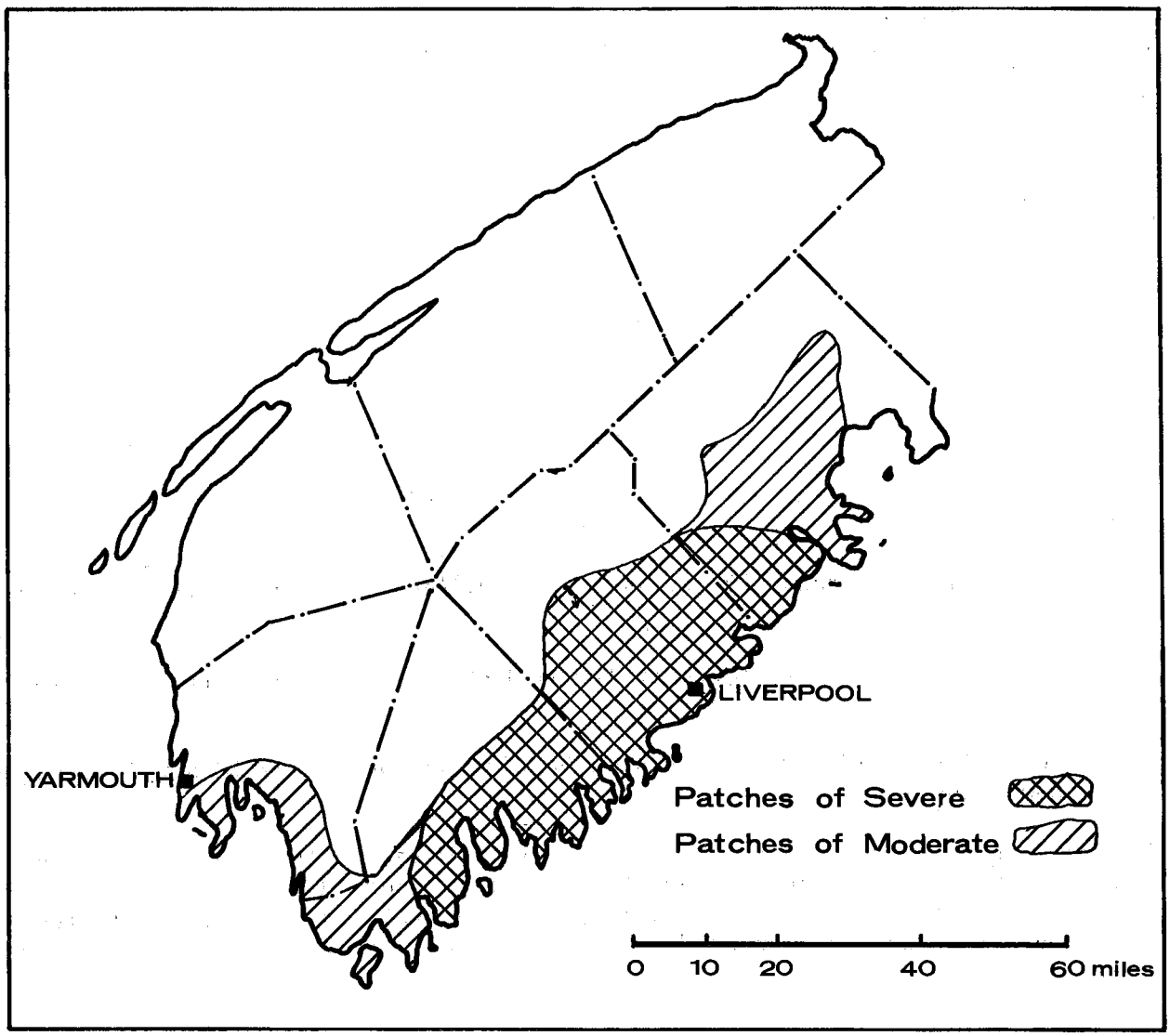

Fig. 6. Area of infestation by larch sawfly, 1978.

Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.)--In Prince Edward Island this insect caused defoliation for the second consecutive year in the central region of Queens County and in a few patches southwest of Shamrock, Prince County (Fig. 7). In these stands about 40% of the merchantable balsam fir and 33% of the hemlock have died within the last year and another 16 and 42% have more than 90% of the foliage missing. More than half, or about 67 m^3/ha (9.6 cunits/acre) of the balsam fir volume is dead, most of it died within the last 2 years and will be degraded by decay fungi unless it is harvested shortly. About 41% of hemlock volume or about 7 m^3/ha (1 cunit/acre) is dead (Table 4). Few larvae from this area were diseased. Elsewhere in the region no large-scale infestations occurred but larvae were present in endemic numbers at widespread locations in Nova Scotia and southern New Brunswick, particularly along the Mariana Road on the Central Highlands of Cape Breton Island.

In 1979, a further 16 and 42% of balsam fir and hemlock are expected to die in central Prince Edward Island. Elsewhere, with the possible exception of the Mariana Road area, no outbreaks are expected.

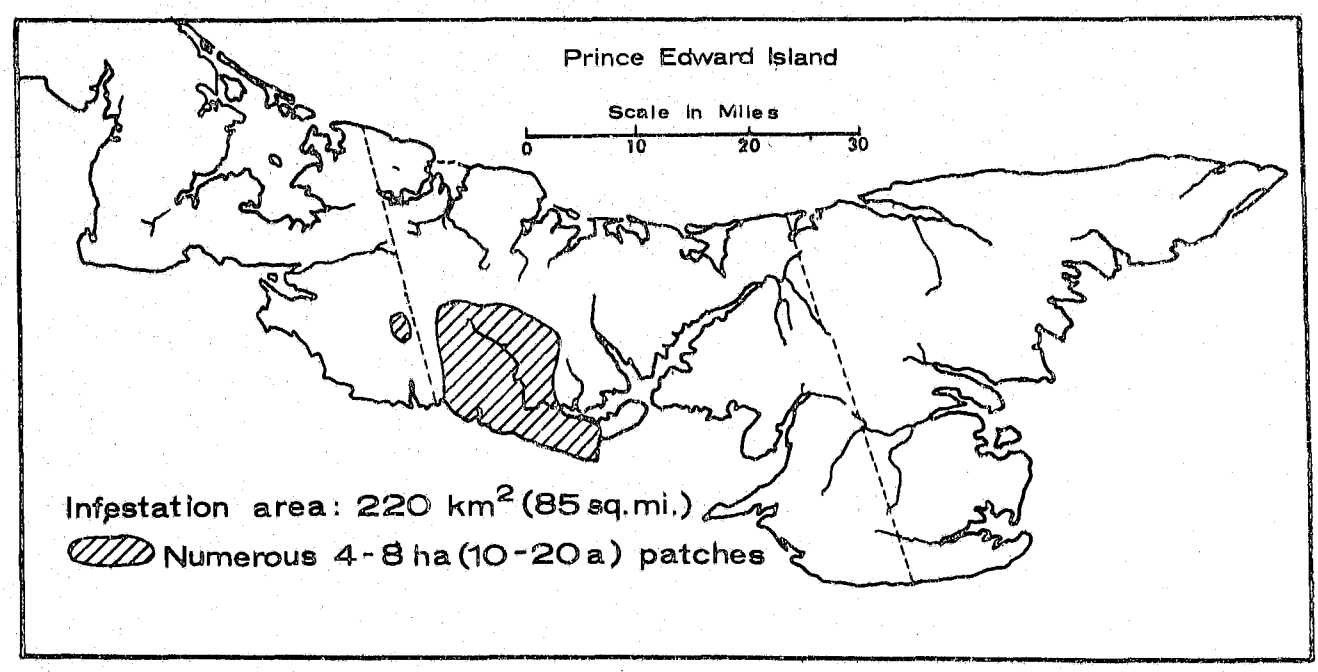

Fig. 7. Area of infestation by eastern hemlock looper, 1978.

Table 4. Condition of conifers in the hemlock looper outbreak area in Prince Edward Island in 1977 and 1978, based on merchantable volumes in five areas

Condition	Balsam fir merchantable volume %		Spruce (red and white) merchantable volume %		Hemlock* merchantable volume %	
	October		October		October	
	1977	1978	1977	1978	1977	1978
Mortality						
Dead less than 2 years	13.2	50.4	0	0	9.8	41.0
Dead 2 years or more	3.1	3.5	0	0	0	0
Total	16.3	53.9*	0	0	9.8	41.0
Defoliation						
Current only	0	0	21.9	25.1	0	0
less than 50% complete	0	13.3	49.9	66.2	0	0
50-90% complete	22.6	15.1	28.2	8.7	0	17.4
More than 90% complete	61.1	17.7	0	0	90.2	41.6
Total	83.7	46.1	100	100	90.2	59.0
Stand composition based on 5 areas examined	57.0% and 124 m^3/ha (17.7 cunits/acre)		13.0% and 29 m^3/ha (4.1 cunits/acre)		8.5% and 17 m^3/ha (2.5 cunits/acre)	

* Occurred at 1 of 5 areas examined.

** Standard error of ± 10.7 at 68% confidence limits.

Whitemarked Tussock Moth, *Orgyia leucostigma* (J.E. Smith)--All outbreaks reported in 1977 have subsided, as predicted, and no noticeable defoliation occurred at those locations in 1978.

Elsewhere moderate to severe defoliation occurred in numerous, isolated patches scattered throughout an area of about 32 000 ha (80,000 acres) located in a narrow strip from Salmon River south to Goldenville, and from Country Harbour west to Melrose, Guysborough County, N.S. (Fig. 8). The total affected area was about 7 100 ha (17,500 acres). Diseased larvae were common and few egg masses were found indicating a decline in populations for 1979. Light to moderate defoliation occurred in the Marsh Brook area of Inverness County, N.S. Egg-mass surveys indicate that defoliation may again occur in 1979.

Endemic numbers of larvae were collected in widely scattered locations in Nova Scotia, on Prince Edward Island and in southern New Brunswick. No larvae were found in northern New Brunswick in spite of an intensive search.

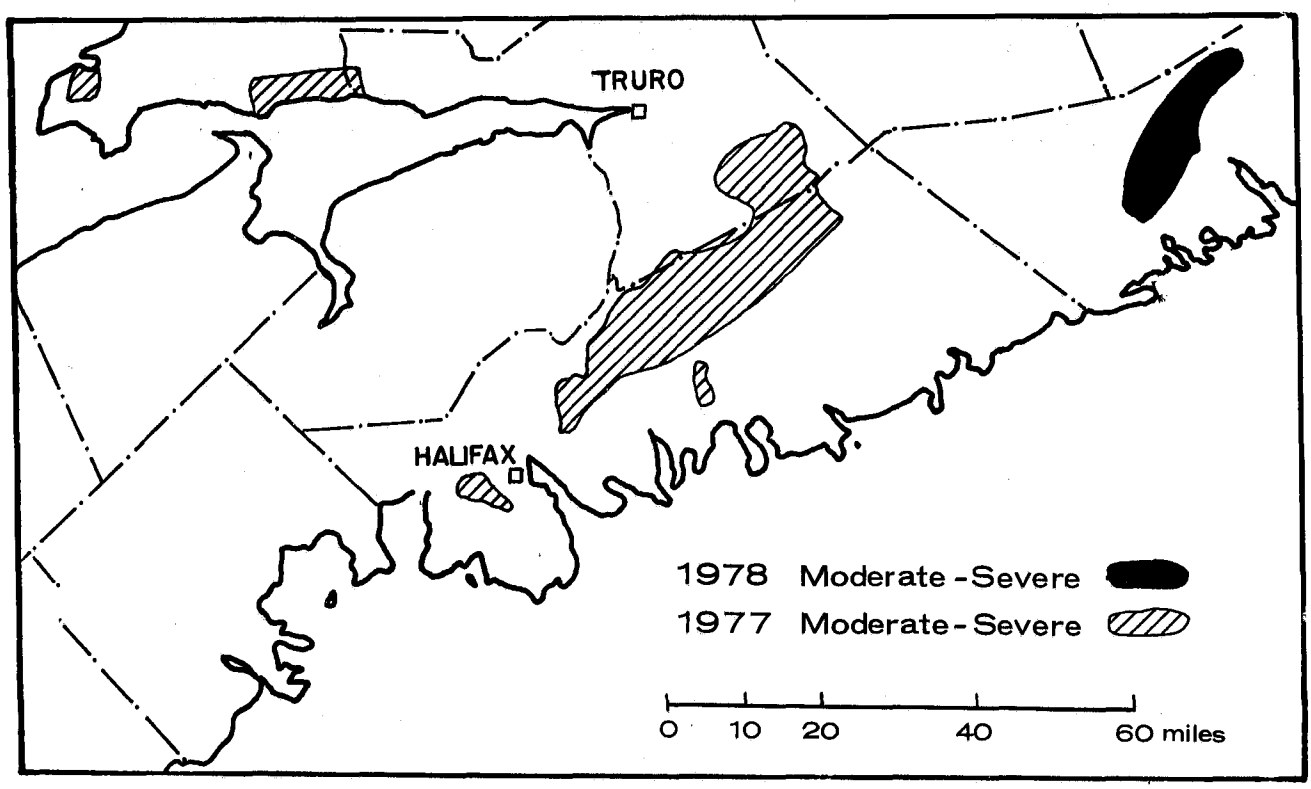

Fig. 8. Area defoliation by the whitemarked tussock moth, 1977 and 1978.

European Pine Shoot Moth, *Rhyacionia buoliana* (Schiff.)--Infestations of this insect were widespread throughout Nova Scotia and Prince Edward Island while in New Brunswick the populations remained low. In Nova Scotia, up to 70% of the trees were affected in red pine plantations, and to a lesser extent in Scots pine plantations in the Sydney and Mira Road areas of Cape Breton County; West Branch River John and Sixmile Brook, Pictou County; East Earltown, Colchester County; Glenmore, Hubley, and Big Lake, Halifax County; Conrad Hill and Rhodes Corner, Lunenburg County; Armstrong Lake and Lake Paul, Kings County; and Fairmount, Antigonish County.

Balsam Twig Aphid, *Mindarus abietinus* Koch--Infestations were common on both wild and cultivated stands of balsam fir throughout New Brunswick. The insect was common in Nova Scotia and Prince Edward Island but in much smaller populations than in 1977.

In New Brunswick where many Christmas trees were unmarketable in 1977, growers successfully controlled the aphid in 1978. While new shoots in unsprayed areas suffered severe or moderate damage, only light or very light damage occurred in sprayed stands.

Results of sampling for twig aphid density in plots at Priceville, Northumberland County, and Lincoln, Sunbury County, N.B. showed numbers 10 times greater than the peak densities of 1967 and 1972. Christmas tree growers should check plantations in May to determine the need for control.

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet--More than a million red pine seedlings ready for planting were destroyed by the J.D. Irving Company at Juniper, N.B., as a precautionary measure to prevent the spread of this disease into plantations. Sanitation measures taken to prevent infection of other seedlings lowered the spore load considerably.

A survey to define the distribution of Scleroderris canker in pine plantations showed that Prince Edward Island is still free of the disease. In Nova Scotia, the fungus could not be found in most areas where it had previously occurred and the only new infection was located

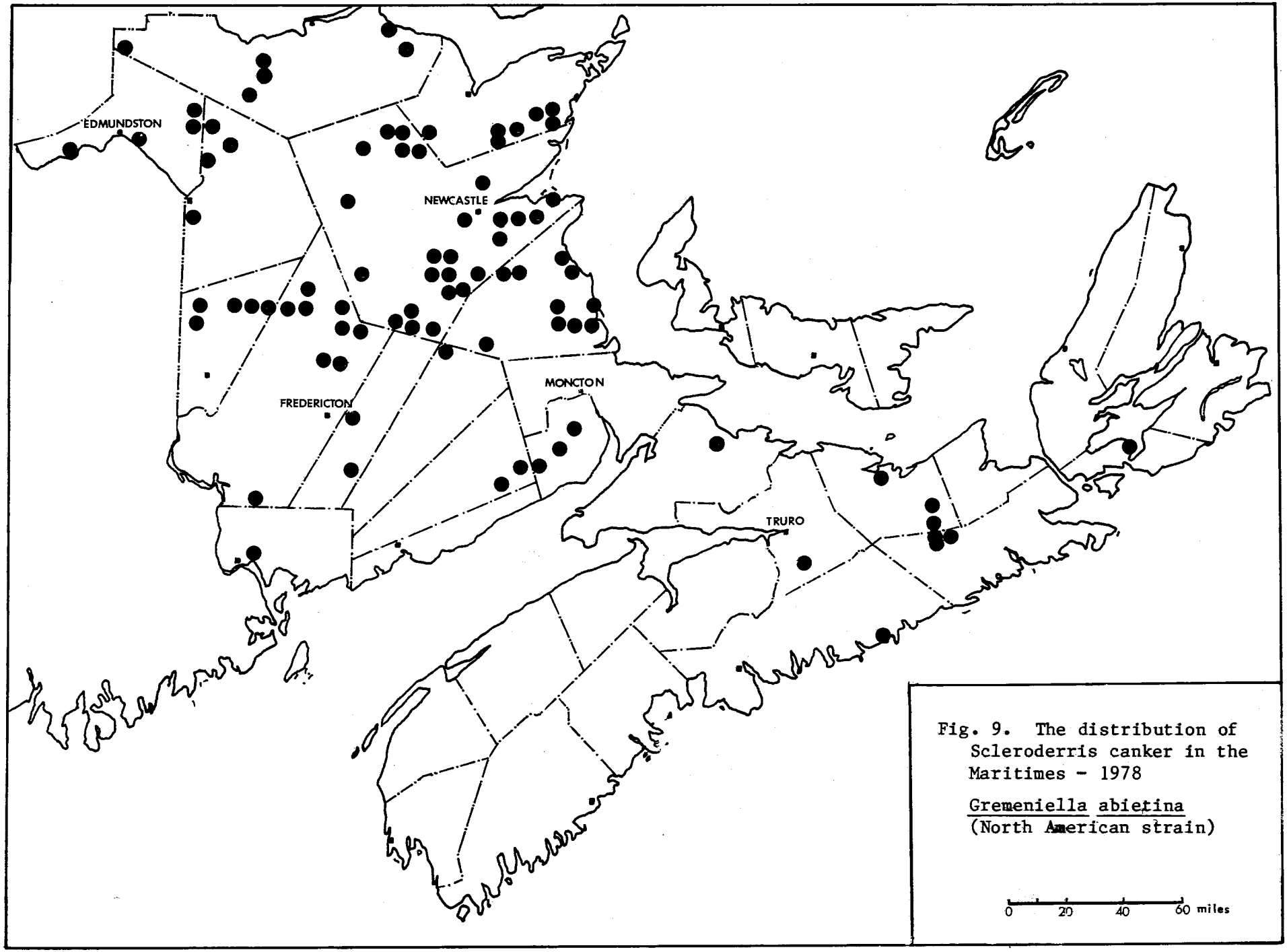

Fig. 9. The distribution of Scleroderris canker in the Maritimes - 1978

Gremeniella abietina
(North American strain)

in a jack pine plantation at Middle Stewiacke, Colchester County. The disease is widespread in New Brunswick (Fig. 9)[1] both jack pine and red pine plantations and is present on several other species of pine. Ninety-six of the 300 pine plantations inspected were found to be infected by the fungus. Most of the infected plantations are in the northern part of the Province; in some areas more than half of the plantations were infected. The disease is widespread throughout the plantations, but in almost half of the infected jack pine plantations (42.9%) only a few branches on each infected tree were affected. There is little doubt that the disease will affect more plantations in future years.

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)--Defoliation by this insect was negligible in New Brunswick although a few larvae were found in the vicinity of areas where outbreaks occurred in 1976 (Fig. 10). Beech trees which suffered severe defoliation during that outbreak continued to die (Table 5). In some of these stands, all of the merchantable beech are now dead and mortality in the stands examined increased more than 30% since 1977. Total dead beech now represents about 57 m^3/ha in the affected areas of Gloucester County (20 200 ha) and 34 m^3/ha in southwestern York and Carleton counties (14 200 ha). Most of this wood has been dead for less than two years and possess cankers caused by the beech scale-nectria complex but it could be salvaged for firewood. The condition of other hardwoods at these locations remains about the same as in 1977 except that some trees show signs of recovery.

No severe outbreaks are expected in 1979 but a further 10% of the beech may die in the 1976-outbreak areas of southwestern York and Carleton counties of New Brunswick.

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[1] The European strain of *G. abietina* has been confirmed at two of the locations after this report had gone to press. Details will be reported elsewhere.

Table 5. Condition of hardwood trees 1 and 2 years after severe defoliation by saddled prominent

Tree class	Percent merchantable volume and range					
	Beech		Sugar maple		Other hardwoods	
	1977	1978	1977	1978	1977	1978
A: Gloucester County, N.B. - 5 areas examined						
Healthy	- -	- -	15.5(0-100)	14.9(0-51)	34.1(0-65)	39.8(0-65)
<50% dieback	14.7(0-58)	14.1(0-58)	78.9(0-100)	81.2(0-100)	35.7(0-39)	39.9(0-50)
50-90% dieback	9.0(0-17)	5.1(0-12)	1.6(0-50)	- -	18.3(0-34)	7.7(0-41)
Dying*	26.9(16-47)	- -	- -	- -	- -	- -
Dead**	49.4(21-84)	80.8(42-100)	4.0(0-5)	3.9(0-5)	11.9(0-25)	12.6(0-25)
Species composition (Avg. of 5 plots)		42%(71 m^3/ha)		23%(38 m^3/ha)		15%(26 m^3/ha)
B: Southwestern York and Carleton counties - 4 areas examined						
Healthy	1.8(0-10)	1.8(0-10)	69.1(62-100)	82.8(76-100)	65.8(0-100)	57.0(0-100)
<50% dieback	14.3(0-34)	25.3(0-39)	30.9(0-38)	17.2(0-24)	- -	34.2(0-100)
50-90% dieback	35.2(25-62)	16.1(0-30)	- -	- -	25.4(0-100)	- -
Dying*	36.7(0-69)	8.9(0-31)	- -	- -	8.8(0-50)	- -
Dead**	12.0(0-28)	47.9(33-61)	- -	- -	- -	8.8(0-50)
Species composition (Avg. of 4 plots)		53%(71 m^3/ha)		13%(17 m^3/ha)		5%(6 m^3/ha)

* Trees with only green cambium or green adventitious shoots.

** Standard error for dead beech in 1978 for A and B is ± 11.3 and ± 6.4, respectively, at 68% confidence limits.

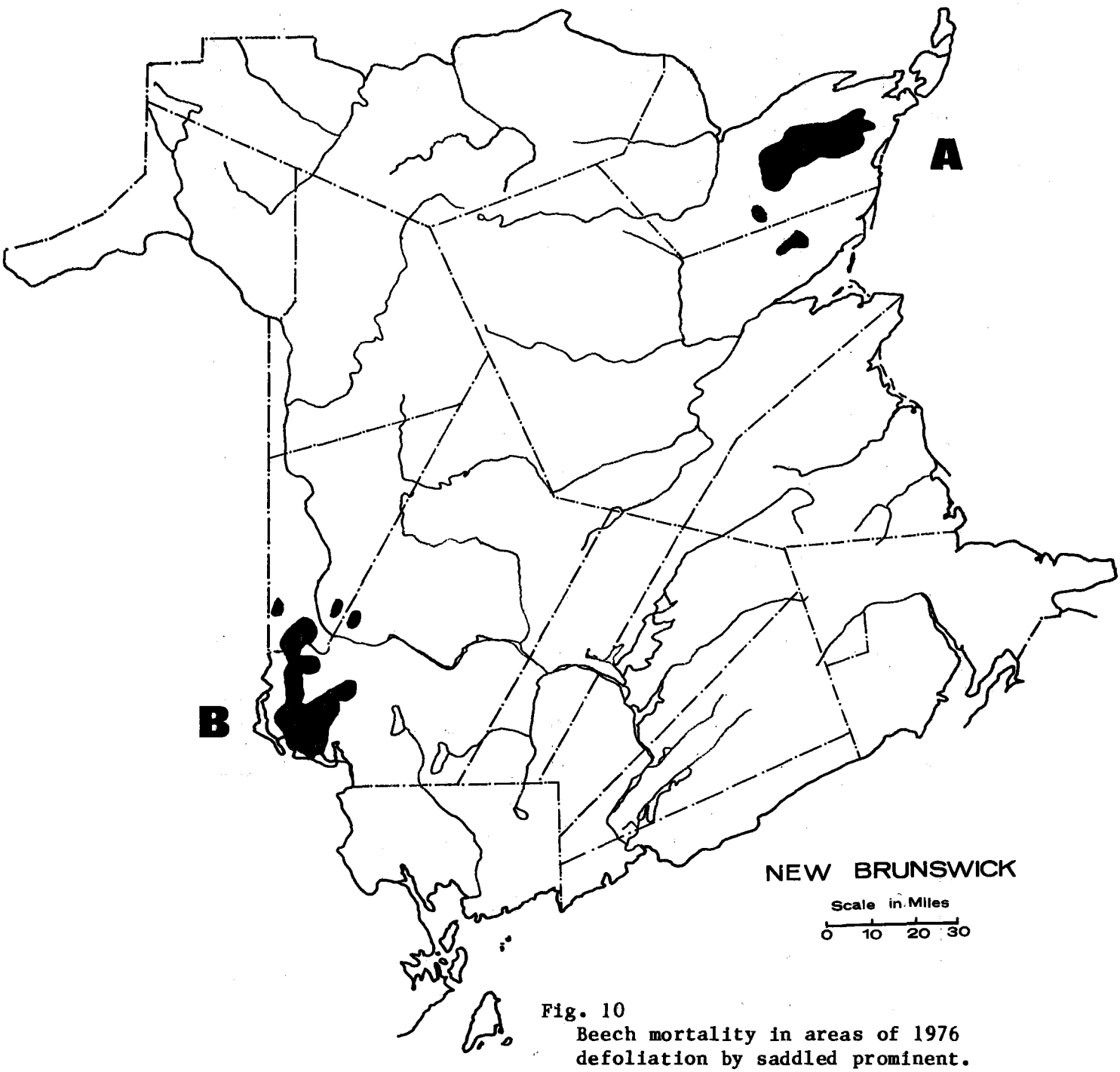

Fig. 10
Beech mortality in areas of 1976 defoliation by saddled prominent.

A - 20 200 ha (50,000 acres) with pockets of dead and
B - 14 200 ha (35,000 acres) dying trees

Greenstriped Mapleworm *Dryocampa rubicunda rubicunda* (F.)-- In New Brunswick, this insect caused severe defoliation of young red maple stands near Basse Aboujagne, Westmorland County, in central Charlotte and western Kings counties and west of Magaguadavic Lake in southwestern York County (Fig. 11). The Charlotte County infestation has been active for the last two years and is associated with defoliation of white birch by the pinkstriped oakworm, *Anisota virginiensis* (Drury); in one stand near Caribou Lake nearly 90% of the red maples were severely defoliated and more than 85% of the white birch had some defoliation, most (78%) were lightly defoliated (Table 6). No tree mortality has occurred to date but some trees had thin or bare tops in June 1978 in areas that suffered severe defoliation in 1977.

In the Chignecto Game Sanctuary, Cumberland County, N.S., light or moderate defoliation was more common than in 1977 and occurred on red maple in several mature stands and many young red maples were completely defoliated.

Defoliation and further branch mortality are expected to occur in the same areas in 1979.

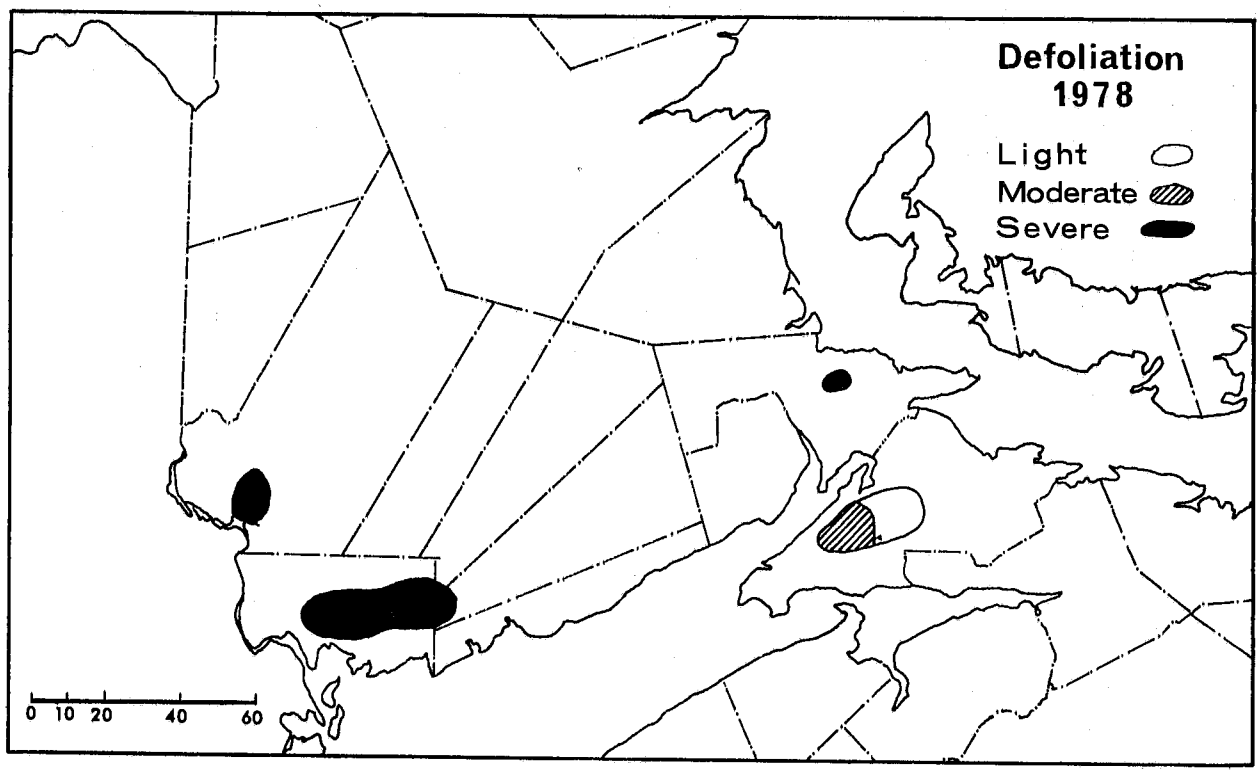

Fig. 11. Area of defoliation by the greenstriped mapleworm.

Table 6. Percent of merchantable volumes affected by greenstriped mapleworm and pinkstriped oakworm defoliation near Caribou Lake, N.B. (3 plots)

Defoliation class	Maple - red Volume and range %	Birch - white Volume and range %
Healthy	- -	15.8 (0-28)
1-25%	- -	78.7*(68-87)
26-50%	- -	1.6 (0-4)
51-75%	13.5 (0-24)	- -
76-100%	86.5*(76-100)	3.9 (0-20)
Dead	- -	- -

* Standard error is ± 3.6 and ± 8.0 for birch and maple, respectively, at 68% confidence limits.
85% of merchantable trees are in 10-15 cm (4-6") dbh class.

Maple Leaf Roller, *Cenopis pettitana* (Rob.)--Severe or moderate leaf rolling with some defoliation of red maples and to a lesser extent of sugar maples occurred in northern and central New Brunswick and in Inverness County, N.S.

In New Brunswick, red maples were severely affected at Edmundston, Madawaska County; Mullin Stream Lake and Trout Brook, Northumberland County; Noinville, Kent County; and sugar maples at Chipman, Queens County. Leaf rolling was light in many other areas in New Brunswick.

In Nova Scotia, sugar maples were severely affected over a 4-ha (10-acre) area at Southwest Margaree and in a 1-ha (2-acre) area at Margaree Forks, Inverness County. Elsewhere in the Province and in Prince Edward Island, leaf rolling was light at scattered locations.

In 1979, populations are expected to increase in central and northwestern New Brunswick. Little change is expected in Nova Scotia or Prince Edward Island.

Forest Tent Caterpillar, *Malacosoma disstria* (Hbn.)--This insect has been causing severe defoliation of trembling aspen for the last five years in Prince County, P.E.I. The main areas of infestation are between Springhill and Portage, near St. Louis, and around Duvar. Levels of parasitism and disease continued to increase in 1978 and some of the stands that suffered severe or moderate defoliation in 1977 lost only a small amount of foliage in 1978. The 1975- and 1978-assessments of infested stands about 15 m (50 ft) high and 10-18 cm (4 to 7 inches) diameter were compared. Tree mortality had not changed appreciably (14 and 16%, respectively) and the only noticeable change in tree condition was an increase in dieback from 3.5 to 20.1%. More than half (61.5%) of the dieback was attributable to Hypoxylon canker in 1975 compared to less than one third (28.5%) in 1978. The incidence of Hypoxylon canker has not increased and in 1978 the number of living trees with cankers was not significantly different, and was slightly less, (about 10%), than in stands elsewhere with no history of defoliation by forest tent caterpillar. Disease and parasitism should further reduce the insect population, and egg-mass surveys indicate that defoliation in 1979 will be light at most locations. In Nova Scotia, the outbreak reported in 1977 near Kentville, Kings County has subsided, and defoliation of aspen was light or very light on scattered trees. In New Brunswick, a few small patches of trembling aspen were severely defoliated along Route 95 near the United States border and light defoliation occurred at Acadieville, Kent County and Selwood, Restigouche County.

Oak Leaf Shredder, *Croesia semipurpurana* Kft.-- In Nova Scotia, severe defoliation of red oak occurred in central Queen's and western Lunenburg counties for the fourth consecutive year resulting in many mature and semimature trees showing signs of deterioration. Severe leaf shredding also occurred in the Middleton-Nictaux areas of Annapolis County. Evidence of feeding was noted in oak stands westward from Kings and Queen's counties, but population levels were low.

In Prince Edward Island, severe damage was limited to a few red oak trees north of Murray River, Kings County. In New Brunswick,

defoliation of red oak was severe along the north side of the St. John River between Mactaquac and Woodstock and moderate at Dover, Westmorland County. Some feeding was also noted in Charlotte County.

Severe defoliation of oak can again be expected in numerous areas in the Region in 1979. Light trap catches at Fredericton, N.B. increased from 578 in 1977 to 1545 in 1978.

Gypsy Moth, *Lymantria dispar* (Linn.)-- Special surveys conducted in southwestern Nova Scotia and at Ingonish, Victoria County, to establish the presence of a possible low population of gypsy moth as indicated by the high numbers of adult males trapped in 1977, were negative. No larvae were found and no defoliation was observed.

The adult trapping program, a joint venture of the Forest Insect and Disease Survey and the Plant Protection Division of Agriculture Canada, resulted in the capture of male adults in 67 of the 167 traps in Nova Scotia, all in the southwestern part of the Province. There were no traps with large numbers of males as in 1977 but the positive traps were distributed over a larger area in 1978. Adults were found for the first time at Digby Neck and on Long Island, Digby County and at the Nova Scotia Lands and Forests' Islands Park, Shelburne County.

In New Brunswick 17 of the 64 traps contained adults, mainly in the same areas as the previous years' catches. All 15 of the traps in Prince Edward Island were negative.

Dutch Elm Disease, *Ceratocystis ulmi* Buism.-- Significant changes occurred in the distribution of Dutch elm disease in both New Brunswick and Nova Scotia in 1978. The disease still has not been found in Prince Edward Island (Fig. 12). The most noteworthy change is the presence of the disease in the Margaree Valley on Cape Breton Island where large numbers of elm trees grow; infected trees were found at Emerald, Gillisdale, South West Margaree, and Upper Margaree in Inverness County. Also for the first time, the disease was identified in Cape Breton County at Sydney and in Lunenburg County at Pinehurst. The boundaries of many previously known infected areas expanded and the disease has intensified within. Notable extensions occurred near West

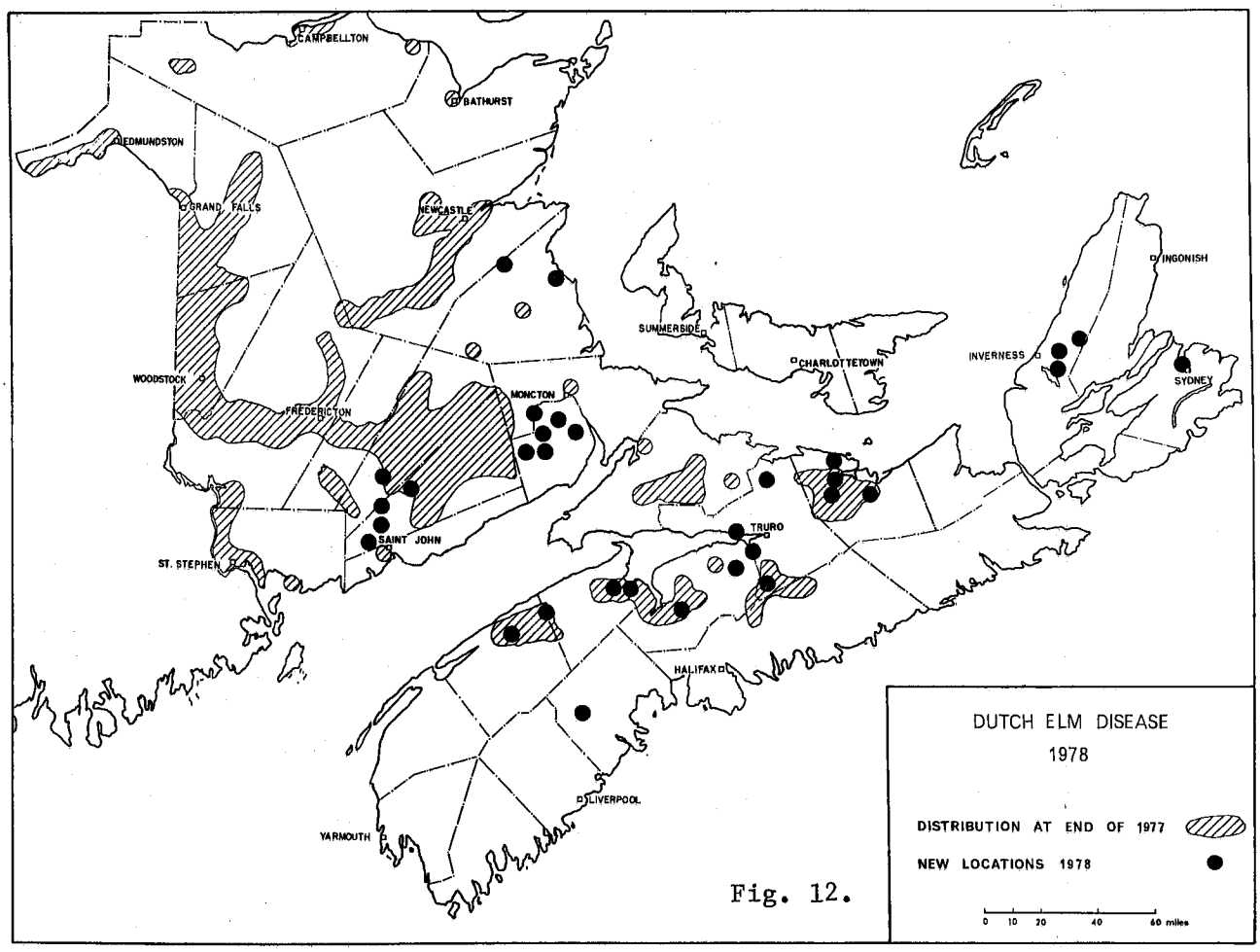

Fig. 12.

New Annan, Glenholme, and Pleasant Valley in Colchester County. In New Brunswick the disease was found for the first time in Albert County, at five locations, and at several new locations in Kent, Kings, and Queens counties.

In the Fredericton Dutch elm disease-control zone, 3% of the trees became infected in 1978 compared to the 14% average annual loss during a 7-year period (1970-77) in nearby uncontrolled areas. More than 90% of the elm trees died in the uncontrolled areas in seven years while the City has lost only about 16% of its original elm population in the past 17 years since the disease first appeared there. A survey in the control zone before the beginning of the 1978 season revealed that in

spite of the removal of about 1600 elm trees, for various reasons, since 1957 the elm tree population has decreased by only 575 trees. Although there is a shift from large street trees to smaller backyard trees, Fredericton's elm losses equal the number of trees removed for other reasons.

Native elm bark beetle, *Hylurgopinus rufipes* Eichh., populations in the control zone were minimally higher than in 1977 but still more than 20 times lower than in outside areas (3 vs. 66 beetles/10 cm^2 of tanglefoot trap). Drastic reduction in beetle numbers occurred in an area being developed for a buffer zone. After an elm-removal program in the winter of 1977-78, the beetle index dropped to 120 beetles/10 cm^2 in 1978 from 308 beetles/10 cm^2 in 1977.

Of 33 apparently healthy elm trees, selected in 1967 in areas of high tree mortality as part of a study of resistance to Dutch elm disease, 6 remain healthy, 2 are infected but living, 21 were killed by the disease, and 4 died from other causes. The two living diseased trees became infected seven and six years ago.

Abiotic Injuries— Snow caused branch and top breakage and severely bent young seedlings in a large number of pine plantations in northeastern New Brunswick, especially in Gloucester and Restigouche counties. One Scots pine plantation at Porter Brook, Northumberland County was badly damaged by a combination of heavy snow and ice carried on the spring flood waters of the Miramichi River. Elsewhere in the Region, snow damage was light and widely scattered.

Wind permanently bent or broke many large trembling aspen trees in a 2-ha (about-5 acres) stand near Napadogan, York County, N.B.

Late spring frost caused moderate to severe damage to most balsam fir Christmas tree stands in Northumberland County, N.B.; at Upper Blackville and Bettsburg, 40 to 60% of the balsam fir Christmas trees suffered severe damage. In Nova Scotia, damage was severe on balsam fir and white spruce in Cumberland County at Conn Mills, Salem, and Lower River Hebert and moderate at Nappan. Frost damage was moderate on foliage of sugar maple, beech, and red oak from the Aspy River to Cape North, Victoria County. On Prince Edward Island, white spruce suffered

severe damage at Mount Pleasant, Prince County and moderate damage at Goose River, Kings County, and Montrose, Prince County.

Winter drying of red pine was moderate to severe at numerous widely scattered locations in areas of Colchester, Lunenburg, Kings, and Shelburne counties N. S., and in Kings County, P.E.I.

In New Brunswick, winter drying was severe in a Scots pine plantation at Porter Brook, Northumberland County.

Several jack pine on the Edmundston Golf Course, Madawaska County, N.B., were discolored by either course maintainance or pulp mill fumes.

CONIFEROUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Animal damage	New Brunswick	Moderate porcupine damage to a 0.5-ha (1-acre) Scots pine Christmas tree plantation at Bettsburg, Northumberland Co, with 20% of damaged trees dead or dying.
Arborvitae leafminer *Argyresthia thuiella* (Pack.)	Prince Edward Island	Cedar trees over about 2 000 ha (5000 acres) at Muddy Creek, Prince Co. in poor condition as a result of repeated attacks.
Balsam gall midge *Paradiplosis tumifex* Gagné	Region	Small pockets of severe or moderate balsam fir needle deformation in localized areas of Lunenburg Co, N.S.; light elsewhere in Province and Prince Edward Island; negligible in New Brunswick.
European spruce sawfly *Gilpina hercyniae* (Htg.)	Region	Populations remained low in the Region. In Nova Scotia larvae were collected in nearly all counties, the highest number, 17, from 4 white spruce at East River St. Marys, Pictou Co. In New Brunswick, numbers were very low, averaging less than one per tree sampled. No larvae were collected on Prince Edward Island.
Globose gall rust *Endocronartium harknessii* (J.P. Moore) Y. Hiratsuka	Nova Scotia and New Brunswick	Severe infection on Scots pine at Paradise, Annapolis Co., Coldbrook, Kentville, Page Lake, and Armstrong Lake, Kings Co, Garden of Eden Barrens, Guysborough Co, Upper Vaughan, Hants Co, and Little River, Cumberland Co, N.S. In New Brunswick, common with some tree mortality in jack pine plantations at Marcelville, Northumberland Co, severe on young jack pine at Pont-Lafrance, Gloucester Co, and severe on 50% of Scots pine with some tree mortality in a 1.6-ha (4-acre) plantation at Upper Blackville, Northumberland Co.

CONIFEROUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Jack pine budworm *Choristoneura pinus pinus* (Free.)	Region	Only a few larvae found in Northumberland and Restigouche counties in New Brunswick, none in Nova Scotia or Prince Edward Island.
Larch casebearer *Coleophora laricella* (Hübner)	Region	Light defoliation occurred from Pleasant Lake to Yarmouth, Yarmouth Co, populations low elsewhere in the Region.
Larch seed insects	New Brunswick	Damage to larch seeds was found to be extensive at several locations during a study of cone insects (not yet completed).
Needle rusts of balsam fir *Pucciniastrum epilobii* Otth *Pucciniastrum* sp.	Nova Scotia New Brunswick	Moderate or severe damage on 4 ha (approx. 10 acres) at Mabou Highlands, Inverness Co, N.S. *P. goeppertianum* (Kuehn) Kleb. was found in the same area on blueberry, the alternate host. In New Brunswick, moderate on 2 ha (5 acres) at Saint-Ignace, Kent Co, and light at scattered locations in northern New Brunswick.
Needle rust of pine *Coleosporium asterum* (Diet.) Syd.	Nova Scotia New Brunswick	Common on pitch pine at Rushy Lake, Yarmouth Co; on jack pine at Beech Hill, Lunenburg Co; and pines at Stanley, Hants Co, N.S.; common in a red pine plantation at Doaktown, Northumberland Co, N.B.
Needle rust of pine *Coleosporium viburni* Arth.	Nova Scotia	Nearly 100% of one-year-old needles were affected in a red pine Christmas tree plantation at North River, Lunenburg Co, also found on jack pine in a plantation at Third Bear Lake, Yarmouth Co.
Needle rust of spruce *Chrysomyxa ledicola* Lagh.	Nova Scotia	Severe on about 4 ha (10 acres) of black spruce near Indian Fields, Yarmouth Co; light to severe on red spruce at East Kemptville, Yarmouth Co, and Stewarts Hill, Halifax Co; light to severe on black, red and white spruce at the Chignecto Game Sanctuary, Cumberland Co; light or moderate on white spruce at Glenmore, and at East Quoddy, Halifax Co.

CONIFEROUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Northern pitch twig moth *Petrova albicapitana* (Busck)	Nova Scotia	Common on jack pine planted since 1974 in the Chignecto Game Sanctuary where incidence ranged from 1 to 56% in 5 plantations; at Little River Cumberland Co 20% of trees were infested in one plantation.
Pine tortoise scale *Toumeyella parvicornis* (Ckll.)	New Brunswick Nova Scotia	This scale insect accompanied by sooty mold caused some branch and tree mortality in red and jack pine plantations at Despres Lake, Northumberland Co, N.B. In Nova Scotia, Scots pines were severely damaged at Midville Branch, Lunenburg Co, damage was moderate or severe at Berwick, Kings Co, light and moderate in 13 plantations at Stanley, Hants Co and in a plantation at Indian Fields, Shelburne Co.
Ragged spruce gall "aphid" *Pineus similis* (Gill.)	Region	Severe damage on spruce at one location near Black Brook, Victoria Co, N.B. Populations low in Nova Scotia and Prince Edward Island.
Red flag of balsam fir *Fusicoccum abietinum* (Hartig) Prill. & Del.	Nova Scotia	Not as common as in 1977, in balsam fir stands along Highway 289 east of Brookfield, Colchester Co, and at scattered locations in Pictou and Guysborough Co.
Red pine sawfly *Neodiprion nanulus nanulus* Schedl.	Nova Scotia Prince Edward Island	Moderate to severe defoliation in a red pine plantation near Churchill Lake, Yarmouth Co; defoliation of varying degrees at East Kemptville, Yarmouth Co, Squirreltown, Annapolis Co, Bridgewater, Lunenburg Co, Garden of Eden Barrens, Pictou Co, N.S. and at Bridgetown, Kings Co, P.E.I.
Roadside salt	New Brunswick	Varying degrees of foliage discoloration occurred on pine in many areas along roads and in a plantation at Saint-Basile, Madawaska Co.

CONIFEROUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Shoestring root rot *Armillaria mellea* (Vahl ex Fr.) Kummer	Cape Breton Island, N.S.	60% of dead and 5% of living balsam fir examined had white mycelial fans at their base. Apparently killed a semi-mature windbreak of red pine at Carleton, Yarmouth Co, N.S.
Shoot blight *Sirococcus strobilinus* Preuss	Nova Scotia New Brunswick	Moderate to severe infection on red pine at Henneberry Lake, Newcombville, Lunenburg Co; up to 90% at Glenmore, Halifax Co; trace to moderate in the Stanley Management Area, Hants Co, and at Debert, Colchester Co; and light at Midconner Lake, Kings Co, N.S. Found in a natural red pine stand at Rooth, York Co, N.B.
SO_2 damage	New Brunswick	Variable discoloration was noted on scattered black spruce seedlings in 1977 plantings within 1 km (0.5 mi.) of the Brunswick Mines concentrator at South Branch Little River, Gloucester Co.
Spruce bud scale *Physokermes piceae* (Schr.)	Region	Common on white, red, and black spruce in plantations in the Black Brook area of Victoria Co, N.B., levels ranging from 2 to 48% of collars infested. Populations low in Nova Scotia and Prince Edward Island.
Spruce needleminer *Pulicalvaria piceaella* (Kft.)	Nova Scotia Prince Edward Island	Common in Inverness, Victoria, and Cumberland Co, N.S. and at Head of Cardigan, Kings Co, P.E.I.
Swaine jack pine sawfly *Neodiprion swainei* Middleton	Nova Scotia	Caused spotty and in some cases severe defoliation of old jack pine foliage in a 70-ha (170-acre) plantation on the Patriquen Road in the Chignecto Game Sanctuary, Cumberland Co.

CONIFEROUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Spruce coneworm *Dioryctria reniculelloides* (Mut. & Mun.)	Region	Common in some areas of Prince Edward Island and Cape Breton, the highest numbers, 49.6 larvae per 3-tree sample, near Montague, Kings Co, P.E.I.; and 36.3 at Margaree Forks, Inverness Co, N.S. Numbers low in New Brunswick and mainland Nova Scotia.
Sweetfern blister rust *Cronartium comptoniae* Arth.	Nova Scotia	Causing mortality in a lodgepole pine plantation at Indian Fields, Shelburne Co; stem cankers common in jack pine plantation in the Stanley Management Area, Hants Co, and in several plantations in the Chignecto Game Sanctuary Cumberland Co; on scattered lodgepole pine at South Brookfield, Queens Co.
Yellowheaded spruce sawfly *Pikonema alaskensis* (Rohwer)	Nova Scotia	Severe defoliation caused some branch and tree mortality in a red spruce plantation at Wentworth Centre, Cumberland Co.
White pine weevil *Pissodes strobi* (Peck)	New Brunswick	Severe infestation on white pines in the Portage Vale-Five Points area of Kings Co; on about 1 ha (2 acres) of young white pine at Dungarvon Road, Northumberland Co; moderate on 0.4 ha (1 acre) at Parker Ridge, York Co, and 0.8 ha (2-acres) plantation at Despres Lake, Northumberland Co; light in the Crooked Rapids and Upsalquitch areas, Restigouche Co, on 0.8-ha (2-acres) young natural stand at Popple Depot, Northumberland Co, and on a 1.6-ha (4-acres) Scots pine plantation at Upper Blackville, Northumberland Co.

DECIDUOUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Alder flea beetle *Altica ambiens alni* (Harris)	Nova Scotia	Severe skeletonizing of alder foliage at many locations in Cumberland, Colchester, Halifax, Hants, Kings, Annapolis and Antigonish Co.
Anthracnose of maple *Kabatiella apocrypta* (Ell. & Ev.) Arx	New Brunswick	Foliage discoloration moderate or severe at scattered locations in northern New Brunswick.
Ash rust *Puccinia sparganioides* Ell. & Barth.	Nova Scotia	Complete defoliation occurred at Brooklyn, Queens Co; Jordan Falls, Shelburne Co; and Argyle and Kemptville, Yarmouth Co; caused varying degrees of foliage discoloration in all six southwestern counties.
Birch casebearer *Coleophora fuscedinella* (Zell.)	Region	In Nova Scotia, white birch was severely defoliated over about 100 ha (250 acres) near Culloden, Digby Co, moderate or severe loss of white birch foliage occurred at various locations in Inverness and Victoria Co. On Prince Edward Island, defoliation was moderate at Corran Ban, Queens Co. In New Brunswick, defoliation was generally light at scattered locations.
Birch leafminer *Fenusa pusilla* (Lep.)	Region	In New Brunswick, moderate or severe browning of wire birch to a lesser degree white birch occurred in northern Kent Co and southern Northumberland Co. Noticeable browning of wire birch and to a lesser degree white and yellow birch occurred in Nova Scotia in northern Colchester, Pictou, central Queens, and Yarmouth Co and in the Annapolis Valley; on Prince Edward Island in Kings and Queens Co.

DECIDUOUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Bruce spanworm *Operophtera bruceata* (Hulst)	Nova Scotia	Light defoliation of hardwoods at East Mapleton, Colchester Co.
Elm leaf beetle *Pyrrhalta luteola* (Müll.)	New Brunswick	Severe browning of elm foliage at Fredericton, York Co, overwintering populations of adult beetles are high and unless control measures are applied, damage will again occur in 1979.
Elm leafminer *Fenusa ulmi* Sund.	Region	Severe browning of English elm in most cities, towns, and villages in central Nova Scotia including the Annapolis Valley; on Prince Edward Island severe browning occurred at Eldon and Charlottetown, Queens Co., Summerside, Bedeque, and Central Bedeque, Prince Co, and at Victoria and Montague, Kings Co. Leaf browning was moderate at Dorchester, Westmorland Co, N.B.
Fall cankerworm *Alsophila pometaria* (Harr.)	Region	Moderate defoliation of apple trees at Margaree Forks, Inverness Co, and light defoliation of hardwoods at Ingonish, Victoria Co, and Springhill, Cumberland Co, N.S. In New Brunswick light defoliation of elms occurred at Fredericton, York Co, and of various hardwoods at Harding Point, Kings Co. Light defoliation of shade trees at Charlottetown, Queens Co, P.E.I. Note: See winter moth.
Ink spot of aspen *Ciborinia whetzelii* (Seav.) Seav.		Patches (± 1 ha) of trembling aspen with moderate or severe leaf browning were common in northwestern New Brunswick.
Leaf blotch of horse-chestnut *Guignardia aescule* (Peck) V. B. Stew.	Nova Scotia Prince Edward Island	Common throughout the range of the host, causing considerable leaf browning, but less than in 1977, at Amherst, Pugwash, Liverpool, and Sydney in Nova Scotia; Charlottetown, Summerside, Souris, Murray River, Kensington and several other places on Prince Edward Island.

DECIDUOUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
Leaf and twig blight of aspen *Venturia macularis* (Fr.) E. Muell. & Arx	Region	Foliage discoloration moderate or severe throughout Carleton and central York Co, at Sutherland, Pictou Co, N.S., and in a small patch of trees at Milltown Cross, Kings Co, P.E.I.
Leaf spot of maple *Phyllosticta minima* (Berk. & Curt.) Underw. & Earle	New Brunswick	Foliage discoloration was severe in maple stands used for syrup production in the Riceville area and light throughout the central and western parts of Madawaska Co.
Lesser maple spanworm *Itame pustularia* (Gn.)	New Brunswick Nova Scotia	Only a few larvae found in Annapolis, Guysborough, Shelburne, and Yarmouth Co N.S. and in Restigouche Co, N.B. Light trap catches were highest at Kejimkujik National Park, Annapolis Co, N.S. where 1256 moths were taken.
Maple decline	Nova Scotia Prince Edward Island	Maples in cities, towns, villages, and along roadsides continue to deteriorate throughout the provinces. Road salt, pollution, and ocean salt spray are all believed to contribute to this continuing 20-year decline.
Mountain-ash sawfly *Pristiphora geniculata* (Htg.)	Prince Edward Island	Common in communities on Prince Edward Island including, Charlottetown, Cavendish, Hunters River and Victoria in Queens Co; Murray Harbour, Souris, and St. Peters, Kings Co. and Summerside, Prince Co.
Poplar-and-willow borer *Cryptorhynchus lapathi* (L.)	Nova Scotia	All hybrid poplars were removed and burned from a nursery at East Kemptville, Yarmouth Co because of the high incidence of this borer.

DECIDUOUS FOREST PESTS OF LESSER IMPORTANCE

Organism	Locality	Remarks
A poplar leaf roller *Epinotia* sp.	Nova Scotia	Severe on trembling aspen in the Oxford, Thompson Station, and Birchwood areas of Cumberland Co; patches of ± 20 ha (50 acres) were affected near Falmouth and Summerville, Hants Co, and Burlington, Kings Co, and between Brickton and Middleton, Annapolis Co.
Poplar serpentine leafminer *Phyllocnistis populiella* (Cham.)	Region	Populations of this insect are increasing and were common on trembling aspen in northern New Brunswick and present at scattered locations in Nova Scotia and Prince Edward Island.
Satin moth *Leucoma salicis* (L.)	New Brunswick Nova Scotia	Severe defoliation of silver poplar at Barra Head, Richmond Co, and at Glendale and Belle Cote, Inverness Co, N.S. At Moncton, N.B., a few shade trees were severely defoliated.
SO_2 damage	New Brunswick	Light leaf browning in natural stands of red maple near Brunswick Mines Concentrator, South Little River, Gloucester Co.
Willow blight *Venturia saliciperda* Nuesch	Region	Severe leaf discoloration at Blacketts Lake, Cape Breton Co, N.S., at St. Peters Kings Co; P.E.I.; moderate at Hampton, Kings Co, N.B. and Bridgetown, Kings Co, P.E.I.
Winter moth *Operophtera brumata* (L.) and Fall cankerworm *Alsophila pometaria* (Harr.)	Region	Mixed populations of winter moth and fall cankerworm caused 30% defoliation of apple trees at Lower South River, Antigonish Co, 10% at Merigomish, and Lower Barney's River, Pictou Co, various levels of defoliation in scattered unsprayed apple orchards in Hants, Kings, and Annapolis Co and on a few elm shade trees at Southampton, Cumberland Co, N.S.; on Prince Edward Island light defoliation by winter moth on scattered basswood trees at North Tryon Prince Co, and Charlottetown, Queens Co; larvae were collected at Little Dover Rd., and Cookville, Westmorland Co, N.B.