



Forest pest conditions in the Maritimes in 1994

by
J. Edward Hurley
and
Laszlo P. Magasi

Canadian Forest Service - Maritimes Region
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ABSTRACT

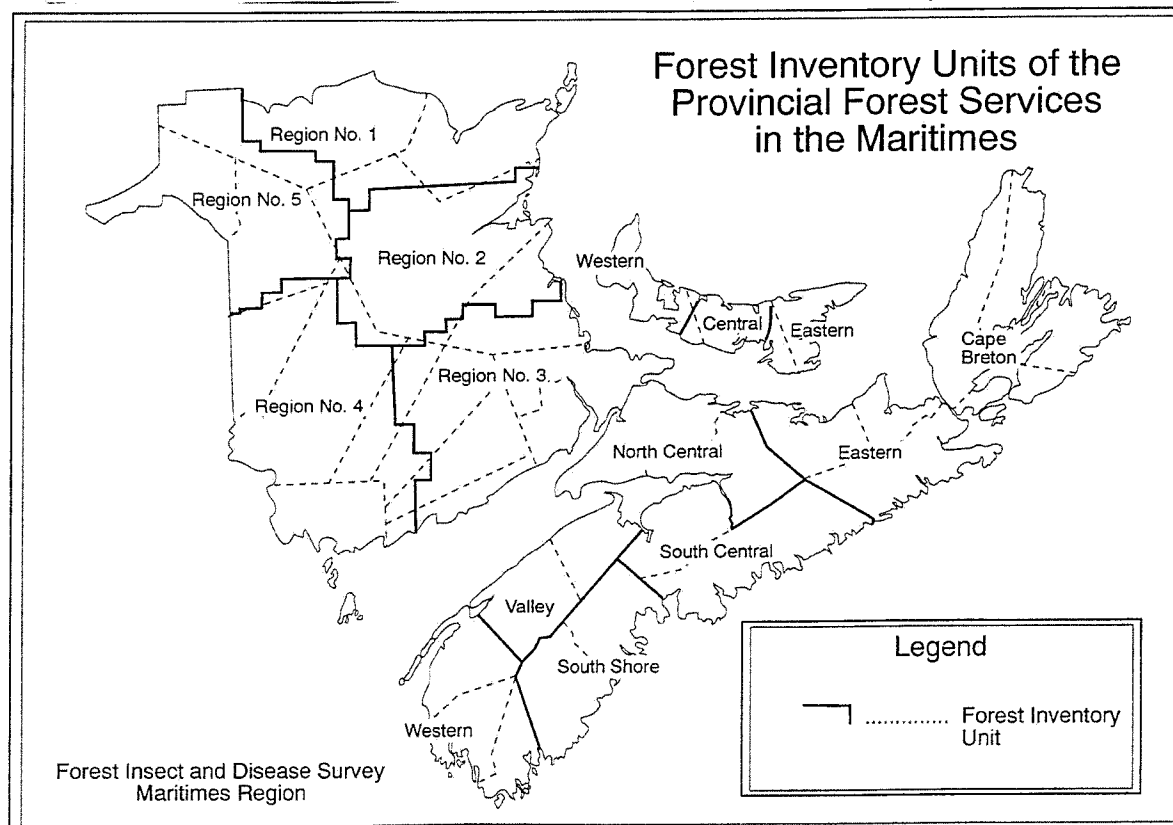
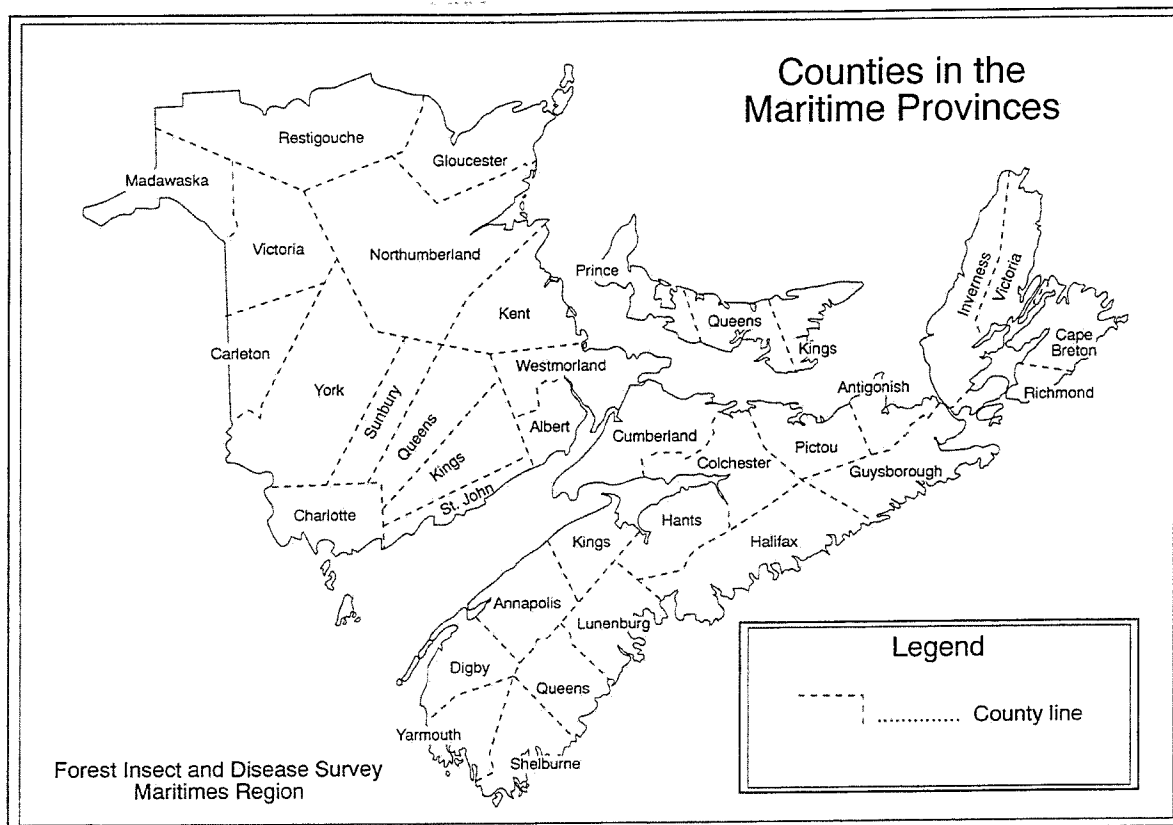
This report reviews the status of forest insects and diseases in the Maritimes region in 1994 and forecasts conditions for 1995, when appropriate. Pests and problems of conifers, hardwoods, and high-value areas (such as nurseries, seed orchards, plantations, and Christmas tree areas) are described. Information on pests under quarantine regulations, new insect and fungus records or new host combinations, and control operations against spruce budworm are summarized. A list of reports and publications relating to forest pest conditions is included. More detailed information is available from the Canadian Forest Service - Maritimes Region.

RÉSUMÉ

Le présent rapport fait le point sur les insectes et les maladies des arbres dans la région des Maritimes en 1994 et il donne au besoin un aperçu des conditions prévues pour 1995. Les ravageurs et les problèmes des conifères, des feuillus et des secteurs à valeur élevée comme les pépinières, les vergers à graines, les plantations et les secteurs plantés d'arbres de Noël y sont décrits. L'information relative aux ravageurs soumis à des règlements phytosanitaires, les relevés de nouveaux insectes ou de nouvelles maladies, ou encore de nouvelles combinaisons hôtes-ravageurs, ainsi que les activités de lutte contre la tordeuse des bourgeons de l'épinette sont résumés. On y trouve en outre une liste des rapports et des publications consacrés aux insectes et aux maladies des arbres. On peut obtenir de plus amples renseignements auprès du Service canadien des forêts - région des Maritimes.

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INTRODUCTION

The Canadian Forest Service - Maritimes Region's "Strategic Plan 1990-1995" states that:

"Forestry Canada - Maritimes will, through its Forest Insect and Disease Survey, capture the condition, health, and changes in the forest conditions and report these to our clients both at the regional and national levels."

This statement is an affirmation of the mandate on which the operation of the Forest Insect and Disease Survey (FIDS) has been based since the establishment of the unit in 1936. In the Maritimes, information on forest pest conditions and the effect of these on the forest is disseminated through periodic reports, such as Seasonal Highlights, Technical Notes, Information Reports, scientific publications, and the various annual reports of the Forest Insect and Disease Survey.

This information report aims to provide forest managers with information on pest conditions in the Maritime Provinces early enough that they can be taken into consideration in management decisions before the start of the 1995 field season. It also aims to emphasize the Canadian commitment to sustainable forest development and the protection of the ecosystem. To this end, we have added, for the first time, an ecological flavor to our discussion of some of the forest pests. All of the Maritimes region is in the Atlantic Maritime Ecozone. For our discussion we have chosen Loucks' "Forest Classification for the Maritime Provinces"¹ as the basis for our 'eco-unit' reporting. The section on new species records and new host-pest combinations is in line with our commitment to the issue of biodiversity, the section on plant quarantine-related pests is in partial fulfillment of one of our federal mandates.

This annual report summarizes pests and problems of conifers, hardwoods, and high-value areas (such as nurseries, seed orchards, plantations, and Christmas tree stands) as they were observed in 1994. Also included is survey information on forest pests under quarantine, control operations against the spruce budworm, and a list of reports and publications relating to forest pest conditions.

Insects and diseases that were widespread and caused considerable concern in 1994 are discussed in detail, others are presented in tabular form. More information on these and on other specific conditions will be provided by the Canadian Forest Service - Maritimes Region upon request.

Two maps are included on the opposite page to help the reader. The maps show the counties of the three provinces, and Loucks' forest classification for the Maritime provinces. Also, the reader will find a table in the appendix listing the distinctive features of the Maritimes ecoregions.¹

Efforts have been made to collect and report information in quantitative terms but, for a variety of reasons, it will never be possible to quantify all observations. Throughout this report, the terms "severe", "moderate", "light", and "trace" are used to describe the level of defoliation and, in some cases, other injury or insect population levels. Unless otherwise stated, the terms should be interpreted as follows:

| | |
|----------|----------|
| Trace | up to 5% |
| Light | 6-29% |
| Moderate | 30-69% |
| Severe | 70-100% |

Much of the information contained in this report has been collected by personnel of the Forest Insect and Disease Survey. However, the level of cooperation with clients has increased significantly in recent years and so has the type and amount of information available. While the contribution of our clients is acknowledged, the Forest Insect and Disease Survey remains ultimately responsible for the content of this report.

The cover of this report depicts two color phases of the variable oak leaf caterpillar, a late-season hardwood defoliator in 1994.

¹ Loucks, O.L. 1962. A Forest Classification for the Maritime Provinces. Proc. Nova Scotian Institute of Science 25(2): 85-167.

PESTS OF CONIFERS

Spruce Budworm

Information about spruce budworm, *Choristoneura fumiferana* (Clem.), is summarized from various sources: New Brunswick Department of Natural Resources and Energy (NBDNRE), Forest Protection Limited, J.D. Irving, Limited, Nova Scotia Department of Natural Resources (NSDNR), and the Forest Insect and Disease Survey (FIDS). Both published and unpublished data were used with permission, and the cooperation of all organizations is acknowledged. More detailed information is available from the various agencies.

Spruce budworm populations have shown a marked downward trend in eastern North America over the last few years. During the aerial surveys in 1994, spruce budworm defoliation was observed only in Prince Edward Island; however, the insect remains one of the major defoliators in the fir-spruce forest in the Maritimes.

Balsam fir and/or various species of spruce are major constituents of ten of the eleven forest ecoregions in the Maritimes, characterized by cool or moderately cool temperatures and wet to moderately dry moisture regimes. Furthermore, spruce and fir are also common in the warm, dry St. John River Ecoregion in New Brunswick, depending on site and past management practices.

New Brunswick

For the second consecutive year, no defoliation of balsam fir or spruce was observed in New Brunswick during the annual spruce budworm aerial survey conducted by NBDNRE. Ground surveys also indicated generally low spruce budworm populations. Feeding damage in most areas was minimal, except in the northwestern part of the province, where a few pockets of light defoliation were observed.

Foliage protection against spruce budworm in New Brunswick was conducted over 22,300 ha in 1994 by Forest Patrol Ltd., a subsidiary company of J.D. Irving, Limited.

All treated areas received a single application of insecticide. Fenitrothion was used on 21% of the area, while 79% was treated with *Bacillus thuringiensis* (*B.t.*).

The rate of application for fenitrothion (Sumithion®) was either 140 g/ha or 210 g/ha. *B.t.* products in 1994 were Foray 76B® and Futura XLV-HP®, applied at 20 BIU/ha.

Surveys of overwintering larvae (L2 surveys) conducted by NBDNRE identified a 6,000-ha area of moderate to high infestation in the Kedgwick district of the New Brunswick Highlands Ecoregion along the South Branch Kedgwick River, in the extreme northwestern part of the province. In addition, 278,000 ha of "detectable, low population infestations" were identified, most in central and northern New Brunswick.

Nova Scotia

For the eighth consecutive year, no defoliation of balsam fir or spruce was observed during the annual spruce budworm aerial survey in Nova Scotia in 1994. Larvae were difficult to find during ground sampling and their presence was recorded only at five locations, all in the northeastern part of the province.

Surveys of overwintering larvae (L2 surveys) conducted by NSDNR at 173 locations indicate that spruce budworm populations will remain low in 1995. Overwintering populations were negative at 92% of the locations sampled and low at the other 8% (14 sample points), all in Pictou and Antigonish counties in the Pictou Uplands District of the Maritimes Uplands Ecoregion.

Prince Edward Island

Defoliation, mostly of white spruce, and to much lesser extent balsam fir, was recorded over 38,600 ha in 1994. Of this, 2,500 ha in the moderate category occurred in patches within the 36,100 ha of light defoliation

(Fig 1). Although the total area affected decreased only slightly from the 42,800 ha mapped in 1993, there was a marked decrease in the overall intensity of the defoliation (2,500 ha moderate in 1994 compared to 33,800 ha of severe and moderate in 1993). Defoliation again occurred mostly in southern Kings and southeastern Queens counties in the Hillsborough district of the Magaguadavic-Hillsborough Ecoregion. Elsewhere in the province, defoliation was only trace or light but was more common than in 1993.

Surveys of overwintering larvae (L2 surveys) conducted by FIDS indicate no significant departure from the situation observed in 1994 and pockets of defoliation can be expected in the southeastern part of the province. Spruce budworm populations appear to be very low in the rest of Prince Edward Island.

- L.P. Magasi and A.W. MacKay

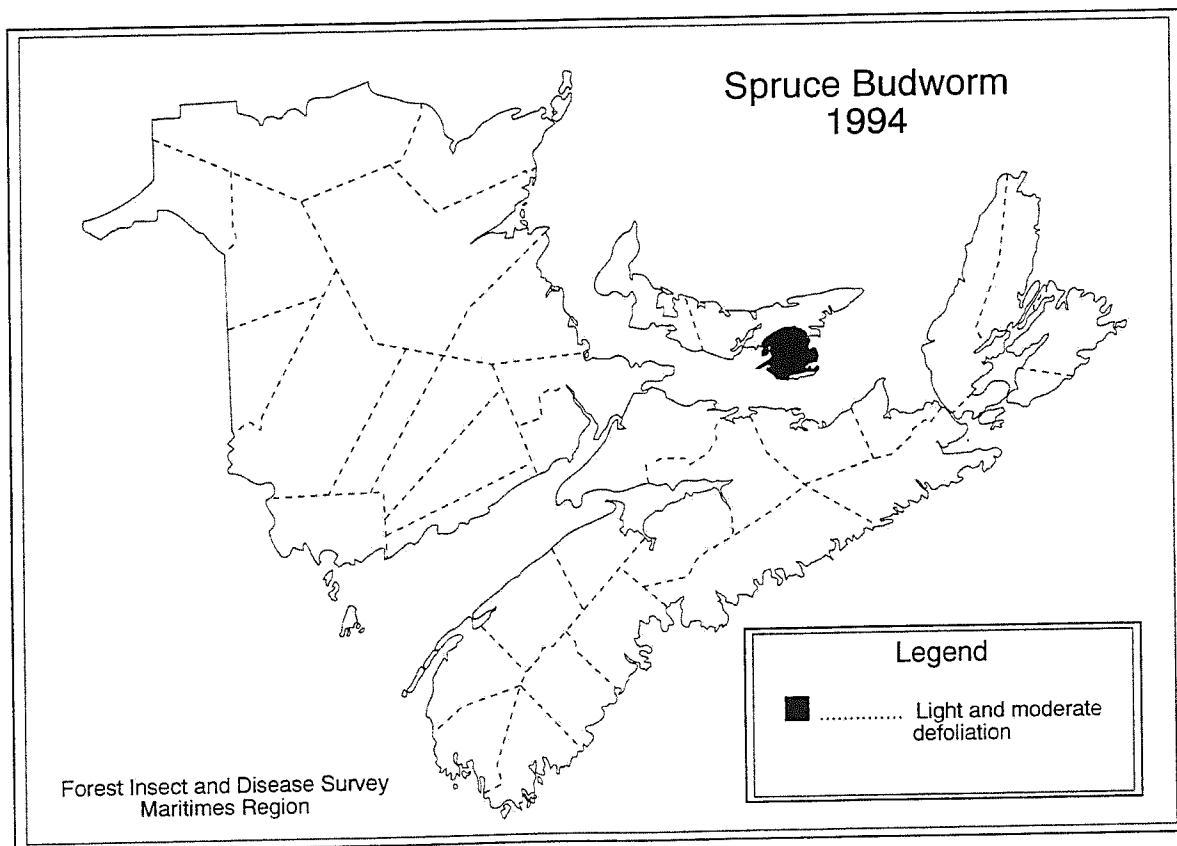


Figure 1 Source: Aerial surveys by NBDNRE, NSDNR, and CFS-M (FIDS)

Hemlock Looper

Hemlock looper larvae, *Lambdina fiscellaria fiscellaria* (Gn.), were found in very low numbers at approximately 100 of the more than 150 sample locations around the Maritimes region. Defoliation was found at only a few locations and never exceeded light levels of damage. However, pheromone trap data and fall egg surveys in Nova Scotia have shown that there are areas of balsam fir that may experience damage from high population levels of hemlock looper in 1995.

Balsam fir, the only conifer that has been significantly defoliated by the hemlock looper in the Maritimes during the period 1989-1992, is a major tree species in ten of the 11 ecoregions. Hemlock looper has defoliated balsam fir at locations in four of these ten ecoregions: the New Brunswick Highlands, the Gaspé-Cape Breton, the Fundy Bay, and the Atlantic Shore. Associated climate for these ecoregions typically has cool to cold temperatures with wet conditions, except for the New Brunswick Highlands Ecoregion where moderately dry conditions prevail. These climatic conditions are not typical for the other ecoregions (except for the Maritime Uplands) where hemlock looper has not been a problem.

In New Brunswick, hemlock looper larvae were found in very low numbers at 22 of the 66 sampling sites around the province. The NBDNRE conducted a fall egg mass survey at a total of 194 sample sites with 80% of those locations with negative results and the remaining locations with low numbers of eggs.

In 1994, hemlock looper larval numbers were very low in Nova Scotia. However, high pheromone trap captures prompted the NSDNR to conduct a fall egg survey. Samples were collected at 265 locations, 206 of these in Inverness and Victoria counties where 60 sampling areas had populations categorized as moderate, high or extreme. Other areas that predict high or extreme looper populations for 1995 include one location in Annapolis Co. and two in Lunenburg Co.

Where high populations of hemlock looper are predicted, in areas in Inverness and Victoria counties, a number of these sampling areas fall within the Maritime Uplands Ecoregion. Climate conditions for this ecoregion are very similar to conditions typical of the previous outbreak areas in New Brunswick and Nova Scotia.

Prince Edward Island hemlock looper populations appear to be even lower than that reported in 1993. Damage levels were no more than trace with the average pheromone trap catch of 127 moths, about half of the average caught in 1993.

- J.E. Hurley

Spruce Beetle

Spruce beetle, *Dendroctonus rufipennis* Kby., activity increased in northwestern New Brunswick, continued to expand in Nova Scotia and remained low in Prince Edward Island.

In the Maritimes, the spruce beetle was found in all ecoregions except the Saint John River Ecoregion. This area is characterized by rich soils, a warm climate, and a relatively low moisture index. Although coniferous swamps and stands of white spruce are to be found, this ecoregion has hardwoods as its characteristic species. The spruce beetle generally infests mature to overmature stands of white spruce, not a significant component in this ecoregion.

In New Brunswick, infestations increased in northwestern areas but remained low in the rest of the province. Up to 2 ha of white spruce experienced severe attack at Violette Brook, Madawaska Co. Dead or dying trees were also found in Charlotte, Northumberland, Victoria, and York counties.

In Nova Scotia, spruce beetle infestations continued to intensify and expand in many parts of the province. Aerial surveys conducted by NSDNR and FIDS showed a continuation in the expansion of areas of recently killed white spruce throughout much of the province. In infested white spruce stands, most trees were dead or dying. Affected areas ranged in size from a few trees to dozens of hectares in all counties except Queens, Shelburne, and Yarmouth. Damage was particularly noticeable along the north coast of the Bay of Fundy, from Digby to Hants county and in northeastern Pictou and northern Antigonish counties. In Pictou and Antigonish counties, numerous patches of old and recently killed white spruce trees were observed over hundreds of hectares.

Volume losses (m^3/ha) were determined at plots established in spruce beetle-infested white spruce stands representative of each of the three damage categories (low, moderate, high). The volume losses (Table 1) are based on the area of beetle-infested stands as compiled in 1993. Nearly 127,000 m^3 of white spruce is estimated to have been killed by spruce beetle during the last few years. Spruce beetle is also attacking red spruce in Nova Scotia. Because of successful attacks, an area of approximately 250 ha is being harvested near Advocate, Cumberland Co., and an infested stand of 7 ha is being cut north of Five Islands, Colchester Co.

Table 1 Area and volume loss of spruce beetle-infested white spruce in Nova Scotia

| | Bark Beetle Damage | | | Total |
|------------------------------|--------------------|----------|-------|--------|
| | Low | Moderate | High | |
| Area* (ha) | 271 | 1045 | 710 | 2026 |
| Volume Loss (m^3) | 5401 | 48331 | 73066 | 126798 |

Area based on 1993 surveys. Area Source: NSDNR - Entomological Services

In Prince Edward Island, new mortality was reported from only one area, Central Bedeque, Prince Co., encompassing a 2-ha site.

- A.S. Doane

Eastern Larch Beetle

The eastern larch beetle, *Dendroctonus simplex* LeConte, was more common and caused more damage in 1994 than in 1993 by attacking and killing numerous semi-mature and mature larch trees in all three provinces. Affected trees were found in three ecoregions: the Maritimes Lowlands, where they were most common, Magaguadavic-Hillsborough, and Clyde River-Halifax.

Eastern larch beetle was more active and common in the eastern and southern parts of New Brunswick. Damage ranged from 4-44% of trees killed with the most severe attack at Cherryvale, Queens Co., where semi-mature larch trees were killed over an area of approximately 20 ha.

In Nova Scotia, incidence and intensity of beetle-attacked trees increased from 1993. Dead and dying trees were found at nine locations in the north-central and western part of the province. The most severe attack occurred at Danvers, Digby Co., where 90% mortality occurred over a 5-ha area.

Mortality of larch was again common in Prince Edward Island, especially in Prince County. Areas with larch mortality usually involved over 10 ha.

- O. A. Meikle

European Larch Canker

European larch canker, caused by the fungus *Lachnellula willkommii* (Htg.) Dennis, is known to occur in the Maritime Lowlands, Fundy Bay, Maritime Uplands, Magaguadavic-Hillsborough, Atlantic Shore, and Clyde River-Halifax Ecoregions. All but the last are characterized by cool or moderately cool weather with varying amounts of precipitation.

In 1994, European larch canker was not found at any of the 28 locations examined outside the known distribution in New Brunswick (Fig. 2). The disease is widespread and common within the infected (and quarantined) area in the province.

In Nova Scotia, the disease was found on larch at three locations outside of the known distribution in the province in 1994. Single branch cankers were found at Kempt, Queens Co., Porter's Lake, Halifax Co., and Alder Plains, Yarmouth Co. These represent significant expansions of the known distribution but are within the quarantine zone, which includes all of mainland Nova Scotia. No infections were found at the 23 other locations examined outside the known distribution in Nova Scotia. The disease is widespread and common within the infected areas in the province.

In Prince Edward Island, where larch canker was found for the first time in 1992, one infected tree was found in one of the 30 areas examined in 1994. The infected tree, with three branch cankers, was in the Camp Tamawaby Demonstration Woodlot, Prince Co., within the same 10 km UTM (Universal Transverse Mercator) grid square as the two 1992 locations. All three cankers were removed and destroyed. Since 1981, nearly 350 stands have been examined throughout the province but larch canker has only been found (as branch cankers) in three of these stands, within 5 km of each other, in Prince County. The province remains outside of the quarantine zone.

- K.J. Harrison

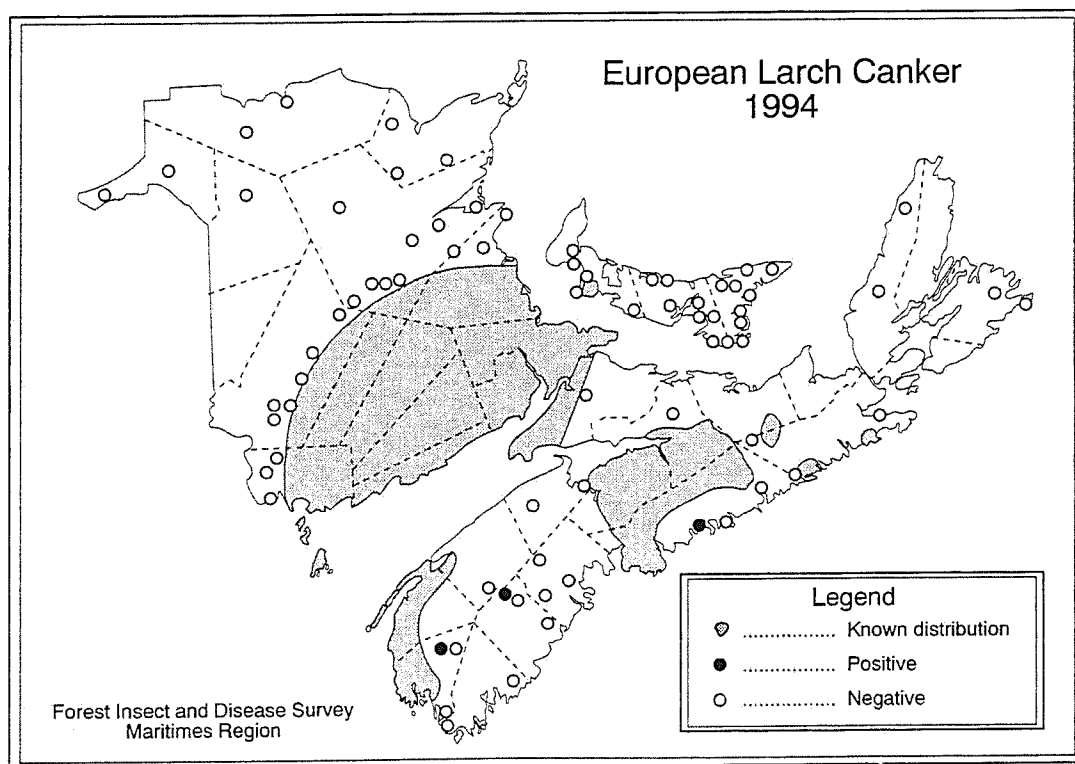


Figure 2

Sirococcus Shoot Blight

Sirococcus shoot blight, caused by the fungus *Sirococcus conigenus* (DC) P. Cannon & Minter, is present in all three Maritime provinces. In the past, the disease has been widely distributed and most damaging on both planted and naturally regenerated red pine in Nova Scotia, west of the Colchester-Pictou and Halifax-Guysborough county lines. In 1993, however, the disease became more widespread and damaging, especially in Nova Scotia and Prince Edward Island. In many areas, repeated infection has resulted in serious deterioration of red pine stands and plantations. This year there was a reduction in disease intensity on red pine from 1993 levels. Larch was found infected for the first time in the Maritimes in 1983, reported again in 1984 and has reappeared in 1994.

In 1994, the disease was present in all ecoregions, except the Saint John River, New Brunswick Highlands, and Cape Breton Plateau Ecoregions. The disease appears to be most common and damaging in the Clyde River-Halifax and Maritime Lowlands Ecoregions and this may be due to the influence of frequent fog and moderate to high precipitation levels which promote infection.

On red pine

In New Brunswick, Sirococcus shoot blight continued to cause shoot and branch dieback on red pine at previously reported locations in Fundy National Park, Albert Co., and MacDougall Lake, Charlotte Co. Damage was also reported at three new locations: severe shoot dieback (in a 15-year-old red pine plantation) at Donegal, Kings Co., and in natural red pine regeneration at McKean Brook, Northumberland Co., and moderate damage at Lily Lake, York Co.

In Nova Scotia, the disease continues to ravage red pine in the southwestern part of the province and on the eastern mainland. In 1993, the cool, wet spring and early summer weather conditions resulted in an increase in the disease intensity. June 1994 was warmer and drier than normal and this weather continued throughout the summer. These dry conditions are not conducive to spore release and infection, thus disease intensity decreased this year. The average infection rate in the moderate and severe categories in 1993 decreased to trace and light in 1994. Mortality of red pine was reported from various locations, especially in western Nova Scotia where the disease has been established the longest. The worst damage was reported from Shelburne and Yarmouth counties. Salvage operations were conducted during the winter of 1993-94 in infected red pine plantations in Cumberland, Guysborough, and Pictou counties to try to stem the spread of the disease. Scott Worldwide Inc. cut 62 ha on the Perch Lake Road, Pictou Co., and Stora Forest Industries Ltd. salvaged 96 ha of merchantable and 57 ha of unmerchantable red pine in the Garden of Eden Barrens, Guysborough Co., and the Trafalgar burn area, Pictou Co. Six hectares of merchantable red pine were salvaged by NSDNR in the Chignecto Game Sanctuary, Cumberland Co.

In Prince Edward Island, the disease continues to intensify in the known infected red pine plantations and is becoming more widespread each year. The status of the disease in some previously reported areas is as follows: an average of 60% of the shoots are dead, range 10-100%, at Valley, Queens Co.; average 40%, range 10-70%, at Selkirk Road, Queens Co., and an average 15%, range 0-50%, at Camp Tamawaby Demonstration Woodlot, Prince Co. Twenty percent of the Colorado blue spruce interplanted with red pine at Selkirk Road had 8% shoot mortality.

On larch

Sirococcus shoot blight was common on larch this year and caused shoot dieback at all levels of intensity on mature and overmature trees. Most of the damaged shoots were closely associated with infected 1993 cones. This was the first time since 1984 that larch has shown symptoms of this disease. In New Brunswick, the disease was confined to the southern half of the province and was most prominent in the southwestern portion. The worst damage observed was 32% of the shoots killed at Pratt Brook, York Co. In Nova Scotia, infected larch trees were found at over 30 locations throughout Nova Scotia but damage was mainly trace or light. The highest infection rate was trace or moderate along a 2-km stretch of roadside trees at Forest

Glen, Yarmouth Co. Infected shoots were also reported at trace levels in three eastern larch and two European larch plantations in Queens Co., Prince Edward Island.

- *A.W. MacKay*

Armillaria Root Rot

Armillaria root rot, *Armillaria mellea* (Vahl ex Fr.) Kummer, is widely distributed in the region but mortality of young and old trees was less common than in 1993.

In 1994, Armillaria root rot killed trees in one of the 78 spruce plantations assessed in New Brunswick and in one of the 28 spruce plantations assessed in Nova Scotia. Infection rates were generally low, mostly in the 2-5% range. The highest level of mortality was recorded in a black spruce plantation at Right Hand Branch Belone Brook, Restigouche Co., where 5% of the trees were dead. The disease was not found in any of the 25 pine plantations surveyed in the Maritimes.

In most years, since the beginning of the plantation pest assessment surveys in 1986, spruce appeared to be more vulnerable to the disease than pine (Table 2). The exceptions to this observation were the years 1992 and 1993 in New Brunswick and 1993 in Nova Scotia. Even though trees of both species are killed by Armillaria root rot in plantations, the number of trees affected has been generally low.

Armillaria root rot also caused sporadic tree mortality in other forest situations. Suppressed or stressed mature and semi-mature trees were killed in the region.

- A.M. Jones and G.R. Lemieux

Table 2 Frequency of Armillaria root rot-infected pine and spruce plantations in New Brunswick and Nova Scotia, 1986-1994

| Year | New Brunswick | | | | Nova Scotia | | | |
|-----------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|--------|
| | Pine | | Spruce | | Pine | | Spruce | |
| | Plant. assessed | % inf. | Plant. assessed | % inf. | Plant. assessed | % inf. | Plant. assessed | % inf. |
| 1986 | 44 | 9 | 95 | 27 | - | - | - | - |
| 1987 | 34 | 6 | 113 | 23 | - | - | - | - |
| 1988 | 50 | 12 | 131 | 18 | 22 | 5 | 37 | 11 |
| 1989 | 68 | 7 | 187 | 22 | 14 | 7 | 42 | 21 |
| 1990 | 52 | 10 | 117 | 15 | 38 | 5 | 104 | 14 |
| 1991 | 36 | 14 | 109 | 17 | 24 | 0 | 81 | 11 |
| 1992 | 37 | 11 | 105 | 6 | 24 | 0 | 45 | 18 |
| 1993 | 60 | 12 | 104 | 5 | 14 | 21 | 40 | 0 |
| 1994 | 13 | 0 | 78 | 1 | 11 | 0 | 28 | 1 |
| All years | 394 | 10 | 1039 | 15 | 147 | 4 | 377 | 8 |

Spruce Budmoths

Spruce budmoths comprise a group of closely related species: the spruce budmoth, *Zeiraphera canadensis* Mut. & Free., the purplestriped shootworm, *Zeiraphera unfortunana* Powell, and the yellow spruce budworm, *Zeiraphera fortunana* (Kft.). *Z. canadensis* is the most common and most important of the three, but occasionally the species-mix changes in favor of one of the other two.

Shoot damage by spruce budmoths, *Zeiraphera spp.*, on white spruce was slightly higher in New Brunswick and Prince Edward Island and slightly lower in Nova Scotia in 1994 than in 1993. While this feeding usually does little injury to mature spruce, serious damage has been found in plantation white spruce in the past.

In New Brunswick, damage ranged from trace to moderate with an average of 16% of the shoots affected at the 18 locations examined, compared to 15% reported in 1993. The most serious injury was recorded at Southwest Head, Charlotte Co., where 75% of the current shoots were moderately defoliated on all trees examined.

In Nova Scotia, damage was generally trace, with pockets of light and one area of moderate and severe infestation. Shoot injury averaged 10% at the 34 locations examined, compared to 12% in 1993. Moderate damage on 80% and severe on 20% of shoots was observed over a 1-ha area at Cap Rouge, Cape Breton Highland National Park, Inverness Co.

In Prince Edward Island, an average of 26% of shoots were injured at 24 locations, which represent a 5% increase from 1993. Damage was trace or light with the exception of a park at Brackley Beach, P.E.I. National Park, Queens Co., where moderate damage was observed.

- T.J. Walsh

Larch Casebearer

Larch casebearer, *Coleophora laricella* Hbn., populations have generally decreased throughout the Maritimes over the past 2 years. Although feeding was observed on trees in areas up to 2 ha, browning was usually limited to small clusters of trees or scattered individuals.

In the Maritimes Region, larch is shade intolerant, often inhabiting open areas of poor site quality. Larch casebearer, an introduced pest, was found in all ecoregions, except Fundy Bay and New Brunswick Highlands. These two ecoregions have climatic conditions unlike the ecoregions where larch casebearer is typically found.

In New Brunswick, foliage discoloration occurred in central and southern areas at lower incidence and severity than in 1993. Foliage browning varied from trace to severe at the 11 locations assessed. The most appreciable browning was observed at Rolling Dam, Charlotte Co., where severe defoliation occurred on all larch over a 2-ha site.

In Nova Scotia, larch casebearer populations have decreased in western areas and increased in eastern areas while intensity levels decreased throughout the province. Discoloration occurred in small patches at mainly trace or light levels with a few areas of moderate browning in Colchester, Cumberland, and Yarmouth counties.

Larch casebearer populations remained at endemic levels in Prince Edward Island.

- A.S. Doane

Blowdown

On November 7, 1994, winds reaching over 100 km per hour in New Brunswick caused serious blowdown. Although scattered individual trees were blown down at several locations throughout the province, numerous softwood stands were destroyed, particularly those composed of balsam fir and spruces, in the northcentral, northwestern, and central parts of the province. Volume estimates recorded by the NBDNRE reveal a total 3,850,000 m³ of wood blown down in the seriously affected areas.

Most of these areas were located in the New Brunswick Highlands Ecoregion, where balsam fir and black spruce are found on generally exposed sites that have shallow soils, and in the Green River District of the Gaspé-Cape Breton Ecoregion, where old growth forests are historically destroyed by wind, if not by insect attack. Other areas, with lesser damage, were located in the northern section of the Maritimes Uplands Ecoregion where balsam fir and spruces predominate in the valley bottoms and form mixedwoods with several hardwoods on steep slopes. All of these areas lie within the high elevation lands of northcentral and northwestern New Brunswick where exposure to high winds is most likely to occur.

- *G.R. Lemieux*

PESTS OF HARDWOODS

Dutch Elm Disease

Dutch elm disease, caused by the fungus *Ceratocystis ulmi* (Buism.) C. Moreau, was a concern in all three Maritime provinces in 1994 (Fig. 3). The disease is found in all ecoregions along streams or rivers, or wherever the high water table has favored the growth of elm trees.

In New Brunswick, the disease is present wherever elm trees are found.

In Nova Scotia, where trees affected by Dutch elm disease that are either dead or dying are common, the disease continued to intensify. On mainland Nova Scotia, the disease was found at two new locations, Warren and Truemanville, Cumberland Co. Both locations are about 5 km apart along Route 6 near two other infected areas, thus representing a minor extension and a closing of a gap in the disease distribution.

Elsewhere in Nova Scotia, several municipalities have ceased efforts to combat the spread of the disease within their jurisdiction. As elm trees die from Dutch elm disease, these municipalities will face the major expense of tree removal to prevent the dead trees becoming a hazard to life and property. In 1993-94, one community spent over \$500,000 to remove potentially dangerous dead elm trees from along its streets.

In Prince Edward Island, diseased trees were more common in western Prince Co. where the disease was first identified in 1979. In 1994, no infected trees were found in either Queens or Kings counties since individual infected trees were found and removed in 1988 and 1991, respectively.

- K.J. Harrison

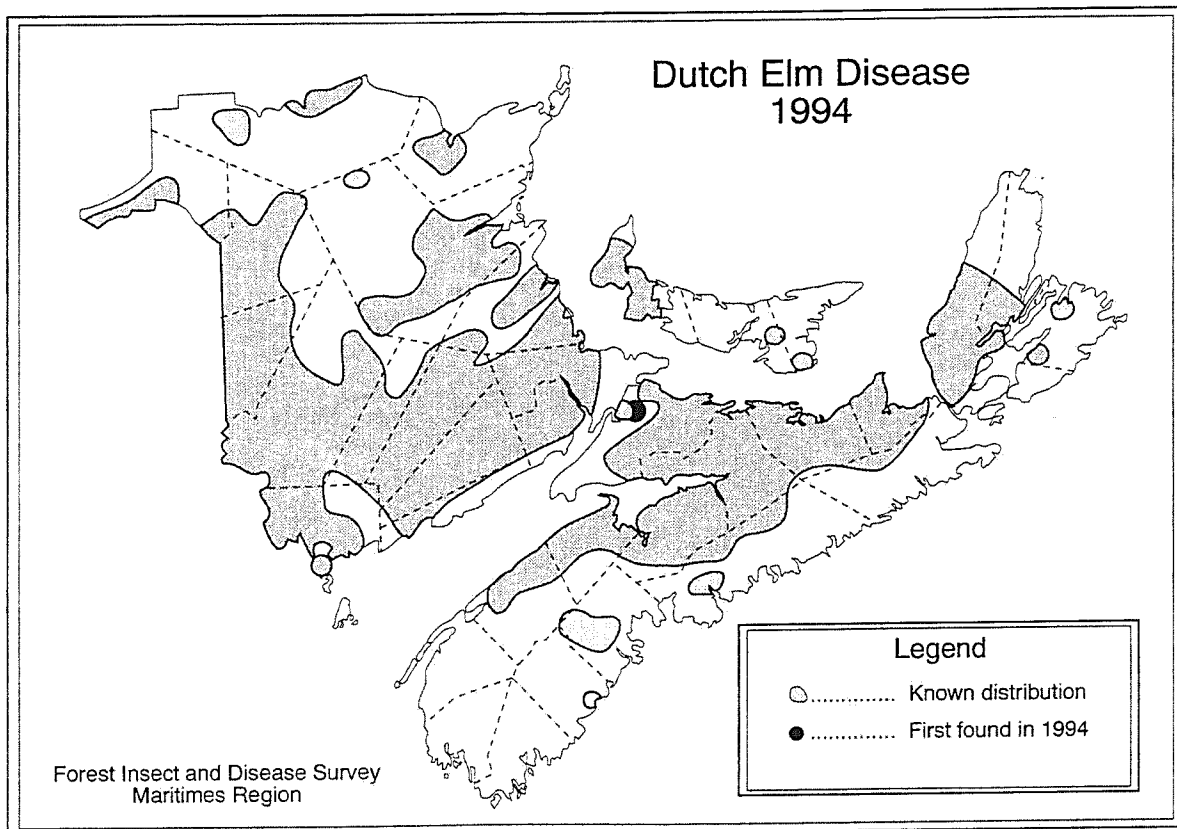


Figure 3

Gypsy Moth

Gypsy moth, *Lymantria dispar* (L.), has been present in parts of New Brunswick and Nova Scotia since 1981. The known distribution increased significantly in 1993 with the discovery of the insect in central New Brunswick. In 1994, additional infested areas were found both in New Brunswick and in western Nova Scotia. Gypsy moth is not known to occur in Prince Edward Island.

Activities relating to gypsy moth were again organized by the Gypsy Moth Coordinating Committee, a multi-agency, multi-governmental group, assisted by hundreds of volunteers.

The distribution of gypsy moth in the Maritimes is depicted in Figure 4 as the presence of various life stages other than male moths (larvae, pupae, female moths, egg masses) within 10-km UTM grid cells. Pre-1994 positive grid cells may have one to several infested locations and may represent current-year finds in addition to older infestations.

In spite of its presence in the region for at least 14 years, gypsy moth populations are still not high enough to cause more than trace levels of defoliation, with the notable exception of one 4-ha patch near Moores Mills, Charlotte Co., N.B. in 1987. Populations are slowly increasing in some of the infested areas, indicated by the increasing ease with which egg masses and larvae are found.

In New Brunswick, gypsy moth is concentrated mostly in two geographic areas: the southwestern part of the province where it was rediscovered in 1981 after a 40-year absence; and southcentral New Brunswick, where the insect was first found in 1993. These infested areas occur in the New Brunswick ecoregions of the Magaguadavic-Hillsborough Ecoregion, characterized — and distinguished from adjacent ecoregions — by a moderately warm, moderately dry climate and an abundance of deciduous vegetation. A common feature

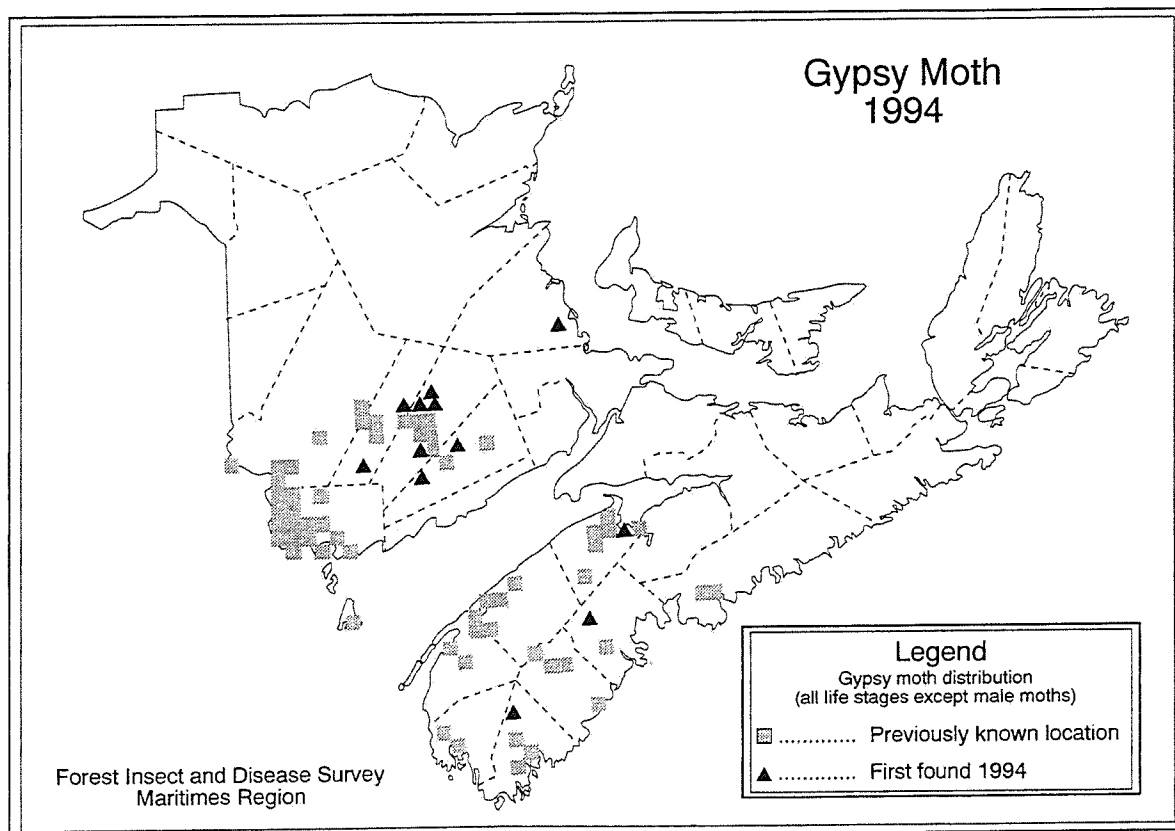


Figure 4 Information based on data provided by members of the Gypsy Moth Coordinating Committee

of most infested locations in the southcentral area is that they are "people" places, *i.e.*, cottage areas, provincial parks, campgrounds, and picnic sites. The spread of gypsy moth is closely tied with movement of people. It remains to be seen whether the current distribution of gypsy moth in this area is a factor of preference by the insect or by the people for the conditions in the ecoregion.

In 1994, gypsy moth was found at 104 locations in New Brunswick, 13 of these in six previously uninfested grids (Table 3). Most of the new locations were adjacent to last year's finds in the southcentral part of the province. The most noteworthy extension in distribution was the find at Buctouche, Kent Co., N.B.

In Nova Scotia, gypsy moth is distributed throughout much of the Clyde River-Halifax Ecoregion, which covers most of the western half of the province, and in several ecodistricts of the adjacent coastal ecoregions. Almost all infested locations along the cooler coast are in areas of habitation (towns, villages) along major tourist routes. Inland, characterized by a warm, dry climate and an abundance of deciduous vegetation, gypsy moth also occurs away from habitation.

In 1994, gypsy moth was found at 21 old and three new locations (Table 4) in Nova Scotia. The number of egg masses per location varied from one to over 150, the latter near Grafton Lake, Queens Co., in Kejimikujik National Park. This represents a significant increase in population from previous years when egg masses were difficult to find.

The gypsy moth pheromone trapping survey program for detection and delineation consisted of 3123 traps returned in the Maritimes in 1994: 1348 in New Brunswick, 1535 in Nova Scotia, and 240 in Prince Edward Island. In addition, 2911 traps were placed by NBDNRE in New Brunswick during a cooperative delineation/control program, co-financed with Agriculture and AgriFood Canada.

- L.P. Magasi and J.E. Hurley

Table 3 Gypsy moth found for the first time in 1994 in New Brunswick, in areas outside the previously known distribution range.

| County | Location | UTM Grid | Egg masses |
|---------|---------------------------|-----------|-------------|
| Kent | Bouctouche | 20-36-514 | new |
| Kings | Oak Point Provincial Park | 19-72-504 | old and new |
| | Belleisle Creek | 20-28-506 | old |
| Queens | Maquapit Lake - Sheffield | 19-71-509 | new |
| | Carpenter | 19-72-506 | new |
| | Lower Cambridge | 19-72-506 | new |
| | McDonalds Point | 19-72-506 | new |
| | Wickham | 19-72-506 | new |
| | Maquapit Lake-Canning | 19-72-509 | old and new |
| | Princess Park | 19-72-509 | old and new |
| | Cumberland Bay | 20-26-509 | old and new |
| | Cox Point | 20-26-510 | new |
| Sunbury | Fredericton Junction | 19-68-505 | old |

Table 4 Gypsy moth found for the first time in 1994 in Nova Scotia, in areas outside the previously known distribution range.

| County | Location | UTM Grid | Egg masses |
|-----------|---------------|-----------|------------|
| Kings | Wolfville | 20-39-499 | new |
| Lunenburg | Barrs Corner | 20-36-493 | new |
| Shelburne | Indian Fields | 20-30-487 | old |

Forest Tent Caterpillar

In 1994, for the fourth consecutive year, forest tent caterpillar, *Malacosoma disstria*, Hbn., was the major hardwood defoliator in the Maritimes. The perimeters of the outbreak areas expanded slightly in the central and southern parts of New Brunswick. In Nova Scotia, forest tent caterpillars were more commonly found in western counties and only rarely found elsewhere. In Prince Edward Island, populations remained at endemic levels.

In the Maritimes region, areas severely defoliated by forest tent caterpillars were located in the Magaguadavic-Hillsborough Ecoregion, especially in the Magaguadavic and Grand Lake districts; also in the Maritime Lowlands Ecoregion in the Harcourt and Oromocto districts where trembling aspen is present in stands originating after disturbance. Trace or light levels of defoliation were found in the Clyde River-Halifax Ecoregion, especially in the Clyde River and Annapolis districts.

In New Brunswick, trembling aspen and other hardwoods were defoliated over 392,000 ha, compared to 196,000 ha in 1993. Of this, 284,000 ha were severe and 108,000 ha. moderate defoliation (Fig. 5). Although the general outline of the defoliated area has changed only slightly from 1993, the overall intensity of defoliation has increased within its boundaries, affecting a greater number of trees species, such as red oak, white birch, and wire birch. Defoliation occurred in central and southeastern York County, the northeastern parts of Charlotte, Sunbury, Queens, and Kings counties, and in a large area in central Kent and Westmorland counties.

In Nova Scotia, defoliation of hardwoods, mainly trembling aspen, was mostly at trace or light levels except for a few elms and willows at Bridgetown, Annapolis Co., that suffered moderate and severe defoliation. Although larvae, ranging from one to dozens per site, were seen at numerous locations along Highway #8 (mainly in Annapolis Co.), little or no defoliation was observed.

In Prince Edward Island, only a few larvae were found in Prince and Kings counties.

- J. R. Cormier

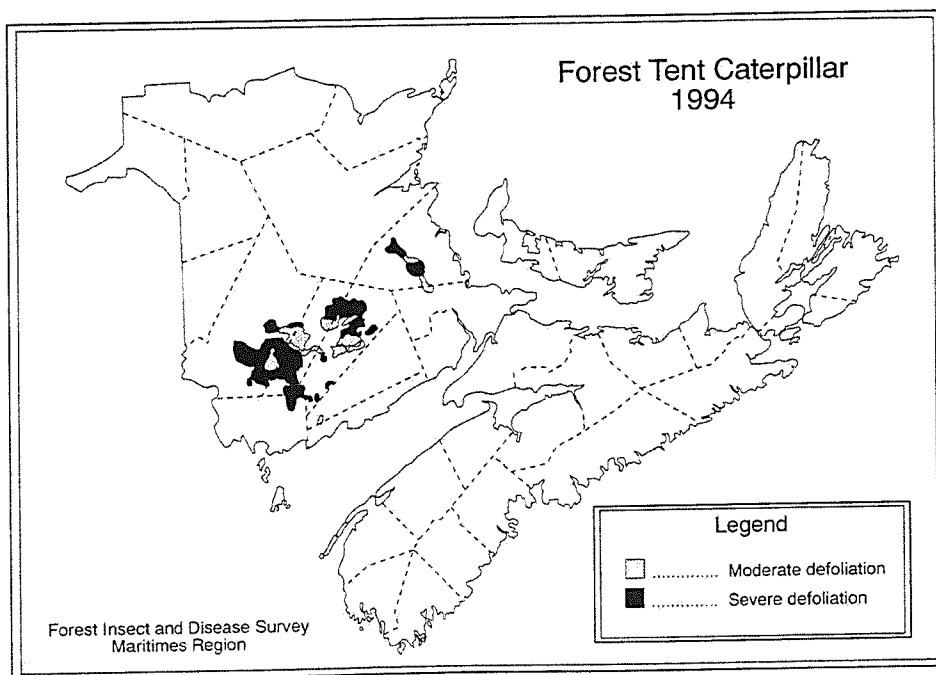


Figure 5

Variable Oak Leaf Caterpillar

The variable oak leaf caterpillar, *Lochmaeus manteo* Dbldy., a late-season defoliator of beech, oak, sugar maple, and several other hardwoods, begins skeletonizing the upper leaf surfaces in early August as larvae feeding in a colony. Older larvae become solitary, voracious feeders and will consume all but the main veins on leaves of mature and understory trees. In 1994, this insect was at its highest population level since the first Maritimes outbreak in New Brunswick in 1990. Since then, small pockets of infestation were noted in 1993 in southcentral New Brunswick and western Nova Scotia.

In the Maritimes region, areas severely defoliated by the variable oak leaf caterpillar were located in the Magaguadavic-Hillsborough Ecoregion, especially in the Pokiok and Magaguadavic districts. This ecoregion, covering the inland portion of southern New Brunswick and central areas of Nova Scotia and Prince Edward Island, is characterized by an abundance of tolerant hardwoods on upland sites, where sugar maple and beech predominate. Also, lower levels of defoliation were found in the Maritime Uplands, Maritime Lowlands, St. John River, and Clyde River-Halifax ecoregions where beech occurs on ridges in some areas.

In New Brunswick, a total of 11,300 ha of mature and understory beech were defoliated on mountain slopes and ridges between the Dungarvon River, Northumberland Co. and the Flume, Charlotte Co. Of this, defoliation was severe on 7,500 ha, moderate on 2,300 ha, and light on 1,500 ha. Defoliation was most severe in the Canterbury and McAdam areas. Sugar maple was occasionally damaged in some of these areas but to a much lesser extent. Defoliation of beech was found at trace levels in Kings and Albert counties. The variable oak leaf caterpillar also caused light to severe defoliation on a few oaks at Magundy, York Co., Scott Head, Charlotte Co. and in Chipman, Queens Co.

In Nova Scotia, defoliation was found as variable-sized patches in the eastern and western areas of the province. In eastern Nova Scotia, the most serious damage occurred at Whycocomagh, Victoria Co., and Mabou, Inverness Co., with moderate and severe defoliation of 20 to 30 ha of beech. In western Nova Scotia, with severe defoliation reported at six locations, the most serious damage occurred on 10 to 15 ha of beech at Parkdale, Lunenburg Co.

In Prince Edward Island, the variable oak leaf caterpillar was collected for the first time. Trace damage was reported, with 15% of leaves affected on all sugar maple trees at Richmond, Prince Co. (See section on New Insects and Fungi in the Maritimes).

- G.R. Lemieux and G.A. Smith

Oak Leafroller and Oak Leaf Shredder

The oak leafroller, *Pseudexentera spoliata* (Clem.), and the oak leaf shredder, *Croesia semipurpurana* (Kft.), either alone or in combination are the most serious pests of red oak in the Maritimes. Historically, the oak leafroller has caused the majority of the damage in Nova Scotia, whereas in New Brunswick and Prince Edward Island, the oak leaf shredder is usually the culprit. As a result of repeated defoliation, red oak stands in many areas are suffering various degrees of twig, branch, and crown dieback and tree mortality.

In Nova Scotia, the majority of the damage is in the western part of the province where most of the red oak stands are located. This area represents the Clyde River-Halifax, Magaguadavic-Hillsborough, Maritime Lowlands, and Atlantic Shore Ecoregions. Peak damage in 1988 saw an average defoliation of 69% over 22,800 ha. In 1991, a severe spring frost caused a collapse of the insect population with a resultant drop in the average defoliation to 5%. Since 1991, average defoliation has gradually increased, with 8% in 1992, 15% in 1993, and 34% in 1994. Last year, there was only one report of severe defoliation whereas in 1994 several areas of patchy severe defoliation were observed in Annapolis and Queens counties as well as one report each from Hants and Pictou counties.

A summary of tree condition surveys in randomly selected oak stands in western Nova Scotia since 1988 is presented in Table 5. The condition of red oak improved as populations decreased from 1988 to 1992, but is starting to decline again as population levels are beginning to increase again.

In New Brunswick, damage has been relatively low for the past 11 years and this trend continued in 1994 with no reports of damage. Historically, defoliation by these insects has occurred in the Magaguadavic-Hillsborough and Maritimes Lowlands Ecoregions.

In Prince Edward Island, defoliation levels were slightly reduced from 1993. Defoliation was reported as moderate at Brudenell Point, Kings Co., and trace at North Milton, Queens Co. Red oak in Prince Edward Island occurs in the Maritime Lowlands, and the Hillsborough district of the Magaguadavic-Hillsborough Ecoregions.

- A.W. MacKay

Table 5 Condition of red oak after repeated defoliation in western Nova Scotia 1988-1994

| Tree Condition | Percent of trees | | | | | | |
|--------------------------|------------------|------|------|------|------|------|------|
| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
| Healthy | 9.1 | 1.0 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 |
| Twig dieback only | 2.6 | 18.2 | 8.6 | 32.4 | 39.8 | 22.4 | 7.6 |
| Branch dieback | | | | | | | |
| 1-25% | 42.9 | 52.2 | 77.1 | 56.8 | 53.8 | 68.8 | 79.2 |
| 26-50% | 14.3 | 18.9 | 7.9 | 8.6 | 3.0 | 6.4 | 4.8 |
| 51+% | 5.0 | 4.9 | 2.0 | 0.8 | 1.8 | 1.2 | 3.6 |
| dying | 0.6 | 0.9 | 1.0 | 0.7 | 0.5 | 0.0 | 2.0 |
| Dead | 5.5 | 3.9 | 0.8 | 0.3 | 1.2 | 2.8 | |
| Number of trees assessed | 931 | 1004 | 975 | 1050 | 1025 | 250 | 250 |
| Number of stands | 35 | 40 | 39 | 42 | 4 | 10 | 10 |

Poplar Serpentine Leafminer

Even though population levels of the poplar serpentine leafminer, *Phyllocnistis populiella* Cham., continued to decrease in the Maritime provinces in 1994, this insect is still causing significant damage in some areas of northern New Brunswick.

In the Maritimes region, the most serious damage caused by this insect usually occurs in the New Brunswick Highlands Ecoregion, especially in the Blue Mountain and Nepisiquit districts, where trembling aspen is abundant on slopes and valleys. It also occurs at lower damage levels in the Restigouche-Bras D'Or, Maritimes Uplands, Saint John River, Magaguadavic-Hillsborough, and Maritime Lowlands ecoregions where trembling aspen is present in stands originating after disturbance.

Light foliage discoloration was still evident in some northern areas of New Brunswick. At 22 random sampling points located in Madawaska, Victoria, Restigouche, Northumberland, and Gloucester counties, an average of 18% of trembling aspen leaves were mined on 84% of trees. This represents a slight population reduction in that part of the province compared to 1993 when 22% of the leaves were mined on 87% of the trees. The highest infestation occurred in the Meadow Brook area, Restigouche Co., where severe leaf mining was found on all trembling aspen trees. As in previous years, both incidence and intensity decreased from the northern half of the province toward the Fundy coast. In the ten southern counties, infestation levels remained low with 4% of leaves affected on 38% of the trees, compared to 10% of leaves on 58% of trees in 1993. Trace leaf mining damage was also found on largetooth aspen at Nine Mile Brook, Gloucester Co., where 15% of leaves were mined on 72% of the trees.

In Nova Scotia, population levels continued to decrease, where the insect was found in the northeastern part of the province in Cumberland, Pictou, and Antigonish counties. An average of 1% of trembling aspen leaves were mined on 13% of the trees compared to 7% of leaves on 39% of trees in 1993.

In Prince Edward Island, population levels also decreased, with only trace damage by this leafminer reported at two locations.

- G.R. Lemieux

Aspen Leafrollers

Of the many defoliators of aspen, there are six species most commonly found rolling leaves from mid-May to mid-July in the Maritimes region: early aspen leafcurler or aspen leafroller, *Pseudexentera oregonana* (Wlshm.), spotted aspen leafroller, *Pseudosciaphila duplex* (Wlshm.), birch-aspen leafroller, *Epinotia solandriana* (L.), aspen leafroller, *Epinotia criddleana* (Kft.), darkheaded aspen leafroller, *Anacampsis innocuella* (Zell.), and lightheaded aspen leafroller, *Anacampsis niveopulvella* (Cham.). These species are usually considered as a complex, as their damage is similar and simultaneous. Occasionally, damage can be attributed to a specific member of the complex.

In the Maritimes region, one or more members of this complex is found in all ecoregions, except in the New Brunswick Highlands Ecoregion. Although trembling aspen is abundant in stands originating after disturbance on slopes and valleys of this ecoregion, aspen leafrollers are not commonly found. The climate associated with this ecoregion is distinguished from other ecoregions by low summer temperature and low rainfall.

In New Brunswick, population levels of these insects have been increasing since 1991. In 1994, most of the leafrolling species were more widespread than in previous years, but associated damage was similar to 1993. As in 1993, the most commonly found species were *P. oregonana* and, to a lesser extent, *P. duplex*, and *E. solandriana*.

P. oregonana, one of the earliest leafrollers on aspen, was more widespread in eastern New Brunswick in 1994 than in previous years. However, this insect was still causing more damage in the western part of the province, mostly along the Saint John River Valley from Connors, Madawaska Co. to Fredericton, York Co. The worst infestation occurred near Drummond, Victoria Co. where 47% of leaves were rolled on all trees. At random sampling points where this species was observed, an average of 14% of leaves were rolled in 1994 compared to 12% in 1993. Although the level of leafrolling increased slightly from last year, the number of trees affected decreased to 74% from 83% in 1993. *P. duplex*, more commonly found in the north-central, central, and eastern parts of the province, caused the most damage at Forty Four Mile Brook, Northumberland Co., where 16% of leaves were rolled on all trembling aspen trees. Although this species was present at fewer locations in 1994 than 1993, and the percentage of rolled leaves decreased slightly (9% in 1994, 11% in 1993), the percentage of affected trees increased by 20% (100% in 1994, 80% in 1993).

E. solandriana, which was mainly present in western New Brunswick in 1993, was found at fewer locations in 1994, though was more widespread in the eastern areas of the province. It was found at ten locations with an average of 5% of leaves rolled on 43% of trees, compared to 16 locations with an average of 11% of leaves on 70% of trees in 1993. The worst infestation occurred at LeBlancville, Kent Co., where 7% of the leaves were rolled on 50% of trembling aspen trees. The other species, *A. innocuella*, *A. niveopulvella*, and *E. criddleana*, were observed at trace levels at fewer locations than the others throughout the province. In most cases, damage levels and number of locations are similar to 1993. *A. innocuella* and *A. niveopulvella* larvae occasionally fed in association with *P. oregonana* and *P. duplex*.

In Nova Scotia, population levels increased slightly but distribution remained confined and damage levels generally lower than in New Brunswick. The most common and severe leafrolling, observed in the north-central and northeastern part of the province, was caused mainly by *P. oregonana*. At random sampling points where this species was found, an average of 23% of leaves were rolled in 1994 compared to 13% in 1993. The worst infestation was reported from North Alton, Kings Co. and St. Croix, Hants Co., where moderate and severe leafrolling occurred on young trembling aspen trees. Trace leafrolling by other aspen leafroller species was present at a few locations in the province.

In Prince Edward Island, population levels in 1994, as in previous years, remained low. *P. oregonana*, the most common species, was associated mostly with trace leafrolling. The worst infestation occurred at Goose River, Kings Co., where 25% of the trembling aspen leaves were rolled on all trees. Trace damage by *P. duplex* and *E. solandriana* was observed at a few locations in the province.

- G.R. Lemieux and G.A. Smith

Birch Leafmining Sawflies

The activity of birch leafmining sawfly may be observed wherever birch is found in the Maritimes. Larval damage, a brown blotch mine on the upper leaf surface, is very similar for the four species occurring in this region: early birch leaf edgeminer, *Messa nana* (Klug), ambermarked birch leafminer, *Profenusa thomsoni* (Konow), birch leafminer, *Fenusa pusilla* (Lep.), and late birch leaf edgeminer, *Heterarthrus nemoratus* (Fallen).

The tiny (3.0 - 4.5mm) adult wasps emerge from winter pupation sites in the duff and are present from May to September. Females of *Messa nana* and *Fenusa pusilla* insert eggs in unfurling leaves while egg laying by *Profenusa thomsoni* and *Heterarthrus nemoratus* occurs on mature leaves from mid to late July. With staggered development among feeding larvae and the presence of two or more generations of *F. pusilla*, damage can often be attributed to more than one species at a particular location, on an individual tree, or occasionally even on a single leaf.

An investigation was conducted in 1994 to determine the distribution of the four species in the Maritimes. White birch, wire birch, and yellow birch were observed at over 300 locations and all samples of blotch mines on birch were submitted for species identification.

In 1994, one or more species has been collected from all ecoregions of the Atlantic Maritime Ecozone except the Atlantic Shore in Nova Scotia, which is characterized as cool, wet, and windy.

Profenusa thomsoni was the most widespread and abundant of the four species and caused the most serious foliage browning in all three Maritime provinces. It was common throughout the region, except in southern and southwestern New Brunswick and the Atlantic and Fundy coasts of Nova Scotia. This species was found at 56, 16, and 12 widely spread locations in New Brunswick, Nova Scotia, and Prince Edward Island, respectively. Blotch mine damage on white birch, wire birch, and occasionally on yellow birch ranged mostly from trace to moderate throughout the region. Severe foliage browning was observed on young wire birch at Kelly's Beach, Kent Co., N.B., for the second consecutive year, and on young white birch at Caledonia and young wire birch at Tracadie, both in Queens Co., P.E.I.

Fenusa pusilla was collected at six locations in northern New Brunswick, all but one in the northwest, at ten widely separated locations in Nova Scotia, and at five locations throughout Prince Edward Island. Foliage browning was trace and light, with the most serious damage observed at Marie, Kings Co., P.E.I., where 27% of leaves of all white birch trees were affected.

Messa nana, first collected in the Maritimes in 1993 in southern New Brunswick, was recorded for the first time in 1994 in Nova Scotia and Prince Edward Island (see New Records of Insects and Fungi chapter). This species was collected at 41 scattered locations in all but the central portion of southern New Brunswick, at four locations in central Nova Scotia and five locations in Prince Edward Island. Leaf browning of white birch and wire birch ranged from trace to moderate in New Brunswick and Prince Edward Island, but was only trace in Nova Scotia. Moderate browning was recorded at Gowland Mountain, Albert Co., N.B., where 54% of leaves of all white birch trees were affected.

A single collection of *Heterarthrus nemoratus* on white birch at Point Lepreau, St. John Co., N.B., represents the only collection of this species in the region since 1990.

- G.A. Smith

NURSERY AND GREENHOUSE PROBLEMS

Although a wide variety of pest-related problems were encountered in forest nurseries in 1994 (Table 6), the most important were overwintering injury and frost damage. The insects and diseases may appear insignificant, however they occurred despite intensive monitoring and control measures. Good nursery practices limited their damage potential.

- K.J. Harrison and G.A. Smith

Table 6 Problems observed in nurseries and greenhouses in the Maritimes in 1994

| Problem | Host(s) | Locality | Remarks |
|---|------------------------------|----------|--|
| Conifer aphids <i>Cinara</i> sp. | Scots pine | N.B. | Eggs on foliage. |
| Frost damage | Black spruce White spruce | N.S. | Serious frost injury to newly outplanted 2-0 container stock caused root and stem mortality in several plantations in May. |
| Gray mold <i>Botrytis cinerea</i> Pers. ex Fr. | Norway spruce | N.S. | On suppressed lower foliage of 2-0 container stock in holding area. |
| Heat lesions | Black spruce Red spruce | N.S. | Stem lesions on 15% (bS) and 5% (rS) of 1-0 container stock in middle of long greenhouses. |
| Overwintering injury | Black spruce | N.B. | Caused loss of 1.5 million container seedlings. |
| Smothering fungus <i>Thelephora terrestris</i> Ehrh. ex Fr. | Black spruce | N.S. | Trace at one nursery. |
| Weevils Curculionidae | Norway spruce | N.S. | Light damage due to girdling on 2-0 container stock. |

SEED ORCHARD PESTS

Seed orchard pests fall into three distinct categories: those that damage the seeds or cones directly; those that affect the trees and thus have an indirect effect on cone and seed production; and those that are primarily defoliators but may feed on immature cones and cause direct damage. Table 7 gives an overview of problems encountered in seed orchards in 1994. There were no diseases observed this year.

- G.A. Smith and K.J. Harrison

Table 7 Problems observed in seed orchards in the Maritimes in 1994.

| Problem | Host(s) | Locality | Remarks |
|---|---|----------|--|
| European spruce sawfly <i>Gilpinia hercyniae</i> (Hartig) | White spruce | N.B. | Larvae present on all trees at Parkindale but with no visible damage. |
| Larch cone maggots <i>Strobilomyia laricis</i> Michelsen <i>Strobilomyia neanthracina</i> Michelsen | Larch | N.B. | 43% of cones damaged at Queensbury, most damage due to <i>S. laricis</i> . |
| Webspinning sawflies <i>Cephalcia</i> spp. | Black spruce Norway spruce White spruce | N.B. | 75%, (bS), 10% (nS), and 20%(wS) infestation, at Parkindale. |

PEST ASSESSMENT SURVEYS IN THE NEW FOREST

Pest assessment surveys in the new forest by cooperating agencies determined conditions on close to 7,300 trees in 142 plantations and four thinned stands in the Maritimes in 1994.

Assessment procedures required detailed examination of 50 trees in each plantation or thinned stand. Ten subplots, of five trees each, were selected along a pre-determined line of travel. The distance between subplots varied according to the size of the area to provide uniform coverage. The level of damage caused by each pest, on the different parts of each tree, was recorded. Field assessments were carried out primarily by staff of cooperating organizations while sample identification and data summaries were done by the Forest Insect and Disease Survey.

Cooperating agencies in 1994, in addition to the Forest Insect and Disease Survey, were: NBDNRE, J.D. Irving, Limited., and NSDNR.

There were 98 plantations and four thinned stands assessed in New Brunswick, 42 plantations assessed in Nova Scotia; and two plantations assessed in Prince Edward Island. Most of the plantations were single species of pine or spruce.

Almost 97% of the plantation trees assessed in the Maritimes were healthy (Table 8), however, there were at least some trees severely affected in 25% of the plantations. Whether or not this damage poses a serious problem depends on the cause of damage and the percentage of affected trees in a given plantation. Table 9 lists the various plantation problems encountered at severe or moderate levels in the three provinces on pine and spruce.

Tree species assessed in the four thinned areas in New Brunswick included balsam fir, spruce, and jack pine. Ninety-seven percent of the 200 trees were healthy. Trees with moderate or severe damage were found in only one of the stands. Damage, on jack pine was caused by a bark beetle (*Conophthorus* sp.) and an unidentified agent, resulting in "forked stems".

- A.M. Jones and L.P. Magasi

Table 8 Summary of tree condition in pine and spruce plantations in the Maritime provinces in 1994.

| Province | Species | No. of trees assessed | Tree Condition Class (% trees) | | | |
|----------------------|---------|-----------------------|--------------------------------|------|------|------|
| | | | Healthy | Fair | Poor | Dead |
| New Brunswick | Pine | 650 | 96 | 3 | 0 | 1 |
| | Spruce | 3900 | 96 | 2 | 0 | 2 |
| Nova Scotia | Pine | 550 | 94 | 3 | 1 | 2 |
| | Spruce | 1400 | 97 | 2 | 1 | 0 |
| Prince Edward Island | Pine | 25 | 100 | 0 | 0 | 0 |
| | Spruce | 25 | 98 | 2 | 0 | 0 |
| Regional Average | | | 97 | 2 | 0 | 1 |

Table 9 Number of pine and spruce plantations containing trees with moderate or severe problems in New Brunswick, Nova Scotia, and Prince Edward Island in 1994

| Problem | Pine | | | Spruce | | |
|--|------|------|--------|--------|------|--------|
| | N.B. | N.S. | P.E.I. | N.B. | N.S. | P.E.I. |
| Abiotic injury | 0 | 0 | 0 | 2 | 0 | 0 |
| Animal damage | 1 | 1 | 0 | 2 | 9 | 0 |
| Bark beetles | 1 | 0 | 0 | 0 | 0 | 0 |
| Black deposits ¹ | 0 | 0 | 0 | 0 | 1 | 0 |
| Black sooty mold | 0 | 1 | 0 | 0 | 0 | 0 |
| Competition - Unspecified | 1 | 0 | 0 | 0 | 0 | 0 |
| Competition - Hardwood | 0 | 2 | 0 | 0 | 0 | 0 |
| Competition - Softwood | 0 | 0 | 0 | 0 | 1 | 0 |
| Coneworm | 0 | 0 | 0 | 1 | 0 | 0 |
| Conifer sawflies | 0 | 0 | 0 | 1 | 0 | 0 |
| Crooked stem/leader | 0 | 1 | 0 | 0 | 2 | 0 |
| Eastern spruce gall adelgid ² | - | - | - | 0 | 3 | 0 |
| Forked stem | 1 | 0 | 0 | 2 | 0 | 0 |
| Frost | 0 | 0 | 0 | 11 | 2 | 1 |
| J-root | 0 | 0 | 0 | 0 | 3 | 0 |
| Little spruce sawfly | - | - | - | 0 | 1 | 0 |
| Mechanical injury | 0 | 0 | 0 | 0 | 1 | 0 |
| Multiple stems | 0 | 0 | 0 | 0 | 1 | 0 |
| Needle flecking | 0 | 2 | 0 | 0 | 0 | 0 |
| Needle cast | 0 | 0 | 0 | 0 | 1 | 0 |
| Needle rust | 0 | 0 | 0 | 5 | 1 | 0 |
| Physical injury | 0 | 0 | 0 | 2 | 0 | 0 |
| Planting problems | 2 | 1 | 0 | 6 | 0 | 0 |
| Poor microsite | 0 | 1 | 0 | 4 | 2 | 0 |
| Red spruce adelgid ² | 0 | 0 | 0 | 0 | 1 | 0 |
| Shoestring root rot ² | 0 | 0 | 0 | 1 | 1 | 0 |
| Sirococcus shoot blight ² | 0 | 1 | 0 | 0 | 0 | 0 |
| Snow damage | 1 | 1 | 0 | 1 | 1 | 0 |
| Spittlebug | 0 | 0 | 0 | 0 | 1 | 0 |
| Spruce bud midge ² | - | - | - | 14 | 0 | 0 |
| Spruce budmoth ² | - | - | - | 4 | 0 | 0 |
| Spruce gall midge ² | - | - | - | 5 | 0 | 0 |
| Suppression | 0 | 0 | 0 | 0 | 1 | 0 |
| Twisted roots-paper pot | 1 | 0 | 0 | 0 | 0 | 0 |
| Unidentified insect damage | 0 | 0 | 0 | 15 | 1 | 0 |
| Weevil damage | 0 | 0 | 0 | 3 | 2 | 0 |
| White pine weevil ² | 2 | 2 | 0 | 1 | 3 | 0 |
| Wind damage | 1 | 0 | 0 | 0 | 0 | 0 |
| Winter drying | 0 | 0 | 0 | 6 | 1 | 0 |
| Yellowing | 0 | 1 | 0 | 0 | 0 | 0 |
| Yellowheaded spruce sawfly ² | 0 | 0 | 0 | 0 | 1 | 0 |

¹ Field-identified problems are reported as received.

² The scientific name is listed either in the "Other Insects and Diseases" section or elsewhere in the report.

Pine plantations assessed: 13 in N.B., 11 in N.S., and 1 in P.E.I.

Spruce plantations assessed: 78 in N.B., 28 in N.S., and 1 in P.E.I.

CHRISTMAS TREE PESTS

Several insects and diseases caused concern at the regional scale, or locally in the Maritimes Christmas tree production areas in 1994. Foliage pests, such as the balsam twig aphid (*Mindarus abietinus* Koch), balsam gall midge (*Paradiplosis tumifex* Gagné), spruce spider mite (*Oligonychus ununguis* (Jacobi)), spruce budworm *Choristoneura fumiferana* (Clem.), the hemlock looper (*Lambdina fuscicollis* (Gn.)), and occasionally any one of the four species of balsam fir needle rust, generally cause problems that are brought to the attention of extension specialists. These pests are frequently annoyances only at the local level and their effects are minimized by the implementation of recommended control strategies. Some of these pests, such as the balsam twig aphid, are cyclical in nature and may affect Christmas tree areas over a wide geographic range. There is a wide range of insects and diseases that affect balsam fir, and other tree species grown for Christmas trees such as Scots pine, red pine and eastern white pine, that the reader will find mentioned elsewhere in this report.

Provincial extension specialists reported a relatively quiet year during 1994. The only problems worthy of mention were spruce spider mite at some tree lots in Victoria Co., New Brunswick, late frost damage in western New Brunswick, and damage to young balsam fir shoots by the balsam shootboring sawfly, *Pleroneura brunneicornis* Roh., in many lots in New Brunswick and Nova Scotia.

Populations of the balsam shootboring sawfly seemed to have appeared from nowhere, compared to 1993 population levels. Light, moderate, and severe damage was found at nearly 80 sampling locations across the Maritimes. Damage to current shoots of balsam fir were as high as 37% at the CFS - Maritimes Experimental Christmas Tree Lot at Seffernsville, Lunenburg Co., Nova Scotia. Growers were concerned about the impact on current shoot growth and tree marketability. Fortunately, the damaged brown tips fall off fairly quickly in the early summer and tend only to "biologically prune" the trees. No trees were known to have been considered unmarketable for 1994.

Balsam twig aphid populations remained low throughout the region's forests. Trace damage was found at ten locations in New Brunswick, averaging 6% of shoots compared to 12% in 1993, 60% in 1992 and 27% in 1991. Surveys conducted by NBDNRE showed that twig aphid occurrence declined further, present at 13% of the 544 locations assessed in 1994, compared to 63% in 1993, 79% in 1992, and 66% in 1991. In Nova Scotia, trace damage to 5% of balsam fir shoots was found at 12 locations, compared to 4% in 1993 and 55% in 1992. Trace damage was found at six Prince Edward Island locations.

Balsam gall midge was of little concern to growers this year. Monitoring results from the region's forests remain low for 1994. Only trace levels of galls were found at 35 sampling areas in the Maritimes. NBDNRE determined that of 544 locations sampled less than 1% of locations had 1-10% of needles affected, compared to 2% of 644 locations with 1-10% of needles affected in 1993.

- J.E. Hurley

PLANT QUARANTINE SURVEYS FOR INTRODUCED FOREST PESTS

A Memorandum of Understanding signed between the Department of Forestry and the Department of Agriculture (Food Production and Inspection Branch) in December 1993 formalized a cooperative arrangement of mutual benefit. FIDS has been formally mandated to participate in detection surveys for introduced pests that may be of consequence to our forests. This chapter provides a list of forest pests currently under regulations that are being surveyed and monitored by FIDS. For some of the pests listed below, the reader will be referred elsewhere in this report for results. For more details, please contact FIDS at the address on the title page of this report.

Dutch Elm Disease - refer to the Dutch Elm Disease section for the current status.

European Larch Canker - refer to the European Larch Canker section for current status.

Gypsy Moth - Gypsy moth surveys are coordinated by the regional Gypsy Moth Coordinating Committee. The reader will find survey details in the section "Gypsy Moth". The Asian gypsy moth has a host list of 500 plant species and females have the ability to fly (unlike the European variety), posing even greater risk and potential for damage in Canada's forests. The Asian and hybrids of the European and Asian varieties are being monitored at some ports of entry by Agriculture and Agrifood Canada. Neither Asian gypsy moth nor hybrids have been found in the Maritimes to date.

Pine Shoot Beetle - The pine shoot beetle, *Tomicus piniperda* (Linnaeus), a native to Europe and Asia, was first discovered on this continent in a Scots pine Christmas tree plantation in Ohio in 1992. Since then, intensive surveying by Canadian and United States regulatory agencies has revealed the beetle to be present in southern Ontario and in six states: Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York.

This beetle is considered to be the most serious scolytid pest of pines in Europe. It feeds on current shoots and is capable of boring into trunks of species of pine, preferably Scots pine, fir, spruce, and larch. Reproduction typically occurs in dead or recently cut pine trees, but healthy trees can be attacked if populations are high. The pine shoot beetle may also be an important vector for several diseases.

In the Maritimes, FIDS and provincial and industrial cooperators surveyed 123 pine stands of several species for pest problems. None of the stands examined had any signs or symptoms of the pine shoot beetle. Table 10 shows the breakdown by province and pine species.

Table 10 Number of locations and pine species assessed for pine shoot beetle in the Maritimes in 1994

| Species | Province | | | Region |
|---------------|----------|------|--------|--------|
| | N.B. | N.S. | P.E.I. | |
| Red pine | 6 | 23 | 11 | 40 |
| Jack pine | 28 | 6 | 0 | 34 |
| White pine | 12 | 20 | 4 | 36 |
| Scots pine | 0 | 2 | 7 | 9 |
| Austrian pine | 0 | 0 | 1 | 1 |
| Mugho pine | 0 | 1 | 0 | 1 |
| Mixed pine | 0 | 2 | 0 | 2 |
| Totals | 46 | 54 | 23 | 123 |

Pinewood Nematode - The pinewood nematode (*Bursaphelenchus xylophilus* (Steiner & Buhrer) Nickle) is a worm about 0.6mm long that has become a worldwide concern to plant quarantine officials and our lumber exporters in the past decade.

In Japan, thousands of hectares of pines were killed in the late 1960s and 70s when pinewood nematode multiplied and blocked the water-conducting vessels of the trees. European plant protection authorities have been concerned about the potential for introduction of the pinewood nematode into their countries. Regulations became more stringent as pinewood nematode was intercepted in wood chips and low grade lumber from North America. Now all spruce, pine, and fir lumber exported to Europe must be kiln dried.

Intensive forest surveys done in the Maritime provinces since 1985 have found pinewood nematode at about 30 widely scattered locations in New Brunswick and Nova Scotia, but it has never been found in Prince Edward Island. The nematode was found in trees that had died from insect, disease, or animal damage. Pinewood nematode is not a tree killer in the Maritimes.

Pinewood nematode has been found in wood chips and spruce, pine and fir lumber destined for export from eastern Canada to Europe. FIDS has been involved in cooperative mill surveys with Agriculture and AgriFood Canada and the Maritime Lumber Bureau to exempt hemlock and cedar from the quarantine restrictions applied to other conifer species.

Pinewood nematodes have been found around grubholes (sawyer beetle galleries) in sawn lumber and, as sawyer beetles are the known vectors of pinewood nematode, it is essential to ship only top grade clearwood to export markets.

No specific pinewood nematode surveys were undertaken in 1994.

Scleroderris Canker - The European race of Scleroderris canker, *Gremmeniella abietina* (Lagerb.) Morelet, is capable of killing trees of any size, unlike the North American race which kills only small trees. This and several other "intermediate" races have been identified at six locations in New Brunswick during the period 1978-1988.¹ At three of these locations the disease was eradicated, at one location control status was achieved by pruning, and the remaining two locations have been under surveillance by FIDS, i.e., an inspection is conducted for symptoms and/or changes in symptom expression. Where present, branches with symptoms are cultured and tested to determine the race of the fungus.

Scots pine at the two infected sites, Upper Blackville, Northumberland Co. and Bourgoin, Madawaska Co., has been monitored intermittently since 1979 and 1988, respectively. None of the diseased branches have been identified as infected by non-North American race of Scleroderris.

Scleroderris canker has not been found in Nova Scotia since 1978 and has never been found in Prince Edward Island.

Forest pests of concern in adjacent jurisdictions - Although no specific surveys were carried out in 1994, the FIDS is constantly alert to a number of pests of quarantine significance that occur in neighboring jurisdictions. These include: ash yellows, butternut canker (*Sirococcus clavigignenti-juglandacearum* Nair, Kostichka & Kuntz), European spruce bark beetle, *Ips typographus* L., hemlock woolly adelgid, *Adelges tsugae* Annand, and sapstreak of sugar maple, *Ceratocystis virens* (R.W. Davidson) C. Moreau (also known as *C. coerulea* (Münch) Bakshi).

- J.E. Hurley and K.J. Harrison

¹ Magasi, L.P., Forest Pest Conditions in the Maritimes in 1993. FC-MR Info. Rept. M-X-183.

NEW INSECT AND FUNGUS RECORDS IN THE MARITIMES

Each year, the biomonitoring activities of the Forest Insect and Disease Survey yield a wealth of information, including new species of pests, predators, and parasitoids as well as pest-host records for the Maritime provinces. With the increased interest in forest health monitoring, biodiversity, climate change, and biological controls, it is important to highlight these records for our clients.

In 1994, the following new species records and pest-host combinations were found in the Maritimes.

Diplodia tip blight, caused by the fungus *Sphaeropsis sapinea* (Fr.) Dyko & Sutton (formerly known as *Diplodia pinea* (Desm.) Kickx), was collected in New Brunswick for the first time, at River Glade, Westmorland Co. on ornamental Austrian pines. This disease is known to occur in Nova Scotia and was found for the first time in Prince Edward Island in 1993. Diplodia tip blight is primarily a problem on ornamental Austrian pine and Scots pine.

Early birch edgeminer, *Messa nana* (Klug), was collected in Nova Scotia and Prince Edward Island for the first time. First recorded in southern New Brunswick in 1993, this leafmining sawfly is now present on white birch and wire birch at several locations in Nova Scotia and Prince Edward Island. See Birch Leafmining Sawflies section.

Fall webworm, *Hyphantria cunea* (Drury), a defoliator of several species of hardwoods, was reported for the first time in the Maritimes on balsam fir, an unusual host for this insect. Two colonies caused light damage to a young tree in a Christmas tree plantation at Brookfield, Colchester Co., Nova Scotia.

Imported willow leaf beetle, *Plagioderma versicolora* (Laicharting), previously collected only in New Brunswick, is a skeletonizer and defoliator both as a larva and adult. It was collected in Nova Scotia for the first time, causing severe damage on semi-mature fringe willow at Vaughan, Hants Co. Moderate to severe damage was observed at 12 additional locations in Hants, Kings, Annapolis, Halifax, and Lunenburg counties.

Parasitoid wasp, *Ooencyrtus* sp., prob. *O. kuvanae* (Howard), was recovered for the first time in the Maritimes from an egg mass of gypsy moth, *Lymantria dispar* (L.), collected at Fredericton, York Co., N.B. This tiny, internal parasitoid was present in 37% of the eggs, having consumed and replaced them, thereby effectively preventing larval hatch and potential defoliation.

Variable oak leaf caterpillar, *Lochmaeus manteo* Dbldy., currently at outbreak levels in New Brunswick and Nova Scotia, was collected in Prince Edward Island for the first time at two locations: Richmond, Prince Co., with trace damage on 15% of leaves of all sugar maple, and New Harmony, Kings Co. See Variable Oakleaf Caterpillar section.

- G.A. Smith and K.J. Harrison

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Much of the information on the status and control of the spruce budworm, hemlock looper, and gypsy moth is based on data provided by other organizations as noted.

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We acknowledge the contribution of scientists of the Centre for Land and Biological Resources Research (CLBRR) of Agriculture Canada for identifications provided.

LIST OF PUBLICATIONS

Reports and publications by the staff of the Forest Insect and Disease Survey and forest pest-related articles by other members of the Canadian Forest Service - Maritimes Region produced in 1994 are listed below. Contributions without direct FIDS involvement are marked by *. Two articles from 1992 are included here for the record. They were not yet available at the time our previous reports went to press.

- Cormier, J.R. 1994. Forest insects and diseases in Roosevelt Campobello International Park in 1993. CFS-M Tech. Note No. 294.
- Cox, R.M. and Magasi, L.P. 1994. Atmospheric variables and the condition of Fundy white birches. Proc. Workshop on Ecological Monitoring and Research in the Coastal Environment of the Atlantic Maritime Ecozone, Huntsman Marine Laboratory, St. Andrews, N.B., March 9-11, 1994. Env. Canada-Atlantic Region, Occasional Report No. 4. pg. 34-37.
- D'Eon, S.P., Magasi, L.P., Lachance, D., and DesRochers, P. 1994. ARNEWS, Canada's national forest health monitoring plot network. Manual on plot establishment and monitoring (Revised). PNFI Info. Rept. PI-X-117.
- Hall, J.P. (Compiler) 1994. Forest insect and disease conditions in Canada in 1992. etc (Caroline, would you please figure out how to cite this and where to put it)
- Hurley, J.E. 1992. Forest pest monitoring systems in the Maritimes in the 1990s. Abstract in Can. J. Plant Sci. 72: 976.
- Hurley, J.E. 1994. Highlights of forest pest conditions in the Maritimes at the end of July 1994. CFS-M Tech. Note No. 302.
- Hurley, J.E. 1994. Highlights of forest pest conditions in the Maritimes at the end of June 1994. CFS-M Tech. Note No. 299.
- Hurley, J.E., and MacKay, A.W. 1994. Highlights of forest pest conditions in the Maritimes in mid-June 1994. CFS-M Tech. Note No. 297.
- Jones, A.M., and Magasi, L.P. 1994. Plantation pest assessment surveys in New Brunswick in 1993. CFS-M Tech. Note No. 300.
- Jones, A.M., and Magasi, L.P. 1994. Plantation pest assessment surveys in Nova Scotia in 1993. CFS-M Tech. Note No. 301.
- Lemieux, G.R. 1994. Forest insects and diseases in Kouchibouguac National Park in 1993. CFS-M Tech. Note No. 295.
- MacKay, A.W. 1994. Forest insects and diseases in Prince Edward Island National Park in 1993. CFS-M Tech. Note No. 291.
- MacKay, A.W., and Hurley, J.E. 1994. Highlights of forest pest conditions in the Maritimes to mid-September 1994. CFS-M Tech. Note No. 303.
- Magasi, L.P. 1994. Monitoring forest health — Canada's ARNEWS program in the Maritimes. Proc. Workshop on the Kejimikujik Watershed Studies: Monitoring and Research five years after "Kejimikujik '88". Kejimikujik Nat. Park, N.S., Oct. 20-21, 1993. Env. Canada-Atlantic Region Occasional Report No. 3 (Abstract).
- Magasi, L.P. and Hurley, J.E. (Editors). 1994. Forest pest conditions in the Maritimes in 1993. CFS-M. Info. Rept. M-X-188.
- Magasi, L.P., Pendrel, B.A., and Hurley, J.E. 1994. Forest health monitoring in the Maritimes in 1993. CFS-M Info. Rept. M-X-192.
- Meikle, O.A., and Hurley, J.E. 1994. Forest insects and diseases in Fundy National Park in 1993. CFS-M Tech. Note No. 296.
- Myren, D.T. (Editor). 1994. Tree diseases of eastern Canada. NRCan, CFS, Ottawa.
- Pendrel, B.A. 1992. Managing the seedling debarking weevil in the Maritimes. Abstract in Can. J. Plant Sci. 72: 997.
- Pendrel, B.A., Doucette, D.E., and Simpson, R.A. 1994. Monitoring forest pests with pheromone traps; Maritimes Report - 1993. CFS-M Tech. Note No. 298.
- *Sweeney, J.D., and Turgeon, J.J. 1994. Life cycle and phenology of a cone maggot, *Strobilomyia appalachensis* Michelsen (Diptera: Anthomyiidae), on black spruce (*Picea mariana* (Mill.) B.S.P., in eastern Canada. Can. Ent. 126: 49-59.
- Walsh, T.J. 1994. Forest insects and diseases in Kejimikujik National Park in 1993. CFS-M Tech. Note No. 293.

APPENDIX

Distinctive Features of the Ecoregions in the Atlantic Maritime Ecozone. (Adopted from Loucks, O.L. 1962. A forest classification for the Maritime Provinces. Proc. Nova Scotian Institute of Science. 25(2):85-167)

| Ecoregion | Characteristic tree species¹ | Associated climate |
|---------------------------|--|---------------------------|
| St. John River | sM, Be, l, wAs, Bu, Ba | Warm, dry |
| Restigouche-Bras d'Or | sM, Be, bF, yB, wP, wS | Mod. cool, mod. dry |
| Magaguadavic-Hillsborough | sM, Be, wP, eH, bF, rS | Mod. warm, mod. dry |
| Maritime Uplands | sM, yB, bF, Be, wS, rS, rM | Cool, moist |
| Clyde River-Halifax | rS, wP, eH, rO, rM, bS, Be | Warm, dry |
| Maritime Lowlands | bF, rS, bS, eH, wP, rM, jP, wS, Be | Mod. cool, mod. dry |
| Fundy Bay | rS, bF, wB, wS, bS, yB, Mo | Cool, wet |
| Atlantic Shore | wS, bF, bS, wB | Cool, wet |
| New Brunswick Highlands | bF, wB, wP, tA, wS, bS, jP, rS | Cold, mod. dry |
| Gaspé-Cape Breton | bF, wB, wS, bS | Cold, wet |
| Cape Breton Plateau | bS, bF, wS, wB, Mo | Cold, wet |

¹ Standard FIDS abbreviations are used to list tree species.

OTHER INSECTS AND DISEASES

This table lists alphabetically, by common name, most insects and diseases encountered in the Maritimes in 1994 but not discussed in detail elsewhere in the report. Inclusion in the table does not imply that the organism is necessarily of lesser economic importance than those discussed in the text. It may be that an organism, *e.g.*, larch sawfly, is at an ebb of biological activity and did not cause enough concern in 1994 to warrant detailed discussion. It may be that, although severe, an organism, *e.g.*, seedling debarking weevil, was only of localized importance in 1994.

- A.W. MacKay, A.S. Doane, and T.J. Walsh

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|--|--|
| Alder flea beetle <i>Altica ambiens alni</i> Harr. | Alder | In New Brunswick, trace to severe browning throughout southern areas and spreading into central and northern areas. In Nova Scotia, similar to 1993, mainly light or moderate with patchy, severe throughout. More intense and widespread, mainly moderate and severe across Prince Edward Island. |
| Anthraxnose of hardwoods <i>Discula quercina</i> (West.) Arx | Basswood White ash | No observations in 1994. |
| Anthraxnose of maple <i>Aureobasidium apocrypta</i> (Ell. & Ev.) Herm.-Niv. (formerly <i>Kabatiella apocrypta</i> (Ell. & Ev.) Arx) | Red maple Sugar maple | No observations in 1994. |
| Apple-and-thorn skeletonizer <i>Choreutis pariana</i> (Cl.) | Apple | Damage of varying intensities at eight locations, mainly in eastern Nova Scotia. Light at one location in New Brunswick; severe on one tree in Prince Edward Island. |
| Ash rust <i>Puccinia sparganioides</i> Ell. & Barth. | White ash | Damage of varying intensities at nine locations, mainly in western Nova Scotia; highest, moderate and severe on several trees East Kemptville, Yarmouth Co. No observations from New Brunswick or Prince Edward Island. |
| Aspen webworm <i>Tetralopha aplastella</i> (Hlst.) | Trembling aspen | Trace to moderate damage at several locations in central, eastern and southern New Brunswick. A few larvae at one location in Nova Scotia. No observations from Prince Edward Island. |
| Bagworm <i>Thyridopteryx ephemeraeformis</i> (Haw.) | Balsam fir Red spruce White spruce | In Nova Scotia, a few larvae at three locations with no associated injury. No observations from New Brunswick or Prince Edward Island. |
| Balsam bark weevil <i>Pissodes dubius</i> Rand. | Balsam fir | Found at three locations in two counties in New Brunswick; highest, 8% of balsam fir infested at Melville Lake, Northumberland Co. No observations from Nova Scotia or Prince Edward Island. |
| Balsam fir bark beetle <i>Pityokteines sparsus</i> (LeC.) | Balsam fir | Eight percent of trees infested at one New Brunswick location. No observations from Nova Scotia or Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|---|
| Balsam fir sawfly <i>Neodiprion abietis</i> (Harr.) | Balsam fir Red spruce | In New Brunswick, incidence and damage levels up from 1993; highest, moderate injury over 10 ha of balsam fir at St. George, Charlotte Co. and light feeding on 30% of balsam fir trees at Wild Goose Lake, Restigouche Co. Found at seven locations in Nova Scotia; highest, moderate defoliation on a few balsam fir at Clam Harbour Beach, Halifax Co. Trace at two locations in Prince Edward Island. |
| Balsam fir tip blight <i>Delphinella balsameae</i> (Waterm.) E. Muell | Balsam fir | No observations in 1994. |
| Balsam shootboring sawfly <i>Pleroneura brunneicornis</i> Roh. | Balsam fir | Up significantly from 1993 levels throughout the Maritimes. In New Brunswick, trace, light or moderate damage at 39 locations, average 10% of shoots affected; highest, moderate on 29% of shoots, Melville Lake, Northumberland Co. In Nova Scotia, damage of varying intensities at 35 locations; average 5%, highest, moderate and severe, averaging 37% of shoots at Seffernville, Lunenburg Co. In Prince Edward Island, trace damage at five locations; average 9%, highest 17% of shoots, Auburn, Queens Co. See "Christmas Tree Pests" chapter. |
| Balsam woolly adelgid <i>Adelges piceae</i> (Ratz.) | Balsam fir | In New Brunswick, both stem attack and gouty twigs observed at four locations, highest at Southwest Head, Charlotte Co. where all trees were attacked; in Nova Scotia, caused trace to light twig damage at five locations; and in Prince Edward Island, stem attack observed on 28% of trees at Rustico Island, Queens Co. |
| Beech bark disease <i>Nectria coccinea</i> var. <i>faginata</i> Lohm., Wats. & Ayers | Beech | Cankered stems common throughout the region. Infection ranged from 16 to 100% of trees in numerous stands examined. |
| and | | |
| Beech scale <i>Cryptococcus fagisuga</i> Linding. | | |
| Birch casebearer <i>Coleophora serratella</i> (L.) | Alder White birch Wire birch Yellow birch | In New Brunswick, found at more than 100 locations at 1993 levels of mainly trace or light. Severe damage at Hornes Gulch, Restigouche Co., and Western Brook, Madawaska Co. Damage in Nova Scotia at 1993 levels of trace or light at 48 locations; highest, 53% of white birch leaves at Poplar Hill, Pictou Co. In Prince Edward Island, damage up from 1993 to mainly trace or light levels, averaging 40% of white birch leaves; highest, moderate at Brackley Beach picnic park, P.E.I. National Park, Queens Co. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|---|--|
| Birch leaf spot <i>Septoria betulae</i> Pass. (formerly <i>S. betulina</i> Pass.) | White birch | Varying intensity levels mainly in southern New Brunswick; highest, severe damage along the Felix-Martin Brook Valley, Madawaska Co. In Nova Scotia, damage similar to 1993, varying intensity levels mainly in central and eastern areas; highest, patches of severe Main-A-Dieu, Cape Breton Co., and Grand River, Richmond Co. Trace at one location in Prince Edward Island. |
| Birch sawfly <i>Arge pectoralis</i> (Leach) | Alder White birch Wire birch Yellow birch | In New Brunswick, defoliation levels were up and more widespread than in 1993. Varying intensity levels throughout; highest, severe on white birch and alder near Mount Carleton, Restigouche Co., and south of Popple Depot, Northumberland Co. Damage similar to 1993, trace defoliation at eight locations across Nova Scotia. More common in Prince Edward Island than in 1993, with trace or light damage at seven locations. |
| Birch skeletonizer <i>Bucculatrix canadensisella</i> Cham. | White birch Yellow birch | Skeletonizing increased in Nova Scotia and Prince Edward Island and remained the same in New Brunswick. Varying intensity levels in New Brunswick; highest, severe on 5 ha of white birch, Godbout, Victoria Co. Trace or light at nine locations in Nova Scotia. In Prince Edward Island, moderate and severe patches; highest, near the eastern end of the Island and in P.E.I. National Park. |
| Bruce spanworm <i>Operophtera bruceata</i> (Hlst.) | Elm Trembling aspen | Trace or light at three locations in New Brunswick and Nova Scotia. A few larvae at one location in Prince Edward Island. |
| Canker of larch <i>Potenzia myces coniferarum</i> (Hahn) Smerlis | Tamarack | Trace at one location in New Brunswick, two in Nova Scotia and six in Prince Edward Island. |
| Cedar leafminers <i>Argyresthia aureoargentella</i> Brower <i>Argyresthia freyella</i> (Wishm.) <i>Argyresthia thuiella</i> (Pack.) <i>Coleotechnites thujaella</i> (Kft.) | Cedar | Incidence and intensity down in New Brunswick, trace or light at two locations; highest, 92% of shoots with light damage Pabineau Lake, Gloucester Co. Trace at two locations in Prince Edward Island. No observations from Nova Scotia. |
| Cherry blight | Cherry | Significant decrease in New Brunswick to a single find. Throughout Nova Scotia, incidence and intensity similar to 1993 at trace, light or moderate levels. Common across Prince Edward Island at reduced levels from 1993, to mainly light or moderate. |
| Cherry casebearer <i>Coleophora pruniella</i> Clem. | American beech Largetooth aspen Trembling aspen | Trace damage at seven locations in Nova Scotia, and four in Prince Edward Island. No observations from New Brunswick. |
| Deterioration of cedar | Cedar | Condition of trees continued to improve in St. John Co., N.B. but with some discoloration and dieback. The initial cause of the deterioration remains uncertain. No observations from Nova Scotia or Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|--|
| Diplodia tip blight <i>Sphaeropsis sapinea</i> (Fr.) Dyko & Sutton | Red pine Scots pine | Light and moderate infection to Scots pine ornamentals with dieback at Argyle Head, Yarmouth Co., and at Rogers Brook, Queens Co., N.S. No observations from Prince Edward Island. See "New Insect and Fungus Records In The Maritimes" chapter for New Brunswick's report. |
| Eastern blackheaded budworm <i>Acleris variana</i> (Fern.) | Balsam fir Black spruce Red spruce White spruce | Similar to 1993 levels, trace to moderate defoliation, especially in northern New Brunswick; highest, moderate at Veneer Brook and light damage to all balsam fir trees at Hornes Gulch, both in Restigouche Co. Trace feeding at 13 locations throughout Nova Scotia and endemic levels in Prince Edward Island. |
| Eastern dwarf mistletoe <i>Arceuthobium pusillum</i> Peck | Spruce | Found at many locations mainly in eastern Nova Scotia. Numerous brooms with associated mortality particularly in northern Annapolis, Antigonish, and western Inverness counties. One observation of trace damage from each county in Prince Edward Island. No observations from New Brunswick. |
| Eastern spruce gall adelgid <i>Adelges abietis</i> (L.) | Black spruce Red spruce White spruce | Present throughout the region at levels similar to 1993 of mainly trace or light. Highest, light damage to 19% of shoots at Clearwater Brook, York Co., N.B., moderate injury to 56% of shoots, Rockdale, Richmond Co., N.S. and light infestation on 17% of shoots at Cavendish Campground, P.E.I. National Park, Queens Co., P.E.I. |
| Eastern tent caterpillar <i>Malacosoma americanum</i> (F.) | Hardwoods | Population levels increased once again in New Brunswick, mainly in central and southern regions. Scattered nests throughout except in Albert, Madawaska, Gloucester, and Restigouche counties. In Nova Scotia, nests were commonly found, similar to 1993 levels, in all counties except Pictou and Cape Breton; highest, over 500 nests along a few kilometers of highway near Copper Lake, Antigonish Co. Found throughout Prince Edward Island at higher numbers than 1993. |
| Elm leaf beetle <i>Pyrrhalta luteola</i> (Mull.) | Elm | Outbreak continued for seventh year on Fredericton city elms, York Co., N.B. with moderate and severe foliage browning; light defoliation in St. Stephen, Charlotte Co. No observations from Nova Scotia or Prince Edward Island. |
| Elm leafminer <i>Fenusa ulmi</i> Sund. | Elm | Defoliation in Nova Scotia similar to 1993 with light and moderate injury throughout as well as a few areas of severe attack. Damage levels up in Prince Edward Island, to moderate and severe patches throughout. No observations from New Brunswick. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|----------------------------|---|
| European pine sawfly <i>Neodiprion sertifer</i> (Geoffroy) | Pine | Endemic levels in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| European pine shoot moth <i>Rhyacionia buoliana</i> (D. & S.) | Red pine | Levels down from 1993 in Nova Scotia to mainly trace or light infestation at a few locations. An average of 32% of red pine with trace damage in Prince Edward Island. No observations from New Brunswick. |
| European spruce sawfly <i>Gilpinia hercyniae</i> (Htg.) | Red spruce White spruce | Found mainly in central and southeastern New Brunswick causing trace defoliation. Low numbers observed throughout Nova Scotia and Prince Edward Island. |
| Fall cankerworm <i>Alsophila pometaria</i> (Harr.) | Hardwoods | Moderate and severe defoliation most notable on ornamental Manitoba maple at several locations between Charlo, Restigouche Co. and Bathurst, Gloucester, N.B. Truro, Colchester Co., N.S. and very common across Prince Edward Island. |
| Fall webworm <i>Hyphantria cunea</i> (Dru.) | Hardwoods Conifers | Nest counts up throughout region. Counts up for the second year throughout New Brunswick, more common in eastern and southwestern areas. In Nova Scotia, numbers increased for the fourth consecutive year, very high counts especially in eastern and northern parts of the province. In Prince Edward Island, very common, particularly in Kings and Queens counties. |
| Flat leaf tiers <i>Psilocorsis reflexella</i> Clem. | Hardwoods | Incidence and intensity levels increased in New Brunswick and Nova Scotia and remained the same in Prince Edward Island. Trace or light at 14 locations throughout New Brunswick. In Nova Scotia, varying intensities at 31 locations; highest, severe in several large patches of trembling aspen, near Monastery, Antigonish Co. Trace at one location in Prince Edward Island. |
| <i>Psilocorsis</i> spp. | Hardwoods | In New Brunswick, trace or light at four locations. Trace to severe damage at 30 locations throughout Nova Scotia; highest, patches of moderate and severe defoliation at several locations in Annapolis, Lunenburg, and Queens counties. Trace at one location in Prince Edward Island. |
| Flea weevil <i>Rhynchaenus</i> spp. | Willow | Moderate to severe at 58 locations throughout most of Nova Scotia, and 14 across Prince Edward Island. No observations from New Brunswick. |
| Foureyed spruce bark beetle <i>Polygraphus rufipennis</i> (Kby.) | Red spruce | Found at one location in New Brunswick. No observations from Nova Scotia or Prince Edward Island. |
| Frost damage | Conifers Hardwoods | Trace or light damage at 42 locations in nearly all New Brunswick counties, six in Nova Scotia, and seven in Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|-------------------------|---|
| Gall mites <i>Eriophyidae</i> | Hardwoods | Trace to moderate infestation at numerous locations throughout New Brunswick. An average of 32% leaves affected at 43 locations assessed in Nova Scotia (increase of 10% from 1993). Levels down slightly in Prince Edward Island to an average of 25% leaves affected at 26 locations assessed. |
| Globose gall rust <i>Endocronartium harknessii</i> (J.P. Moore) Y. Hiratsuka | Jack pine Scots pine | Found at two locations in New Brunswick; highest, moderate infection on Jack pine and Scots pine at Upper Blackville, Northumberland Co. on a 2-ha plantation. Trace or light at two locations in Nova Scotia. No observations from Prince Edward Island. |
| Greenheaded spruce sawfly <i>Pikonema dimmockii</i> (Cress.) | Spruce | At endemic levels in the Region. |
| Greenstriped mapleworm <i>Dryocampa rubicunda rubicunda</i> (F.) | Maple | Damage levels similar to 1993 in New Brunswick and up in Nova Scotia and Prince Edward Island. Moderate or severe defoliation to residual trees at Rosaireville, Northumberland Co., and severe over 5 km of roadside trees at Allardville, Gloucester Co., N.B. In Nova Scotia, trace to severe defoliation at 14 locations, mainly in central and western counties; highest, moderate injury to 53% of red maple leaves on all trees at Mount Uniacke, Hants Co. Trace or light infestation at seven locations in Prince Edward Island. |
| Hail damage | White pine | Trace damage to 16% of white pine branches on 70% of the trees at Dungarvon River, Northumberland Co., N.B. No observations from Nova Scotia or Prince Edward Island in 1994. |
| Hare damage | Conifers | Trace damage at four locations in Nova Scotia and five locations in Prince Edward Island. No observation from New Brunswick. |
| Hypoxylon canker <i>Hypoxylon mammatum</i> (Wahl.) Mill. | Trembling aspen | Common throughout region. In New Brunswick, average of 14% of trees infected; highest, 52% of trees affected at Beaumont, Westmorland Co. An average of 12% of trees infected at 15 locations in Nova Scotia; highest, 56% of trees dead or dying at Smiths Cove, Digby Co. In Prince Edward Island, an average of 17% of trees were infected; highest, 88% of trees dead or dying at Rustico Island campground, P.E.I. National Park, Queens Co. |
| Ink spot of aspen <i>Ciborinia whetzellii</i> (Seaver) Seaver | Trembling aspen | In New Brunswick, damage and incidence increased considerably. Found at 22 locations, mostly across northern New Brunswick at all levels of damage; highest, severe at Little Fork Branch, Madawaska Co. No observations from Nova Scotia or Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|-------------------------------------|--|
| Jack pine budworm <i>Choristoneura pinus pinus</i> Free. | Jack pine | No damage observed. Two adult moths caught in light trap in Nova Scotia. |
| Larch needleworm <i>Zeiraphera improbana</i> (Wlk.) | Larch | Trace injury at two locations in Nova Scotia and one in Prince Edward Island. No observations from New Brunswick. |
| Larch sawfly <i>Pristiphora erichsonii</i> (Htg.) | Larch | Population levels down in New Brunswick with trace or light defoliation at three locations. In Nova Scotia, this pest continues to intensify and expand in western counties. Mostly moderate or severe damage to roadside or forest stands at over 35 locations; highest, severe over 5 ha at Conquerall Mills, Lunenburg Co. No observations from Prince Edward Island. |
| Large aspen tortrix <i>Choristoneura conflictana</i> (Wlk.) | Trembling aspen | No observations in 1994. |
| Leaf and twig blight of aspen <i>Venturia macularis</i> (Fr.) E. Muell. & Arx. | Largetooth aspen Trembling aspen | Infection up from 1993 in New Brunswick to an average of 14% shoots on 69% of trees; highest, 90% leaves affected at Portage Brook, Restigouche Co. Levels same as 1993 with mostly trace or light infection at 15 locations throughout Nova Scotia; highest, moderate at Pine Tree, Pictou Co. Damage up in Prince Edward Island from trace to light or moderate. |
| Leaf blisters Birch leaf blister <i>Taphrina carnea</i> Johanson | Yellow birch | In New Brunswick, infected an average of 15% of leaves on 63% of trees. In Nova Scotia, trace to moderate injury at 13 locations; highest, moderate on 56% of leaves on all trees at Newton Mills, Colchester Co. No observations from Prince Edward Island. |
| Black leaf blister <i>Taphrina dearnessii</i> Jenkins | Red maple | In New Brunswick, trace or light damage to an average of 58% of leaves at 15 locations. In Nova Scotia, mostly trace at seven locations with highest (32% of leaves on 70% of trees) west of Medway, Queens Co. In Prince Edward Island, one report of moderate damage at Elmsdale, Prince Co. |
| Oak leaf blister <i>Taphrina caerulescens</i> (Desm. & Mont.) Tul. | Red oak | Trace at one location in New Brunswick. No observations from Nova Scotia and Prince Edward Island. |
| Yellow leaf blister <i>Taphrina flava</i> Farl. | White birch Wire birch | In New Brunswick, infected an average of 24% white birch and wire birch leaves on 87% of trees; highest, moderate damage on 44% of wire birch foliage at Laketon, Kent Co. In Nova Scotia and Prince Edward Island, light damage at seven locations in each province. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|--|
| Leaf blotch of horse-chestnut <i>Guignardia aesculi</i> (Peck) V.B. Stew. | Horse-chestnut | Incidence down in New Brunswick to two reports; trace and severe on a few trees. Infection levels similar to 1993 in Nova Scotia and Prince Edward Island with mainly moderate or severe and light to severe, respectively. |
| Leafcone caterpillars <i>Caloptilia</i> spp. | Birch Maple | At 1993 levels in New Brunswick causing mainly trace or light damage throughout province; highest, 49% white birch leaves on all trees at Zionville, York Co. Increased in incidence and intensity in Nova Scotia, from 1993 levels, to trace or light at 19 locations; highest, light damage to 27% of yellow birch leaves at South Range, Digby Co. In Prince Edward Island, trace damage at five locations. |
| Leaf fungus of largetooth aspen <i>Astrodochium coloradense</i> Ell. & Ev. | Largetooth aspen | Infection similar to 1993 levels of mainly moderate or severe foliage discoloration on scattered individuals or small pockets of trees in western Nova Scotia; highest, moderate or severe throughout Grey Mountain, Hants Co., and at LaBelle, Queens Co. No observations from New Brunswick or Prince Edward Island. |
| Leaf spot on poplar <i>Drepanopezia tremulae</i> Rimpau | Trembling aspen | Moderate or severe infection at six locations in Nova Scotia (highest, severe at Debert, Colchester Co.) and at Cavendish Campground, PEI National Park, Queens Co., Prince Edward Island. Trace damage at one location in New Brunswick. |
| Lesser maple spanworm <i>Itame pustularia</i> (Gn.) | Mountain maple Red maple Striped maple | Population levels down in New Brunswick to trace defoliation at one location. Incidence and intensity up from 1993 in Nova Scotia to trace or light at 35 locations. Low numbers at four locations in Prince Edward Island. Light trap catches up in region especially at Kejimikujik National Park (1161 in 1994, 578 in 1993). |
| Maple bladder gall mite <i>Vasates quadripes</i> (Shim.) | Red maple | Common and widespread throughout region. In New Brunswick, an average of 31% of leaves affected on 77% of trees at 57 locations. In Nova Scotia, 37% of leaves on 73% of trees at 58 locations; 77% of leaves on 96% of trees across Prince Edward Island. |
| Maple leafroller <i>Sparganothis acerivorana</i> Mack. | Red maple Sugar maple | In New Brunswick, leafroller damage similar to 1992 and 1993, averaging 7% of leaves on 64% of trees at 17 locations. In Nova Scotia, trace damage at four locations. In Prince Edward Island, an average of 8% of leaves with light damage; highest, moderate on 17% of leaves at Brudenell, Kings Co. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|--|---|
| Maple spindlegall mite <i>Vasates aceris-crumena</i> (Rly.) | Sugar maple | Common throughout the region. In New Brunswick, an average of 22% of leaves with galls on 73% of trees at 18 locations; highest, (64%) at Fundy National Park, Albert Co. In Nova Scotia, 24% of leaves affected at eight locations; highest, (60%) at Murray Brook, Guysborough Co. In Prince Edward Island, 63% of leaves with trace or light damage at seven locations |
| Mountain ash sawfly <i>Pristiphora geniculata</i> (Htg.) | Mountain ash | .Trace damage at one location in Nova Scotia and three in Prince Edward Island. No observations from New Brunswick. |
| Needle casts <i>Lirula macrospora</i> (Hartig) Darker | Black spruce Red spruce White spruce | In New Brunswick, light damage to young red spruce at Point Wolfe campground, Fundy National Park, Albert Co. In Nova Scotia, trace at five locations; highest, 20% of white spruce needles at Lake Doucette, Digby Co. Light damage on white spruce, Howlan, Prince Co., P.E.I. |
| <i>Lirula mirabilis</i> (Darker) Darker | Balsam fir | Trace damage at Whycocomagh, Inverness Co., N.S. No reports from New Brunswick or Prince Edward Island. |
| <i>Lirula nervata</i> (Darker) Darker | Balsam fir | In New Brunswick, trace damage at Grassy Lake, York Co. In Nova Scotia, trace or light at ten locations; highest, (20%) at Broadway, Pictou Co. No observations from Prince Edward Island. |
| <i>Phaeocryptopus gaeumannii</i> (Rohde) Petr. | Douglas fir | In New Brunswick, defoliated a few ornamental hedgerow trees at Oromocto, York Co. No observations from Nova Scotia or Prince Edward Island. |
| <i>Rhabdocline weirii</i> Parker & Reid | Douglas fir | No observations in 1994. |
| <i>Bifusella linearis</i> (Peck) Hoehn. | White pine | No observations in 1994. |
| <i>Hypodermella laricis</i> Tub. | Tamarack | No observations in 1994. |
| Needle flecking | Conifers | Damage of varying intensities 15 locations across Nova Scotia; highest, moderate and severe on black spruce at Indian Lake, Halifax Co. Trace at one location in New Brunswick and light at four locations in Prince Edward Island. |
| Needle rusts on balsam fir <i>Melampsora abieti-capraearum</i> Tub. <i>Pucciniastrum epilobii</i> Otth <i>Pucciniastrum goeppertianum</i> (Kuehn) Kleb. <i>Uredinopsis</i> sp. | Balsam fir | Generally trace and light at numerous locations throughout the region. <i>P. epilobii</i> highest damage was moderate on 43% of needles at Wild Goose Lake, Restigouche Co., N.B. <i>Uredinopsis</i> sp. severe in combination with <i>P. epilobii</i> at New Ross, Lunenburg Co., N.S. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|--|
| Needle rusts on eastern hemlock <i>Melampsora abietis-canadensis</i> C.A. Ludwig ex Arth. <i>Pucciniastrum vaccinii</i> (Wint.) Jorst. | Eastern hemlock | In Nova Scotia, <i>P. vaccinii</i> light to moderate with patchy severe infestations on 0.5 km of roadside hemlock at Puzzle Lake, Queens Co. and trace at one other location. No observations from New Brunswick and Prince Edward Island. No observations of <i>Melampsora abietis-canadensis</i> in 1994. |
| Needle rusts on pine <i>Coleosporium asterum</i> (Diet.) Syd. <i>Coleosporium viburni</i> Arthur | Red pine | <i>C. asterum</i> caused trace or light damage at four locations in Prince Edward Island. No observations from New Brunswick or Nova Scotia. No observations of <i>Coleosporium viburni</i> in 1994. |
| Needle rusts on spruce <i>Chrysomyxa ledi</i> dBy. <i>Chrysomyxa ledicola</i> Lagh. <i>Chrysomyxa</i> sp. | Black spruce Colorado blue spruce Red spruce White spruce | <i>C. ledi</i> , <i>C. ledicola</i> and <i>Chrysomyxa</i> sp. were found in all three Maritime provinces. In New Brunswick, trace damage at 11 locations; highest, 10% of needles on 80% of black spruce trees affected by <i>C. ledicola</i> , West Burntland Brook, York Co. In Nova Scotia, trace to severe damage at 42 locations; highest, severe by <i>C. ledicola</i> on one dozen white spruce trees at Great Village, Colchester Co., and severe by <i>C. ledi</i> on several white spruce at L'Archeveque, Richmond Co. In Prince Edward Island, trace or light at seven locations; highest, 20% of black spruce damaged by <i>C. ledicola</i> at Marie, Kings Co. |
| Needle rust on tamarack <i>Melampsora medusae</i> Theum. | Tamarack | Trace or light damage at one location in each of New Brunswick and Nova Scotia; highest, 25% of shoots damaged on 70% of trees, California, Victoria Co., N.B. No observations from Prince Edward Island. |
| Northern pitch twig moth <i>Petrova albicapitana</i> (Busck) | Jack pine | Incidence down from 1993 levels to trace at five locations in region, from 20 in 1993. |
| Oak leaf tier <i>Psilocorsis quercicella</i> Clem. | Beech Red oak White birch Yellow birch | Trace or light at five locations in New Brunswick. In Nova Scotia, incidence and intensity increased throughout western areas. Trace to moderate damage at 11 locations; highest, moderate defoliation of red oak at Molega, Queens Co. No observations from Prince Edward Island. |
| Obliquebanded leafroller <i>Choristoneura rosaceana</i> (Harr.) | Hardwoods | In New Brunswick, trace or light defoliation at eight locations; highest, moderate damage on 64% of trembling aspen leaves at Caverhill, York Co. Trace at four locations in each of Nova Scotia and Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|---|
| Ocean salt spray | Balsam fir Red pine | Severe damage to several balsam fir at Trenton, Pictou Co., N.S. Moderate on young red pine at Cape Wolfe, Prince Co., P.E.I. No observations from New Brunswick. |
| Ocellate gall midge <i>Cecidomyia ocellaris</i> O.S. | Mountain maple Red maple Sugar maple | Present throughout New Brunswick, average leaf damage 17% on 80% of trees; highest (45% on all red maple) at Upper Shepody Road, Albert Co. Present across Nova Scotia, averaging 15% on 83% of trees; highest (55% on all red maple) at Tracadie, Antigonish Co. Trace on an average of 9% of leaves at 14 locations in Prince Edward Island. |
| Orange spruce needleminer <i>Coleotechnites piceaella</i> (Kft.) | Balsam fir Black spruce Red spruce White spruce | Trace damage at eight locations across Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Pear thrips <i>Taeniothrips inconsequens</i> (Uzel) | Sugar maple | Low numbers with no visible defoliation at one location in New Brunswick. No observations from Nova Scotia or Prince Edward Island. |
| Pepper-and-salt moth <i>Biston betularia cognataria</i> (Gn.) | White birch Wire birch | At endemic levels in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Pine bark adelgid <i>Pineus strobi</i> (Htg.) | White pine | Varying levels of damage, from light to severe, on the Farmlands Trail, P.E.I. National Park, Queens Co., P.E.I. No observations from New Brunswick or Nova Scotia. |
| Pine engraver <i>Ips pini</i> (Say) | Jack pine | Found on one tree in New Brunswick. No observations from Nova Scotia or Prince Edward Island. |
| Pine leaf adelgid <i>Pineus pinifoliae</i> (Fitch) | Red spruce White pine | Trace or light infestation mainly on white pine at 12 locations across western Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Pinkstriped oakworm <i>Anisota virginiensis virginiensis</i> (Drury) | Red oak White birch | At endemic levels in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Poplar felt mite <i>Phyllocoptes didelphis</i> Keifer | Large-tooth aspen Trembling aspen | Found throughout New Brunswick at trace to moderate levels; highest, moderate damage on 93% of trembling aspen leaves on all trees at Tinker, Victoria Co. In Nova Scotia, averaging 23% of foliage at 22 locations; highest, (83%) at Basin Lake, Guysborough Co. In Prince Edward Island, average 21% on 68% of trees. |
| Poplar leaf-folding sawfly <i>Phyllocolpa</i> spp. | Large-tooth aspen Trembling aspen | Common throughout the region. In New Brunswick, found at 28 locations; average of 17% leaves folded on 66% of trees; highest, (57% on 80% of trembling aspen trees) at Cheyne, Kings Co. In Nova Scotia, intensity increased, average 22% (7% in 1993) on 90% of trees at 22 locations; highest, (84%) at Gully Lake, Colchester Co. In Prince Edward Island, trace damage on 9% of leaves on 83% of trees. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|---|--|
| Poplar leafmining sawfly <i>Messa populifoliella</i> (Town.) | Trembling aspen | Trace damage at one location in each province. |
| Poplar petiolegall moth <i>Ectoedemia populella</i> Busck | Trembling aspen | Trace damage at three locations in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Porcupine damage <i>Erethizon dorsatum</i> Linnaeus | Conifers | Girdled trees common throughout New Brunswick and Nova Scotia. Highest (20-25%) of jack pine trees damaged at Miller Brook, Queens Co. and Cain River, Northumberland Co., N.B. In Nova Scotia; highest, 84% dead or dying red pine at Rogers Brook, Annapolis Co. There are no porcupines in Prince Edward Island or on Cape Breton Island. |
| Ragged sprucegall adelgid <i>Pineus similis</i> (Gill.) | Black spruce Red spruce | In Nova Scotia, incidence similar to 1993, but intensity decreased. Found at 14 locations; highest, 3% of red spruce shoots (37% in 1993) at Kempton Lake, Annapolis Co. No observations from Prince Edward Island. No observations from New Brunswick. |
| Red flag of balsam fir <i>Fusicoccum abietinum</i> (Hartig) Prill. & Delacr. | Balsam fir | Moderate or severe damage at two sites in northern Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Red pine cone beetle <i>Conophthorus resinosae</i> Hopk. | Red pine | Moderate damage at Lily Lake, York N.B. No observations from Nova Scotia or Prince Edward Island. |
| Red spruce adelgid <i>Pineus floccus</i> (Patch) | Red spruce | Trace damage at one location in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Roadside salt damage | Conifers Hardwoods | Various intensity levels at numerous locations in New Brunswick and Nova Scotia. Moderate at one location in Prince Edward Island. |
| Saddled prominent <i>Heterocampa guttivitta</i> (Wlk.) | White birch | Endemic levels in New Brunswick (single larva). Two moths caught in a light trap in Nova Scotia. |
| Satin moth <i>Leucoma salicis</i> (L.) | Lombardy poplar Silver poplar Trembling aspen Willow | Common throughout region at all intensity levels. In New Brunswick, populations are higher than in 1993 with moderate or severe defoliation to mainly silver poplar. Damage similar to 1993 in eastern Nova Scotia, moderate or severe at many locations; highest, severe on several dozen trees at Port Hawkesbury, Inverness Co. Incidence and intensity levels up in western counties. Up slightly in Prince Edward Island to moderate or severe across the province. |
| Seedling debarking weevil <i>Hylobius congener</i> D.T., Sch. & Marsh. | Conifer seedlings | Found at four black spruce and/or larch plantations in New Brunswick; highest, 20-25% of seedlings girdled at Six Mile Brook, Northumberland Co. Two caught in a trap in Prince Edward Island. No observations from Nova Scotia. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|--|--|
| Snow damage | Conifers | Trace or light injury to scattered trees mainly in plantations throughout the region. |
| Spearmarked black moth <i>Rheumaptera hastata</i> (L.) | White birch Wire birch Yellow birch | Observed at seven locations in New Brunswick at trace damage levels. Endemic populations in Nova Scotia and no observations from Prince Edward Island. |
| Spider mites <i>Oligonychus</i> spp. <i>Tetranychidae</i> | Conifers | Trace damage by <i>Oligonychus</i> spp. at one location each in New Brunswick and Nova Scotia on larch and eastern white pine, respectively. Trace to moderate at four locations in Prince Edward Island with highest on Scots pine at Camp Tamawaby Demonstration Woodlot, Prince Co. Incidence of <i>Tetranychidae</i> up throughout region, particularly on larch, due to the hot, dry summer weather. Trace to moderate infestations at six locations in northern New Brunswick with highest on black spruce at Siegas Lake Settlement, Madawaska Co. Infestations increased dramatically throughout Nova Scotia at numerous locations. Most damage on larch was moderate or severe along Atlantic coast from Halifax to Cape Breton counties. In Prince Edward Island, found at 17 locations, mainly moderate and severe damage on larch and red pine in Queens and Kings counties. |
| Spiny elm caterpillar <i>Nymphalis antiopa</i> (L.) | Trembling aspen Willow | Various intensity levels of defoliation to individual trees mainly across northern New Brunswick. Two reports of severe defoliation to roadside willow in Nova Scotia. Moderate injury to a single willow in Prince Edward Island. |
| Spittlebugs <i>Aphrophora</i> spp. <i>Cercopidae</i> | Conifers Hardwoods | Trace or light damage at 3, 15, and 7 locations in New Brunswick, Nova Scotia, and Prince Edward Island, respectively. |
| Spotted tussock moth <i>Lophocampa maculata</i> Harr. | Crabapple Walnut | Trace at two locations in Prince Edward Island. No observations from New Brunswick or Nova Scotia. Numbers doubled to over 50 adults at one Nova Scotia light trap. |
| Spruce bud midge <i>Rhabdophaga swainei</i> Felt | Black spruce Red spruce White spruce | Light at a few locations in New Brunswick and common throughout Nova Scotia and Prince Edward Island. |
| Spruce bud scale <i>Physokermes piceae</i> (Schr.) | Black spruce Red spruce White spruce | In Nova Scotia, significant reduction in population from common in 1993 to trace at five locations. Endemic levels in New Brunswick and Prince Edward Island. |
| Spruce coneworm <i>Dioryctria reniculelloides</i> Mut. & Mun. | Balsam fir | Trace defoliation at one location in New Brunswick. No observations from Nova Scotia or Prince Edward Island. |
| Spruce gall adelgid <i>Adelges lariciatus</i> (Patch) | Spruce | No observations in 1994. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|--|-----------------------------|---|
| Spruce twig aphid <i>Mindarus obliquus</i> (Cholod) | White spruce | Single report of trace damage from Nova Scotia and Prince Edward Island. No observations from New Brunswick. |
| Stillwell's syndrome | Balsam fir | Scattered individuals or small numbers of dead trees found throughout region. Incidence same as in 1993, found in central and northern areas of New Brunswick. Less widespread in Nova Scotia, but mainly in central and northern counties. Affected trees found but not common across Prince Edward Island. |
| Sugar maple borer <i>Glycobius speciosus</i> (Say) | Sugar maple | One or two observations of trace damage from each Maritime province. |
| Sunscorch | | Not observed in region in 1994. |
| Tar spot of maple <i>Rhytisma acerinum</i> (Pers. ex St. Amans) Fr. | Mountain maple Red maple | Found at 28 locations throughout Nova Scotia, at mainly trace levels; average 22%; highest, light on 60% of red maple leaves on all trees at Third Lake, Digby Co. Light or moderate at three locations in New Brunswick. Trace or light at seven locations in Prince Edward Island. |
| Uglynest caterpillar <i>Archips cerasivorana</i> (Fitch) | Hardwoods | Numbers of nests continue to decline throughout New Brunswick; highest counts in York County. Less common in Nova Scotia; highest, several hundred nests along 50 m of roadside cherry near Upper Musquodoboit, Halifax Co. Numbers up in Prince Edward Island, common throughout, ranging from one nest to six dozen nests per site. |
| Wax filament scale <i>Xylococcus betulae</i> (Perg.) | White birch Yellow birch | Found throughout southern New Brunswick, averaging 69% of birch at 24 locations. In Nova Scotia at five locations; highest, all white birch with numerous scales at Big Deadwater Lake, Digby Co.; and Indian Fields, Shelburne Co. No observations from Prince Edward Island. |
| Weevil <i>Strophosoma melanogrammus</i> Forst. | Red spruce | At endemic levels in Nova Scotia. No observations from New Brunswick or Prince Edward Island. |
| Whitemarked tussock moth <i>Orgyia leucostigma</i> (J.E. Smith) | Balsam fir | Larvae found at two locations in New Brunswick and at ten locations in western Nova Scotia, with no significant injury. Trace or light at nine locations in Prince Edward Island. |
| White pine blister rust <i>Cronartium ribicola</i> J.C. Fisch. | White pine | In New Brunswick, found at three locations; highest, (24% of trees damaged) at Rooth Station, York Co. In Nova Scotia, trace or light at three locations. No observations from Prince Edward Island. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|---|
| White pine needle blight | White pine | The exact cause of this condition is unknown. Light damage at one location in New Brunswick. Various levels of discoloration at a few scattered locations in Nova Scotia; highest, moderate to severe on individual roadside trees in northern Pictou County. No observations from Prince Edward Island. |
| White pine sawfly <i>Neodiprion pinetum</i> Nort. | White pine | Light defoliation at one location in New Brunswick. No observations from Nova Scotia or Prince Edward Island. |
| White pine weevil <i>Pissodes strobi</i> (Peck) | Black spruce Jack pine Norway spruce Red pine White pine White spruce | Common and widespread throughout region. Incidence increased in New Brunswick, found at 40 locations; highest, 64% of white pine at Stream Lake, Northumberland Co. In Nova Scotia, found in all but three counties; highest, 44% of white pine at Chignecto Game Sanctuary, Cumberland Co. Incidence and intensity increased throughout Prince Edward Island; found at 22 locations; highest, 68% of white pine at Foxley River, Prince Co. See Plantation Pest Assessment Survey chapter. |
| Whitespotted sawyer beetle <i>Monochamus scutellatus</i> (Say) | Conifers | Trace or light feeding at seven locations in New Brunswick, nine in Nova Scotia and two in Prince Edward Island. |
| Willow blight <i>Venturia saliciperda</i> Nuesch | Willow | In New Brunswick, moderate and severe damage at four locations; severe at one location in Nova Scotia; moderate at one location in Prince Edward Island. |
| Wind damage | Conifers Hardwoods | See section on Blowdown in New Brunswick; scattered uprooted hardwood trees in Kejimikujik National Park, Queens Co., trace or light foliage damage throughout Nova Scotia. An average of 34% of leaves with mainly light damage across Prince Edward Island; highest, moderate on 44% of leaves at North Bedeque, Prince Co. |
| Winter drying | Conifers | Trace or light at five locations in New Brunswick. In Prince Edward Island, moderate with some severe; highest, moderate and severe reddening of red pine at Victoria, Queens Co. No observations from Nova Scotia. |
| Winter moth <i>Operophtera brumata</i> (L.) | Hardwoods | Trace or light defoliation at two locations in Nova Scotia. Incidence much reduced in Prince Edward Island to light and moderate at two locations. No observations from New Brunswick. |
| Witches' broom of balsam fir <i>Melampsorella caryophyllacearum</i> Schroet. | Balsam fir | Common and widespread throughout the region. |
| Witches' broom of spruce <i>Chrysomyxa arctostaphyli</i> Diet. | White spruce | No observations in 1994. |

| INSECT OR DISEASE | HOST(S) | REMARKS |
|---|--|---|
| Woolly alder aphid <i>Paraprociophilus tessellatus</i> (Fitch) | Alder | Populations of less intensity and incidence than in 1993. Light damage at two locations in New Brunswick. Trace or light at fourteen locations in western Nova Scotia. In Prince Edward Island, trace at three locations. |
| Yellowheaded spruce sawfly <i>Pikonema alaskensis</i> (Roh.) | Balsam fir Black spruce Colorado blue spruce Red spruce White spruce | More widespread in New Brunswick, found at many locations; highest, severe on black spruce in Martin Heads area, St. John Co. and Shepody Road, King Co. Much reduced in Nova Scotia, trace damage at nine locations. Moderate and severe throughout Prince Edward Island; highest, several areas of severe damage in all three counties. |