

1973



## QUEBEC REGION

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### INTRODUCTION

Since its formation in 1952, the Quebec section of the Forest Insect and Disease Survey has operated according to arrangements made with the Quebec Department of Lands and Forests as reported in the 1955 Annual Report. In 1972, changes were made in these arrangements and the Forest Insect and Disease Survey accepted new responsibilities. The new proposal (dated July 1972 and which will be re-evaluated within a period of 1 year) assigns responsibilities for the survey work as follows: the Laurentian Forest Research Centre (LFRC) assumes responsibility for the annual evaluation of insects and diseases in general; the Quebec Department of Lands and Forests (QLF) assumes responsibility for special surveys in relation to control operations. In addition, the QLF still receives and processes insect material sent by their collaborators. Coordination and mutual assistance will be assured through a committee comprised of personnel from both agencies. It is felt that this new agreement will clarify the situation and permit increased effectiveness in both the detection and the solution of problems.

Rainfall in Quebec was below normal in April, May and part of June, and was generally above normal during the remainder of the growing season; temperatures were below normal throughout the season except during the month of May in western and central Quebec.

In 1972, as in past years, the survey program was problem oriented. The Survey Section provided increased assistance to QLF in two main control projects; the first against the spruce budworm, the second against the hemlock looper; this impeded other work. Assistance was requested by the QLF for the following: a cost-benefit study on spruce budworm spraying programs, the biological assessments and extensive ground sampling for the spruce budworm and the hemlock looper control projects. General survey work was also conducted in close collaboration with QLF personnel who kindly furnished valuable information for the preparation of reports and their collaboration is acknowledged.

Spruce budworm continued to be the most important forest insect problem in Quebec and moderate to severe defoliation occurred over 25.7 million acres, mainly in western and central Quebec. Control operations were conducted with success on 1.7 million acres in the most critically affected areas and most valuable stands; unfortunately some severely damaged areas had to be omitted, and mortality is now evident in these areas. Serious damage to forests of Anticosti Island by the hemlock looper was prevented through successful aerial spraying of 0.4 million acres of affected balsam fir stands; the infestation is now reduced to approximately 40,000 acres.

Other prominent species in the Quebec Region were the large aspen tortrix, throughout most of the Province, the Bruce spanworm in the Eastern Townships, and the birch casebearer in the Lower Saint Lawrence and Gaspé Peninsula regions. The balsam twig aphid caused serious damage on balsam fir Christmas trees

in extensive areas south of the Saint Lawrence River. Some increases were recorded in the population of the birch skeletonizer, tent caterpillars and the fall webworm. Local resurgence of populations of both the jack pine budworm and Swaine jack pine sawfly was recorded. The distribution area of two exotic species, the gypsy moth and the small European elm bark beetle, enlarged. Conversely, cedar leafminers and larch casebearer populations decreased. Populations of previously known important species such as the spruce sawfly, the larch sawfly, and the blackheaded budworm, which were at a low level for some years, remained static.

Climatic conditions favored an increase in the incidence and severity of such foliar diseases as needle rusts, leaf blotches and leaf spots; tip blights were recorded more frequently than in previous years. A heavy ice storm at the end of March 1972 resulted in broken trunks and branches of hardwood trees, particularly aspen, elm and birch, in a 1,800-sq-mi area of southern Quebec. Late frosts were recorded during the last week of June and a number of hardwood species were damaged in southwestern counties of the Province.

Additional infection centers of scleroderris canker were recorded in natural jack pine regeneration areas, mostly within the known range of the disease. A second eradication operation against scleroderris canker was conducted in a small plantation near Grand'Mère. An appraisal of the severity of white pine blister was made in plantations and in natural stands located on various sites in several areas of the Province. Although the beech scale continued to extend its range at the same rate as in 1971, nectria cankers were observed only in two additional localities compared to seven, last year. In 1972, field investigations were made in 74 plots to evaluate the pathological conditions of white spruce trees in a fertilized plantation. The results of this pilot study will be used for the appraisal of damage by diseases in other plantations.

Finally, some buds opened prematurely during the fall season on a number of tree species in several counties of south-central Quebec. This resulted in the killing of buds and will probably lead to reduced growth during the summer of 1973.

### IMPORTANT FOREST INSECTS

**Spruce Budworm, *Choristoneura fumiferana* (Clem.)**—The spruce budworm was the most important forest insect in the Quebec region in 1972. As in 1971, the LFRC and the QLF participated in ground and aerial surveys to evaluate the status of the spruce budworm epidemic in progress in Quebec since 1967. Again in 1972, the spruce budworm made new gains both in distribution and numbers. The insect was collected throughout the territory south of a line joining Abitibi Lake, on the Ontario border, to Landry Lake, 40 miles inland on the Natashquan watershed, in Duplessis County. The total area of infestation visible from the air was estimated at approximately 26 million acres (see page 7). The increase in area resulted both from the extension of known infested areas and the development of new infestation centers. The status of the budworm in western, central and eastern Quebec in 1972 are reported below.

**Western Quebec**—The most important change was a marked extension of the Dumoine-Lièvre infestation in a northeasterly direction to reach central Quebec. This area of infestation now comprises a solid block incorporating the whole of Dumoine, Coulonge and Gatineau watersheds, and the upper section of the Ottawa, Rouge, Maskinongé and Saint-Maurice watersheds; from south to north, the block extends from the Ottawa River and the Saint Lawrence Valley into the headwaters of James Bay. For convenience, the part of central Quebec that is contiguous with that block will be discussed in this section. Within this approximately 22 million acres, cumulative defoliation decreases from west to east; up

to 5 years of severe defoliation occurred in the western section, resulting in some tree mortality whereas in the eastern section, only 1-2 years of defoliation were observed and the trees are still in relatively good condition. Of this area, 1.8 million acres of the critically defoliated forests were sprayed twice by the provincial authorities, in late May and early June, with fenitrothion in order to preserve the foliage and prevent tree mortality. Results of the treatment were very satisfactory on 80% of the area sprayed.

Outside the main body of infestation, numerous pockets of varying size were found by aerial surveys. The situation may be described as follows: to the west, two new centers of medium size were found east of Temiscamingue Lake; to the northwest, the small patches reported in the vicinity of Simard Lake in 1971 enlarged and merged to form several medium sized patches between Des-Quinze and Simard lakes, and the infestation west of Opasatica Lake on the Ontario border persists; to the north, a concentration of small to large infestation areas occurred again along Highway 58 adjacent to Parent and Quevillon lakes and a large group of small to medium sized pockets south and east of Gouin Reservoir coalesced into the infestation block shown on the map (page 7).

Forecasts for 1973 in western Quebec are for the persistence of the infestation in and at the periphery of the main infestation block with some decline along the southwestern margin; the few samples taken in Rouyn-Noranda County indicate that the population will be low in 1973.

*Central Quebec*—The main outbreak area of western Quebec extended into central Quebec to approximately 15 miles east of the upper Saint-Maurice River, north of La Tuque. In the lower Saint-Maurice, the front of the outbreak still is some 30 miles west of the river, except for a pie-shaped extension reaching the river at its confluence with the Matawin River. Current defoliation was moderate to severe throughout most of the above area. In the western part, severe defoliation was recorded for the second consecutive year.

Outside the main block of infestation in central Quebec, pockets of various sizes were found. The most important ones were located in the Lac-Saint-Jean and Saguenay areas and can be described as follows: west of the lake, a 30-mile stretch of infestation extends along the road from Saint-Félicien, Roberval County, to Chibougamau; south and southeast of the lake, a group of medium sized foci were found between Roberval and Bagotville; north of the Saguenay River, small pockets were located along the Sainte-Marguerite River in Dubuc County. Towards the southeast in Charlevoix County, pockets of infestation increased in numbers along the Saint Lawrence River between Baie Saint-Paul and Saint-Siméon.

The forecast for 1973 for areas outside the main outbreak is for a generally light infestation, except in and around some of the pockets mentioned.

*Eastern Quebec*—This region is divided into two sections: the north shore, and the south shore of the Saint Lawrence River. In the north shore region, only two medium sized infestations were found, one a few miles from the shore in Escoumains watershed, and the other in the Sault-au-Mouton watershed, Saguenay County. Egg sampling gave either nil or low counts indicating light defoliation for the whole region in 1973.

On the south shore, the Témiscouata infestation, first reported in 1969, persisted and now incorporates most of Témiscouata and Pohénégamook lakes watersheds. It extends to the north and the northeast, into Rivière-du-Loup and

Rimouski counties. Of particular importance, is a new infestation covering the area south of a line joining New Richmond, Bonaventure County to Fort Prével, Gaspé-est County. Defoliation varying from light to severe in the Témiscouata and Bonaventure-Gaspé infestations, depending upon the proximity to infestation centers, is forecast for 1973. Elsewhere, eggs were either rare or absent.

Sampling at the 52 monitoring stations established a number of years ago was continued in 1972, and 38 gave positive results compared with 42 in 1971. Most of the stations giving negative results were again located in eastern Quebec. As in past years, moth flights in a few strategic areas were monitored with light traps. The largest catches were taken on the 17th and 19th of July. The following table shows the relative importance of the captures in eight typical areas in 1971 and 1972.

Locality	Position re main outbreak area	Total captures		Forecast for 1973 based on egg-mass survey
		1971	1972	
Landron Lake.....	Central	14,300	42,600	Severe
Red Pine Depot.....	Central	49,300	28,600	Severe
Harrington Farm.....	At southern border	2,600	2,100	Light
Normand Lake.....	On the eastern front	23,900	71,100	Light to severe
Chute-aux-Galets.....	110 miles to the northeast	1,100	600	Nil to light
Montmorency Forest.....	70 miles to the east	19	0	Nil
Malbaie.....	110 miles to the east	3	100	Nil to severe
Causapsal.....	80 miles east of Témiscouata infestation	1	700	Nil

One thousand of the females captured at four stations were dissected to count the number of remaining eggs, and an average of 6.7 was obtained. No eggs were found in 38.4% of the females dissected, and the maximum number obtained was 60.

*Eastern Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Guen.)*—The population of this looper was generally low through most of the province this year, as indicated by the number of samples received by the QLF, which decreased from 108 in 1971 to 39 in 1972. Nevertheless, this looper was given much attention in 1972 as a result of the 545,000 acres of balsam fir forest defoliated on Anticosti Island in 1971. As predicted on the basis of adult surveys made in the fall 1971, larval populations were high throughout most of the infested territory in the spring 1972. A spraying program had been prepared during the winter and an area of approximately 425,000 acres was treated with fenitrothion to prevent further balsam fir mortality. The remaining 120,000 acres were not sprayed because a pre-spray sampling made in the spring revealed that the insect population had dropped to low levels. The operation, which started at the end of June, was completed on July 10; it was very successful.

Population sampling after the spraying, in the fall 1972, revealed that the Anticosti infestation is now restricted to two areas, a 40,000-acre area in the



Brick and Jupiter watersheds in central Anticosti, and a small pocket near Plantain Lake at the western end of the Island. Treatment of these two areas is contemplated for 1973.

The infestation area reported for the North Shore region in the fall of 1971, was sampled early in the spring of 1972, and it was found that the population had completely collapsed; these areas were not sprayed.

No other infestations of the looper was discovered in 1972 despite increased attention by survey personnel, particularly in eastern Quebec where hemlock looper infestations occurred in the past. Populations were low in the area where an infestation was reported in Whitworth Township, Rivière-du-Loup County in 1970.

**Jack Pine Budworm, *Choristoneura pinus pinus* Free.**—Aerial surveys of jack pine stands made by the QLF in February 1972, revealed the presence of a residual pocket of jack pine budworm infestation, north and northeast of the Mercier Dam infestation sprayed in 1970. Due to its proximity to the spruce budworm infested areas, QLF decided to include this area in the 1972 spruce budworm spraying program. An area of 19,500 acres, including all known infested jack pine stands plus a buffer zone, was sprayed with two applications of fenitrothion between 28 June and 3 July, 1972. According to the officers of QLF, results obtained were quite satisfactory.

Outside of the sprayed area, the insect was collected at six localities in 1972 but only in small numbers. Three of these localities were in the lower Gatineau watershed, one in the lower Ottawa, and one in the lower Saint-Maurice. The remaining collection originated from an area 15 miles west of Chapais on Route 113, in Abitibi-est County; this extends the known range in the Province 120 miles to the northeast.

**Aspen Defoliators, Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.) and others**—For the second consecutive year the large aspen tortrix increased in numbers and distribution, and ranked second in abundance among forest insects in the Quebec Region in 1972. This defoliator of trembling aspen occurred generally over the Province south of 51°N. The main areas of infestation are presented on the accompanying map. The three main areas of infestation in 1971 were sampled again in 1972. The population was again very high in the eastern area of severe infestation reported for the Lac-Saint-Jean-Saguenay region, Montmorency, Charlevoix and Rivière-du-Loup counties; in 1972, the infestation had extended west and east to cover l'Islet, Kamouraska and Rimouski counties. The area of moderate to severe infestation reported last year in Labelle County now extends to Gatineau County. The severe infestation area adjacent to the Ontario border in Témiscamingue County persisted with some extension northward. As in 1971, within these areas, numerous poplar stands were almost completely defoliated in June but partially refoliated in July.

The infestation expanded further toward the Eastern Townships and spread over Dorchester, Beauce, Frontenac and Compton counties, where moderate to severe defoliation was observed. Similar conditions were also reported for a small area in Gaspé-est County.

The four defoliators reported in 1971 as associated with the large aspen tortrix were again collected in the same general area, but were greatly outnumbered by the aspen tortrix. Only one species, *Enargia decolor* Wlk., had some importance; the other three species, *Epinotia solandriana* L., *Pseudexeuera oregonana* Wlsh., and *Sciaphila duplex* Wlsh., were generally rare.

**Maple Defoliators, Bruce Spanworm, *Operophtera bruceata* (Hulst), Linden Looper, *Erannis tiliaria* (Harr.) and Fall Cankerworm, *Alsophila pomelaria* (Harr.)**—Of the three species known to infest maple groves, the Bruce spanworm was by far the most abundant in 1972 as it was in 1971. The insect was found throughout the range of sugar maple from Pontiac County in the west, to Bonaventure County in the east. This year, the insect seemed to have a broader distribution but areas of higher infestation were, as predicted, again located in southeastern Quebec. The counties of Beauce, Compton, Frontenac, Mégantic, Dorchester and l'Islet were most affected. In several areas maple trees were completely stripped of their foliage; similar conditions were also observed locally on trembling aspen, particularly in Beauce County. Pockets of moderate to severe infestation were also found respectively at Saint-Cléophas, Matapédia County and Sainte-Rita, Rivière-du-Loup County. Contrary to what was observed last year, the larval virus disease caused by *Borrelinavirus bruceata* occurred in a great number of the severely infested localities. The influence of this disease, the main control factor of the last infestation, is becoming more apparent as the infestation progresses.

The forecast for 1973 is for a general reduction in populations with severe defoliation in some areas. The figures presented in the following table show the trend of the population in and around the localities sampled.

Locality	County	Average number of females captured per tree			Maximum defoliation expected*
		1971	1972	Ratio 1972/71	
Duchesnay . . . . .	Portneuf	60.3	56.3	0.9	M
Saint-Sylvestre . . . . .	Lotbinière	49.0	18.1	0.4	L
Lambton . . . . .	Frontenac	3.7	3.2	0.8	T
Saint-Achille . . . . .	Montmorency	2.7	2.5	0.9	T
Saint-Henri . . . . .	Lévis	5.4	2.8	0.5	T
Saint-Benoit (west) . . . . .	Beauce	976.2	479.2	0.5	S
Saint-Benoit (south) . . . . .	Beauce	417.0	192.8	0.5	S
Saint Raphaël . . . . .	Bellechasse	2.2	1.5	0.7	T
Sainte-Rose . . . . .	Dorchester	21.2	26.9	1.3	L
Saint-Aubert . . . . .	l'Islet	21.7	7.0	0.3	T
Sainte-Hélène . . . . .	Kamouraska	20.3	5.6	0.1	T
Sainte-Rita . . . . .	Rimouski	18.4	1.1	0	T
Saint-Fabien . . . . .	Rimouski	20.9	0.5	4.5	T
Saint-Alexis . . . . .	Matapédia	15.6	70.2		M

\*Defoliation expected: trace (T), 1-10%; light (L), 11-32%; moderate (M), 33-74%; severe (S), 75% plus.

The linden looper ranked second although relatively low in abundance; it was collected in only 35 of the 186 localities sampled and in all cases only a few were found. Most collections were from around Plessisville and Thetford Mines, Frontenac County, in l'Assomption County and in the southeastern section of Pontiac County. A very low level of population is forecast for 1973, on the basis of female moths captured.

The fall cankerworm was found in only 10 localities and the population was very low in each of them. On the basis of the number of females captured, the same conditions will prevail in 1973 as in 1972.

**Birch Casebearer, *Coleophora fuscedinella* (Zell.)**—Contrary to predictions made on the basis of casebearer counts completed after the birches dropped

their leaves in the fall, the birch casebearer was less abundant in 1972 than in 1971. The reduction in population was apparently due to unfavorable weather conditions during the winter along the Saint Lawrence River in eastern Quebec. On the north shore, populations were generally low, but small pockets of moderate to severe infestations were found. On the south shore, the infestation was estimated as light for the area as a whole; however, pockets of moderate infestation were found in Rimouski and Matane counties, in addition to a strip of moderate to severe defoliation along the Cascapedia River, Bonaventure County.

In central Quebec insect abundance varied. East of Quebec City, the insect was common with variations in numbers from high to low; one pocket of moderate infestation was found near La Pocatière, and several moderately to severely infested localities were reported in Charlevoix County. In the remaining areas the insect population was either low or absent except in one area near Coaticook, Stanstead County, where the infestation was moderate.

Counts of casebearers were made in 1972 in all localities sampled in previous years. Final figures for 1971 (those in the 1971 Report were preliminary) and 1972 follow:

Locality	County	Average number of casebearer/bud*		
		1971	1972	Ratio 1972/71
Saint-Germain.....	Kamouraska	8.9	3.2	0.4
Estcourt.....	Témiscouata	4.2	1.0	0.2
Saint-Jean-de-la-Lande.....	Témiscouata	5.2	2.3	0.4
Cabano.....	Témiscouata	5.4	0.7	0.1
Saint-Mathieu.....	Rimouski	2.9	1.3	0.4
Bic.....	Rimouski	7.2	2.4	0.3
Saint-Anaclet.....	Rimouski	4.2	1.8	0.4
Métis Beach.....	Matane	9.7	1.4	0.1
Routhierville.....	Matapédia	3.6	2.1	0.6
Oak Bay.....	Bonaventure	1.1	2.2	2.0
New Richmond.....	Bonaventure	3.4	0.7	0.2
Saint-Siméon.....	Charlevoix	4.8	1.2	0.3

\*It is estimated that five casebearers per bud will cause severe defoliation in the year following the count.

These data indicate that the fall population was remarkably lower in 1972 than in 1971 and only light to moderate infestations are expected in the localities listed in 1973. Additional counts were made for the first time in other localities and with comparable results.

**Balsam Twig Aphid, *Mindarus abietinus* Koch**—In 1972, numerous complaints were received from Christmas tree growers concerning damage caused to young balsam fir trees by the balsam twig aphid. This insect feeds on the needles of the current year and causes a curling of the new growth, which seriously affects the appearance of the tree. Although a severe infestation may cause twig mortality it rarely results in tree mortality. This year, the insect occurred in abnormally high numbers throughout the whole area located south of 50°N, from Val d'Or, Abitibi-est County, eastward to Gaspé. Ninety per cent of the 303 samples received from this area were collected east of the Saint-Maurice watershed. The degree of infestation varied from light to severe. The main areas of moderate to severe infestation occurred in the Chicoutimi-Jonquière area, the section of the Adirondacks mountains located west of l'Islet County, and in Rimouski, Matapédia and Matane counties.

This is the most severe infestation of this insect recorded in Quebec.

**Balsam Fir Sawfly**, *Neodiprion abietis* complex—No important change was recorded in the general status of this insect in 1972. The moderate to severe infestation reported for a number of years between Pembroke and Hull in the Ottawa River valley persisted in 1972. Trees severely defoliated for several consecutive years by this insect and then by the spruce budworm are presently dead and others are dying. The Ottawa Valley infestation was first reported in 1967 and it is still active. In contrast, the Ham-Nord infestation reported in 1971 had collapsed by 1972. Outside of these areas small numbers of the insect were found occasionally.

Mass rearing of larvae originating from the Ottawa Valley infestation, begun in 1968, was continued for the evaluation of biological control factors. The polyhedral virus disease, recorded for the first time in 1971, increased in 1972. On the other hand, the virus was relatively more active in the Ham-Nord infestation in 1971 and probably was the main cause of the infestation collapse in that area.

**Jack Pine Sawflies**—In February 1972, as reported under the jack pine budworm, QLF personnel surveyed jack pine areas of central and western Quebec to determine their general condition in relation to possible damage by the Swaine jack pine sawfly, *Neodiprion swainei* Midd. One area appeared to be severely defoliated, near Landron Lake, northeast of La Vérendrye Park. In early summer, ground surveys indicated that control measures were needed. Spraying plans were then prepared by QLF and an area of approximately 17,600 acres was sprayed on 13 August 1972. Post-spray sampling revealed that excellent results were obtained.

Ground surveys of jack pine stands were on a small scale in 1972, due to the heavy work load of other problems. Forty-seven jack pine stands were sampled to evaluate the status of the Swaine jack pine sawfly. The insect was found in 17 localities; fourteen of them were in the upper Saint-Maurice, Lac Saint-Jean and Saguenay areas, the balance occurred in western Quebec. Insect populations were low except three watersheds: Ha!-Ha!, Shipshaw and Péribonka, where the infestations varied from moderate to high. Two other pockets of infestation were subsequently found in the same general area by QLF personnel, one north of Saint-Jean-Bosco on Highway 19 and one near Saint-Honoré, Chicoutimi County.

The Swaine sawfly project group reported that in the Saint-Maurice area the insect population was still low in the areas sprayed in 1965; outside of these areas a population increase was recorded in the Lac-du-Chevalier area. Moderate to severe infestations were also reported in the Rivière-à-Mars watershed, and in the vicinity of Echouani Lake, south of Clova.

The sawfly project group also reported that the infestation of the jack pine sawfly, *N. pratti banksianae* Roh., recorded in 1967 for Lac-à-Baude, Champlain County, was still active, and that some population increase had occurred in the Strawhat Depot area.

**Birch Skeletonizer**, *Bucculatrix canadensisella* Cham.—A slight population increase and an extension of infestations of this skeletonizer were recorded in 1972. Reports were received from all regions with the exception of Témiscamingue County and the Eastern Townships. In the triangular area formed by Montreal, Buckingham and Mont-Laurier, the population generally decreased, although a pocket of moderate to severe infestation persisted south of Saint-Jovite, Terrebonne County. In the infestation along Highway 19, population levels remained high and a southward extension of the infestation was recorded.

In 1972, a moderate to severe infestation developed along Highway 58 in La Vérendrye Park and extended in a northerly direction along Routes 64 and 113 to Lac Quévillon in Abitibi-est County. In all other areas populations were low. The previous recorded infestation in Quebec started in 1960 and lasted for 6 years.



**Cecidomyid on Scots Pine, *Contarinia baeri* (Prell)**—Damage has been reported to Scots pine Christmas trees in the East-Angus area every year since 1969. It was first observed in 1968 by Christmas tree growers who were seriously alarmed by a browning of shoots followed by a light to severe needle drop. Similar damage had been observed by survey personnel in a Mégantic plantation in 1968. The organism responsible for the damage was identified as *Contarinia baeri* by R. Gagné of the U. S. National Museum. This was the first report of *Contarinia baeri* in Canada but it is a well known species in England.

Control of this insect by the Chemical Control Research Institute with assistance from LFRC personnel, was very successful and the results will be published in the near future. In the meantime, recommendations for treatment can be obtained from these organizations.

**Gypsy Moth, *Porthetria dispar* (L.)**—In 1972, according to new policies of the Plant Protection Division, Canada Department of Agriculture, monitoring of the gypsy moth became the responsibility of each district. The following report is based on information kindly furnished by officers of the Montreal Plant Protection office. Control measures through aerial spraying were applied up to 1970, when spraying was stopped because it was not giving the desired result. Since then moth trapping was intensified to monitor the status and extension of the infestations. In 1972, traps were installed in the vicinity of known infestations and 75 of them gave positive results. Traps were also placed in camping sites at Mont-Tremblant and in the Gaspé Peninsula. This has resulted in four additional counties being included in the infestation area, Terrebonne, Verchères, Saint-Hyacinthe and Bagot.

In severely infested areas defoliation was generally limited to non-economic tree species. In areas of 1 acre and less, a polyhedral virus disease was responsible for a high larval mortality. Similar observations were made in many areas by personnel of the LFRC. The program for 1973 provides for further monitoring of the population through trapping, and for verification of possible extension of the infestation in camping sites.

One infestation located southwest of Ormstown, Châteauguay County, decreased from severe to light.

**Birch Leafminers**—Light browning of birch foliage by *Fenusa pusilla* (Lep.) occurred on white and wire birch in the Lac-Saint-Jean and Saguenay areas and across south-central Quebec, with scattered pockets of moderate to severe browning scattered throughout the range of wire birch. No reports of damage were received from the Gaspé Peninsula, probably due to defoliation by another species, the birch casebearer, *Coloeophora fuscedinella* (Zell.).

Since 1969 observations have been made of *Profenusa thomsoni* (Konow) in an infestation north of La Tuque, Laviolette County. In 1972, the infestation varied from light to moderate. The insect was also found locally in the Lac-Saint-Jean and Saguenay valleys and at four localities on the Gaspé Peninsula.

**Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)**—The population of the redheaded pine sawfly was the lowest recorded in a number of years. This year, 51 red pine plantations in previously infested areas in southwestern Quebec were surveyed. The insect was found in only six of the plantations visited. The population was rated high near Campbell's Bay, Pontiac County, but it was low elsewhere.

In the Rouge River area, the second noteworthy infestation center, the survey was done by officers of the QLF. Seventy-five plantations were visited of which seven contained this sawfly. All affected plantations found in 1972 were treated with the virus suspension tested in 1970, which was again supplied

by the Insect Pathology Research Institute, Sault Ste. Marie, Ont. The results obtained from the treatment were very satisfactory.

The plantations treated with the same virus in 1970 were visited again in 1972 to check its long term effectiveness. The sawfly was found in only one of these plantations and it was again treated with the virus.

Outside these two areas, local infestations were found in two plantations in south-central Quebec, at Clarenceville, Missisquoi County, where 80% of the trees were infested, and at Roxton, Shefford County, for which no quantitative data are available.

**Tent Caterpillars**—A light to moderate increase in numbers of the forest tent caterpillar, *Malacosoma disstria* Hbn., low for a number of years, was recorded in some areas in 1972. The number of collections received by the QLF increased from 18 in 1971 to 30 in 1972. The increase was particularly evident in the Lac-Saint-Jean and Saguenay areas where the majority of the collections originated. Moderate to severe defoliation was recorded near Saint-Félicien, Roberval County. Light infestations were also recorded in southern Quebec in the counties of Pontiac, Gatineau, Terrebonne, Deux-Montagnes, Montcalm, Portneuf, Montmagny, l'Islet, Montmorency and Charlevoix.

The status of the eastern tent caterpillar, *M. americanum* (F.), was comparable to that of 1971. The insect was observed in the rural areas of 20 counties, from Pontiac to Kamouraska. The majority of the observations were made in the lower Ottawa Valley, the plain of Montreal, and the Richelieu and Saint-François valleys. Higher populations were observed near Chichester and Cayamant Lake in Pontiac County, in Argenteuil County, and in the lower Richelieu Valley.

Again in 1972, only a few collections of the western tent caterpillar, *M. californicum pluviale* (Dyar), were made and all were in northwestern Quebec.

**Fall Webworm**, *Hyphantria cunea* (Drury)—Tents of the fall webworm were more abundant in 1972 than in 1971. They were again abundant in the general areas of infestation reported last year in southwestern and south-central Quebec. It was commonly collected in the Ottawa and Saint Lawrence River valleys from Fort-Coulonge, Pontiac County, to the city of Three Rivers. Within this area the insect was again abundant in the vicinity of Highway 8 and Route 41 between the cities of Hull and Joliette, and along Highway 52 in Huntingdon and Saint-Jean counties. Counts of nests per mile of roadside were made in 50 localities of which 12 were classified as moderate or severe. The maximum count of over 1,000 nests per mile was recorded at Covey Hill, Huntingdon County and two counts of over 300 nests per mile were made at Belle-Rivière and Saint-Placide, Deux-Montagnes County.

**Greenstriped Mapleworm**, *Anisota rubicunda* (F.)—In 1972, infestations of the greenstriped mapleworm was quantified in the three infested localities reported last year. At Tee Lake, Témiscamingue County, the insect population recurred at very low levels whereas, at Bouchette, Gatineau County, the insect remained at high levels. In the third and most extensive infestation center in Assumption, southern section of Joliette, Montcalm and Berthier counties, the insect was found in all 13 localities sampled. Numbers were low in all localities but two: Laurentide, Assumption County and Saint-Jacques, Montcalm County, where the infestations were, respectively, moderate and severe. New infestations were reported from Grand-Remous, Gatineau County and Saint-Bernard, Saint-Hyacinthe County.

**Larch Casebearer, *Coleophora laricella* (Hbn.)**—Contrary to predictions, populations of this casebearer were low in 1972 and no reports of serious defoliation were received. This probably resulted from a reduction in populations during the winter. Evidence of control by birds was found in the spring. The tips of many cases were cut and the cases appeared to be empty. Counts of casebearers were again made in the fall. The number of casebearers per 100 buds apt to cause the degree of defoliation corresponding to each of the four categories used was: trace, 1–7; light, 8–24; moderate, 25–55; severe, 56 and more. Of a total of 73 localities sampled, only one was classified as moderate to severe compared to 14 out of 41 in 1971. Generally the casebearer population will decrease in 1973.

**OTHER NOTEWORTHY INSECTS**

Insect	Host(s)	Locality	Remarks
<i>Aceria parapoecilii</i> (Keifer) Poplar bud-gall mite	Aspen, trembling	Saint-Augustin, Portneuf Co.	First record in 1970; present in small numbers since.
<i>Acleris variana</i> (Fern.) Blackheaded budworm	Fir, balsam Spruce, white, red	Throughout the range of fir and spruce	Low numbers.
<i>Anisota virginiensis</i> (Drury) Pinkstriped oakworm	Oak	Rapides-des-Joachims, Pontiac Co. and surrounding areas	Moderate to severe defoliation on north shore of Ottawa River.
<i>Adelges piceae</i> (Ratz.) Balsam wooly aphid	Fir, balsam	Bonaventure and Gaspé- Est counties	Infestation area static; increase of gout but decrease of trunk attack.
<i>Archips cerasivoranus</i> (Fitch.) Uglynest caterpillar	Cherry, choke Willow	Farmlands	Population level as in 1971 <sup>1</sup> Local infestation in Berthier, Brome, Portneuf, Kamouraska Rimouski, Matapédia and Bonaventure counties.
<i>Argyresthia aureoargentella</i> Brower <i>A. canadensis</i> Free. <i>A. thuiella</i> Pack and <i>Pulicolaria thujaella</i> Kft. Cedar leafminers	Cedar, eastern white	West of Saint-François River in south-central Quebec  Lower St. Lawrence and Gaspé regions	Insect common; infestation generally light, moderate to severe locally.  Pockets of light to moderate infestation.
<i>Croesia semipurpurana</i> (Kft.) Oak leaf-tier	Oak, red	Lower section of Ottawa valley Metropolitan Quebec and Orleans Island	Light to severe infestations. Light infestations only.
<i>Dasineura balsamicola</i> Lint. Balsam gall midge	Fir, balsam	Mount Wright, 30 miles north of Labrador City, Duplessis Co.	Severe infestation center and new distribution record. Population low elsewhere.
<i>Dendroctonus rufipennis</i> (Kirby) Spruce beetle	Spruce, white	Lac-à-la-Tortue, Champlain Co.	Infestation still active; damage increased since reported in 1967; patches of moderate infestation.
<i>Diprion hercyniae</i> Htg. European spruce sawfly	Spruce, white and black	Southeastern and central Quebec	Insect common in Eastern Townships, North Shore and Gaspé Peninsula regions but population generally low.
<i>Diprion similis</i> (Htg.) Introduced pine sawfly	Pine, Scots	Mégantic Lake, Frontenac Co. Ste-Marguerite, Compton Co. Ste-Clothilde, Arthabaska Co. Franklin, Huntingdon Co.	New distribution records; population very low.

## OTHER NOTEWORTHY INSECTS (concluded)

Insect	Host(s)	Locality	Remarks
<i>Hemichroa crocea</i> (Fourc.) Striped alder sawfly	Alder, speckled	East Bolton, Brome Co.	Local infestation; severe defoliation.
<i>Nepytia canosaria</i> (Wlk.) False hemlock looper	Fir, balsam	Sainte-Sophie, Mégantic Co.	Infestation collapsed.
<i>Petrova albicapitana</i> (Busck) Pitch nodule maker	Pine, jack	Throughout the range of jack pine	Severe infestation locally. Damage more important in plantations where up to 100% of trees affected.
<i>Pikonema alashensis</i> Roh. Yellowheaded spruce sawfly	Spruce, white and black	Province-wide	Populations reduced. Low numbers in Gaspé Peninsula and North Shore regions.
<i>Pikonema dimmockii</i> (Cress.) Greenheaded spruce sawfly	Spruce, white and black	Province-wide	Populations low.
<i>Pissodes strobi</i> Peck White pine weevil	Pine, white Spruce, white and Norway	South-central Quebec	Important in plantations; up to 85% of trees affected.
<i>Pristiphora erichsonii</i> (Htg.) Larch sawfly	Tamarack	Province-wide	Quantitative sampling in 63 localities: Nil, 32; light, 27; moderate to severe, 4.
<i>Pristiphora geniculata</i> (Htg.) Mountain-ash sawfly	Mountain-ash	Throughout the range of mountain-ash	Low numbers in Saguenay and Chaudière watersheds; population light to moderate in Gaspé Peninsula.
<i>Rhyacionia buoliana</i> Schiff. European pine shoot moth	Pine, Mugho	Madeleine Islands	First report east of Matapédia County.
<i>Scolytus multistriatus</i> (Marsh.) Smaller European elm bark beetle	Elm, white	Montreal Islands, Saint-Telesphore, Soulanges Co. and l'Assomption, Assomption Co.	New distribution record.
<i>Stilpnotia salicis</i> L. Satin moth	Poplar, white, silver and Lombardy	Several counties in Eastern Townships	Light to severe infestation locally.
<i>Vasates quadripes</i> (Shimer) Maple bladdergall mite	Maple, silver	Wide distribution	Numerous reports of local infestations received yearly.

IMPORTANT FOREST DISEASES

**Scleroderris Canker of Pine, *Gremmeniella abietina* (Lagerb.) Morelet** ( $\equiv$  *Scleroderris lagerbergii* Gremmen)—In natural stands scleroderris canker has only been reported on jack pine. This year the disease was reported in two additional counties, Chicoutimi and Bonaventure. Scleroderris canker was evident in 11 of the 26 counties where jack pine is growing naturally and the most severely affected areas are located in Lac-Saint-Jean, Saguenay and Abitibi-Est counties. At Nicabau, Lac-Saint-Jean County, tallies from 11 sample plots (200 x 10 ft each) chosen within a 5 sq mi area of natural jack pine regeneration, 3 to 8 years of age, are presented in the accompanying table.

Plot No.	No. of trees examined	Infection level (%)	Mortality (%)
1.....	214	81	17
2.....	394	61	37
3.....	181	83	15
4.....	292	29	71
5.....	677	52	48
6.....	206	50	50
7.....	110	70	30
8.....	43	77	21
9.....	171	76	18
10.....	513	72	9
11.....	48	84	10
Total.....	2,849	62	34

In plantations, three species are concerned, red, jack and Scots pine. Red pine was found to be affected by *G. abietina* at l'Ascension, Chicoutimi County. In two plantations, Lachute, Argenteuil County and Saint-Léon, Matapédia County, jack pine showed a few cankers. With these three additional records, the disease is now present in plantations of 21 counties of the Province among which Portneuf, Champlain, Saguenay and Rimouski are presently the most severely affected.

Eradication of newly infected stems in a Scots pine plantation near Grand' Mère, Champlain County, was repeated this year to complete the operation started last year.

**White Pine Blister Rust, *Cronartium ribicola* J. C. Fischer**—The severity of white pine blister rust was evaluated in plantations and natural stands in 23 counties, mainly in southern Quebec. Levels of infection varied in Terrebonne, Papineau, Gatineau, Pontiac, Argenteuil, Champlain, Beauce, Charlevoix and Saguenay counties; often 25% or more of the trees were infected. On the other hand, most reports originating from Berthier, Portneuf, Soulanges, Charlevoix, Québec, Lotbinière, Nicolet, Drummond, Arthabaska and Lac-Saint-Jean counties showed less than 10% of the trees infected even in 50-year-old stands.



The data presented in the following table illustrate the frequency of occurrence of *C. ribicola* in sample plots established in 1972.

Locality	County	Elevation (ft.)	No. trees examined	Infected trees (%)	Average age
Sainte-Philomène.....	Berthier	100	485P*	3	30
Sainte-Marguerite.....	Saguenay	100	38N**	5	100
Lanoraie.....	Berthier	100	150N	1	30
Drummondville.....	Drummond	200	144P	6	15
Lotbinière.....	Lotbinière	200	102P	0	10
Beech Grove.....	Pontiac	200	150N	20	55
Sainte-Sophie.....	Nicolet	300	143P	1	10
Sainte-Sophie.....	Nicolet	300	28P	0	15
Sainte-Eulalie.....	Nicolet	300	111N	5	60
Sainte-Eulalie.....	Nicolet	300	123N	8	20
Vallée Jct.....	Beauce	500	203P	20	20
Normandin.....	Lac-Saint-Jean	600	54P	6	40
Normandin.....	Lac-Saint-Jean	600	118P	3	20
Normandin.....	Lac-Saint-Jean	600	120P	2	12
Saint-Joachim.....	Montmorency	700	205P	10	40
Lac des Plages.....	Papineau	800	150N	50	50
Tapanee Farm.....	Labelle	900	160N	43	65
Sainte-Angeles.....	Beauce	1300	113P	28	20

\*Plantation. \*\*Natural Forest.

These data would suggest an increased susceptibility to blister rust at higher altitudes, presumably as a result of a difference in temperature and local topography. Additional sampling is proposed during the coming year.

**Beech Scale-Nectria Complex**, *Cryptococcus fagi* (Baer.) and *Nectria coccinea* var. *faginata* Lohm., Wats. and Ayers—The beech bark disease and the beech scale continued to spread to the north and west. Six new infestations of the scale were discovered in 1972. At Saint-Benoit and Saint-Frédéric, Beauce County and at Duchesnay, Portneuf County, the infestation varied from light to moderate while at Pointe-à-la-Garde, Bonaventure County, Mansonville, Brome County and Cap Tourmente, Montmorency County the scale population was high.

At Duchesnay and Pointe-à-la-Garde infections by *N. coccinea* var. *faginata* were recorded for the first time. The known distribution of both the scale and the disease, shown on the accompanying map, suggests that the scale insect is a precursor of the fungi responsible for the disease.

**Needle Rusts of Conifers**—Needle rusts were observed more frequently in 1972 than during the previous 2 years. Moderate and severe damage was particularly noticeable north of 48°N. On Anticosti Island, *Chrysomyxa ledicola* Lagh. was observed in a 5-mile strip of black spruce along the road from Port-Menier to MacDonald River. The QLF reported severe infections on black spruce near Gagnon, Saguenay County, at 52°N; this is an extension to the known

northern distribution of this needle rust. South of this infection, the disease was reported in 10 additional localities in Saguenay and Charlevoix counties; in a 12-acre stand of white spruce at Cap-des-Rosiers-est, Gaspé-sud County and at Saint-Elzéar, Beauce County.

*Chrysomyxa ledi* d By. was observed on white and black spruce in Matapédia, Montmorency, Frontenac, Saguenay and Duplessis counties; infection levels ranged from trace to moderate.

Balsam fir foliage was affected by *Hyalopsora aspidiotus* (Magn.) Magn. in Gaspé-est, Gaspé-ouest and Saguenay counties. *Milesia fructuosa* Faull also damaged balsam fir foliage in eight localities of Papineau, Portneuf and Montmagny counties and the Gaspé Peninsula.

More than 80% of the young red pine trees examined in various plantations of Yamaska, Soulanges and Drummond counties showed the presence of the needle rust, *Coleosporium asterum* (Diet.) Syd. In Papineau, Labelle, Gatineau, Compton and Portneuf counties relatively light infections were reported (between 10 and 30% of the foliage affected).

**Root Rots**—Observations were made this year on two major root rots. A total of 74 (0.1 acre) sample plots were examined for the presence of *Polyporus tomentosus* Fr. in a 46-year-old partly fertilized white spruce plantation at Grand' Mère, Champlain County, and it was found that root rot was one of the main causes of the death of 20% of the trees within the last 10 years. *P. tomentosus* var. *circinatus* (Fr.) Sartory and Maire was also commonly observed in living trees. In early August, fruiting structures were frequently found on trees in fertilized areas.

Damage caused by *Armillaria mellea* (Vahl ex Fr.) Kummer was also noted in several areas of the Province. In plantations at Valcartier, Quebec County, 8% of the young Norway spruce trees were affected. Low levels of infection by *A. mellea* were found in Scots pine in Berthier and Portneuf counties. In natural stands of jack pine *A. mellea* was noted in two areas, north of Maniwaki in Gatineau and in Montcalm County. In these areas up to 5% of the jack pine regeneration (3–10 years old) left after a mechanized clear cut of mature stands were infected. A few balsam fir and black spruce trees were also found affected by this root rot near Hérouxville, Champlain County. Another center of infection was located in a mixed stand of white pine, white birch and sugar maple near Pont-Rouge, Portneuf County.

**Foliar Diseases of Hardwoods**—Weather conditions during the summer, favored the development of numerous foliar diseases and foliar diseases caused by 11 different organisms were observed in 1972. Ink spot of aspen, *Ciborinia whetzeli* (Seaver) Seaver, was observed in 16 counties. At most of the 30 stations visited, damage to trembling aspen foliage was rated as moderate (30–60% of the foliage affected), which was higher than in 1971. Severe damage by this fungus was noted only in Matapédia, Matane and Gaspé-est counties.

Balsam poplar, aspen and hybrid poplars were affected by leaf spots caused by *Septoria populicola* Pk., *S. musiva* Pk. and *Marssonina populi* (Lib.) Magn. in various localities of Portneuf, Chicoutimi, Gatineau and Pontiac counties; levels of incidence and severity varied from trace to moderate depending upon the species or clones examined.

Sugar maple leaf blotches, mainly caused by *Kabatiella apocrypta* (Ell. and Ev.) Arx, were common in Portneuf, Brome, Mégantic and Sherbrooke counties. In Mégantic county, many of the sugar maples had shown similar blotches in 1971. Leaf spots caused either by *Phleospora aceris* (Lib.) Sacc. or by *Rhytisma punctatum* (Pers.) Fr. were frequently collected in sugar maple stands of Portneuf,

Quebec and Mégantic counties. On butternut, up to 75% of the foliage was affected by *Marssonina juglandis* (Lib.) Magn. in various localities in Mégantic, Gatineau and Pontiac counties.

Trembling and largetooth aspen leaves were commonly affected by the rust, *Melampsora medusae* Thuem. in Matapédia, Matane, Bonaventure, Chicoutimi and Papineau counties. In the same counties and in Montmorency County, *Melampsora epitea* Thuem. occurred on various species of willow. The willow tar spot caused by *Rhytisma salicinum* (Pers.) Fr. was collected on ornamentals throughout the Province.

**Gall Rust, *Endocronartium harknessii*** (J. P. Moore) Y. Hiratsuka—Gall rusts were discovered at six additional localities in 1972. Up to 40% of the jack pine trees were affected by *E. harknessii* in an area located 35 miles west of Chapais, Abitibi-est County; moderate damage was also observed near Berthierville, Berthier County, Lac Delage, Gatineau County and Sainte-Anne-du-Lac, Labelle County. This rust was also observed on trunks and branches of Scots pine near Saint-Jovite and Saint-Janvier, Terrebonne County.

**Hypoxylon Canker of Polar, *Hypoxylon mammatum*** (Wahl.) Miller—Hypoxylon canker caused moderate to severe damage and some mortality to trembling aspen in Kamouraska, l'Islet, Bellechasse, Matapédia, Montmagny, Gatineau, Pontiac, Vaudreuil, Deux-Montagnes, Terrebonne and Champlain counties. It was prevalent on trembling aspen in small, farm woodlots; in seven of 49 localities visited, more than 25% of the trees were affected. In larger forested areas, damage to trembling aspen was generally less.

**Eutypella Canker of Maple, *Eutypella parasitica*** Davidson and Lorenz—Eutypella canker was widely distributed in sugar maple stands throughout the Province but the level of infection was generally light. Of 46 stations in 23 counties, only eight infections were reported as moderate to high. Small woodlots in Montcalm, Portneuf and Dorchester counties were the most severely infected. Thirty-three other sugar maple stands showed canker but the level of incidence was rated as trace to low. No symptoms of the disease were observed in five localities in l'Islet, Matapédia and Bonaventure counties.

**Dutch Elm Disease, *Ceratocystis ulmi*** (Buism.) C. Moreau—The severity of the Dutch elm disease in Quebec was somewhat similar, if not lower, in 1972 to that in 1971, mostly due to the cool and rainy summer months. Six observation areas, covering about 1 sq mi each, were re-examined for the presence of healthy trees; the percentages of healthy trees ranged from 6 to 30% of the trees tagged in 1945, when the disease was first discovered in the area. This year, a few additional trees in the sample plots showed symptoms of the disease.

**Leucostoma Canker on Conifers, *Leucostoma kunzei*** (Fr.) Munk ex Kern—This canker produced light to moderate damage on jack pine at Rang Saint-Mathieu, Champlain County, l'Ascension and Saint-Honoré, Chicoutimi County and on Norway spruce near Thetford Mines, Mégantic County and also on white pine near Forestville, Saguenay County. The areas of infection were limited in extent. The pathological survey performed in 74 (0.1 acre) sample plots in the Grand'Mère white spruce plantation, referred to under root rots, showed that 18% of the 2,181 living trees examined had at least one active cytospora canker. Cankers were often on dominant and co-dominant trees and seemed to heal over more rapidly in nitrogen-fertilized plots.

**Balsam Fir Decline**—The reddening and death of crowns of semi-mature balsam fir trees occurred in small pockets near Chandler, Gaspé-est County and Grand Caspédia, Matapédia County; scattered damage was also observed within a distance of 8 miles around the two major infection centers. Cankering seems to be responsible for the decline; *Dermea balsamea* (Pk.) Seaver and *Thyronectria balsamea* (Cke. & Pk.) Seeler were identified as the causal agents.

**Shoot Blight of Balsam Fir**—Browning of balsam fir foliage was observed on tips of lateral branches in eight localities of Portneuf, Québec, Compton and Gaspé-est counties. *Cytospora friesii* Sacc. was observed on affected shoots and on brown needles. In addition, at the base of some branches, *Valsa friesii* (Duby) Fckl. and *Leucostoma kunzei* (Fr.) Munk ex Kern could be identified although cankering was not apparent.

**Climatic Damage**—Moderate to severe damage, caused by ice storms at the end of March 1972, covered an area of about 1,800 sq mi in southern Quebec (see accompanying map). Broken trunks and crowns were common on trembling aspen, white elm, red maple and wire birch within the area, which included the counties of Argenteuil, Deux-Montagnes, Terrebonne, Assomption, Joliette, Berthier, Richelieu, Yamaska and Nicolet. The trunks of trembling aspen were often broken at the level of the canker caused by *Hypoxylon mammatum* (Wahl.) Miller. In addition to trunk and branch breakage, buds were damaged by frost and the number of samaras or strobili produced by the affected trees was reduced. Other hardwood species, such as yellow birch, white ash, sugar maple and willow were also damaged. Wounds from broken branches, some over 4 inches in diameter, will probably be colonized by decay fungi in the coming years.

Moderate to severe damage caused by heavy snow falls was observed in areas surrounding the zone affected by ice storms. Broken branches and trunks were noted in red pine plantations of Soulanges, Joliette, Portneuf and Rimouski counties. In Pontiac, Papineau, Labelle, Argenteuil, Terrebonne, Berthier and Rivière-du-Loup counties jack and Scots pine plantations showed numerous broken branches.

Temperatures below 32°F in late June damaged 50 to 100% of the foliage of white ash, trembling aspen and occasionally sugar maple in Pontiac, Gatineau, Témiscamingue and Labelle counties. Buds were moderately damaged on balsam fir, white and Norway spruce in the counties mentioned above and in Abitibi, Champlain, Kamouraska, Rimouski and Argenteuil counties. In Chardon Township, Chicoutimi County, the QLF reported a 165-acre plantation of Norway spruce damaged by late frost. The number of requests received from the public throughout the Province showed that bud freezing on ornamentals was at least as severe as in 1971.

Winter drying of conifers was observed in plantations of red, Scots and white pine in Mégantic, Labelle, Terrebonne, Berthier, Missisquoi, Portneuf, Stanstead, Compton and Roberval counties. Approximately half of the 45 reports dealing with this type of damage reported a reddening of 50% of the crown on more than 70% of the planted trees. Eastern white cedar also suffered from winter drying in Gaspé and Bonaventure counties. Red, white and Norway spruces were affected in some of these counties.

Hail caused light to moderate damage to sugar maple foliage near Sainte-Marguerite, Dorchester County and East-Broughton, Beauce County.

In the fall of 1972, the buds of willows, trembling aspen, balsam poplar, and less commonly red and jack pine, opened in Quebec, Portneuf, Montmorency, Arthabaska, Mégantic, Lotbinière, Dorchester, Montmagny and Drummondville counties. The resultant damage in terms of growth reduction or possibly crown decline will be appraised next year.

**Fume Damage**—Symptoms of hydrogen fluoride and sulfur dioxide damage were observed on conifer foliage near Baie Comeau, Saguenay County. Dieback and tree mortality occurred in the immediate vicinity of the sources of these gases, and symptoms of damage could be observed as far as 15–20 miles down wind.

Crown decline in 25–40% of the trees is evident in a sugar maple stand of about 100-acre stand of sugar maple near Tring Jonction, Beauce County. The QLF investigated the damaged area and will perform soil and foliage analyses to determine whether toxic substances are involved and their concentration.

**Animal Damage**—Numerous leaders were eaten by rabbits in a Norway spruce plantation at Saint-Roch-de-Mékinac, Champlain County. Severe damage by the yellow-bellied sapsucker was observed in another plantation of Norway spruce near Thetford Mines, Mégantic County. Field mice caused heavy damage in small plantations and on ornamentals in Quebec City and vicinity as a consequence of the early snow cover and above average snow accumulation. Ten percent of the jack pine saplings, in a few acres of natural forest near Saint-Léon, Chicoutimi County showed lateral and terminal bud damage by squirrels.

#### OTHER NOTEWORTHY DISEASES

Organism and Disease	Host(s)	Locality	Remarks
<i>Botrytis cinerea</i> Pers. Gray mold blight	Larch, European	Duchesnay, Portneuf Co.	More than 60% of the seedlings affected in a greenhouse.
<i>Coryneum kunzei</i> Cda. Canker, dieback	Oak, red	Beaumont, Bellechasse Co.	First herbarium record.
<i>Dothiorella advena</i> (Cke. and Ell.) Sacc.	Oak, red	Beaumont, Bellechasse Co.	First herbarium record. Associated with dieback.
<i>Fomes igniarius</i> (L. ex Fr.) Kickx White heart rot	Hickory, bitternut	Sainte-Scholastique, Deux-Montagnes Co.	First report on <i>Carya</i> in Quebec.
<i>Fomes igniarius</i> var. <i>populinus</i> (Neuman) Campbell White trunk rot	Aspen, trembling	Murdockville, Gaspé-ouest Co.	On burned areas, along York river, up to 25% of the 40-year-old stems are affected.
<i>Fomes pinicola</i> (Sw. ex Fr.) Cke. Brown cubical rot	Pine, Scots	Lachute, Argenteuil Co.	First host record in Quebec.
<i>Gnomonia ulmea</i> (Schw.) Thuem. Leaf spot	Elm, white	Portneuf and Quebec Co.	Light infections.
<i>Melampsorella caryophyllacearum</i> Schroet. <i>Chrysomyxa arctostaphyli</i> Diet. Yellow witches' broom	Fir, balsam Spruce, white and black	Bonaventure, Matapédia, Matane and Rimouski Co.	Up to 5% trees affected in small areas of natural forest.
<i>Pestalotia funerea</i> Desm. Needle blight	Pine, jack	Duchesnay, Portneuf Co.	Light on 200,000 nursery seedlings.
<i>Phyllactinia corylea</i> Pers. ex Karst. Powdery mildew	Birch, white	Charlevoix and Témiscouata Co.	Up to 80% of the foliage affected.
<i>Phyllosticta minima</i> (Berk. and Curt.) Ell. and Ev. Leaf spot	Maple, red and sugar	Nicolet and Quebec Co.	Light infections.
<i>Sclerotinia kernerii</i> Wettst.	Fir, balsam	North of Saint-Jules, Bonaventure Co.	On male flowers, associated with alter- nating stunted needles; first North American record of the perfect stage.



## OTHER NOTEWORTHY DISEASES (continued)

Organism and Disease	Host(s)	Locality	Remarks
<i>Sirococcus strobilinus</i> (Desm.) Petr. Tip blight	Spruce, black	Laurentide Park, Montmorency Co.	Two new locality records. Presence confirmed on over 200 sq mi in center of park.
<i>Taphrina johansonii</i> Sadeb. Catkin blister	Aspen, trembling Cottonwood, eastern	Vicinity of Quebec and Montreal	On ornamentals.
<i>Uncinula salicis</i> (DC. ex Mérat) Wint. Powdery mildew	Willow	Drummond and Portneuf Co.	Up to 60% of the foliage affected.
<i>Venturia tremulae</i> Aderh. Leaf and twig blight	Aspen, trembling	Kamouraska and Témiscouata Co.	Light infections.

## FOREST INSECT AND DISEASE SURVEY 1972



