

# QUEBEC REGION

R. MARTINEAU AND G. B. OUELLETTE  
*Forest Research Laboratory, Ste. Foy, Quebec*



## INTRODUCTION

A marked extension in the known distribution of the balsam woolly aphid infestation in the Gaspé and the discovery of the beech scale in Témiscouata County were the most important insect records of the year. Populations of two defoliators, the forest and eastern tent caterpillars, reached outbreak proportions in southern Quebec. Increases in numbers of the jack-pine sawfly were recorded in early summer in previously known areas of infestation but spread of the insect was curtailed by unfavourable weather conditions during the summer and fall. Populations of the birch skeletonizer, larch sawfly, gypsy moth, and Bruce spanworm declined and the spruce budworm and the linden looper became relatively rare after several years of continuous decline.

The detection of a previously unreported canker and resinosis on balsam fir in Anticosti Island constitutes one of the important disease findings in 1965. Also noteworthy was the first record in Quebec of *Nectria galligena* associated with cankers on beech trees infested with the beech scale.

Investigations on stem rusts of jack pine have shown that *Cronartium stalactiforme* is probably widespread in Quebec. This rust was found to be particularly abundant in stands along the north shore of the St. Lawrence River. Globose gall rust, caused by *Peridermium harknessii*, was also abundant in the same areas. Important new loci of root rot infections by *Polyporus tomentosus* were observed in plantations, and Cytospora canker on spruce was observed in many new areas, including natural stands.

Weather conditions during the winter and early spring were again responsible for severe damage to trees. Frost injury to roots resulted in the death of some ornamental trees while pronounced winter drying occurred on conifers in many areas. These conditions and the severe drought which occurred early in the growing season were responsible for the continued deterioration of roadside maple trees in many localities. On the other hand, rainfall from July to October was well above average in many areas around Quebec City and will undoubtedly have an influence on the development of tree diseases in 1966.

The Survey staff acknowledges the cooperation of the forest industry and the Quebec Department of Lands and Forests in providing information, accommodation, and personnel assistance in field operations. A total of 1,192 insect and 543 disease collections were made in 1965. Their distribution by host tree species is as follows:

Coniferous trees	Collections		Broad-leaved trees	Collections	
	Insect	Disease		Insect	Disease
Balsam fir.....	359	112	Poplar		
Spruce			Trembling aspen.....	196	31
White spruce.....	34	62	Lombardy poplar.....	17	
Black spruce.....	2	33	Largetooth aspen.....	11	
Norway spruce.....	1	33	Balsam poplar.....	1	9
Misc.....	1	7	Misc.....	3	1

Coniferous trees	Collections		Broad-leaved trees	Collections	
	Insect	Disease		Insect	Disease
Pine	13	16	Birch	91	23
Jack pine	3	10	White birch	57	2
Red pine	4	8	Wire birch	7	8
Scots pine		10	Yellow birch	11	1
Pitch pine	1	6	Misc.....		
White pine	4	1	Cherry	56	
Mugho pine		4	Choke cherry	23	9
Misc.....			Pin cherry	30	2
Tamarack	15	6	Misc.....		
Eastern white cedar	3	2	Maple	47	23
Eastern hemlock		2	Sugar maple	19	1
Misc. hosts		6	Red maple	1	5
			Mountain maple	13	4
			Misc.....		
			Beech	8	38
			Elm	13	15
			White elm	4	3
			Misc.....		
			Willow	28	5
			Oak	14	5
			Red Oak		4
			Misc.....		
			Mountain-ash		13
			White ash	9	
			Basswood	11	
			Ironwood	3	3
			Misc. hosts	79	20
TOTAL	440	318	TOTAL	752	225
GRAND TOTAL					1,735

### IMPORTANT FOREST INSECTS

**Balsam Woolly Aphid, *Adelges piceae* (Ratz.)**—The known distribution of the balsam woolly aphid increased markedly in 1965, with the discovery of infestations over some 600 square miles at the eastern tip of the Gaspé Peninsula. Since the limits of the infestations were determined from surveys of obvious gout and stem attack only, the insect is probably more widely distributed. Despite extensive surveys, the aphid was not found on Anticosti Island.

On the Gaspé, the aphid is presently well established 10 to 15 miles inland through Gaspé-Sud and in eastern Bonaventure County. It was found in all accessible watersheds of that area with the exception of Grand-Pabos and Grande-Rivière. The most serious and active infestation centres were located a few miles inland in the Rivière-au-Renaud, Saint-Jean, Pabos-Ouest, and Port-Daniel valleys. In these areas stem attack was generally common on pole-sized, mature, and overmature trees. Saplings were less seriously affected. A tally of 50 trees in a 90-year old pure stand of balsam fir at Rivière-au-Renaud

showed that 72% of the balsam fir trees were obviously gouted, 48% had dead tops, and 6% were completely dead.

Tree mortality is a slow process since practically no red crowns were observed in the area of infestation. Growth ring studies in a few localities revealed the occurrence of abnormal wood back to the year 1955 which would date the first attack at least a few years earlier. Further information will be obtained in 1966 through plot studies in the infested area.

**Swaine Jack-pine Sawfly, *Neodiprion swaini* Midd.**—In March 1965, an aerial survey was conducted over 650 square miles of 40-year old jack pine stands scattered over an area of 5,000 square miles in central Quebec as a prerequisite to the control of sawfly infestations. This was a cooperative project involving industry, the Quebec Department of Lands and Forests, and the Federal Department of Forestry. Infestations were classified as either moderate or severe on the basis of crown discoloration. Light infestations could not be detected from the air. A total of 74,000 acres supported moderate or severe infestations, of which approximately 25% were severely affected. The infested areas generally occurred in patches of various sizes scattered through the central section of the area surveyed. The most important centres were located in the following townships: Poterie and Galifet, Saint-Maurice County; and Livernois, Picard, Dupuis, Sincennes, Laliberté, Lortie, Geoffrion, Bisailon, Prémont, and Chateauvert, Lavolette County. To prevent further damage 150,000 acres were treated with an aerial application of Phosphamidon (Dimecron 90) in mid-August. The control program was very successful throughout the sprayed area, reducing populations to tolerable levels and preventing further defoliation and tree mortality.

The sawfly was reported in several localities of western Quebec but in relatively low numbers.

**Forest Tent Caterpillar, *Malacosoma disstria* Hbn.**—The first large and active forest tent caterpillar infestations to occur in Quebec since the collapse of an outbreak in 1953 were recorded in south-central Quebec in 1965. Pockets of moderate to severe infestations were recorded throughout southern Quebec from Pontiac County in the west to Kamouraska County in the east. The main infestation, estimated to cover an area of 3,600 square miles, occurred in a band 30 miles wide along Route 9 from Saint-Hyacinthe County to Laurier-ville, Lotbinière County. Defoliation varied from moderate to severe in both pure aspen stands and in mixed stands of aspen and wire birch. In some localities other deciduous trees, particularly red and sugar maple, were also severely defoliated. Fortunately, by midsummer aspen and maple trees had partially refoliated. Moderate defoliation occurred over 600 square miles between Joliette and Saint-Jérôme in Terrebonne, Montcalm, Joliette, and L'Assomption counties. Elsewhere defoliation was generally light. No spectacular moth flights were reported or recorded. During the summer, only 341 moths were captured in a light trap installed some 40 miles east of the main infestation. Analysis of 200-cocoon lots collected from various localities revealed an average moth emergence of 83.7% with a minimum of 67.8%.

No evidence of high larval mortality was recorded either in the field or in the laboratory. The dipterous parasite *Sarcophaga aldrichi* Park, responsible for the collapse of the 1953 outbreak, appeared to be the most important control factor. Indications are that the outbreak conditions will continue in parts of southern Quebec in 1966.

**Eastern Tent Caterpillar, *Malacosoma americanum* (F.)**—Important population increases of this tent caterpillar were recorded in southern Quebec in 1965. Not only were its favoured fruit trees seriously defoliated, but also other deciduous trees such as wire and yellow birch, poplar, maple, elm, and

willow. Tents were common throughout most of the area affected by the forest tent caterpillar. Centres of infestation were found in the Ottawa and Gatineau valleys in Pontiac, Gatineau, and Papineau counties. Counts of primary tents were made and records of over 200 tents per mile of roadside were common. Even higher counts were recorded at some localities in the Richelieu and Yamaska River valleys, where concentrations of tents occurred in Huntingdon, Missisquoi, Saint-Jean, Shefford, and Bagot counties, the main centres of infestation in 1964. An important increase in numbers was also recorded north of the St. Lawrence River in the southern section of Joliette, Montcalm, and Berthier counties and in greater Quebec, particularly the Sainte-Foy area.

**Beech Scale, *Cryptococcus fagi* (Baer.)**—Nymphs of this beech scale were observed for the first time in Quebec beech stands at Les Etroits, Témiscouata County. The infestation is located near the northernmost limits of American beech, and some 20 miles north of the nearest known infestation at Clair, N.B. The infested stands cover an area of approximately 20 square miles and consist of a mixture of beech and sugar maple. The insect was found in three different localities but in all cases less than 1% of the beech trees were affected.

**Larch Sawfly, *Pristiphora erichsonii* (Htg.)**—Populations of the larch sawfly continued to decline in 1965. At most sampling stations the intensity of the infestations was either the same or lower than in 1964. The only population increase was recorded at Sainte-Agathe, Lotbinière County. In the infestation that has persisted at Mare du Sault on Route 54, populations have declined in recent years, but serious tree mortality has resulted from several consecutive years of severe defoliation. In eastern Quebec no important increases in numbers were recorded. Observations on scattered tamarack trees on Anticosti Island, indicated that the population of this insect in that area was very low.

**European Spruce Sawfly, *Diprion hercyniae* (Htg.)**—Fluctuations in the populations of this sawfly have been recorded annually in white spruce stands but numbers have not reached outbreak proportions since the early forties. This has been attributed mainly to the action of parasites and a polyhedral virus disease. A noteworthy increase in sawfly numbers was reported in 1964 and the insect was kept under close surveillance during the past season. Records from permanent sampling stations summarized in the following table indicate that the population trend was generally downward in 1965.

Locality	Stand Origin	Generation	Average larval population per tree/year								
			1957	1958	1959	1960	1961	1962	1963	1964	1965
Sainte-Agathe.....	Plantation	1	—	—	—	—	—	—	2.8	4.7	0.2
		2	—	—	—	—	—	—	4.6	12.2	11.5
Sainte-Agathe.....	Old Field	1	13.2	17.4	23.1	1.6	1.2	—	2.6	4.1	7.6
		2	29.8	41.4	26.0	9.3	2.0	2.7	5.0	34.1	13.7
Saint-Sylvestre.....	Old Field	1	13.8	11.4	15.6	5.7	3.6	4.2	2.1	1.6	1.2
		2	46.2	25.4	28.5	9.1	9.0	8.0	4.6	10.3	12.5
Cap Madeleine.....	Plantation	1	10.9	13.9	16.1	—	0.9	2.4	3.7	2.2	2.0
		2	20.1	10.5	9.9	—	2.7	5.0	3.4	3.3	3.0

**Ugly-nest Caterpillar, *Archips cerasivoranus* (Fitch)**—This insect was more abundant than in the previous 3 years throughout most of the St. Lawrence Valley and southern Quebec. Moderate to severe infestations were recorded on choke cherry at Saint-Cuthbert, Berthier County; Sainte-Sophie

and Sainte-Anne-des-Plaines, Terrebonne County, and at Champigny and Sainte-Foy, Quebec County. Other infestations of lower intensity were observed at Beaumont, Bellechasse County.

**Fall Webworm, *Hyphantria cunea* (Drury)**—The fall webworm was again rare at all permanent sampling points. Roadside nest counts averaged less than one per mile except at Noyan, Missisquoi County, where numbers were high in 1964. The general population decrease occurred also in this area 138 nests were recorded as compared to 438 in 1964.

**Gypsy Moth, *Porthetria dispar* (L.)**—Nine hundred acres of gypsy moth infested bushland and fence rows in southern Quebec were sprayed under the direction of the Plant Protection Division, Canada Department of Agriculture. The insecticide formulation containing Sevin and Loro used in 1963 was applied again in 1965 because of its good residual properties. Spraying was carried out on June 21 and 10 days later no live larvae of the gypsy moth could be observed in either of the two sprayed areas. Summer trapping for male moths at 1,000 localities distributed throughout the most susceptible area resulted in the capture of three specimens in as many localities, namely: Bedford and Noyan, Missisquoi County, and Cantic, Saint-Jean County. Egg masses were found only in the last two areas located 1 mile apart on the Richelieu River. The extent of the 1966 spray program has not been determined but consideration is being given to the spraying of newly infested areas and of a buffer zone totalling 300 acres.

**Birch Leaf Miner, *Fenusa pusilla* (Lep.)**—This sawfly of European origin continued to be common on wire birch and white birch although decreases in numbers were recorded in several areas. Pockets of severe infestation were found mainly in south-central Quebec and more particularly in Berthier, Missisquoi, Drummond, Lotbinière, Beauce, and Mégantic counties. In other areas, infestations varied from light to moderate.

**Birch Skeletonizer, *Bucculatrix canadensisella* Cham.**—The numbers of this skeletonizer decreased markedly in 1965. Moderate to severe infestations persisted in some localities of Bellechasse and Charlevoix counties but in all other areas investigated skeletonizing was light.

**Birch Casebearer, *Coleophora fuscedinella* (Zell.)**—Browning of white birch foliage by this casebearer was again common throughout the lower St. Lawrence and Gaspé regions. Although a general population decrease was observed in the areas of infestation, some increases were recorded in a few localities of Témiscouata County. Moderate to severe browning also occurred in several localities along Chaleur Bay in Bonaventure County and from Percé to Gaspé in Gaspé-Sud County.

**Amber-marked Birch Leaf Miner, *Profenusa thomsoni* (Konow)**—This leaf miner has been observed on white birch in eastern Quebec for the past few years. It is now known to be present throughout the South-Shore, Lower St. Lawrence, and Gaspé regions. Populations were highest at Saint-Paulin and Grosses-Roches, Matane County, and Mont-Louis and Murdochville, Gaspé-Nord County.

**Satin Moth, *Stilpnotia salicis* L.**—The satin moth caused severe defoliation of single or groups of Lombardy poplar and cottonwood in Sainte-Foy and Champigny, Quebec County; Saint-Michel, Bellechasse County; and Baie-Saint-Paul, Charlevoix County.

## OTHER NOTEWORTHY INSECTS

Insect	Host(s)	Locality	Remarks
<i>Acrobasis betulella</i> Hulst Birch tube maker	Birch, white, wire, and yellow	St. Lawrence Valley and southern Quebec	Common in 1964, less abundant in 1965.
<i>Caliroa cerasi</i> (L.) Pear slug	Hawthorn	Sainte-Foy, Quebec Co.	First noticeable population in- crease since 1956-57 outbreak.
<i>Choristoneura fumiferana</i> (Clem.) Spruce budworm	Fir, balsam	All districts	Extremely rare.
<i>Coleophora anatipennella</i> Hbn.	Beech Maple, red	Saint-Augustin, Portneuf Co.	Collected occasionally since 1957.
<i>Epinotia solandriana</i> L. A leaf roller	Aspen, trembling	Eastern townships and St. Lawrence Valley	Light damage.
<i>Erannis tiliaria</i> (Harr.) Linden looper	Maple, sugar	Maple grove area	Population still declining.
<i>Malacosoma pluviale</i> (Dyar) Western tent caterpillar	Cherry, pin	Saint-Jean-de-Dieu, Abitibi-Ouest Co.	Light infestation.
<i>Mindarus abietinus</i> Koch Balsam twig aphid	Fir, balsam	Saint-Augustin, Portneuf, Co.	Relatively common; collected every year since 1961.
<i>Neodiprion lecontei</i> Fitch Red-headed pine sawfly	Pine, red	Arundel, Argenteuil Co.	Severe infestation in some plantations.
<i>Neodiprion pratti banksianae</i> Roh. Black-headed jack-pine sawfly	Pine, jack	Saint-Hilarion, Charle- voix Co.	Rare.
<i>Nymphalis antiopa</i> (L.) Mourning-cloak butterfly	Cottonwood	Baie-Saint-Paul, Charle- voix Co.	Light to moderate defoliation on scattered trees.
<i>Operophtera bruceata</i> (Hulst) Bruce spanworm	Maple, sugar, and red	Bonaventure Co.	Small pockets of infestation.
<i>Pristiphora geniculata</i> (Htg.) Mountain-ash sawfly	Ash, mountain	Quebec area	Less common in 1965.
<i>Rhyacionia buoliana</i> Schiff. European pine shoot moth	Pine, Mugho	Quebec area	Very rare in all permanent samp- ling points.
<i>Trichocampus viminalis</i> Fall. Poplar sawfly	Poplar	Greater Quebec	Resurgence of population in some scattered areas.
<i>Ziraphera ratzeburgiana</i> Ratz. Spruce bud moth	Spruce, white	Anticosti Island, Duplessis Co.	Very abundant; distribution record.

## IMPORTANT FOREST DISEASES

**Frost Injury**—Numerous ornamental trees and shrubs, particularly Lombardy poplar, Japanese barberry, and snowberry were severely injured by frosts during the winter. Sudden drops in temperature of more than 50 degrees occurred several times between December and February, often following heavy rains that completely melted the snow cover. These conditions were probably responsible also for the root mortality observed on several dying maple trees at Charny and Saint-Nicolas, Lévis County, and on ornamental apple, oak, and elm trees in Quebec City. In some instances, *Nectria episphaeria* (Tode ex Fr.) Fr. and a fungus similar to *Hypoxyton deustum* (Hoffm. ex Fr.) Grev. were isolated from the dying roots of maple.

Late frosts again caused considerable injury to leaves of ornamental maple trees in many areas. Stunting and leaf deformation on trembling aspen in a large area along the York River, Gaspé-Sud County, were also attributed to this condition. Bud-killing on black spruce was reported to be moderate to severe in Chibougamau Park.

**Bark Cracking**—This injury on balsam fir was common on slopes around Mont-Albert, Gaspé Park. As previously reported in 1959 and 1963, climatic factors are believed to be the inciting agents.