

# Forest Insect and Disease Conditions

## Prince Rupert Forest Region

British Columbia, 1978

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Spruce beetles killed trees over an estimated 16 000 ha. Counts of mountain pine beetle killed lodgepole pine doubled. Western balsam bark beetle continued to be a chronic problem in spruce-balsam stands. A hemlock sawfly defoliated western hemlock and alpine fir along the Skeena and Kispiox rivers.

A foliage disease caused severe browning of trembling aspen in the Houston area. "Winter drying" affected conifers in the Kitimat, Kalum and Nass valleys and lodgepole pine near Fawnie Mtn. Labrador tea rust affected 20-100% of the new foliage on Sitka spruce between Tlell and Masset.



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Table 1. Spruce beetle infested stands in the Prince Rupert Forest Region during 1978

Location	area (hectares)	Intensity <sup>1/</sup>
Smithers Landing	2 500	M
Morrison Lake	2 265	M-H -scattered
Natowite Lake	1 400	M-H -scattered
Fleming Creek	1 300	M
Telkwa	1 200	M-H -scattered
Old Fort	1 000	L-M -scattered
Old Fort Mtn	650	L-M
McBride Lake	525	L
Babine River	445	L -scattered
Tildesley Creek	400	L
Frypan Lake - Morice River	365	M-H
NW end of Natowite Lake	345	L
Morice River	320	M-H
Hautete Creek	320	L-M
N end of Babine Lake	320	L
Fulton River (Chapman L end)	200	L
Houston Tommy Creek	200	M-H
Haul Lake	180	L
Eutsuk Lake (Redfern Rapids)	160	L -scattered
Holland Lake	160	M
Tahlo Creek	160	M
Between Babine & Morrison Lake	160	M
Pimpernel Creek	160	M-H
Bristo Creek	145	M
Tochcha Lake	140	M
Chapman Lake	130	M
Bittern Creek	120	H
Haul Lake	120	M
Fleming Lake	120	M
Fulton Lake (Babine Lake end)	80	L
Bill Nye Lake	80	H
Maxan Lake	70	L
Fedral Creek	65	M
Nilkitkwa Lake	60	L
Fulton Lake (mid)	50	L
Betty Creek	40	M
Guess Creek	40	M
Burbridge Creek	40	M
Tanglechain Creek	40	M
Lamprey Creek	40	L
Bittern Lake	40	H
Nichyeskwa Creek	40	L
Morice Lake (N end)	30	L
Tagit Creek	25	L
Charleston Creek	25	L
Tchesinkut Creek	20	L
Donald Landing	20	L
Gloyazikut Creek	20	L
Torkelsen Creek	20	L
Dorsay Lake	20	M
Gosnell Creek	10	L
Clota Lake	10	L
Guyishton Lake	5	L
Reiseter Creek	5	L

<sup>1/</sup> Intensity L = 2-5% trees in stand killed, M=6-30%, H=31+%

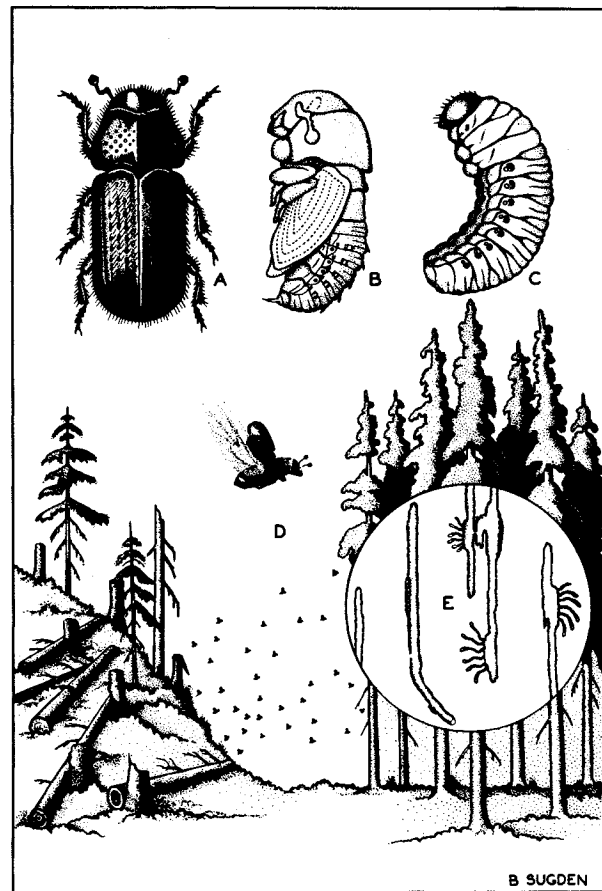
**SPRUCE BEETLE,**  
Dendroctonus rufipennis

Spruce beetle infestations in the Prince Rupert Forest Region now cover 16 800 ha of spruce type. This is an increase from 100 ha in 1976 and 2 280 ha in 1977. The population build-up began in windfalls in 1973, with initial attack on standing white spruce trees probably occurring in 1975. The locations, estimated area affected and attack intensity are listed in Table 1.

Assessment of intensity of attack and brood development in 13 infested areas revealed very light successful 1978 attack on standing spruce trees. A heavy flight apparently had occurred as trap trees felled during February and recent windfalls were heavily infested. While successful attacks were uncommon, "pitch-outs" (trees that successfully repulsed beetle attacks using heavy pitch flow) and partial attacks (beetles that have successfully established a brood on one section of a tree) were common.

The spruce beetle normally has a two-year-cycle; i.e., overwintering first as a large larva and the following winter as an adult, before attacking. In 1977 60% of the population (the 1977 attack) changed to a one-year-cycle, and attacked in 1978, one year early. Brood assessments in the fall of 1978 however indicated a return to the normal two-year pattern, of large larva, and very few adults infesting the trees.

Additional information was gathered on cruises at three locations, Table 2.



SPRUCE BARK BEETLE

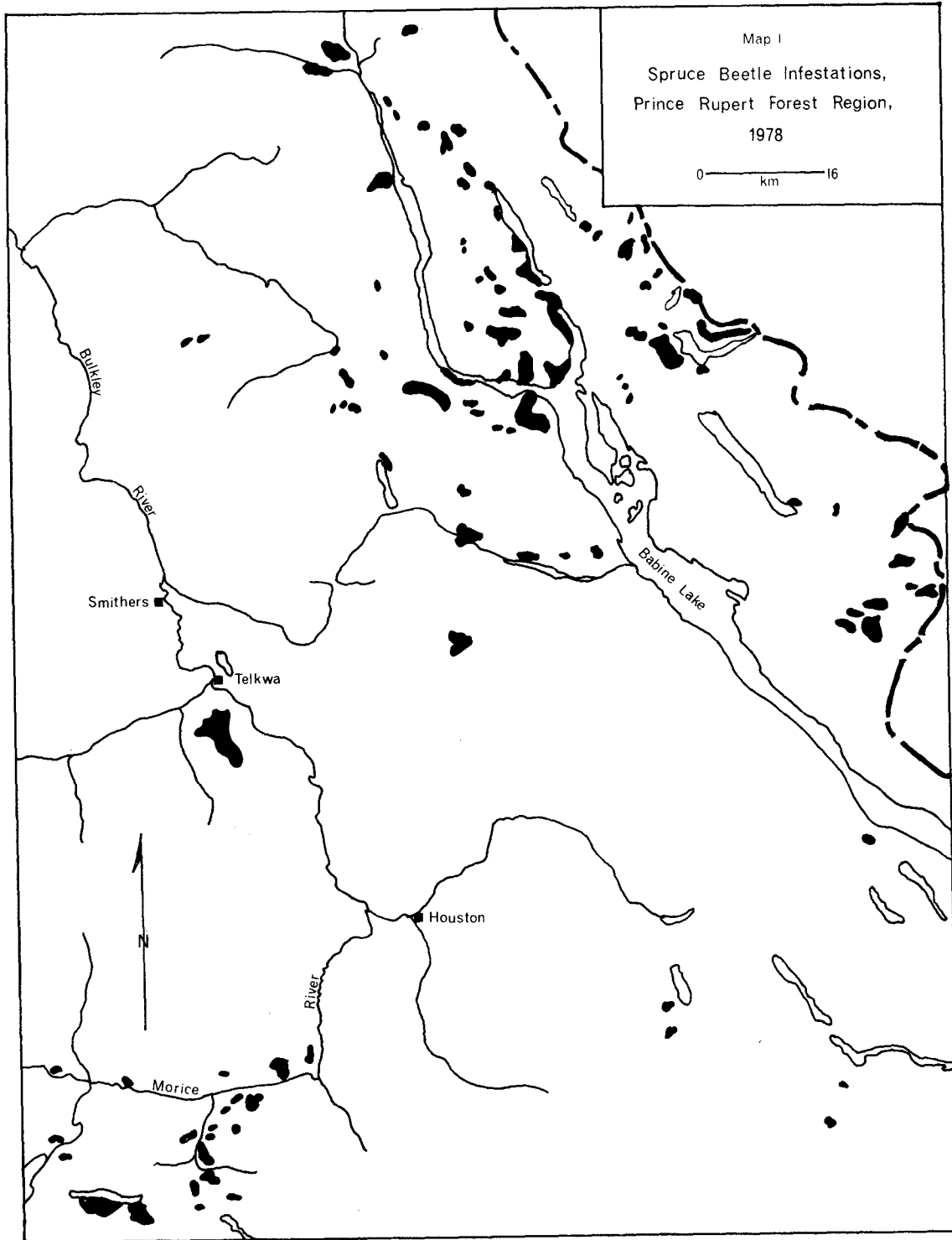
A, adult; B, pupa; C, larva; D, beetles from logging debris and stumps attacking adjacent living trees; E, galleries under bark with eggs and young larvae.

Table 2. Spruce beetle cruise results Prince Rupert Forest Region, 1978

Location	Stems per hectare					Volume per hectare (m <sup>3</sup> )				
	healthy	green attack	partial attack	red	gray	healthy	green attack	partial attack	red	gray
Smithers Ldg (Park Reserve)	145	0	1	7	24	252	0	4	19	41
Morrison Lake	118	3	0	0	3	241	8	0	0	8
Old Fort	244	0	7	2	5	250	0	11	7	9

In addition, 9% of the trees successfully resisted (pitched-out) 1978 beetle attacks at Smithers Landing and 3% at Old Fort.

With high populations in windfalls, a hazard exists and if conditions change, such as lack of new windfall to absorb the next flight, standing trees may be attacked in 1980.



**MOUNTAIN PINE BEETLE,**  
*Dendroctonus ponderosae*

Mountain pine beetle continues to be a major problem in the western portion of the Region, with 23 000 dead lodgepole pine trees mapped in 1978, twice as many as in 1977. Counts in 1977 showed the first decrease since 1969, however optimism that populations might be declining was premature.

In 1972 the Ministry of Forests initiated a salvage and control program in the Smithers-Houston areas where beetles have been reduced to acceptable endemic levels. The only areas in the eastern portion of the Region with continued beetle damage were at

Cunningham Lake (75 red-tops), across from Donald Landing on Babine Lake (50), and along Pierre Creek where 40 dead lodgepole pine were counted.

In the western section of the Region beetles continued to kill trees along the Bulkley River between Smithers and Hazelton, the Kispiox River Valley and along the Skeena River from Hazelton to Doreen and north up the Kitwanga River as far as Vandyke Island in the Nass River.

Brood checks along the Kispiox River and Harold Price Creek indicated that beetle populations are sufficient to cause continuing problems. The 1978-79 winter may cause some mortality.

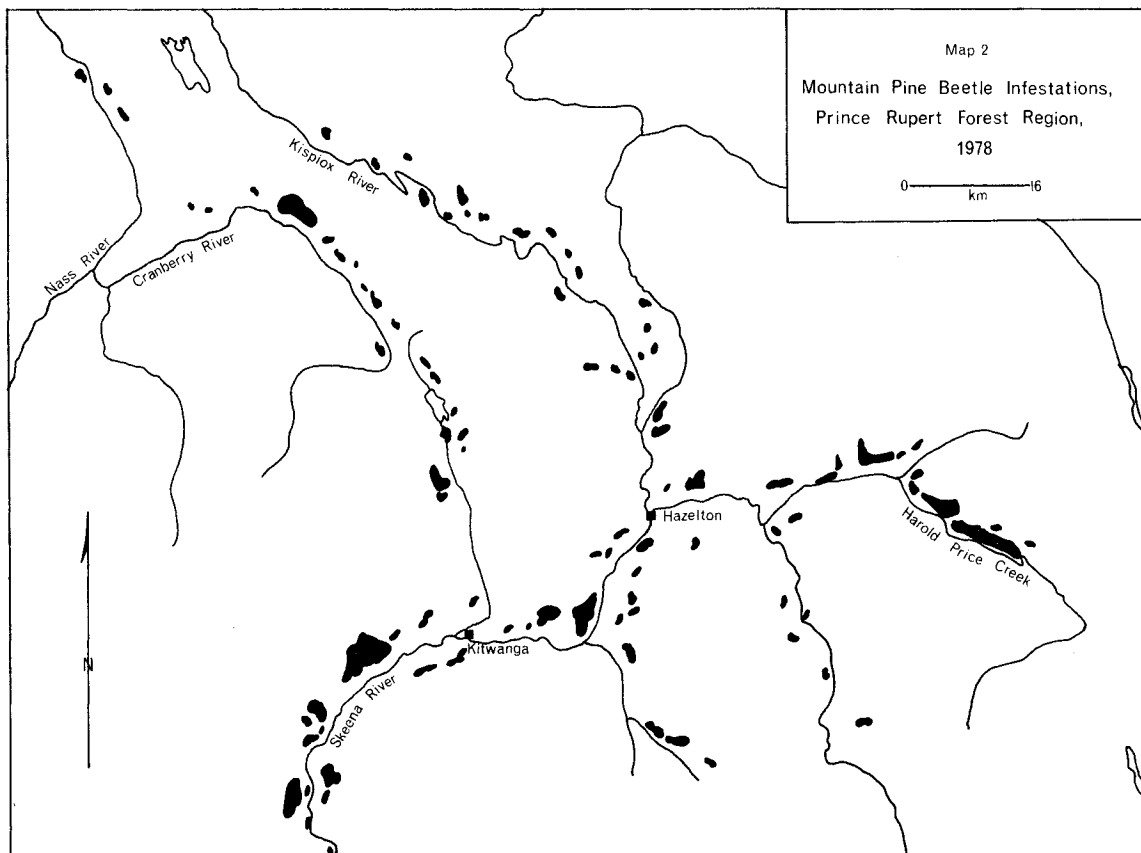


Table 3. Mountain pine beetle-killed lodgepole pine trees estimated during aerial surveys in the Prince Rupert Forest Region, 1976-78

Location	Numbers of dead lodgepole pine:		
	1976	1977	1978
Harold Price Creek	4 200	2 600	6 500
Kispiox River	1 900	1 200	3 000
Woodcock	500	1 000	3 000
Ritchie	1 000	1 500	2 000
Suskwa River Valley	1 900	465	1 600
Nash-Y (opposite Carnaby)	2 000	1 000	1 200
Price Creek	400	570	1 100
Seeley Lake	1 000	330	600
Two Mile Creek	—	140	400
Kitwanga	250	180	350
The Nipples	350	150	350
Insect Creek	—	100	280
North Juniper Creek	—	50	250
Flint Creek	—	105	200
Mill Creek	125	55	200
Andimaul-Andi Creek	—	250	200
Juniper Creek	—	150	200
Four Mile Creek	—	140	180
New Hazelton	—	150	150
Porphyry Creek	—	25	150
Bulkley Canyon	—	200	130
Junction-Dean-Takia rivers	410	380	130
Cedarvale	110	100	120
Kitwancool	500	100	120
Cunningham Lake	—	40	75
Moonlit Creek	—	35	70
Wilson Creek	—	5	60
Nass River (S of Vandyke Island)	—	—	60
Doreen	—	25	50
Sedan Creek	—	5	50
S. Kitwanga	—	—	50
Kitwanga	—	110	50
Burdick Creek	—	50	50
Boling Point	—	70	50
Gramophone Creek	—	35	50
Pierre Creek	—	—	40
Opposite Woodcock	—	—	30
Lorne Creek	—	—	20
Atrill Creek	—	20	20
Sharpe Creek	—	15	20

#### WESTERN BALSAM BARK BEETLE, Dryocoetes-Ceratocystis complex

In 1978, Dryocoetes confusus, in association with the lesion-causing fungus Ceratocystis dryocoetidis, continued to cause mortality of alpine fir in the Prince Rupert Forest Region. An estimated 8,300 red-topped alpine fir in scattered patches were mapped near Smithers in addition to the 5 900 ha in McKendrick Pass area, a chronic problem area with continuous alpine fir mortality. Areas and numbers of red-tops mapped during aerial surveys in 1978 were:

Higgins Creek (2,000); Howson Creek (1,800); Haystack Creek (1,000); Serb Creek (700); Harold Price Creek (500); John Brown Creek (300); Kitseguecla River (200); Owens Creek (200); Pine Creek (200); Nado Creek (200); Mooseskin Johnny Lake (150); Morice Lake (150); Tildesley Creek (100); Winfield Creek (100); Guess Lake (100); Deception Lake (100); Tsalitpn Lake (100); Troitsa Lake (100); Pondosy Bay (50); Cumming Creek (50); Goathorn Creek (50); Byman Creek (50); Dockril Creek (50); Nadina Mtn (50).

Studies have shown that approximately 35% of alpine fir mortality is due to direct attack by the beetle, the remainder being attributed to the beetle-induced, lesion-causing fungus Ceratocystis dryocoetidis. Initial beetle attacks may be pitched out, but subsequent attacks on trees weakened by lesions are often successful and coalescing lesions may kill trees without further beetle activity.

**HEMLOCK SAWFLIES,**  
Neodiprion sp.

Moderate to heavy defoliation of overmature western hemlock and some alpine fir occurred along the Skeena River south of Carrigan Creek (1 000 ha) and in the Kispiox River Valley near Ironside Creek (300 ha). In October numerous sawfly pupae, many parasitized, remained attached to foliage of under-story trees. Very few overwintering eggs were found.

**SPRUCE BUDWORM,**  
Choristoneura biennis

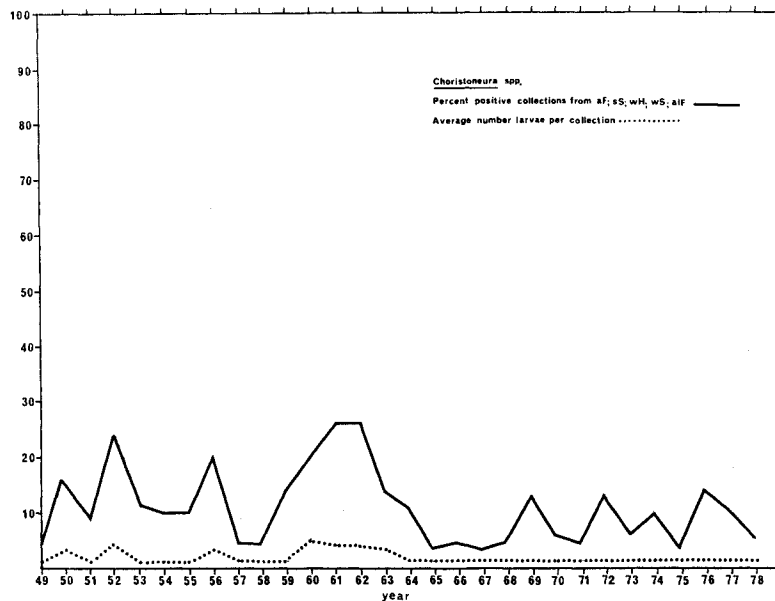
Budworm larval populations on white spruce and alpine fir remain at very low levels in the Region. Only three larvae were found in 131 positive collections (beating samples containing insects). No significant defoliation by this species has occurred since the last outbreak subsided in 1964 along Babine Lake.

Traps baited with a sex-attractant were used to assess adult male budworm populations again for the seventh consecutive year. From 8-100 male adults were trapped at eight locations.

Continued low budworm populations are foreseen for 1979, and no damage is expected.



Hemlock sawfly Neodiprion sp.



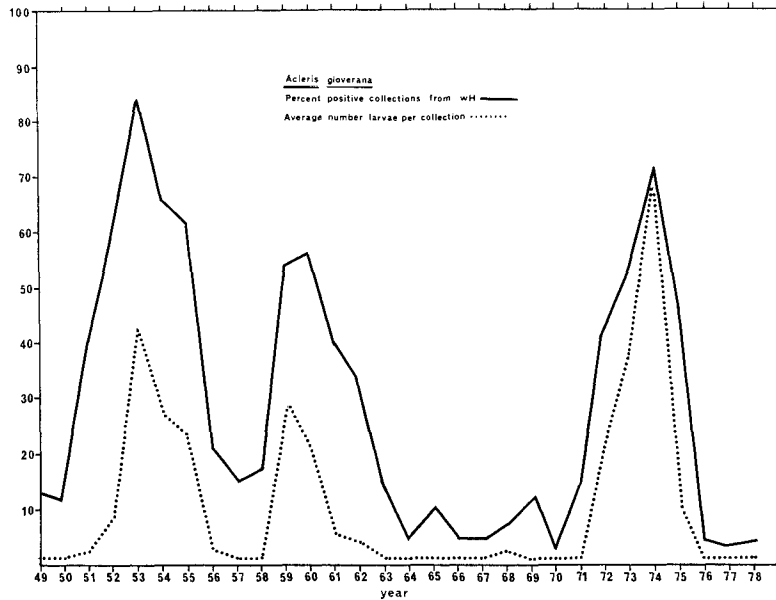
**BLACKHEADED BUDWORM,**  
*Acleris gloverana*

Blackheaded budworms remain at low population levels, with only 6% of beating samples containing larvae. Highest populations were found on alpine fir at Chapman Lake (14 larvae/beating). Some light defoliation (10%) of the current years growth of alpine fir and white spruce occurred for the third consecutive year along the Bell-Irving River at Glacier, and Oweege creeks and the second crossing of Bell-Irving River.

In plots established to monitor stand condition over time on the Queen Charlotte Islands, cumulative tree mortality as a result of severe budworm defoliation in 1973 and 1974, was 66% in immature western hemlock at Kwaikans Island and 31% in a mature stand at Deena Creek; an increase over 1977 of 4% at both locations.



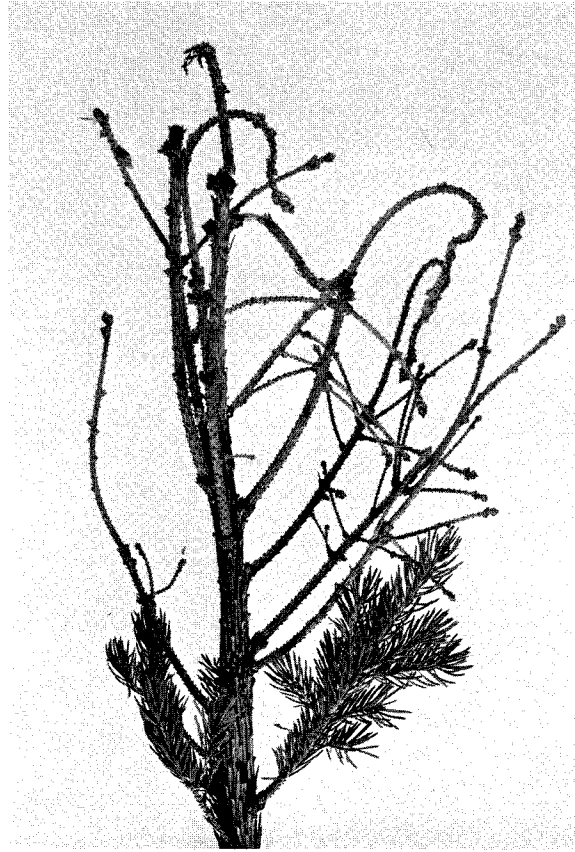
Western hemlock killed by Blackheaded budworm.







White spruce with snow breakage at weak point caused by woolly aphids.



Spruce weevil damaged leaders.

**WOOLLY APHIDS,**  
*Pineus prob. similis*

Plantations throughout the Prince Rupert Forest Region are infested to varying degrees by this aphid which causes galls to form on leaders and laterals of white and Sitka spruces. In one chronic plantation examined since 1976 near Chapman Lake, the percentage of trees infested varied from 38% in 1976, to 22% in 1977 and 27% in 1978.

Most trees recover without major deformities but some are more susceptible, become stunted and bushy-topped, and perpetuate the infestation.

**SPRUCE WEEVIL,**  
*Pissodes strobi*

Spruce weevil continued to cause minor damage throughout the Region: 4 km Houston FDR, 6% of 10-15 year old white spruce examined were attacked; 4 km east of Smithers, 8% of 10-26 years old trees; and at Moricetown where 16% of the 15-26 year old trees were attacked.

North of Terrace, weevil attacks increased noticeably at Alice Creek, where 35% of young Sitka spruce on 2 ha had infested leaders and near km 9, Kalum Lake road, where 10% of planted spruce were attacked.

**A PINE TERMINAL WEEVIL,**Pissodes terminalis

Near Telegraph Creek about 40% of young lodgepole pine had dead leaders in a stand covering 60 hectares. Thirty-eight new attacks were noted in an area between miles 30 and 31 on the West Morice Forest Development Road, compared to 9 and 11 in 1977, and 1976.

**SPRUCE BUDMOTH,**Zeiraphera sp.

First reported in 1975, Zeiraphera continues to cause deformed tops and laterals on 54 ha of pre-commercially thinned Sitka spruce at Spur 90 - Deena Creek on Moresby Island. Alteration in form and height growth of terminals resulting from bud destruction was evident in 56% of trees examined while the percentage of laterals infested averaged 7% per tree. At nearby Spur 60 - South Bay, 44% of 12-15 year old Sitka spruce in a 90 ha spacing trial had deformed leaders; infested lateral buds averaged 2% per tree.

**CONE INSECTS**

The 1978 cone crop on white spruce was generally light but heavy on alpine fir throughout the Region. In 15 spruce stands sampled the most common insect found in the spruce cones was a spiral spruce-cone borer (Hylemya anthracina), 76% of the cones examined were infested by this seed destroyer. Others were a spruce seedworm, (Laspeyresia youngana) also a seed destroyer, 39% of the cones from 13 stands were infested; a spruce gall midge (Dasineura canadensis) forms a gall in the cone scale, 12% of the cones from 10 locations were infested; a spruce cone axis midge (Dasineura rachiphaga) 26% of the cones infested at 10 locations; a spruce seed midge (Mayetiola carpophaga) a single seed destroyer infested 4% of the cones at four locations.

Alpine fir cones were sampled at eight locations, insects infesting the cones were: a fir-cone maggot (Earomyia aquilonia) which destroys all seeds was found in 4% of the cones at two locations; an alpine-fir seed chalcid (Megastigmus lasiocarpa), destroys only a single seed was found in 7% of the cones at four locations; a fir-cone maggot (Earomyia abietum), a seed feeder, moving from seed to seed, 1% of the cones at one location; other seed and cone insects found in alpine fir cones were; a fir seed chalcid (Megastigmus pinus), a fir-cone seed midge (Dasineura abiesemia), and a cone-scale midge (Resseliella sp.).

Table 4. Insects of current minor significance

Insect	Host(s)	Remarks
<u>Epirrita autumnata</u> Green velvet looper	Alpine fir White spruce Sitka spruce Western hemlock	Defoliator; new growth of alpine fir was lightly defoliated (10-30%) at Morice Lake and at Km 34 Natlan FDR.
<u>Elatobium abietinum</u> Green spruce aphid	Sitka spruce	Sucking insect; caused severe discoloration and needle drop of spruce on the Queen Charlotte Islands and adjacent mainland in the Prince Rupert area in 1977, has collapsed.
<u>Hemichroa crocea</u> Striped alder sawfly	Red alder	Defoliator; light damage over several hectares on Kwaikans Island and for 1 km along the shore of Rennell Sound on the Queen Charlotte Islands.

**BUD NECROSIS,**  
*Camarosporium strobilinum*

This disease, normally a bud fungus was first noticed attacking leaders in 1976 at Division Lake where 80% of the white spruce in a 4- to 6-year-old plantation were infected. In 1977 34% of the trees had infected leaders.

Plantations along Ganokwa Creek also have a history of infection, but as of June 1978 31% of the trees had recovered; i.e., new laterals had taken over, 8% were unsuccessful and had bushy tops and 6% had been re-attacked in 1977. Of 300 trees examined in August 1978 only five had their leaders infected but 44 had 1978 lateral bud damage.



Leader damage on white spruce caused by *Camarosporium strobilinum*.

**LEAF AND TWIG BLIGHT OF POPLAR,**  
*Venturia macularis*

Leaf and twig blight infected most of the trembling aspen in the Bulkley Valley from Burns Lake to Hazelton with particularly conspicuous damage surrounding Houston for approximately 10 km. Aspen trees near Hazelton which had heavy infection in 1977 were only lightly infected this year. Trees in the area around Smithers were lightly infected, with the exception of pockets of heavy infection near Tye Lake and along the Telkwa River Road. Light to moderate infection occurred between Telkwa-Quick and near Round, Burns and Decker lakes areas along with moderate to heavy browning of aspen leaves along Highway No. 16 from the Burns Lake airport to Palling and Decker Lake. The north side of Francois Lake generally had light infection, except for pockets of moderate to heavy browning near the west end of the lake.

**SNOW BLIGHT,**  
*Lophophacidium hyperboreum*

This blight continues to be a problem in 8- to 14-year-old Perow Burn and Chapman Lake plantations. Needle drop and dieback, mostly on lower branches, affected 79% of the white spruce in the Perow area and 30% at Chapman Lake.

**SPRUCE-LABRADOR-TEA RUSTS,**  
*Chrysomyxa ledicola*, and *C. ledi*

A needle rust, *C. ledicola*, was common on bog-site Sitka spruce between Tlell and Masset, where the alternate host, Labrador-tea, was abundant. Most spruce from seedling size to 8 metres had from 20 to 100% of their new growth infected. Severely infected trees exhibited a distinctive "golden" hue. This is the second year of severe rust infection in the area. At Diana Lake, near Prince Rupert this rust occurred on 67 of 100 young Sitka spruce examined with generally less than 10% of the foliage affected.

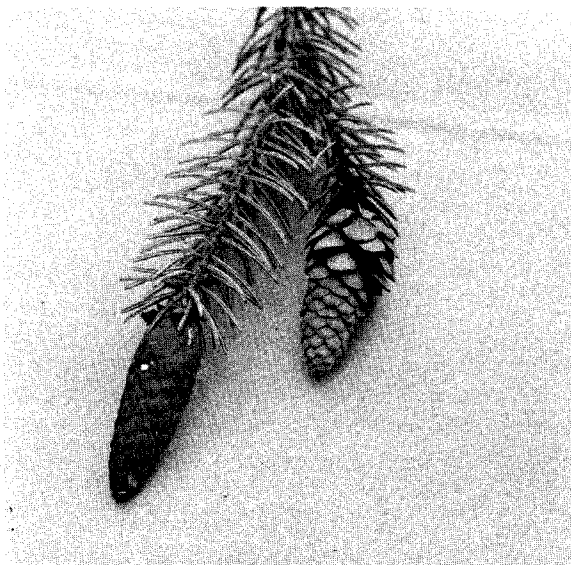
The small-spored spruce-Labrador-tea rust, *C. ledi*, caused light infections on open-grown white spruce along Hatchery arm on Babine Lake.

## SPRUCE CONE RUST, *Chrysomyxa pirolata*

Spruce cone rust which causes premature opening of cones and restricts seed development was light in the Region in 1978 in conjunction with a generally light cone crop. Twenty cones from each of five trees were examined at 19 areas; Table 5.

Table 5. Spruce cone rust, Prince Rupert Forest Region 1978

Location	Host	Incidence (%)
Tseax River	sS	1
Cedarvale	sS	Neg
Seeley Lake	Ws	1
Salmon River	Ws	Neg
Kisgegas	Ws	Neg
4 Km Houston FDR	Ws	13
4 Km east of Smithers	Ws	11
17 Km west of Smithers	Ws	14
20 Km Smithers Ldg road	Ws	8
6 Km Telkwa Pass road	Ws	Neg
12 Km Kitsequecla Lake road	Ws	Neg
10 Km Telkwa-Hi road	Ws	6
Ganokwa Creek	Ws	Neg
Skeena Bridge	Ws	22
Telkwa	Ws	Neg
50 Km W. Morice FDR	Ws	1
32 Km Morice FDR	Ws	Neg
Smithers Landing	Ws	Neg
Francois Lake	Ws	Neg



White spruce cone infected by spruce cone rust causing premature opening of cone.

## PORCUPINE DAMAGE

Continued killing of immature lodgepole pine was noted in scattered pockets of 10 to 100 trees each along the Skeena River from Terrace to Flint Creek, and of 150 trees at Serb Creek west of Smithers.

Porcupines are a chronic problem in Bear Valley and along Bitter Creek, north of Stewart killing approximately 200 scattered young western hemlock. Scattered mortality affecting up to 20% of 25-year-old hemlock over 800 ha is also continuing along Khutzeymateen Inlet.



Porcupine feeding on lodgepole pine.

## CLIMATIC INJURY

A type of injury commonly referred to as "winter drying" was common on natural regeneration and planted conifers in the Kitimat, Kalum and Nass river valleys. Injury can occur following rapid drops in temperature or, when sunny, dry weather and sometimes accompanying wind, follow periods of freezing temperatures. The needles transpire, but the water cannot be replenished from the frozen ground. This causes the needles to dry and discolor, often giving the trees a "scorched" appearance before the affected needles are prematurely shed.

Up to 50% of the young western hemlock in some locations in the Kitimat Valley, and along the Nass River between Nass Camp and Cranberry Junction had lost up to 90% of their older foliage, although the average was less than 30%. Some minor

top kill and tree mortality occurred in these areas.

Immature lodgepole pine in the Terrace area, the Nass Valley and at a few locations between Cedarvale and Hazelton were also affected with "flagging", mostly on the south sides of trees on exposed sites. To a much lesser degree injury occurred sporadically on young amabilis fir, and there was only minor reddening of western red cedar, Sitka and white spruces.

Winter drying also occurred to lodgepole pine and white spruce in a band between 900 and 1100 metres elevation, along south-facing slopes west of Dease Lake and along Tanzilla Butte and similar damage occurred over 500 hectares of lodgepole pine near Fawnie Nose Mountain, south of Nataalkuz Lake.



Rhizina root rot fruiting bodies.

Table 6. Diseases of current minor significance

Disease	Host	Remarks
<u>Chrysomyxa weirii</u> Spruce needle rust	White spruce	Causes premature shedding of needles, affects previous years needles, 60% of trees examined lightly infected along Babine River.
<u>Cronartium comandrae</u> Comandra blister rust	Lodgepole pine	Causes perennial cankers on stems and branches; two areas infected; at Dease Lake 40 and 80% infection respectively of 1-5 m trees, over 2 ha.
<u>Kabatina thujae</u> A dieback	Yellow cedar	Diana Lake, 80% infection, causes dieback, first report on a non-ornamental tree in North America.
<u>Leptomelanconium cinereum</u> Needle blight of pine	Lodgepole pine	Needle cast; 10-50% loss of foliage over 2 400 ha in a thinning operation at Co-op Lake near Burns Lake.
<u>Lirula abietis-concoloris</u> Needle cast	Alpine fir	Attacks previous years foliage, common in individual trees along the Suskwa River, at Smithers Landing, Atlin Lake, and Km 92 Atlin Road.
<u>Lirula macrospora</u> Needle cast	Sitka spruce	Light on 12% of trees examined at Stewart.
<u>Polyporus tomentosus</u> False velvet top fungus	White spruce	Root rot; 10 ha isolated stand of spruce heavily infected near Dorsay Lake
<u>Pucciniastrum epilobii</u> Fir-fireweed rust	Alpine fir	Causes premature loss of needles, light infection of new growth at Smithers Landing.
<u>Rhizina undulata</u> Rhizina root rot	Duff: area not planted	Root disease of seedlings; fruiting bodies found on a 1977 fall burn at Km 58 West Morice FDR.
<u>Trisetacus campnodus</u> Kinky disease	Lodgepole pine	Deforms tree needles, moderate infection on 40% of planted trees examined in Kitimat Valley.

STATUS OF FOREST PESTS IN PACIFIC REGION 1978

PEST	FOREST REGIONS						
	PRINCE RUPERT	PRINCE GEORGE	VANCOUVER	CARIBOO	KAMLOOPS	NELSON	YUKON
SPRUCE BEETLE	17 000 ha infestations mainly in the Babine Lake and Morice R. areas	Extensive areas of tree mortality	Localized attacks Mowhokam Cr.	Low population in northeastern corner of Region	Localized infestations, upper Lambly Cr., Lawless Cr., Olivine Cr. Increasing populations in blow down areas	New, spot infestations	Low populations Haines Jct area
MOUNTAIN PINE BEETLE	Widespread infestation, Cedarvale to Smithers	Active in widely separated areas	Infestation declined Klinaklini R. Localized infestations Haymore and Mowhokam Creeks	Heavy infestation in scattered areas throughout Region	Heavy infestations Trout Cr., Gun Lake area. Increased populations, Below Mission Cr., Stein R. Ashnola R.	Increasing in West Kootenay exploding in East Kootenay	Not found
DOUGLAS-FIR BEETLE	Not found	Low frequency of tree mortality near McBride	Light attacks Fraser Canyon, Silver Skagit, Pemberton	Low population	Increased populations Tranquille Cr. Heffley Cr., Dairy Cr. and along Carpenter L.	Small pockets	No host
WESTERN SPRUCE BUDWORM (1-YEAR-CYCLE)	Low populations	Low populations	Populations declined sharply in many areas of the infestation.	Medium population, lighter than 1977	Significant decrease in most infested areas. Light to moderate populations near Ashcroft	Small populations holding steady	Low population
SPRUCE BUDWORM (2-YEAR-CYCLE)	Low populations	Increasing populations some current defoliation	Not found	Medium to high population, eastern part of Region	Medium population near Lempriere Cr.	Increasing populations	Not found
WESTERN BLACKHEADED BUDWORM	Minor defoliation Bell-Irving R.	Very low populations	Population increase, west coast Vancouver Island	Low population	Very low populations	Low populations	Low population
CONIFER SAWFLIES <i>Neodiprion</i> spp.	Moderate defoliation 1300 ha wH, aIF at Carrigan and Ironside creeks	Infestations subsided	High populations on northern Vancouver Isl.	Low populations	Infestation collapse near Vavenby and Clearwater R.	Low populations	Low population
FOREST TENT CATERPILLAR	Not found	General collapse of infestation	Not found	Not found	Low populations	Low populations	Not found
ASPEN LEAF AND SHOOT BLIGHT	Heavy infection Houston area	Extensive widespread damage	Not found	Light to moderate incidence Big Lake to Canim L.	Severe browning of foliage at Clearwater R. Avola and Monashee Cr.	Widespread light infection of aspen	Low incidence

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