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ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1975  
PART I, VANCOUVER FOREST DISTRICT

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by  
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PACIFIC FOREST RESEARCH CENTRE  
CANADIAN FORESTRY SERVICE  
VICTORIA, BRITISH COLUMBIA  
- FILE REPORT -

DEPARTMENT OF THE ENVIRONMENT  
December, 1975

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## INTRODUCTION

This report outlines forest insect and disease conditions in the Vancouver Forest District and forecasts pest population trends, emphasizing pests capable of sudden, damaging outbreaks.

Regular field work in the District commenced on May 28 and ended on September 11. Time expended on special surveys was as follows: 10 man days on a balsam woolly aphid survey in March; about 17 hours on aerial surveys on the Mainland in July and August; 16 man days on a western spruce budworm egg survey and damage appraisal in August; eight man days on a Poria root rot survey in September.

A total of 526 insect and 28 tree disease collections were submitted to the Pacific Forest Research Centre. Map 1 shows drainages and general location of field collection points.

The number of collections containing larvae on Vancouver Island decreased from 66% in 1974 to 64% in 1975; on the Mainland there was an increase from 70% in 1974 to 80% in 1975.

Western spruce budworm infestations in Douglas-fir and true fir stands increased by about 8,000 acres to a total of 201,440 (81,382 ha). Mountain pine beetle infestations increased in the Klinaklini River Valley where lodgepole pine mortality was widespread. Douglas-fir beetle attacks continued at scattered locations on Vancouver Island and appeared to be increasing in budworm-damaged stands in the Pemberton area. The known range of balsam woolly aphid was expanded on Vancouver Island and the Mainland. Small infestations of satin moth occurred on the Mainland and Vancouver Island. Western tent caterpillar and bruce spanworm infestations expanded and intensified on deciduous hosts in the southern part of Vancouver Island. Poplar-and-willow borer damage was widespread in the District. Pine butterfly moth flights occurred at some locations on Vancouver Island. Black vine weevils killed nursery stock at Victoria and Cowichan.

Winter injury to replanted Douglas-fir occurred over 1,500 acres in the Cameron Valley. Globose gall rust infections were severe on lodgepole pine at Chilliwack Lake. Localized heavy infections of yellow laminated root rot were present near Okeover Arm northwest of Powell River. Douglas-fir needle blight infections were widespread on Vancouver Island and shoe-string root rot caused tree mortality of young Douglas-fir at several locations.

Details on individual insect and disease problems appear in subsequent sections.

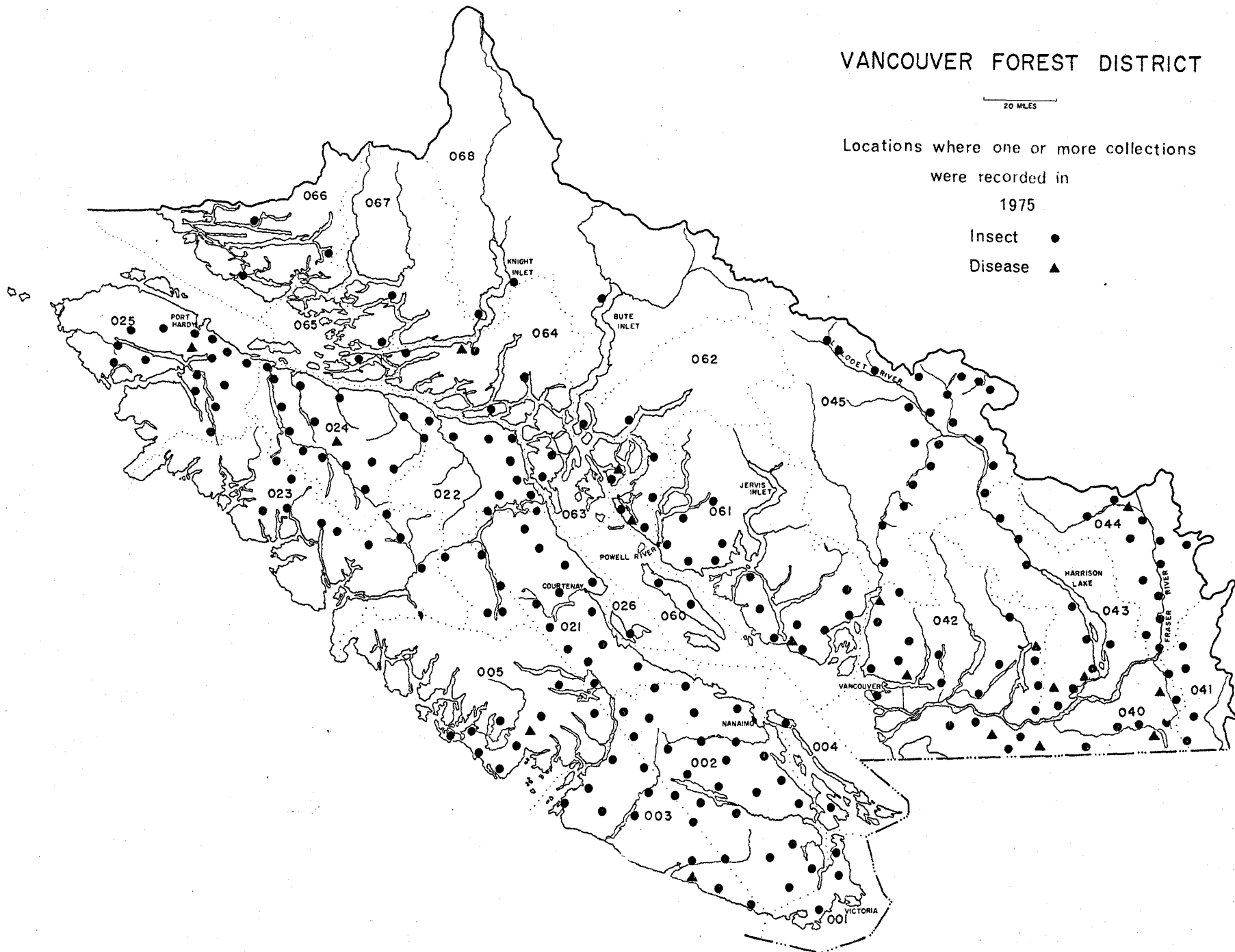
# VANCOUVER FOREST DISTRICT

20 MILES

Locations where one or more collections  
were recorded in  
1975

Insect ●

Disease ▲



## FOREST INSECT CONDITIONS

### Defoliators

Western spruce budworm, *Choristoneura occidentalis*

Areas of defoliation of Douglas-fir and true fir increased to a total of 201,440 acres (81,382 ha) from 193,600 acres in 1974. Infestations declined along the Lillooet River northwest of Pemberton and expanded in the Fraser Canyon and along Silverhope Creek and Skagit River into Manning Park. New areas of damage occurred along Lillooet Lake and Lillooet River south to Tuwasus Creek.

In late May up to 22% of the Douglas-fir buds along the Sumallo and Skagit rivers were infested with budworm larvae and beating collections contained from 50 to 70 larvae. By mid-July the number of larvae per sample increased as follows: Sumallo River (222); Skagit River (112); Railroad Creek (69); Haylmore Creek (124); Birkenhead Lake (65); Rutherford Creek (300). Table 1 shows a comparison between the 1974 and 1975 larval populations in drainages where infestations occurred.

Table 1. Summary of spruce budworm beating collections from Douglas-fir, Vancouver Forest District

Drainage divisions *	No. samples taken during larval period		% samples containing larvae		Avg no. larvae per positive sample		Avg no. larvae per sample	
	1974	1975	1974	1975	1974	1975	1974	1975
041	9	7	89	86	133	66	118	56
044	6	8	17	100	2	9	0.3	9
045	13	14	100	79	79	92	79	72

\* See Map 1.

Dissection of 100 late instar spruce budworm larvae from Douglas-fir for parasitism studies at each of several locations had the following results: Haylmore Creek (12%); Spuzzum Creek (6%); Sumallo River (5%); Skagit River (4%). One collection of 100 larvae from western hemlock at Skagit River had 16% parasitism. Mass collections of larvae from Rutherford Creek and Skagit River submitted to the Insect Pathology Research Institute showed no evidence of disease.

An aerial spray control program was conducted by a private company for the second consecutive year on 500 acres near Tashme. Fenitrothion was applied with an Agwagon aircraft at the rate of 3 ounces per acre on July 3 (in 1974 a rate of 4 ounces per acre was used). The treatment was effective in reducing the budworm population and resulted in a marked reduction in defoliation on overstory trees between the sprayed and unsprayed areas.

Aerial surveys in August showed that a greater proportion of the defoliation in the District was in the moderate to heavy category than in 1974 (Table 2).

Table 2. Areas of spruce budworm defoliation of Douglas-fir, Vancouver Forest District

Location	NO. ACRES DEFOLIATION					
	light		moderate		heavy	
	1974	1975	1974	1975	1974	1975
Lillooet R* (Pemberton to Lillooet Gla.)	35,360	6,400	8,960	960	4,000	0
Rutherford Cr	3,680	1,760	800	0	0	480
Soo R	3,040	0	640	960	0	0
Cheakamus L	0	0	0	960	0	0
Birkenhead L & R, Blackwater Cr	21,600	4,640	320	5,120	320	4,160
Haylmore Cr	5,440	640	640	640	0	1,120
Spruce Cr	2,400	0	160	960	0	0
Gates R	2,400	4,000	160	640	0	800
Owl Cr	0	800	0	960	0	0
Lillooet L - Green R	12,320	9,920	0	7,200	0	1,280
Lillooet R (south of Lillooet L)	0	320	0	1,600	0	0
Tuwasus Cr	0	1,760	0	1,440	0	0
Fraser Canyon (Choate to Boston Bar)	30,400	16,800	6,720	15,840	2,720	8,800
Nahatlatch L & R	6,240	13,440	5,120	13,120	1,600	1,760
Anderson & East Anderson rivers	11,200	8,640	800	7,680	0	1,600
Fraser R (north of Boston Bar)	0	4,000	0	6,720	0	800
Eight Mile Cr	0	0	480	2,080	320	160
Silverhope Cr - Skagit R	10,400	17,120	3,200	4,480	0	480
Sumallo R	800	5,280	4,960	5,440	1,440	1,440
Coquihalla R	320	1,280	0	0	0	0
Snass R-Skaist Cr	2,400	2,080	2,240	2,880	0	0
Totals	148,000	98,880	35,200	79,680	10,400	22,880
Grand totals: 1974 - 193,600 acres (78,380 ha); 1975 - 201,440 acres (81,382 ha)						

\*Host was alpine and amabilis fir along upper Lillooet River.

Predictions of 1976 defoliation were made in August by counting egg masses on two 18-inch branches from the mid-crown of each of 10 Douglas-fir trees at each location. Predictions were based on the criterion that up to 50 egg masses per 100 ft<sup>2</sup> of foliage could result in light defoliation (up to 30% of the foliage lost), from 50 to 150 egg masses in moderate defoliation (from 35 to 70% of foliage lost) and more than 150 egg masses in heavy defoliation (more than 75% of foliage lost).

Defoliation estimates taken on each of the egg sample trees showed that the estimated total defoliation was lower in some areas than in 1974. This was attributed to the fact that some trees produced an abundance of new foliage in 1975 (Table 3).

Table 3. Spruce budworm egg masses and defoliation estimates on Douglas-fir trees, Vancouver Forest District

Location	Avg no. egg masses per 100 ft <sup>2</sup> of foliage		Estimated loss of current year's foliage (%)		Estimated total defoliation (%)		Predicted* defoliation for 1976
	1974	1975	1974	1975	1974	1975	
Railroad Cr	50	117	90	25	40	15	M
Rutherford Cr	67	61	90	35	25	15	M
Birkenhead L	185	300	80	85	25	35	H
Haylmore Cr	90	103	95	35	35	15	M
Gates R	68	142	55	40	15	15	M
Sumallo R <sup>1/</sup>	162	52	90	20	40	15	M
Nahatlatch R	94	136	20	50	5	5	M
Manning Park	117	213	80	75	10	10	H
Skagit R	93	153	trace	55	trace	10	H
Twin One Cr (Lillooet L)	-	68	-	30	-	5	L 17
Anderson R (Fraser Canyon)	-	269	-	90	-	30	H

\* L - light; M - moderate; H - heavy.

<sup>1/</sup> Sprayed with Fenitrothion in 1975.

Plot studies by the Appraisal Group at Railroad Creek showed that successive years of defoliation ranging from 54 to 98% has killed 8% of 431 tagged trees in the plot, the most severely defoliated plot.

Flight traps baited with a sex attractant, trans-11-tetra decenal, were used to assess adult male budworm populations. The attractant was impregnated into plasticized, cylindrical cores of 4 mm diameter then cut into 10 mm lengths with each length containing 4 mg of attractant. One section was placed in each trap which consisted of 2-quart milk carton with the ends cut out. Each trap was 4 x 4 x 9 5/8 inches and had a sticky trapping surface of 154 in<sup>2</sup>. The traps were set out between June 23 and July 3, and retrieved between August 11 and 20. Table 4 shows a comparison of the number of adults caught in 1974 and 1975.

Table 4. Western spruce budworm adult males in pheromone baited traps, Vancouver Forest District

Location	Larval population density		NO. ADULTS IN TRAPS					
			range		total		avg	
	1974	1975	1974	1975	1974	1975	1974	1975
Thetis L	nil	nil	0-1	10-15	2	65	0.4	13
Green Mtn	nil	nil	0-9	6-16	18	58	4	12
Fuller L	nil	nil	0-6	7-17	14	60	3	12
Skagit R	light	moderate	42-67	22-65	282	221	56	44
Sumallo R	moderate	heavy	93-97 <sup>1/</sup>	33-74 <sup>*</sup>	190 <sup>1/</sup>	223 <sup>*</sup>	95 <sup>1/</sup>	45 <sup>*</sup>
Spuzzum Cr	moderate	light	100-128 <sup>1/</sup>	27-65	228 <sup>1/</sup>	259	114 <sup>1/</sup>	52
Rutherford Cr	heavy	heavy	40-59	18-48 <sup>2/</sup>	239	142 <sup>2/</sup>	48	36 <sup>2/</sup>
Haylmore Cr	heavy	moderate	16-57	52-65	202	277	40	55
Birkenhead L	heavy	moderate	47-85	19-62	311	182	62	36

\* Sprayed with Fenitrothion in 1975.

<sup>1/</sup> Three traps destroyed in 1974.

<sup>2/</sup> One trap destroyed in 1975.

There was some question as to the effectiveness of the glue used in retaining the moths in the traps. When the traps were retrieved in August, a few moths were observed flying out of them, suggesting that the glue had lost its adhesive quality.

Additional experiments in trapping were conducted at Skagit River and in Manning Park. Fifteen traps were set out at each of five locations with each trap having either a different mixture of trans-cis isomers or a caged virgin female (two traps at each location were left blank as checks). The best results were obtained from a mixture of 96% trans to 4% cis but the results were not conclusive.

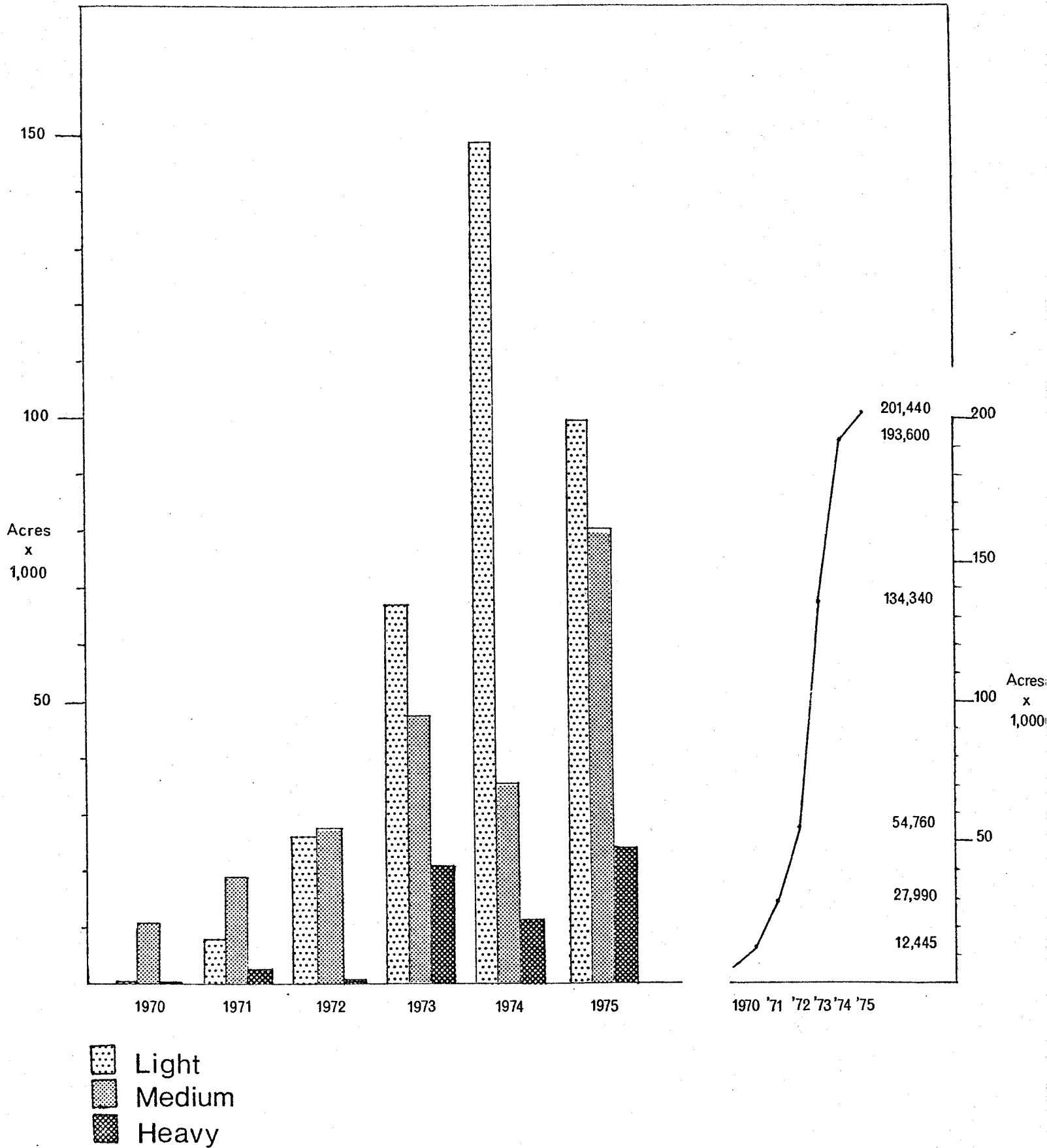
The general directional trend of spruce budworm infestations in the Vancouver District since 1970 has been from north to south; this trend continued in 1975. Egg mass counts and moth flights suggest that current populations in areas now infested will continue and, if weather is favorable, will likely increase in some areas resulting in moderate to heavy defoliation. Areas likely to suffer the heaviest damage in 1976 are Birkenhead Lake, Gates River, Nahatlatch - Anderson rivers, Manning Park - Skagit River. Infestations south of Lillooet Lake will probably expand toward Harrison Lake.

The graph illustrating western spruce budworm defoliation since 1970 shows that the greatest increase in area of defoliation occurred in 1973 and that the spread of infestations may be reaching a peak. However, the intensity of defoliation may still increase within areas now infested. Another year of even moderate defoliation in areas such as Railroad Creek, Haylmore Creek and Sumallo River, which have suffered extensive damage for several consecutive years, will no doubt increase top-kill and tree mortality which is already present.

Adult budworm populations on Vancouver Island were considerably higher in 1975, but no significant defoliation is expected there in 1976.



# SPRUCE BUDWORM DEFOLIATION VANCOUVER FOREST DISTRICT 1970 - 1975



### Other Noteworthy Insects

#### Mountain pine beetle, *Dendroctonus ponderosae*

There was a notable increase in the recorded numbers of beetle-killed trees in western white pine stands in 1975 (Table 5).

Table 5. Numbers of western white pine trees killed by mountain pine beetles, Vancouver Forest District

Location	No. of red-tops	
	1974	1975
Cheakamus L & R	20	160
Green L & R	-	110
Soo R	50	20
Lillooet R	50	300
Meager Cr	-	10
Tenquille Cr	-	100
Birkenhead L - Blackwater Cr	300	420
Gates L & R	40	50
Joffre Cr	0	150
Roger Cr	0	50
Skagit R	-	165
Sumallo R	0	100
Nahatlatch L & R	0	910
Kookipi Cr	1,125	800
E. Anderson R	320	250
Totals	1,905	3,595

In lodgepole pine stands there were an estimated 40,000 red-tops recorded along the Klinaklini River. Most of the mortality occurred from Calwell Creek to Knot Creek but there were a few small pockets of dead trees south of Frontier Creek. About 300 red-tops were recorded at Haylmore Creek south of Anderson Lake.

Western blackheaded budworm, *Acleris gloverana*

Larval populations in former infestation areas on Vancouver Island continued at low levels since their initial decline in 1972. The highest number of larvae per sample was five, collected at Georgie Lake east of Holberg. No defoliation has been observed since 1972.

Testing of sex attractants to measure the male adult populations continued for the second year. Nine locations were sampled with five traps containing the pheromone trans-11-tetron decenal (CSC 75) set out at each location. Results are shown in Table 6.

Table 6. Numbers of male adult western blackheaded budworm collected in pheromone traps, Vancouver Island, 1975

Location	Total no. traps	Bait	No. adults trapped	
			total	avg
Marshall Cr	5	CSC 75	7	1.4
Dunsmuir Cr	5	"	41	8.2
Loss Cr	5	"	60	12.0
Gracie L	5	"	14	2.8
Espinosa Inlet	4	"	10	2.5
Kelsey Bay	5	"	12	2.4
Port McNeill	5	"	4	0.8
Port Alice	5	"	147	29.4
Holberg	4	"	4	1.0

Douglas-fir beetle, *Dendroctonus pseudotsugae*

A moderate to high population of beetle larvae was found early in June in a few 1974-attacked blowdown Douglas-fir trees at Cathedral Grove. Light attacks occurred in 1975 on individual trees and slash at widely separated locations on Vancouver Island but were of little significance.

On the Mainland, there were 400 beetle-killed Douglas-fir trees recorded in groups of 5 to 150 trees along Silverhope Creek and Skagit River.

Beetle attacks were recorded on a few Douglas-fir trees defoliated by western spruce budworm at Skagit River, Sumallo River and Haylmore Creek. At Railroad Creek, where western spruce budworm infestations have occurred annually since 1970, detailed records showed that 8% of 431 tagged trees had light beetle attacks in 1975. Some of these attacked trees were dead, presumably from budworm defoliation.

Bruce spanworm, *Operophtera bruceata*

Populations of this defoliator were high on Vancouver Island in 1975. Defoliation became evident early in May on oak, maple and other deciduous tree species, resulting in 100% defoliation of scattered individual trees. The most severe damage occurred in the Greater Victoria region and populations are expected to be moderate to high in 1976. This is based on an abundance of moths observed late in November and early in December in some localities of Greater Victoria.

Western tent caterpillar, *Malacosoma c. pluviale*

Populations of western tent caterpillar were greatly increased from 1974 levels. Defoliation was moderate to severe on alder, willow and other deciduous hosts in the Greater Victoria area. Defoliation also occurred in the Gulf Islands, along the east coastal section of the Island north to Sayward and in the Port Alice area.

On the Mainland, only occasional tents were noted with little resultant damage.

Satin moth, *Stilpnotia salicis*

Three localized infestations of satin moth, two in Victoria and one in Nanaimo, resulted in light to moderate defoliation of trembling aspen, black cottonwood and Lombardy poplar on Vancouver Island in 1975.

On the Mainland, the infestation at Birkenhead Lake persisted, with another outbreak occurring southward along the lake. The parasite, Apanteles solitarius, was present at Victoria, Nanaimo and Birkenhead Lake.

Two small areas of defoliation of deciduous trees were observed during aerial surveys, one at Meager Creek and one at Capricorn Creek. The defoliation was attributed to satin moths but no verification was possible.

Poplar-and-willow borer, *Cryptorhynchus lapathi*

An area of 50 to 100 acres of logged and replanted forest was infested by this weevil along the Mamquam River. Dead and dying willows and black cottonwood trees were scattered throughout the area.

Infested trees were much more common in the District in 1975 and were noted from Boston Bar to Vancouver, in the Pemberton Valley, along the Sechelt Peninsula on the Mainland and along the east coastal area of Vancouver Island.

Balsam woolly aphid, *Adelges piceae*

The known range of the balsam woolly aphid expanded farther in 1975 with the finding of specimens on Mt. Elphinstone northwest of Gibson's Landing and at Lyons Lake above Halfmoon Bay. There was one aphid reportedly collected from the Freda Creek area in the Stillwater Division but the specimen was lost before it was positively identified.

A compilation of collections taken since 1973 show aphids were collected on the Mainland at Furry Creek, Diamond Head, Stawamus River, Mt. Fromme, Coquitlam Lake, Capilano Mountain, Widgeon Lake, Mt. Burke and Mt. Seymour. On Vancouver Island, positive collections were made at Weeks Lake in 1975.

Areas of what appeared to be dead *Abies* spp. were noted south of Cheakamus Lake, at Rutherford Creek and along the upper Lillooet River. Branch samples taken near Salal Creek failed to disclose any aphid specimens, although branches had gouting typical of that caused by *A. piceae*. Further sampling will be necessary to determine the cause of the stand condition but it can be at least partly attributed to the defoliation by western spruce budworm.

Black vine weevil, *Brachyrhinus sulcatus*

Black vine weevil larvae killed 500 of a block of 1,200 one-year-old Douglas-fir seedlings growing under greenhouse conditions at the Pacific Forest Research Centre in Victoria. The seedlings were planted in November, 1973, in cedar boxes containing soil from the Cowichan Lake area.

Seedling mortality, occurring from January to mid-February, was caused by root feeding and stem girdling and ranged from 5 to 100% in individual boxes. The outbreak was controlled by applying "Dylox", "Furadan", and "Chlordane" in late February.

This was the second outbreak of *B. sulcatus* at the Pacific Forest Research Centre, the first one occurring in western hemlock in 1972.

In addition, an undetermined amount of seedling mortality caused by black vine weevil occurred in the BCFS Nursery at Mesachie Lake.

A leaf blotch miner, *Lyonetia saliciella*

Heavy blotch mining of western white birch leaves occurred in the upper Fraser Valley in 1975. Damage was heaviest between Agassiz and Hope, where 75 to 100% of the foliage of numerous trees were mined, giving a brown, scorched appearance to trees over an extensive area.

Douglas-fir tussock moth, *Orgyia pseudotsugata*

There was no defoliation by tussock moths in the Vancouver District in 1975.

Flight traps consisting of two-quart milk cartons with the ends removed were set out at the two areas where defoliation has occurred in recent years, one at Clearbrook on the Mainland and one at Colwood Golf Course on Vancouver Island, and were on site from July 31 to September 22. Ten traps were set out at each location and baited with a sex pheromone obtained from Dr. G. Daterman of the United States Forest Service. In five traps the attractant was inoculated into magicaps and in the remaining five it was impregnated in plasticized cores. There were no Douglas-fir tussock moth caught at either location but two adults of the rusty tussock moth, *Orgyia a. badia*, were in one trap baited with the plasticized pheromone at Clearbrook.

European pine shoot moth, *Rhyacionia buoliana*

Flight traps using the pheromone attractant trans-9-dodecenyl acetate in a plastic polymer were tested again in 1975 as a means of determining the presence of European pine shoot moth. The traps were two-quart milk cartons with both ends removed and measured 4 x 4 x 9 5/8 inches and were coated on the inside with tree tanglefoot. They were in the field from May 30 to August 1. The pheromone was obtained from Dr. G. N. Daterman of the United States Forest Service and was impregnated in the plastic polymer at the Pacific Forest Research Centre in Victoria.

On Vancouver Island the traps were set out in groups of two at nurseries in Saanich and Cordova Bay. On the Mainland they were in groups of five in nurseries at Chilliwack and Langley and in a group of 10 at one location in Vancouver. Results were negative in all but one trap in Vancouver, which caught two shoot moth adults. This location had a known population of shoot moth and indicated that the pheromone, or the method of plasticizing it, was faulty.

Gypsy moth, *Porthetria dispar*

Attempts to trap male adults of the gypsy moth were made at six locations in the District in 1975. The traps used were the 3M type and baited with a sex pheromone in a laminated strip. Traps and pheromone were provided by the Canada Department of Agriculture.

The traps were set singly at Emory Creek, Cultus Lake, Clearbrook, Abbotsford airport and White Rock on the Mainland, and at Goldstream Park on Vancouver Island. Traps on the Mainland were on site from July 2 to August 21. On the Island they were in the field from August 5 to September 3. All traps had negative results.

Sitka spruce weevil, *Pissodes strobi*

A project to evaluate the susceptibility of Sitka spruce provenances and progenies to Sitka spruce weevil attacks was established by the B. C. Forest Service at Sayward on Vancouver Island in 1974. The Canadian Forestry Service is cooperating in the study through Dr. L. McMullen and the Forest Insect and Disease Survey. Examinations will be done annually with the records of attacks starting in 1978.

Details of the project are in Sitka Spruce Weevil Trial, Vancouver Island. E. P. 702.03 by Louis Hartmann, B. C. F. S., Research Division.

Conifer sawflies, *Neodiprion* spp.

Heavy defoliation of western hemlock occurred on about five acres at Coqueis Creek on the west side of Neurotsos Inlet. Populations of these sawflies were moderate to high throughout most of Vancouver Island with light defoliation of amabilis fir at scattered locations.

Table 7. Other insects of current minor significance

Insect	Host(s)	Locality	Remarks
<i>Adelges cooleyi</i> Spruce gall aphid	Douglas-fir, Sitka spruce	Ucluelet to Tofino	Sucking insect. Heavy localized attacks.
<u>Chrysomelid beetles</u>			
<i>Altica tombacina</i> A leaf beetle	Mountain alder	Nahatlatch River	A leaf skeletonizer. Severe damage in localized patches.
<i>Pyrrhalta carbo</i>	Willow	Norrish Creek	A leaf skeletonizer. Moderate popula- tion.
<i>Pyrrhalta puncti- pennis</i>	Fireweed	Mamquam River	A leaf skeletonizer. Moderate popula- tion.
<i>Lambdina fiscellaria lugubrosa</i> Western hemlock looper	Coniferous species	General	Defoliator. Low population.
<i>Melanolophia imitata</i> Green-striped forest looper	Western hemlock, Douglas-fir	General	Defoliator. Low population.
<i>Neophasia menapia</i> Pine butterfly	In flight	Campbell River - Victoria	Defoliator. Heavy moth flights observed.
<i>Nepytia phantasmaria</i> False hemlock looper	Douglas-fir	General	Defoliator. 11% of samples were positive with avg of 2.8 larvae.
<i>Nyctobia limitaria</i> Yellow lined looper	Western hemlock, Douglas-fir	General	Defoliator. Low population.



# FOREST DISEASE CONDITIONS

## Currently Important Diseases

### Laminated root rot, *Phellinus weirii*

Laminated root rot was widely distributed in a 50- to 60-year-old stand of Douglas-fir near Okeover Arm. A total of 328 chains were cruised from September 8 to 11 and prism plots established every two chains.

Of the 164 plots, 15% contained root rot foci varying from .02 to 1 acre. There were 1,515 standing trees recorded; 91% were Douglas-fir, 4% were western hemlock, 3% were western red cedar and 2% were lodgepole pine. In strips one to three, totalling 149 plots, about 10% of the plots contained root rot in which 33% of the trees were dead or dying. In strip four, totalling 15 plots, 33% of the plots contained infection and more than 50% of the trees were dead (Table 8).

Table 8. Status of laminated root rot in Douglas-fir trees near Okeover Arm, Vancouver Forest District, 1975

Strip no.	No. of chains	No. plots		% plots infected	No. standing trees in infected plots			% trees infected
		healthy	infected		healthy	yellow	dead	
1	80	35	5	12	45	0	12	21
2	140	60	10	14	49	5	20	34
3	78	34	5	13	28	2	12	33
4	30	10	5	33	15	2	17	56

The survey showed that within the cruise strips there has been a loss to date equal to about 20 12-inch dbh trees per acre and that within the infected plots the volume has been reduced by about 40%. Further losses will occur before the stand reaches harvestable age.

*P. weirii* was also evident in a semi-mature stand in the Woss Camp area on Vancouver Island.

## Winter Injury

Winter damage to Douglas-fir occurred over an estimated 1,500 acres in the Cameron River Valley. Damage affected about 50% of the trees in plantations established from 1969 to 1971. The discoloration was limited to the 1974 foliage and the southern exposure of individual trees. Tree mortality was less than 1%.

## Shoot blight, *Sirococcus strobilinus*

Extensive mortality of white spruce occurred in a dozen seed lots at Surrey Nursery in 1975. The dead seedlings were removed and burned.

*S. strobilinus* was also present on 7 out of 10 western hemlock trees examined at Marion Lake north of Haney.

## Dwarf mistletoe, *Arceuthobium tsugense*

Dwarf mistletoe has become widespread in the coastal range of western hemlock and is likely causing severe growth loss.

On August 19, a 108-acre setting on Turnour Island, clear-cut in 1971-72, was examined to determine the incidence of dwarf mistletoe on residual trees. Of the approximate 172 residuals examined, about 15% supported mistletoe plants. The examined trees ranged up to 10 feet in height and no mistletoe plants were seen more than 6 feet from ground level. No infection was noted on 3- to 5-year-old regeneration which was about 3 feet high. Company surveys in 1974 indicated a 61% stocking of natural regeneration on all but 20 acres of the setting.

Additional sanitation cutting is planned by the MacMillan-Bloedel Company.

Table 9. Other diseases of current minor significance

Organism	Host(s)	Locality	Remarks
<i>Armillaria mellea</i> Shoestring root rot	Douglas-fir, Grand fir	Woss L, Nanaimo	Light but widespread mortality in planta- tions.
<i>Endocronartium</i> <i>harknessii</i> Globose gall rust	Lodgepole pine	Chilliwack L	Infection on 95% of 100 examined trees.
<i>Fusarium</i> sp. A top blight	Mountain hemlock, Douglas-fir	Surrey, Duncan	20% mortality of one- year-old Douglas-fir at Surrey.
<i>Lirula macrospora</i> A needle disease	Sitka spruce	Knight Inlet	Heavy infection on one tree.
<i>Rhabdocline</i> <i>pseudotsugae</i> Douglas-fir needle cast	Douglas-fir	Vancouver I	Infection varied from light to heavy at widespread locations.
<i>Rhabdocline weirii</i> A needle cast	Douglas-fir	Chehalis R	Infection light on 2 out of 20 trees examined.