

ANNUAL DISTRICT REPORT  
FOREST INSECT AND DISEASE SURVEY  
BRITISH COLUMBIA, 1969  
PART II, VANCOUVER FOREST DISTRICT  
MAINLAND SECTION

by  
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CANADIAN FORESTRY SERVICE  
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## INTRODUCTION

This report outlines the status of forest insect and disease conditions in the Vancouver Forest District, Mainland Section, for 1969 and, where possible and meaningful, attempts to forecast pest population trends. It places regular stress on the level of pest populations capable of sudden, damaging outbreak. Data on the occurrence and intensity of other pests, characterized by more insidious, but often greater ultimate losses, are reported occasionally, but frequently such information is more meaningfully presented in specific reports distributed by this Laboratory.

Reports of forest pest outbreaks to the Forest Insect and Disease Survey by public or private cooperators helps greatly in the interpretation of the general pest situation and improves our ability to gauge population trends.

Regular field work in the District this season began May 19 and ended August 8. Special surveys were as follows: an evaluation of the impact of dwarf mistletoe on western hemlock and lodgepole pine was carried out from August 11 to 22; black-headed budworm egg sampling from September 22 to October 3, and western hemlock looper egg sampling from October 20 to 24. Nine hours' flying time were used in July to map black-headed budworm defoliation and sample inaccessible areas.

Insect and disease collections are shown, by host, in Table 1; collection localities and drainage divisions are shown on Map 1. The principal problems in each Forest Insect and Disease Survey drainage division are shown in Table 2. The abbreviations for host trees used in the report are given in Appendix I.

Numbers of larval defoliators found in field collections increased slightly this year: 91% and 75% of beating collections in the eastern and western parts of the District, respectively, contained larvae. Details on individual insect and disease problems follow in subsequent sections.

Black-headed budworm caused light to heavy defoliation of approximately 14,500 acres of western hemlock and amabilis fir, mainly in the Indian, Coquitlam and Pitt River Valleys. Egg counts made in the fall indicate that moderate to severe defoliation will occur in these areas in 1970. Budworm populations east of Harrison Lake declined sharply.

Western hemlock looper populations increased to infestation proportions near Coquitlam Lake, but caused only light defoliation. Egg counts made in October indicate a moderate to high population will persist in 1970. Phantom hemlock loopers were commonly found in association with western hemlock loopers.

Spruce budworm populations increased in the Fraser Canyon and in the vicinity of Pemberton, causing light defoliation of Douglas-fir.

Balsam woolly aphid attacks were found outside the known boundary of infestation, extending the range slightly.

Severe temperatures in the winter of 1968-69 resulted in some tree mortality in exposed sites in the Fraser Valley.

Table 1. Collections by hosts, Vancouver Forest District,  
Mainland Section, 1969

Coniferous hosts	Forest insects	Forest diseases	Broad-leaved hosts	Forest insects	Forest diseases
Cedar, western red	82	1	Alder, red	2	0
Douglas-fir	87	1	Birch, western white	3	0
Fir, alpine	2	0	Cottonwood, black	2	0
Fir, amabilis	15	0	Maple, broadleaf	5	0
Fir, grand	5	0	Maple, vine	3	0
Hemlock, western	181	37	Willow sp.	1	0
Pine, lodgepole	17	4	Miscellaneous	7	0
Pine, ponderosa	3	0			
Pine, western white	4	1			
Spruce, Norway	2	0			
Spruce, Sitka	34	0			
Totals	432	44	Totals	23	0
			No host	21	0
			GRAND TOTALS	476	44

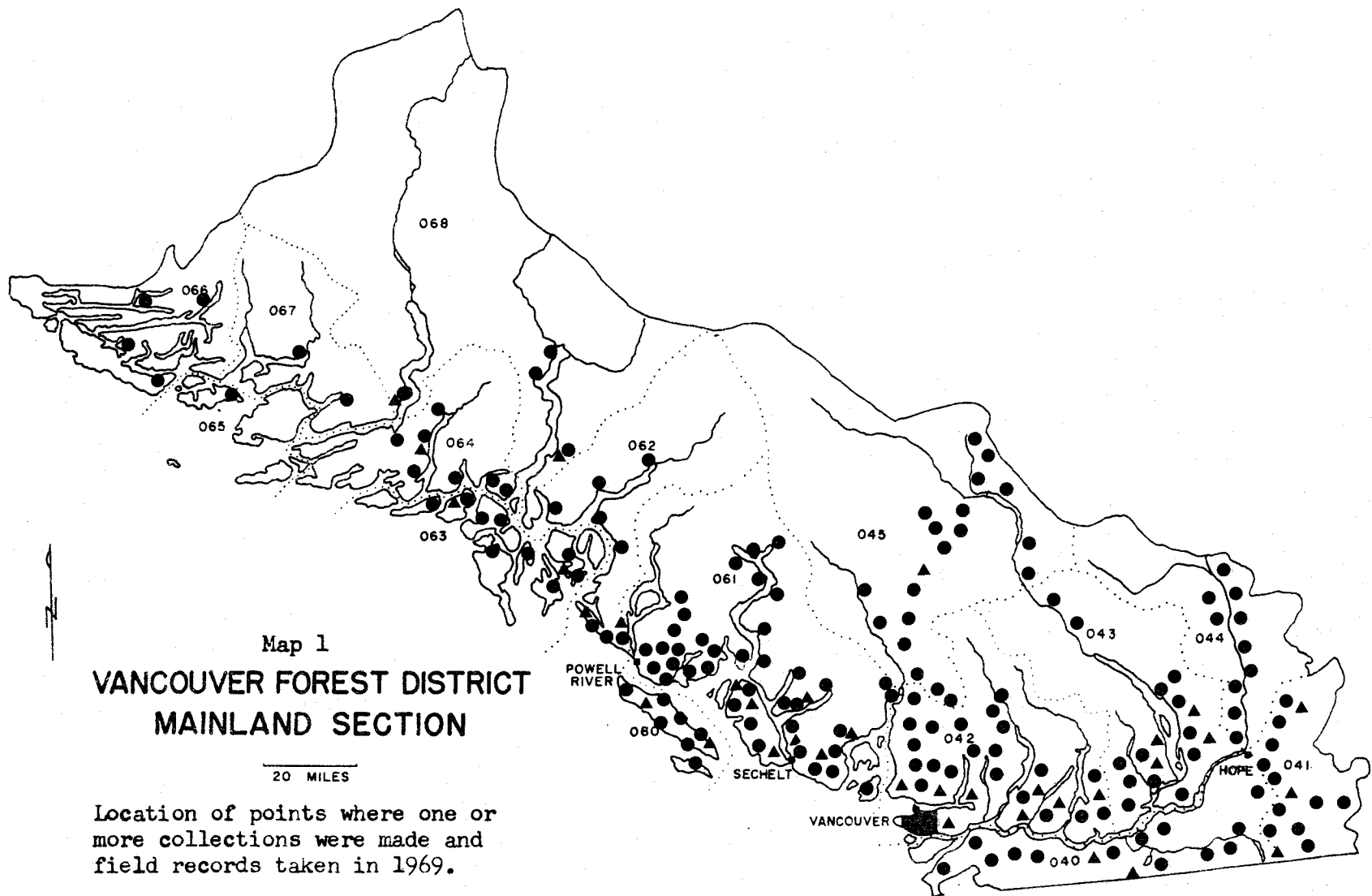
Table 2. Currently important insect and disease<sup>1/</sup> problems by drainage division, Vancouver Forest District, Mainland Section, 1969

Insect and disease problems	Principal hosts <sup>2/</sup>	Importance by drainage divisions <sup>3/</sup>														
		040	041	042	043	044	045	060	061	062	063	064	065	066	067	068
<u>Defoliators</u>																
Black-headed budworm	wH, mH, aF, alF, gF, D, sS	1	2	5	3	1	3	1	3	1	1	1	1	1	1	1
Western hemlock looper	wH, wC, D	0	0	4	2	1	1	1	3	2	1	1	1	1	1	1
Phantom hemlock looper	D, wH, wC, aF	1	3	3	2	1	1	0	1	0	0	0	0	0	0	0
Spruce budworm (one-year cycle)	D	2	1	1	2	2	3	0	0	0	0	0	0	0	0	0
<u>Sucking Insects</u>																
Balsam woolly aphid	aF, alF, gF	1	0	5	3	0	2	0	3	0	0	0	0	0	0	0
<u>Non-infectious Diseases</u>																
Winter injury	D, wH, wC	4	1	3	1	1	1	2	1	1	1	1	2	2	1	1

<sup>1/</sup> Includes only weather-induced and foliage diseases which fluctuate annually.

<sup>2/</sup> See host code in Appendix I.

<sup>3/</sup> High population and/or widespread outbreak in progress - 5.  
 Scattered high populations and/or significant damage in restricted areas - 4.  
 Rising populations and/or moderate numbers and/or potential problems - 3.  
 Static or falling population and/or moderate numbers and/or no problem at present - 2.  
 Endemic population and/or no significant damage - 1.  
 Not sampled and/or no host and/or not found - 0.



Location of points where one or more collections were made and field records taken in 1969.

Forest insect ● Forest disease ▲

FOREST INSECT CONDITIONS

Currently Important Insects

Defoliators

Black-headed budworm, Acleris variana

Moderate to high populations were found on western hemlock and amabilis fir from the west side of Howe Sound to Harrison Lake (Table 3). The heaviest defoliation, up to 40%, occurred between 1,500 and 3,000 feet (a.s.l.) in pockets totalling some 1,400 acres on both sides of the Indian River Valley from Forestry and Hixon Creeks south to Clementine and Grand Creeks; on 300 acres northwest of Coquitlam Lake, and on 700 acres near Shale and Iceworm Creeks in the Pitt River Valley. Areas of defoliation mapped late in July are shown in Table 4.

Defoliation was negligible in the Hope Slide area and Coquihalla Valley, where damage was recorded in 1967 and 1968.

During July and August, mass larval and pupal collections were made for parasite and disease studies. Parasitism was 26% in collections made in Capilano Valley, 21% at Raffuse and Furry Creeks, and 7% in the Indian River Valley. Parasitism is not considered to be high enough to control effectively the budworm outbreaks. Virus disease was scarce in all samples.

Based on the number of eggs counted on 10-inch branch tips in the fall of 1969 (Table 5), heavy defoliation is expected in the upper Seymour and Indian River Valleys in 1970. Although no egg counts were taken, damage could also occur in the inaccessible areas of the upper Coquitlam and Pitt River Valleys where terrain, climate and stand composition are similar. Moderate defoliation is expected in mountainous areas surrounding Squamish, i.e., Mills, Furry and Raffuse Creeks. Map 2 shows the location of points where black-headed budworm infestations occurred in 1969.

Table 3. Summary of black-headed budworm collections,  
Vancouver Forest District, Mainland Section

Drainage divisions	Number of samples taken during larval period			% samples containing larvae			Average number of larvae per positive sample		
	1967	1968	1969	1967	1968	1969	1967	1968	1969
040	19	14	21	47	64	52	18.1	16.7	8.7
041	29	30	15	86	83	80	63.4	95.4	15.3
042	76	75	67	63	64	61	11.7	25.5	36.7
043	29	19	25	45	47	76	17.6	10.2	7.9
044	28	10	16	68	0	56	6.6	-	9.0
045	31	21	13	39	19	85	11.3	3.8	14.0
060	18	9	19	17	0	5	1.7	-	0.3
061	108	124	80	12	14	16	1.7	3.9	1.8
062	23	24	17	17	17	0	2.5	1.5	-
063	37	20	7	3	20	0	1.0	1.2	-
064	18	11	14	0	0	0	-	-	-
065	0	4	2	-	0	0	-	-	-
066	0	14	9	-	0	0	-	-	-
067	0	3	4	-	0	0	-	-	-
068	4	9	11	0	0	33	-	-	0.3
Totals	420	387	320	35	31	37	19.2	32.9	19.1



Table 4. Number of acres of black-headed budworm defoliation,  
Vancouver Forest District, Mainland Section, 1969

Location	Est. no. of acres			Total
	Light	Medium	Heavy	
Mills Cr.	500	300	-	800
Indian R.	1,500	1,800	1,400	4,700
Coquitlam R.	900	1,300	300	2,500
Pitt R.	1,600	2,000	700	4,300
Salsbury (Cypress) Lk.	1,000	-	-	1,000
Chehalis R.	600	-	-	600
Sloquet Cr.	600	-	-	600
Totals	6,700	5,400	2,400	14,500

Table 5. Summary of black-headed budworm egg counts and defoliation estimates, Vancouver Forest District, Mainland Section

Location	Avg no. eggs per 10" tip		% defoliation			
	1968	1969	1969		1970 <sup>1/</sup>	
			Current foliage	Total foliage	Current foliage	Total foliage
Mills Cr.	-	3.7	35	15	40	15
Furry Cr.	1.5	5.8	60	25	60	25
Raffuse Cr.	2.6	6.0	50	20	60	25
Grouse Mtn.	0.1	0.9	10	T <sup>2/</sup>	10	T
Seymour Cr. (Dam)	2.1	3.9	30	10	40	15
Seymour Cr. (Orchid Cr.)	-	21.6	40	15	90	70
Indian R. (Meslilloet Cr.)	-	1.2	15	5	15	5
Indian R. (Hixon Cr.)	-	20.5	75	40	90	70
Lost Cr.	1.2	1.8	25	5	20	5
Salsbury Lk.	4.8	0.6	25	5	5	T
Wray Cr.	0.2	0.9	5	T	10	T
Mt. Coulter	0.5	0.3	5	T	T	T
Boston Bar Cr.	0.2	0.1	5	T	T	T
Romeo	0.2	0.9	5	T	10	T




<sup>1/</sup> Estimated defoliation in 1970 that will be caused by larvae hatching from 1969 eggs.

<sup>2/</sup> T = Trace

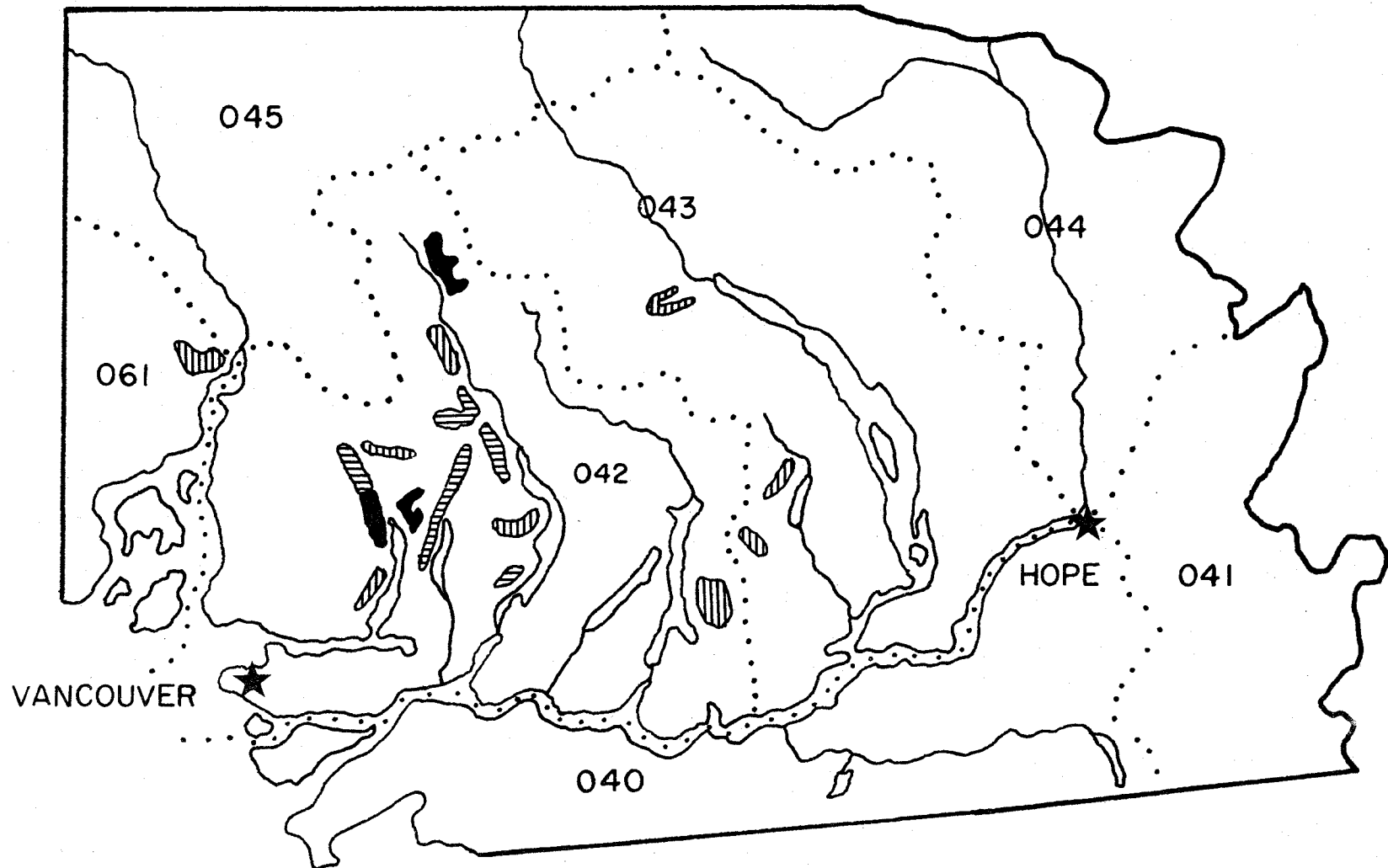
Map 2

# VANCOUVER FOREST DISTRICT MAINLAND SECTION

Areas within which black-headed budworm  
infestations occurred in 1969.

Light   
Medium   
Heavy 

  
20 MILES



Western hemlock looper, Lambdina fiscellaria lugubrosa

Larval populations increased to infestation proportions in the mature hemlock-cedar stands surrounding Coquitlam Lake. Standard beating samples made during the summer contained up to 300 larvae; however, only light defoliation occurred. From 10 to 15% of late instar larvae were parasitized. Collections in other areas north of the Fraser River from Vancouver to Harrison Lake contained fewer larvae than in 1968, but the number and distribution of collections containing loopers increased. Collections of up to 50 larvae were taken at scattered sites in Salmon, Narrows and Jervis Inlets, a two-fold increase from 1968. Table 6 shows a summary of collections by drainage division.

Egg counts were made in late October at seven locations north of the Fraser River. There were fewer new eggs than old, indicating a decline in populations in 1970 (Table 7). However, a sufficient number of eggs were found at Coquitlam Lake to result in a high larval population in 1970. The majority of eggs was found on moss just below the crown and in the lower and mid-crowns of dominant trees. Map 3 shows the locations where hemlock looper infestations occurred in 1969.

Table 6. Summary of western hemlock looper collections,  
Vancouver Forest District, Mainland Section

Drainage divisions	Number of samples taken during larval period			% samples containing larvae			Average number of larvae per positive sample		
	1967	1968	1969	1967	1968	1969	1967	1968	1969
040	28	16	20	25	13	0	2.4	1.5	-
041	34	30	9	15	0	0	1.0	-	-
042	103	78	67	28	30	40	6.5	7.1	23.8
043	36	22	30	22	41	53	8.1	21.0	5.5
044	24	4	12	38	25	33	1.7	2.0	1.5
045	36	26	14	11	12	14	2.3	1.0	1.0
060	18	9	19	11	11	5	3.0	1.0	1.0
061	156	142	80	24	11	33	6.0	2.5	9.8
062	27	24	17	22	17	12	2.1	2.2	5.5
063	44	20	7	16	25	43	1.8	1.6	1.7
064	18	11	14	17	27	29	1.3	1.3	4.0
065	0	4	2	-	0	0	-	-	-
066	0	14	9	-	0	11	-	-	0.1
067	0	3	4	-	0	50	-	-	1.0
068	4	9	11	25	44	45	2.0	1.7	1.0
Totals	528	412	315	23	20	29	4.6	5.2	11.2

Table 7. Summary of western hemlock looper egg counts,  
Vancouver Forest District, Mainland Section, 1969

Location	No. of $\frac{1}{2}$ sq ft moss samples	Avg no. of eggs	
		new	old <sup>1/</sup>
Seymour Cr.	6	2.8	14.3
Buntzen Lk.	7	0.1	4.1
Coquitlam Lk.	8	26.5	57.1
Loon Lake (Haney)	4	.0	1.9
N. Alouette R.	3	0.3	3.3
Lost Cr. (Mission)	7	3.3	28.1
Harrison Bay	2	.0	6.0

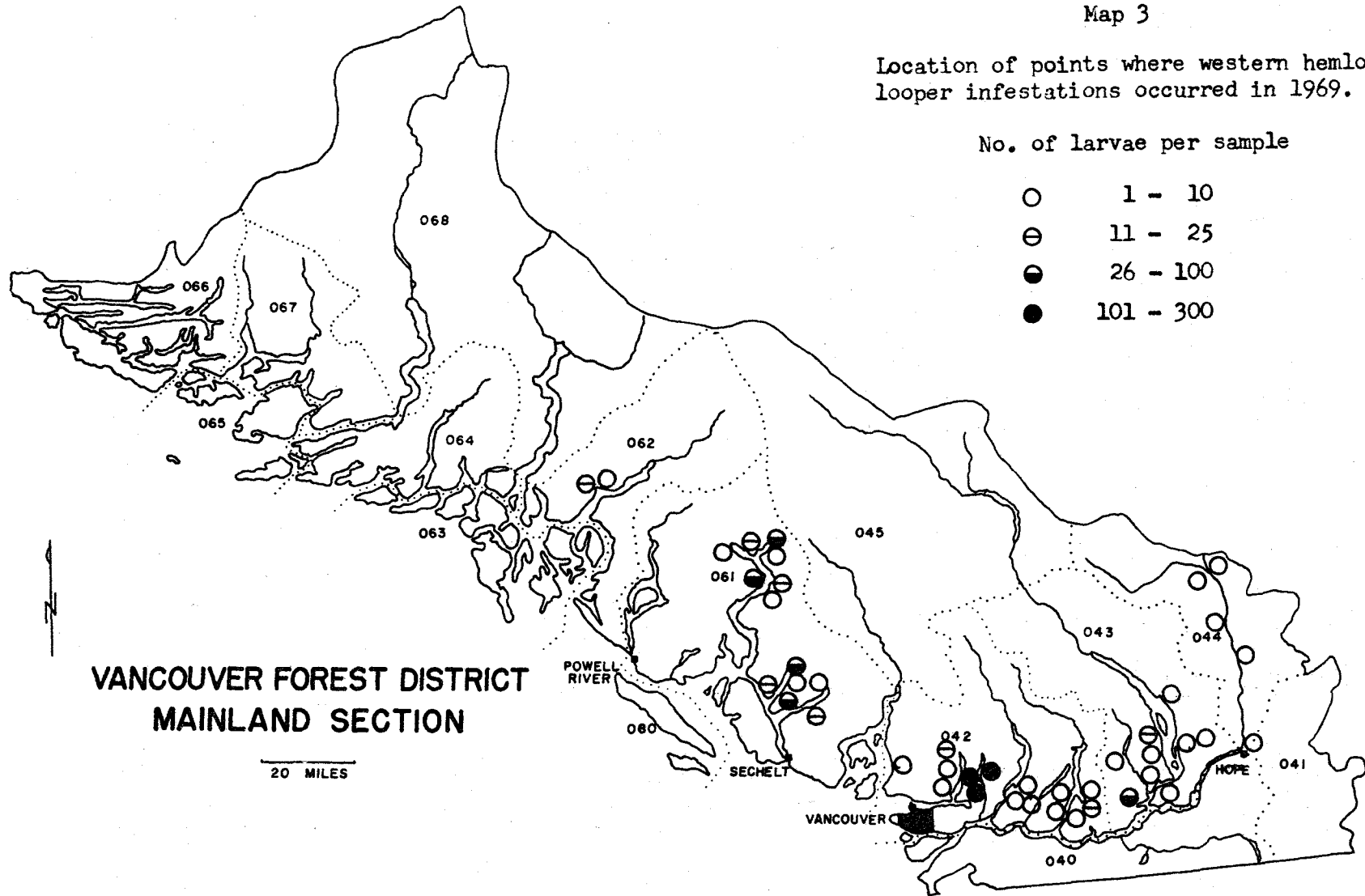
<sup>1/</sup> Presumably includes eggs more than one year old.

Map 3

Location of points where western hemlock  
looper infestations occurred in 1969.

No. of larvae per sample

- 1 - 10
- ◐ 11 - 25
- ◑ 26 - 100
- 101 - 300



Phantom hemlock looper, Nepytia phantasmaria

Larval populations increased in 1969, and they were commonly found in association with western hemlock looper. Up to 55 larvae per collection were taken at Coquitlam Lake, while smaller numbers were collected in the Harrison and Hope B. C. Forest Service Ranger districts. The preferred hosts were Douglas-fir, western hemlock and western red cedar. Following is a comparison of collections, in drainage divisions 040 to 045<sup>1/</sup>, which contained phantom hemlock loopers:

Number of samples taken during larval period			% samples containing larvae			Average number of larvae per positive sample		
1967	1968	1969	1967	1968	1969	1967	1968	1969
268	180	159	9	12	18	2.4	1.5	4.5

Spruce budworm, Choristoneura occidentalis

Larval populations on Douglas-fir increased significantly in the Pemberton - D'Arcy area for the second consecutive year. Populations were below serious infestation levels, but light defoliation occurred near Pemberton Meadows and Blackwater Creek. In 1969, 100% of collections contained an average of 8 larvae compared with 71% with 3.6 larvae in 1968. Collections of 42, 21, 17 and 13 larvae were taken at Hope, Alice Lake, Hells Gate and Boston Bar, respectively. A summary of collections in drainage divisions 040 to 045 is shown in Table 8. Spruce budworm are seldom found northwest of Howe Sound.

<sup>1/</sup> Very few larvae were taken in drainage divisions 060 to 068 in the period 1967-69.



Table 8. Summary of spruce budworm collections in drainage divisions  
040 - 045, Vancouver Forest District, Mainland Section

Drainage divisions	Number of samples taken during larval period			% samples containing larvae			Average number of larvae per positive sample		
	1967	1968	1969	1967	1968	1969	1967	1968	1969
040	3	5	11	33	60	46	1.0	14.7	1.8
041	1	9	3	100	67	67	4.0	6.5	28.0
042	6	7	8	33	29	13	2.0	3.5	2.0
043	1	6	6	0	33	17	-	1.5	1.0
044	18	13	13	44	62	62	2.9	2.6	4.9
045	10	7	7	40	71	100	2.5	3.6	8.0
Totals	39	47	48	41	55	50	2.6	5.1	6.8

### Sucking Insects

#### Balsam woolly aphid, Adelges piceae

Infested amabilis fir were found at Boise Creek, north of Pitt Lake. This extends the known boundaries of aphid infestation in this area by several miles. The largest concentrations of dying balsam were in the Seymour, Indian and Coquitlam River Valleys.

During an aerial survey, red-topped Abies sp. were noted at: Tatlow Creek (Ashlu Cr.); near Glacier Lake, northwest of Harrison Lake, and in the upper Pitt River Valley and Iceworm Creek. These locations are just outside the known infestation area and are suspected but unconfirmed balsam woolly aphid damage areas.

### Other Noteworthy Insects

#### Douglas-fir beetle, Dendroctonus pseudotsugae

The few beetle-killed Douglas-fir observed in 1969 were restricted to the Lillooet River Valley, northwest of Harrison Lake. Counts of red-topped trees were as follows: Glacier Lake, 20; Fire Creek, 5; Sloquet Creek, 90; Tipella Creek, 10; and Tretheway Creek, 10.

Mountain pine beetle, Dendroctonus ponderosae

The number of beetle-killed western white pine remained low. Counts of red-topped trees were as follows: Snowcap Creek, 25; Glacier Lake, 85; Fire Lake, 40; and Tretheway Creek, 5.

Green-striped forest looper, Melanolophia imitata

Few larvae were collected in 1969, although a small population persisted in hemlock - cedar stands in the mountains north of Vancouver. In 1967 and early in 1968, populations increased from Bute and Jervis Inlets to Howe Sound. Late in 1968, a fungus disease Entomophthora sp., was prevalent in larvae in all areas. A comparison of collections containing green-striped forest loopers is as follows:

Number of samples taken during larval period			% samples containing larvae			Average number of larvae per positive sample		
1967	1968	1969	1967	1968	1969	1967	1968	1969
585	423	354	75	48	28	9.5	5.3	1.8

Spruce aphid, Neomyzaphis abietina

Spruce aphids were scarce in 1969 on shelter-belt spruce in the Fraser Valley. Aphid populations may have been reduced by the unusually cold winter of 1968-69. The majority of spruce, which had been heavily attacked each year from 1964 to 1968, recovered. The approximate numbers of semi-mature trees killed were: Ladner, 20; Cloverdale to Langley, 10; Clearbrook, 4; Sumas Prairie, 38; and Chilliwack, 10. Spruce in forest sites were not seriously affected.

Table 9. Other insects of current minor significance

Insect	Hosts <sup>1/</sup>	Locality	Remarks
<u>Adelges cooleyi</u> Cooley spruce gall aphid	sS, D	Bute, Toba, Jervis Inlets, Powell River	Sucking insect. Heavy attacks on young D at Powell River. Common but light elsewhere.
<u>Altica</u> spp. Leaf beetles	rAl, bCo, W	Chilliwack and Harrison B.C.F.S. Ranger Districts. Lund to Saltery Bay	Leaf Skeletonizer. Common, moderate to severe damage.
<u>Ectropis</u> <u>crepuscularia</u> Saddleback looper	wH, D, wC, aF	North Vancouver mountains and valleys, Jervis and Toba Inlets	Defoliator. Increased in 1968 but declined again in 1969.
<u>Epirrita</u> <u>autumnata</u> Green velvet looper	aF	Roberts Creek, Woodfibre	Defoliator. Common, largest collection contained 34 larvae.
<u>Halisidota</u> <u>argentata</u> Silver-spotted tiger moth	D, wH, sP	Coastline from White Rock to Powell River	Defoliator. Caused noticeable damage in 1968. Very scarce in 1969. Population may have been killed by low winter temperatures.
<u>Hyphantria</u> <u>cunea</u> Fall webworm	rAl, Po, Ch, Hw	Fraser Valley	Defoliator. Increase, especially on bCo from Abbotsford to Chilliwack.
<u>Lecanium</u> <u>coryli</u> A soft scale insect	vM, bM, rAl, mtn. ash	Stanley Park, Vancouver area	Up to 50% defoliation of small groups of trees. More than 75% of scale population was parasitized, infestation should subside in 1970.

Table 9. (Continued)

Insect	Hosts <sup>1/</sup>	Locality	Remarks
<u>Malacosoma californicum pluviale</u> Western tent caterpillar	rAl, W, Ch, wB, Hw	White Rock to Britannia, Howe Sound to Powell River	Defoliator. Severe defoliation of immature trees in a 2 to 3 mile strip along the coastline.
<u>Malacosoma disstria</u> Forest tent caterpillar	bCo, W, rAl, wB	Port Mann	Defoliator. Average 50% defoliation in 250 acres.
<u>Nematus</u> sp. A sawfly	rAl	Mission and Chilliwack B.C. F.S. Ranger Districts	Defoliator. Common, severe defoliation of immature trees.
<u>Neodiprion</u> spp. Conifer sawflies	wH, D, sS, aF, gF, lP, pP	Widespread	Defoliator. Light defoliation of wH and aF in Raffuse and Furry Creeks and Hope Slide area. 200+ larvae per collection.
<u>Rhyacionia buoliana</u> European pine shoot moth	Scots, mugho pines, lP	Vancouver	Terminal borer. Severe attacks in parks and residential areas. No attacks found in forest stands.
<u>Stilpnotia salicis</u> Satin moth	white poplar	Langley, Port Mann, Ladner	Defoliator. Up to 50% defoliation of several small groups of trees.
<u>Zeiraphera</u> sp. A tip moth	D	Clearbrook, Abbotsford	Defoliator. Up to 23 larvae per collection.

<sup>1/</sup> Host tree abbreviations appear in Appendix I.

## FOREST DISEASE CONDITIONS

The organisms currently causing much of the tree mortality, growth loss, and quality reduction attributed to diseases are mistletoes and stem and root rot fungi. These organisms, once established in a stand, persist for many years. They usually intensify at a slow rate which makes annual summaries of their status repetitious; for this reason the following report may omit the mention of some of the more important diseases. Emphasis is placed on new outbreaks, the status of the annually varying foliage diseases and abnormal weather conditions, i.e., frost, drought, snow damage, etc., which immediately affect tree appearance and often cause dieback and mortality. Other aspects of the Disease Survey dealing with mortality, growth loss, and factors influencing the occurrence of the more important diseases are summarized elsewhere.

### Currently Important Diseases

#### Stem Diseases

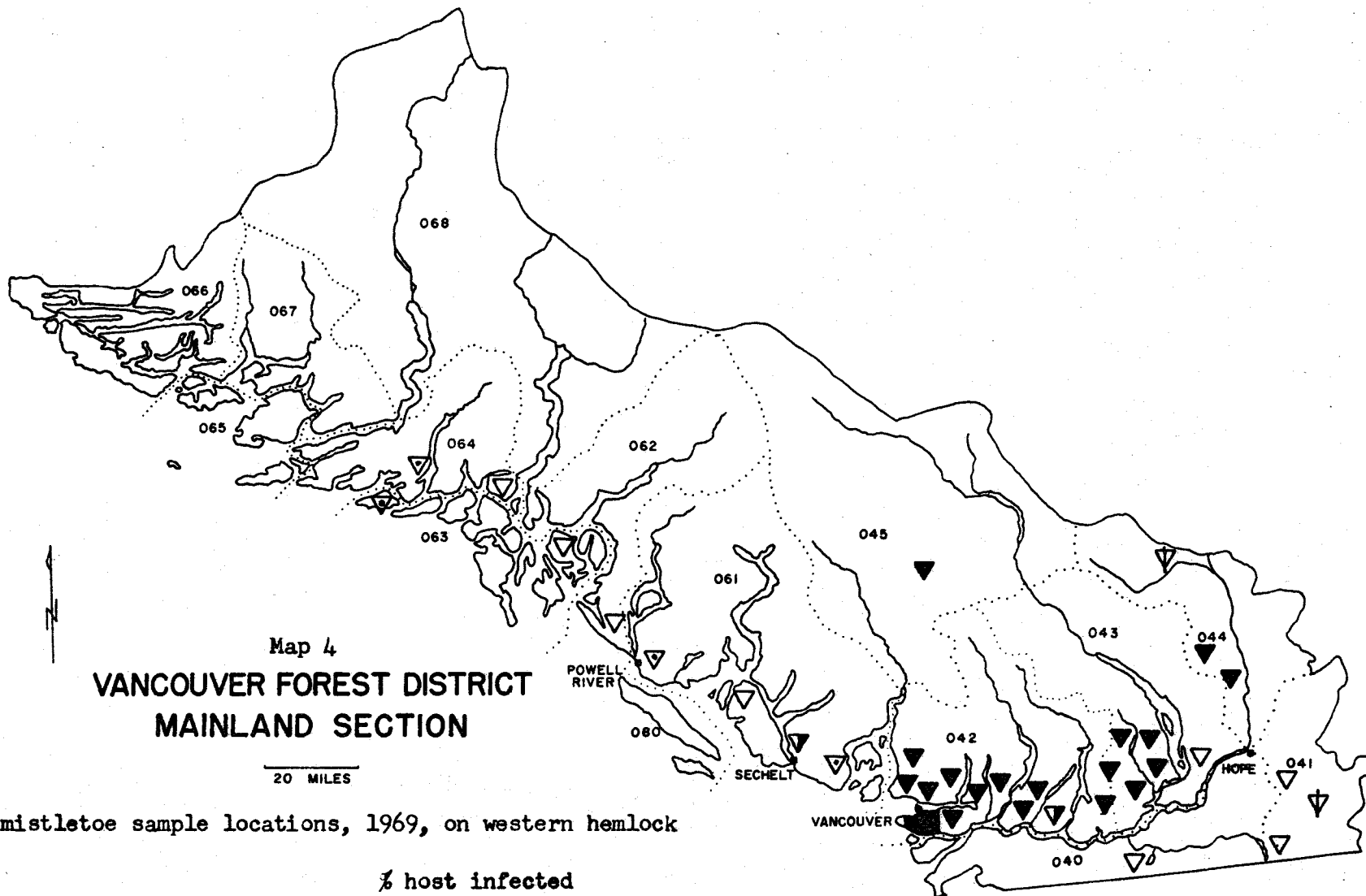
##### Dwarf mistletoe, Arceuthobium campylopodum f. tsugensis

Western hemlock stands were examined to determine the distribution and intensity of dwarf mistletoe attack. Mistletoe infections were common in all hemlock stands in the district, with the exception of stands bordering the interior of British Columbia, i.e., Nahatlatch River and the upper Coquihalla and Skagit Valleys. Most stands over 40 years old were infected. The most severe infections occurred in mature stands between Howe Sound and Harrison Lake on the north side of the Fraser River. Few plots were established north of Powell River due to the inaccessibility of the area. Map 4 shows the percentage of trees infected in 50-tree plots.

#### Non-infectious Diseases

##### Winter injury

Several coniferous tree species in the Fraser Valley were injured during the winter of 1968-69, presumably as a result of unusually cold temperatures and strong winds. Discolored foliage and twig loss was most noticeable on open-growing or exposed trees at the fringe of forested areas. Western red cedar, Douglas-fir, western yew and western hemlock suffered the most damage, in descending order. Only a few dozen red cedars had been killed but numerous semi-mature and mature Douglas-fir lost up to 50% of their twiglets and foliage. The most severe damage occurred in the vicinity of Haney, Abbotsford, Sumas and Yarrow.



Map 4  
**VANCOUVER FOREST DISTRICT  
 MAINLAND SECTION**

20 MILES

Dwarf mistletoe sample locations, 1969, on western hemlock

Dwarf mistletoe species	% host infected				
	0	1-25	26-50	51-75	76-100
<u>Arceuthobium campylopodum</u>	▽	▽	▽	▽	▽
<u>f. tsugensis</u>	▽	▽	▽	▽	▽

Arceuthobium campylopodum    ▽   ▽   ▽   ▽   ▽  
f. tsugensis

Exotic Plantations

There are 39 plantations of a variety of introduced trees in the District; at least 15 are examined each year to determine the occurrence and effect of native diseases and insects. No serious problems were found. A needle cast disease, Phaeocryptopus gaeumannii, caused from 5 to 50% needle loss of immature Douglas-fir in a plantation north of Haney. A variety of exotic poplars near Haney and Chilliwack were lightly defoliated by leaf beetles.

Other Noteworthy Diseases

Table 10. Other diseases of current minor significance

Organism	Hosts <sup>1/</sup>	Locality	Remarks
<u>Cronartium ribicola</u>	wwP	Texada Island	A stem rust causing girdling cankers. Common, some seedling mortality at Gilles Bay.
<u>Discocainia treleasei</u>	WH	Port Moody and Mission B.C.F.S. Ranger Districts	A branch canker. Common on immature trees.
<u>Epipolaeum tsugae</u>	WH	Sechelt Inlet	A sooty mold. 30% needle infection on most understory trees at Porpoise Bay and Salmon Inlet.
<u>Endocronartium harknessii</u>	LP	Lois Lake, Sechelt Peninsula	A gall rust. Common on saplings.

<sup>1/</sup> Host tree abbreviations appear in Appendix I.

Appendix I. Host tree abbreviations

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Abbr.	Common name	Abbr.	Common name
wC	western red cedar	rAl	red alder
D	Douglas-fir	wB	white birch
aF	amabilis fir	Ch	cherry-general
alF	alpine fir	bCo	black cottonwood
gF	grand fir	Hw	hawthorn-general
mH	mountain hemlock	bM	broadleaf maple
wH	western hemlock	vM	vine maple
lP	lodgepole pine	Po	poplar-general
pP	ponderosa pine	W	willow-general
sP	shore pine		
wwP	western white pine		
sS	Sitka spruce		

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