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A REVIEW OF SOME FOREST INSECT SURVEY RECORDS ASSOCIATED  
WITH DEFOLIATOR INFESTATIONS IN COASTAL BRITISH COLUMBIA

by

G. T. Silver

INTERIM REPORT  
FOREST ENTOMOLOGY AND PATHOLOGY LABORATORY  
VICTORIA, B.C.

CANADA  
DEPARTMENT OF FORESTRY  
FOREST ENTOMOLOGY AND PATHOLOGY BRANCH  
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INFESTATIONS IN COASTAL BRITISH COLUMBIA

G. T. Silver

INTRODUCTION

The main functions of forest insect surveys are the detection of insect outbreaks and an annual census of forest insect conditions throughout the accessible forest land of British Columbia. During the course of the detection survey in the coastal region approximately 3,000 insect collections are made each year, the majority by trained insect rangers.

Most of these are beating collections. A 7 x 9-foot sheet is spread under a tree and the branches are "beaten" with a 10-foot pole. Three trees constitute a sample. The insects are picked off the sheet, placed in a mailing tube with a supply of fresh foliage, and forwarded to an Insectary near Victoria where they are identified and counted. An enclosure slip containing all necessary data is included with each collection. After the insects are identified, all information on the enclosure slip is coded and the data transferred to punch cards and placed in permanent files.

The beating method works well for most defoliators at low to medium densities. In more severe infestations, branch sampling is often introduced to obtain specific information on population levels and trends, but beating collections are continued so that continuity of the records can be maintained.

Random beating collections are subject to certain errors. The area of foliage sampled is not constant, and there may be differences in the numbers of larvae recovered due to variations in weather, insect development, or time of sampling. Some of these errors or reasons for variations exist in any type of sampling. If collections were to be truly comparable from one year to the next in any one locality, samples would have to be made at the same phenological time. But this is not always possible, because of conflict with extension and other work and uncontrollable events such as forest closures.

During recent outbreaks in coastal British Columbia, annual collections have been summarized, and when analyzed for broad regions such as drainage divisions or Ranger Districts they have revealed definite trends in insect numbers. In some instances the increases of several species have been clearly defined from rare occurrence to outbreak status. It is not unusual for insect populations to fluctuate from year to year; increases may be observed for several successive years and a species may decrease to low levels again or continue to increase in intensity. The main problem is to ascertain at which level the population of any particular species may be considered high enough to represent a threat to timber stands.

The objective of this study is to review all collections from the major hosts in coastal districts, to determine the population trends indicated by random beating collections, and to associate these trends with more specific records of known infestations. If the correlations are satisfactory the records for the selected species could be analyzed annually, and the method extended to include more species in the interior of the province as well as on the coast. These tabulated data on insect trends would then

become part of the Ranger's field notes, and would provide a quick reference to indicate the importance or significance of any increase in the abundance of the insect species considered in this report. If the correlations are satisfactory, weaknesses in the routine survey methods should be revealed, and these may be reviewed and corrected.

Four species of defoliators were selected for this study; two tortricids, the spruce budworm, Choristoneura fumiferana (Clem.), and the black-headed budworm, Acleris variana (Fern.), and two geometrids, the western hemlock looper, Lambdina fuscicollis lugubrosa (Hlst.), and the green-striped forest looper, Melanolophia imitata Wlk. These species were selected because they are potentially dangerous defoliators and all, with the exception of the hemlock looper, have been at outbreak levels at least once in the past 10 years.

#### METHODS

Considerable time was spent developing methods suitable for a compilation of this magnitude. Hand-sorting the enclosure slips and recording the data manually are too time-consuming. Consequently, all data in this report were extracted from punched cards. The methods of compiling the information for the categories used in this report are as follows.

Locality.- Coastal British Columbia is divided into two Forest Districts, Vancouver and Prince Rupert. There are four Ranger Districts in the Vancouver Forest District, and three in the Prince Rupert District. All information on collections is tabulated by Ranger Districts, as this is the most useful for local purposes.

Each Ranger District is subdivided into a number of compartments referred to as Drainage Divisions (DD). The present compilation was made more difficult by a re-organization of the Drainage Divisions in 1954, since all locality records prior to 1954 were coded by another system and all later records were coded by the new system. Although many of the drainage boundaries were unchanged, some were sub-divided and in some instances were split by Ranger District boundaries. With three exceptions, all Drainage Divisions up to 1954 remain in their original Ranger Districts. In the exceptions, only small portions are included in other districts, and do not affect the compilations appreciably. To insure uniformity in any future compilations, the association between old and new drainages, is shown below. The present DD numbers are used in the tables, and the corresponding numbers up to 1954 are indicated. The exceptions are also noted.

Ranger District	Present DD No.	DD number up to 1954
South Vancouver Island (S.V.I.)	001	1
(#1 subdivided into 001 and 004, but appears as 001 up to 1954)	002	2
	003	3
	004	1
	005	4

Ranger District	Present DD No.	DD number up to 1954
North Vancouver Island (N.V.I.) (#5 subdivided into 021 and 022)	021 )	5
	022 )	
	023	6
	024	7
	025	8
	026	-
South Vancouver (S. V.) (#9 subdivided into 040 and 041)	040 )	9
	041 )	
	042	10
	043	11
	044	12
	045	14
North Vancouver (N. V.)  (060 is small portion of #1 and up to 1954 is included in S.V.I. tables as 001)  #13, 15, and 17 subdivided into DD shown.)	060	1
	061 )	13
	062 )	
	063 )	15
	064 )	
	065 )	17
	066 )	
	067 )	
068	16	
South Prince Rupert (S.P.R.)  (DD 082 inaccessible so portion of 60 prior to 1954 not included)	080	18
	081	19
	082	60
	083	20

Ranger District	Present DD No.	DD number up to 1954
West Prince Rupert (W.P.R.) (Only small portion of #20 included in 102 prior to 1954. All of #20 included in 083 up to 1954.)	100 )	
	)	24
	101 )	
	102	20
	103	21
	104	22
	105	23
	106	25
East Prince Rupert (E.P.R.)	120	52
	121	54
	122	55
	123	59

Tree hosts.- In the original compilation all tree hosts from which larvae were collected were included. Some of these were considered as incidental hosts, so they were excluded later. Other hosts not normally considered as preferred were included in the tables because larvae in very dense populations were commonly found on them. The host names associated with the abbreviations in the tables are shown below.

B - Amabilis fir  
Ba- Alpine fir  
Bg- Grand fir  
C - Western red cedar  
F - Douglas fir  
H - Western hemlock  
Pl- Lodgepole pine  
Pw- Western white pine  
Py- Ponderosa pine  
S - Sitka spruce  
Se- Engelmann spruce  
Sw- White spruce

Insect stage.- Only larval records were considered in this report. The cards containing eggs, pupae, and adults were disregarded unless the collections also contained larvae.

Calculation of larval periods.- Only collections made during the larval period were used. It was difficult to establish a reliable way to determine dates. Phenological development varies considerably between Forest and Ranger districts, and even between drainages in some Ranger Districts. However, it was impossible to fix separate dates for each drainage or even for Ranger Districts, as there were some years, particularly when insect populations were reduced when some of the species considered in this report were never collected. It was finally decided to fix the dates for the larval periods on a Forest District basis. All cards from each Forest District containing the larval records for species concerned were sorted by years, and the first and last dates on which larvae were collected were obtained. These dates were then used for all the Ranger Districts in that Forest District.

Total number of collections.- This was obtained by sorting all cards containing larval records by Ranger Districts to obtain hosts. All cards for each district were then sorted to obtain the total number of beating collections for each host made between the dates of the first and last larval collections.

These collections were then re-sorted by combining all hosts and obtaining the number of collections by Drainage Divisions.

Number of collections containing larvae.- These figures were obtained by sorting all collections containing larvae by hosts and then by Drainage Divisions.

Average number of larvae per collection.- The number of larvae collected in each sample are recorded on punch cards by code. As this is a single field code, numbers are coded in only nine classes. In an effort to determine a suitable conversion factor, collections for the four species were analyzed manually and the actual number of larvae calculated by code classes (Table 1). There was a tendency for the average number of larvae per collection to be slightly below the mid-point in most of the classes. A total of 1,047 collections were analyzed, but some classes contained scarcely more than one collection, and two classes contained none. There was a trend for the average to be closer to the mid-point as the number of collections increased. Consequently, the mid-point of each class seemed suitable for conversion of the codes to numbers of larvae per collection.

Table 1

Average Number of Larvae per Collection by Code Classes. Coastal B. C.

Code	Range	Mid-point	Calculated number of larvae per collection			
			<u>Choristoneura</u>	<u>Acleris</u>	<u>Melanolophia</u>	<u>Lambdina</u>
1	1	1	1.0	1.0	1.0	1.0
2	2-5	3.5	3.1	3.0	2.8	2.9
3	6-10	8	7.4	7.4	7.6	7.0
4	11-20	15	14.7	15.0	14.7	14.1
5	21-40	30	27.8	29.6	28.5	28.7
6	41-60	50	52.5	48.7	51.7	56.0
7	61-100	80	77.0	75.4	77.3	68.7
8	101-200	150	150.5	146.3	128.0	-
9	200 +	250	200	-	304.8	325.0



## RESULTS

### Spruce Budworm

There have been two major upsurges of spruce budworm numbers recorded in coastal British Columbia since 1949. An outbreak of the 1-year-cycle spruce budworm occurred in the South Vancouver District, and the 2-year-cycle form has been at outbreak levels in the East Prince Rupert District almost consistently since 1950. This is the only district containing the two-year form; the spruce budworm in all other districts takes only one year to complete its larval stage.

One-year-cycle form - Since the only outbreak of the 1-year-cycle spruce budworm occurred in the South Vancouver District, its records will be reviewed first (Table 5). A detailed account of this infestation has been published (1), so that only the general trends need reviewing now.

The outbreak was first observed in 1953, and by 1954 defoliation was severe along the Lillooet River and Lake (DD 043 and 045), and in the Anderson and Nahatlatch River valleys (DD 044). The outbreak increased in extent until 1958, and collapsed in all regions in 1959. The area infested in 1954, and the maximum extent of defoliation from 1954 to 1958, are outlined on Map 1.

Considering the district as a whole, there was a noticeable increase in the spruce budworm population in 1953. Of the 181 samples taken during the larval period, 17.1 per cent contained an average of 14 larvae. The percentage of collections containing larvae increased each year from 1954 to 1956, decreased in 1957, increased again in 1958, and finally declined in 1959. The decrease in 1957 was attributed to a cold, wet spring which resulted in heavy losses of young larvae.

Examination of the data by Drainage Divisions indicates the population trend. For example, in 1950, 36.4 per cent of the collections in DD 044 contained spruce budworm larvae, but the average number per sample was only 2.2. The percentage of collections containing larvae increased in 1951 and 1952, and there was a small corresponding increase in numbers. Defoliation was not observed until 1953, when 59 per cent of the collections contained an average of 15.9 larvae each. The population reached its peak in 1954, remained at a relatively high level until 1956, and then declined.

The portions of Drainages 043 and 045 containing the infestation were inaccessible until 1954, so that no figures on the build-up are available. Defoliation in DD 043 was first observed in 1953, when 21 per cent of the collections contained an average of 15.9 larvae. The figures remained relatively high, but showed a definite downward trend in 1959. During egg counts in 1959, only one egg mass could be found in the entire outbreak area, which suggests that larval populations averaging less than 3.0 per collection are in fact very light.

The population in DD 045 was high in 1954, and remained at a relatively high level until the outbreak collapsed in 1959. It is interesting to note that although the outbreak collapsed in 1959, the population, although light, increased in 1960.

# SOUTH VANCOUVER DISTRICT



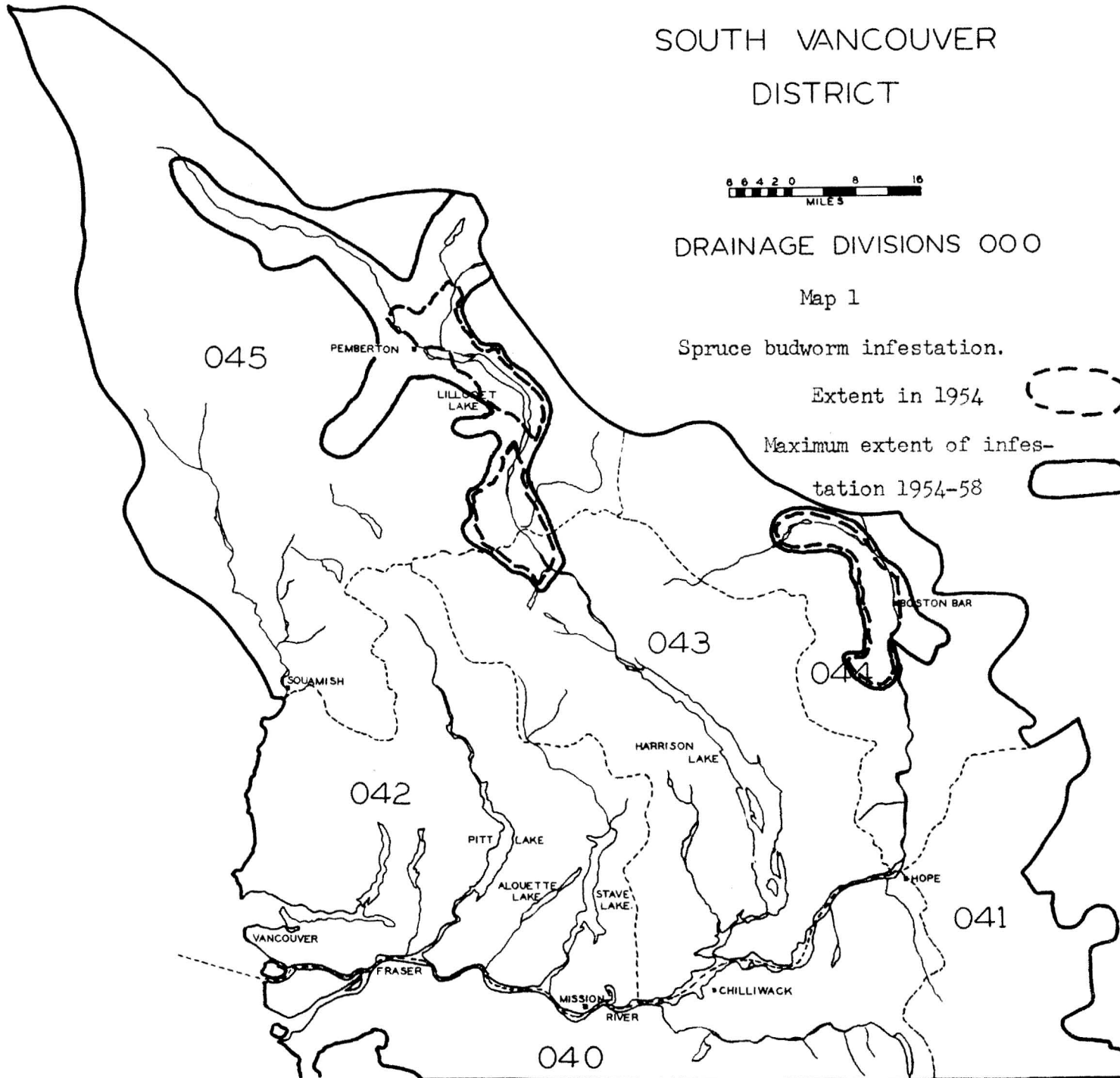
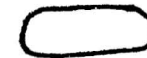
DRAINAGE DIVISIONS 000

Map 1

Spruce budworm infestation.

Extent in 1954

Maximum extent of infestation 1954-58



The records from DD 043 and 044 suggest that when 20 per cent of the collections made during the larval period contain an average of 15 or more spruce budworms, an outbreak may be anticipated. Defoliation can be expected if over 40 per cent of the collections contain an average of 15 or more larvae. There is a suggestion that an outbreak is indicated by an increase in the number of collections containing larvae, even when this is accompanied by only a relatively small increase in the number of larvae. However, the above levels need not indicate a potential outbreak. For example, populations increased to a relatively high level in DD 041 in 1955, but an outbreak did not develop. The limits should therefore be regarded as a warning, and the field staff should be alerted.

The occurrence of spruce budworm by host trees is shown in Table 12. Douglas fir is the preferred host of the 1-year-cycle spruce budworm in coastal British Columbia but, as the population increased, larvae also were found on hemlock, lodgepole pine, balsam, and spruce. However, Douglas fir and hemlock are the major tree hosts in this District, so that relatively few collections were made on the other hosts. It should be noted that the frequency of occurrence on hemlock was always well below that on Douglas fir, whereas the small number of collections on pine and balsam frequently contained larvae.

It is unlikely that a more accurate picture of population trend could be obtained by using only Douglas fir. In 1953, 45.2 per cent of the samples from Douglas fir contained an average of 17.1 larvae. The occurrence was almost three times that of all hosts combined. But as the population increased, occurrence and abundance were only slightly greater than the average for all hosts combined. It is therefore believed that the method of using a number of hosts which are found in all drainages is better than using only one host which may not always be present where a collection is made.

A review of the occurrence and abundance of spruce budworm in the other coastal districts reveals an interesting comparison (Table 2). Previous to 1953, the spruce budworm was common in other Vancouver Districts, but as the population increased in the South Vancouver District, records decreased in the other districts. At no time did the population outside the South Vancouver District reach a serious level between 1949 and 1959. However, an infestation has recently developed in the West Prince Rupert District in DD 102. Populations increased to light outbreak proportions in 1960 when 21.8 per cent of the collections contained an average of 25.0 larvae each. (Table 8) Heavy defoliation occurred in some localities in 1961. It is interesting to note that although spruce budworm larvae were common in 1949, and increased significantly in 1960, the budworm population decreased or remained at a relatively low level during the time when the infestation in the South Vancouver District was building up, and no larvae were collected in 1956 and 1957. Although only a few samples were taken in 1959 in DD 102, these indicated an increase in population which at the time was not considered serious or meaningful. As in the South Vancouver District, defoliation occurred when about the same proportion of samples, 22 per cent, contained spruce budworm larvae, although the average number of larvae per collection, 25.0, was higher than the 15.9 recorded in the southern outbreak. These records in the West Prince Rupert District therefore support the 20 per cent and 15 larvae limits suggested for spruce budworm.

Two-year-cycle form - The 2-year-cycle spruce budworm is presently restricted to the East Prince Rupert District. A comprehensive report on its history in British Columbia has been prepared (2). As the name implies, this form requires two years to complete its life cycle. The eggs are laid in August of the even years, e. g., 1950, 1952, and the first winter is passed as second instar larvae in hibernacula under bark scales or on the foliage. The following year the young larvae feed on needles (needle-miners) until the buds open. They then become shoot feeders. The feeding period is relatively short, lasting only three or four weeks. The second winter is passed as fourth instar larvae. The following year (even years) the larvae start feeding as soon as shoot growth starts, and complete their development. The heaviest defoliation occurs in the even years.

The 2-year-cycle spruce budworm has been at outbreak levels in the East Prince Rupert District since 1950. The major portion of the outbreak is in DD 122. The first recorded upsurge at the southern end of Babine Lake was at a high level in 1950, but this population slowly decreased to a low level in 1953. In 1954, heavy defoliation occurred in the northern and central regions around Babine Lake. The extent increased with each completed cycle and, by 1959, defoliation extended over a very large proportion of DD 122 and was observed in DD 121 (Map 2). The extent increased greatly again in 1960.

A review of Survey records for the District, and particularly, for DD 122, gives a good summary of the population trend (Table 9). No spruce budworm were collected in 1949, but in 1950, 64.2 per cent of collections on DD 122 averaged 58.8 larvae each. The occurrence and abundance decreased in 1951, increased in 1952, and decreased considerably in 1953, the lowest population level during the period from 1949 to 1960. Abundance increased thereafter, with the largest numbers recorded during the even years, except in 1959, when the outbreak reached its peak.

As noted above, the occurrence and abundance of larvae in survey collections showed a tendency to decrease in the odd years and increase in the even years. Undoubtedly this is due to the mining habits of the first year larvae, which make them more difficult to collect in beating samples. But the timing of collections for the first-year larvae also is more critical because the feeding period is shorter. Consequently, population trends derived from beating samples would be more reliable if they were based on even-year collections only, even though comparisons between odd years also show a similar trend.

The spread of the infestation to DD 121 in 1959 is also indicated by the increased occurrence and abundance of spruce budworm larvae in collections made that year. A smaller increase was also recorded in DD 120, but no outbreak developed there.

Unfortunately, sampling was not intensive enough prior to 1950 to record trends such as those found for the 1-year-cycle spruce budworm. The lowest population for the even years, 1954, is the only guide at the present time. This was the first year of the large increase, and 38.9 per cent of the collections averaged 15.8 larvae each. As heavy defoliation occurred that year, the occurrence and abundance ratings



which would serve as an alert point were probably less. Until more information is obtained, the figures suggested for the 1-year-cycle budworm could be used as a guide for the 2-year-cycle form as well; e. g., 20 per cent of collections containing an average of 15 larvae could be regarded as a potential threat.

The preferred hosts of the 2-year-cycle spruce budworm are white spruce and amabilis fir (Table 16). The occurrence and incidence of spruce budworm on these hosts do not differ to any great extent. Larvae also are common on lodgepole pine and Douglas fir, but this latter tree species, along with hemlock, forms only a small proportion of the stands in the affected region.

#### Black-headed Budworm, Acleris variana (Fern.)

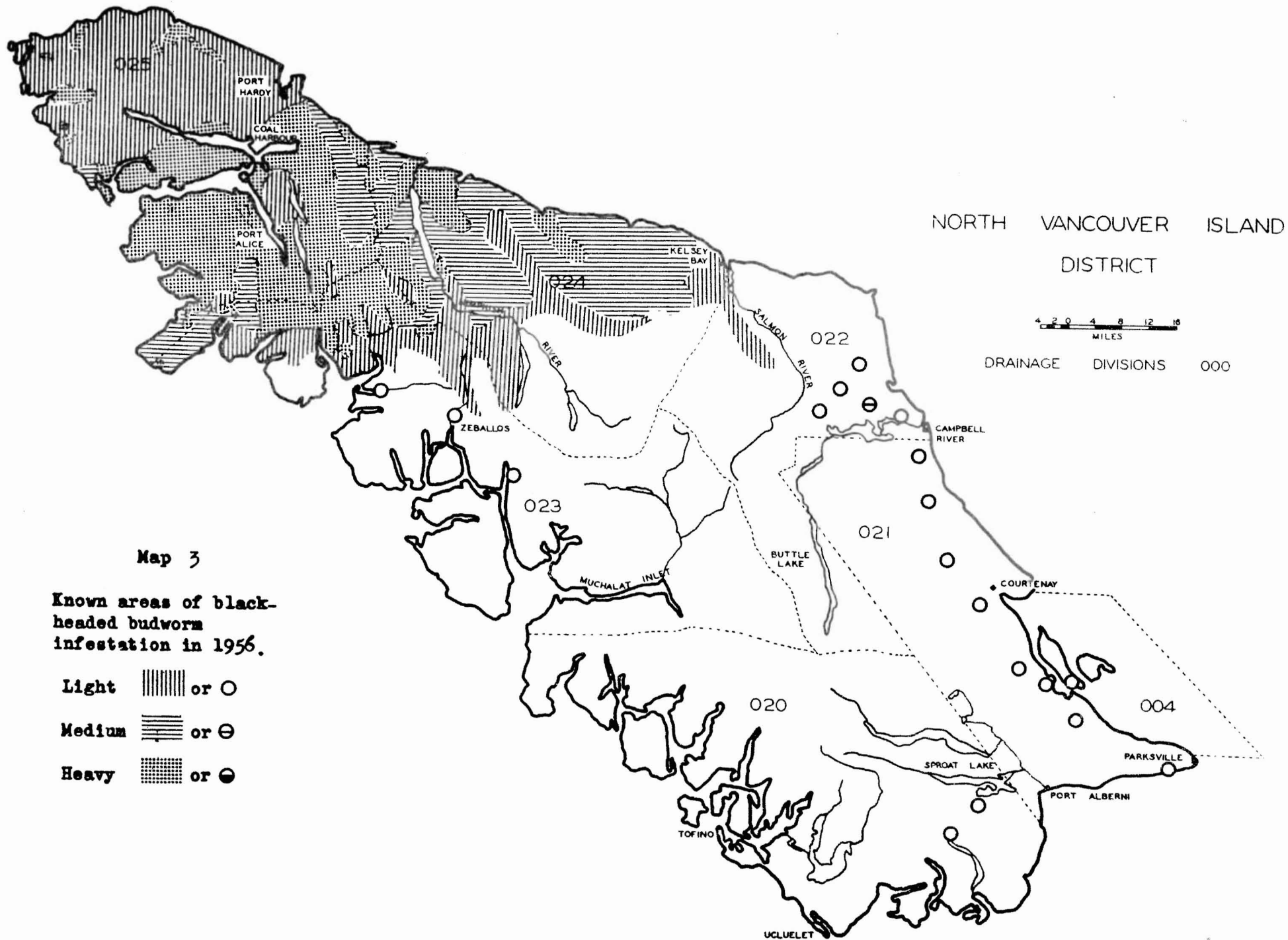
The history of the black-headed budworm in the coastal forests of British Columbia is one of recurring groups of outbreaks. The latest cycle occurred from 1952 to 1957, when major outbreaks occurred in the North Vancouver District and the West Prince Rupert District. A summary of these outbreaks has been published (3), so that only a general review is required here.

Moth emergence starts about mid-August and is complete by mid-September. The orange-coloured eggs are laid singly on the under sides of both new and old needles. The winter is passed in the egg stage. Hatching begins about mid-May and is usually complete by the first week of June. The larvae eat the opening shoots in protected feeding sites for several weeks and later become free feeding. Pupation starts in mid-July and continues until the end of August.

The outbreak on North Vancouver Island will be reviewed first, as Survey records are most complete for this District (Table 19). The maximum extent and intensity of the outbreak is shown in Map 3.

Larvae were first found in small numbers in 1951. An increase was noted in 1952, and continued in 1953. The following year defoliation was observed along Holberg Inlet (DD 025) and at Salmon River (DD 022). By 1955 the infestation covered an area of 1,600 square miles, and by 1956 approximately 3,000 square miles were affected (Map 3). The only drainages which were free of it were 021 and 026. In 1957 the outbreak collapsed late in the larval period.

A review of the collections made in the North Vancouver Island District indicates the general trend of the outbreak. No black-headed budworm larvae were collected in 1949 or 1950. In 1951, larvae were found in several drainages, and their abundance and occurrence increased in 1952 and 1953. In 1954, 88.4 per cent of the collections from DD 025 averaged 33.0 larvae each. This number per collection resulted in noticeable defoliation. The outbreak expanded in 1955, both in extent and intensity, although samples collected that year indicated a decrease. It reached its height in 1956, when defoliation in portions of DD 024 and 025 was severe. Nearly all collections contained larvae, and the average in DD 024 reached a high of 120.7 larvae per sample. Occurrence and abundance declined in 1957, and the collapse of the infestation in the late larval period of 1957 is clearly shown in 1958, when no larvae was



found in 1958 in DD 024 and 025. Larvae were common in small numbers on the west coast (DD 023), but less so in 1959. They were still found in 1959 in the heavy outbreak area, but the occurrence decreased significantly in 1960.

The population apparently reached a critical level in 1953. Considering the entire District, 11.3 per cent of the collections averaged 5.0 larvae, still a relatively low figure. An indication of the impending outbreak was more evident in DD 024, where 38.9 per cent of the collections contained larvae. The population was declared to be at "infestation level" in 1954, and defoliation in DD 024 was visible when 65 per cent of the collections contained an average of 45 larvae, and in DD 025 where the respective figures were 88 and 33. The trend, as indicated by beating collections, compared favourably with egg counts which were made from 1954 to 1960. It is also interesting to note that in DD 025, only 13.7 per cent of collections contained an average of 4.3 larvae the year before defoliation was observed. The frequency of occurrence was much higher in DD 024, but the number of larvae was about the same. On this basis when 15 per cent of the collections in a drainage average 5 or more larvae, the black-headed budworm population could be regarded as high enough to represent a potential threat to hemlock stands.

If the respective figures reach 40 and 25, there is a good chance that there is noticeable defoliation in the District.

Western hemlock is the preferred host, followed by amabilis fir and alpine fir (Table 26). Although larvae were collected from a variety of coniferous hosts as the population increased, the occurrence and incidence of larvae on hemlock always remained above the average for all hosts. However, the difference was not very great some years.

The other two black-headed budworm infestations occurred in the West Prince Rupert District, one on the Queen Charlotte Islands, and the other on the mainland. These will be considered separately.

The infestation on the mainland was of short duration. Larvae were present in DD 103 in 1949, and the population continued to increase until it reached its peak in 1953. During 1953 and 1954, defoliation occurred along the shore and along many rivers in all drainages in the district (Map 4). The larval population decreased greatly late in the feeding period of 1954; very few were collected in 1955 and none in 1956.

Beating collections made from 1949 to 1960 in the coastal regions are shown in Table 23. All drainages from 102 to 106 inclusive were involved. Black-headed budworm larvae were present in DD 103 in 1949, and increased during the next few years until 42.9 per cent of the collections contained an average of 6.5 larvae in 1951.

Populations also increased appreciably in the other drainages in 1951, with the exception of 105, which is an inland division. Abundance increased again in all regions in 1952, and in 1953 the budworm was in outbreak. Unfortunately no collections were made in the Portland Canal area that year due to its inaccessibility. The population in the district reached its height in 1954, when the majority of collections contained larvae. The decrease in population observed in 1955 also is shown in the records, where the complete collapse of the outbreak in 1956



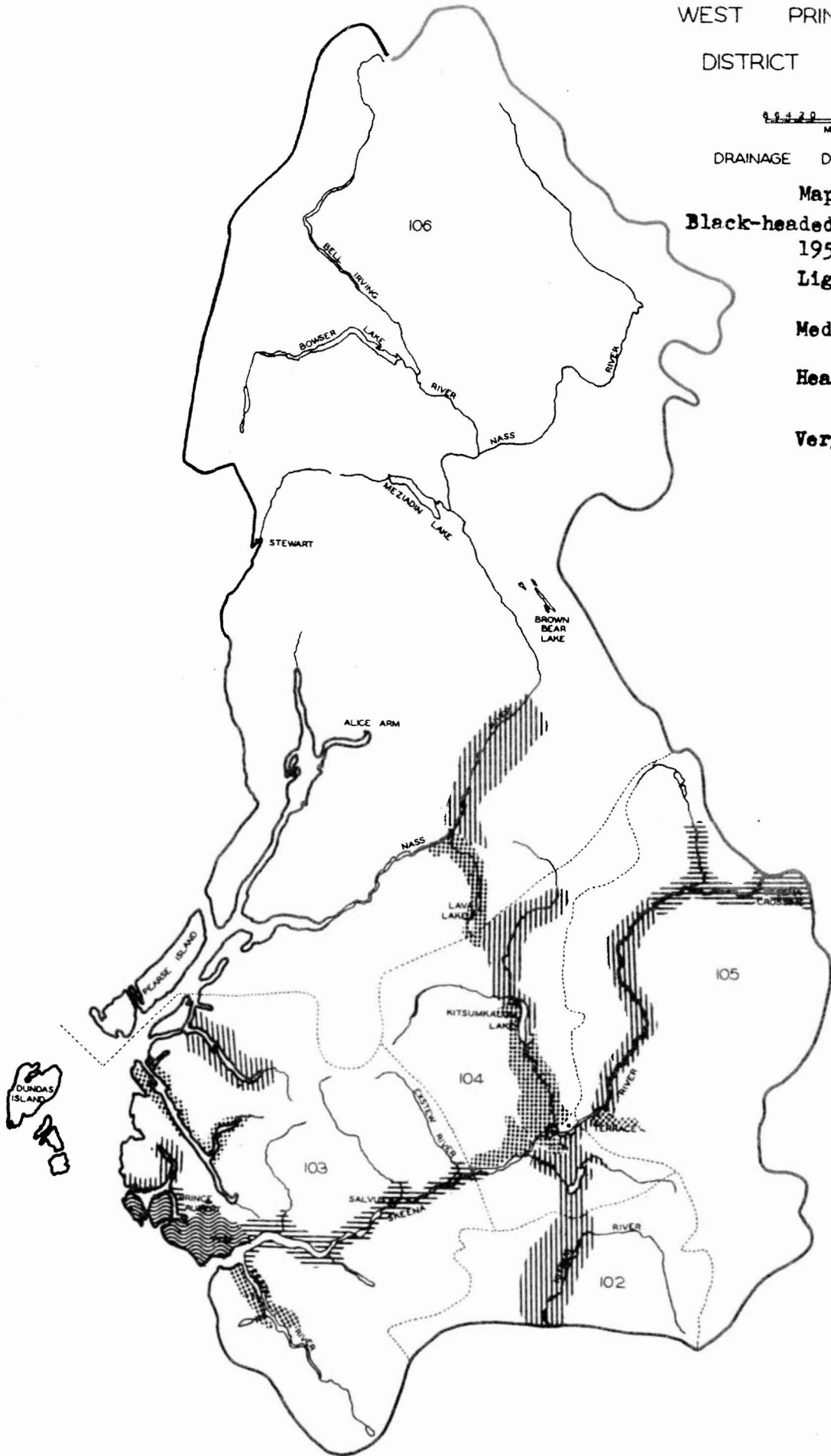
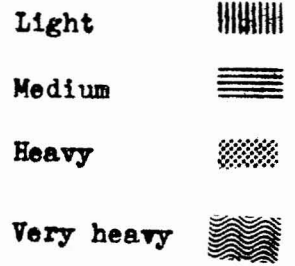
WEST PRINCE RUPERT  
DISTRICT (MAINLAND)



DRAINAGE DIVISIONS 000

Map 4

Black-headed Budworm Infestation  
1954



is very conspicuous. Sampling from 1957 to 1959 has shown that a light black-headed budworm population has been present in the coastal region since 1957, and that it was especially conspicuous in 1959, when each of the few samples from the mainland contained larvae.

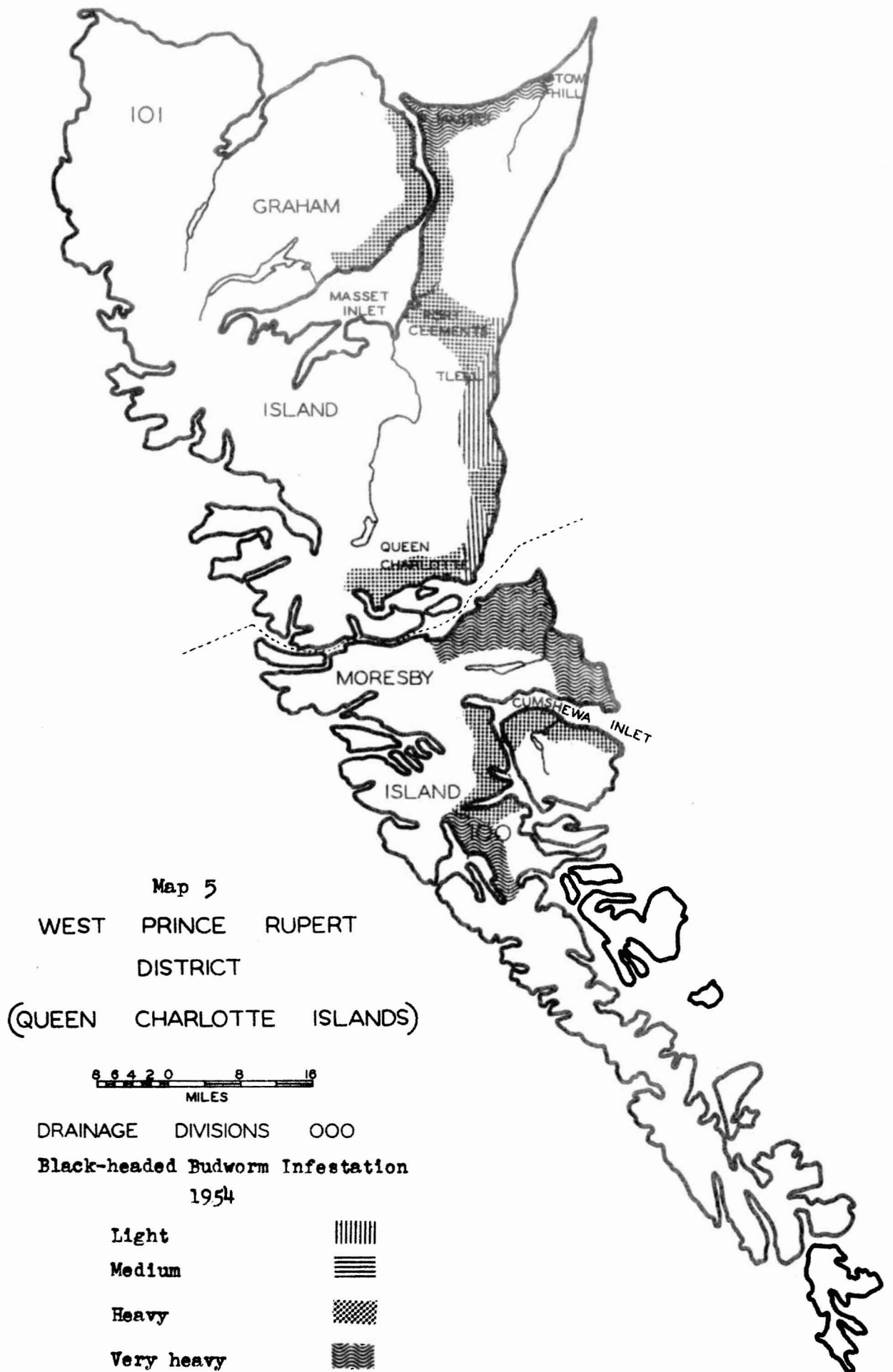
The population on the Queen Charlotte Islands followed the general trend of that on the mainland. Unfortunately, the Islands are relatively inaccessible, and the ranger makes only one scheduled collecting trip a year. The number of collections is therefore quite small in some years, so that it is encouraging to note that the general trend in larval numbers is still shown. The infestation became noticeable in 1953, when 61.5 per cent of the collections contained 79.9 larvae, and reached its peak in 1954 when about 90 per cent of the collections contained larvae (Map 5). The population decreased in 1955, and was at a low level in 1956. However, it started to increase again in 1957, and continued to build up rapidly to major outbreak levels in 1959. Hemlock was again the preferred host, although larvae were found on many coniferous hosts during the height of the infestation. Over 30,000 acres were sprayed in 1960 to prevent severe defoliation.

Black-headed budworm populations increased to high levels in the South Prince Rupert District from 1954 to 1956 (Table 22). Although this outbreak was not severe, heavy defoliation occurred along South Bentinck Arm, Labouchere Channel and around Ocean Falls, all in DD 081. Larvae were also numerous in the other portions of the District, as shown by the presence and abundance of black-headed budworm in collections. Noticeable defoliation occurred when over 40 per cent of the total number of collections contained an average of more than 25 larvae. The SPR district was not surveyed in 1957, but the budworm population was very low in 1958. There was an appreciable increase in population in 1959, coinciding with the increase on the Queen Charlotte Islands, but the population collapsed before causing serious damage.

As a result of the analysis of collections compared with studies of infestations, the black-headed budworm population could be regarded as heavy when 40 per cent of the collections made during the larval period contain larvae. The average number of larvae per collection varied, but defoliation occurred when the number exceeded 25.

Tabulation of its presence on different host trees shows that western hemlock was again the preferred host. As the population increased, its presence on other hosts also increased, as shown in Table 30. In 1949, black-headed budworm larvae were found on only two hosts; in 1953, larvae were collected from nine hosts. In 1957, following the collapse of the outbreak larvae once more were collected from only two hosts. Thus, the occurrence of budworm larvae on different host species may be another indication of population level.

The black-headed budworm is one of the commonest forest pests in coastal British Columbia. As shown in Table 17, it is present at all times, and its populations increased to relatively high levels in all districts during outbreaks from 1953 to 1957. Therefore, although a limit of 15 per cent of collections averaging 5 larvae may present a potential threat, and although populations may build up to greater



magnitude than these levels, the infestation limit of 40 per cent of the collections averaging more than 25 larvae appears valid, as outbreaks developed only after this limit was reached. Thus there is no easy rule for the black-headed budworm, and thorough annual detection surveys must be maintained over large regions during periods of rising populations. This particular species demonstrates the necessity for well planned and thorough forest insect surveys, with careful appraisal surveys in 'danger' areas.

Green-striped Forest Looper, Melanolophia imitata Wlk.

The moths of this looper emerge in April or May, mate, and each female lays an average of 80 eggs. The sex ratio is approximately one male to one female. The larvae feed from June to September. Foliage of all ages is eaten, with a preference shown for needles one year old. When feeding is completed the larvae drop to the ground and overwinter as pupae in the duff. The larvae have been regarded as economical feeders in that there is a strong tendency to devour the entire needle, instead of chewing it off at the base, or move from one needle to another eating bits from each.

The green-striped forest looper was not regarded as a potentially dangerous defoliator in coastal British Columbia until recently. Larval populations increased along the west coast of Vancouver Island in 1951. The largest collection that year, 120 larvae, was from Effingham Inlet. Populations in 1952 decreased along Effingham Inlet, but increased in the Tofino-Bedwell Sound area. Up to 800 larvae per sample were collected on the south side of Barkley Sound, but defoliation was light and exceeded 30 per cent in only one small area. The population decreased in 1953, and remained at a low level until 1957, when a general increase was noted in the Vancouver Forest District. By 1960, populations had reached very high levels, and defoliation occurred in 37 localities, totalling over 26,000 acres on the west coast of Vancouver Island. The outbreak was of short duration with a significant decrease in intensity occurring in 1961. Heavy defoliation was confined to DD 005 in the south Vancouver Island District (Tables 33 and 34). These records will be reviewed first.

Considering the South Vancouver Island District as a whole, larvae were common in 1949 and 1950 (Table 33). A small increase was noted in 1951, but particularly in DD 003 and 005. In 1952, the number of collections containing larvae was at a low level (only 4.1 per cent in 003, and 5.4 per cent for all DD), but the average number of larvae per collection increased greatly to a maximum of 46.8 and an average of 25.4. The populations decreased in intensity in 1953, although the number of collections containing larvae increased greatly. Larvae were very scarce in 1954 and none was found in 1955, but in 1956 the population once more started to increase. The percentage of collections containing green-striped forest loopers increased from 1957 to 1959, but the average number of larvae did not increase appreciably until 1959, and this increase was restricted mainly to DD 005, where heavy defoliation occurred in 1960.

Records from the North Vancouver Island District indicate a low population of about the same magnitude as the southern portion of the island in 1949, but the population remained at this low level until

1957 (Table 34). It should be noted that coverage of the west coast drainages was not adequate because of the relative inaccessibility of that coast. However, in 1957, over 30 per cent of collections from all drainages contained an average of 1.5 larvae each. The population more than doubled in 1958, when 56.2 per cent of the collections averaged 6.3 larvae each. A significant increase in numbers, 14.4 larvae per collection, occurred in DD 023, but the occurrence was high in all drainages. Populations increased in 1959, but the presence in survey collections declined in DD 021, 022, and 023, although the number of larvae increased in DD 023. Severe defoliation and heavy tree mortality occurred in DD 023 in 1960. Unfortunately, that drainage was not surveyed in 1960 due to boat trouble so there are no population estimates available for the affected drainage. Populations in the remainder of the district decreased or remained low.

Some trends are indicated by the present data. The green-striped forest looper is found in all drainages on Vancouver Island, and during periods of rising populations its presence and abundance in collections are generally similar throughout the Island. The population build-up is first indicated by an increase in the percentage of collections containing larvae, with the average number of larvae remaining relatively low. The year before severe defoliation occurs there is a decrease in occurrence of larvae in collections, but the average number of larvae per collection increases significantly. This trend was noted in 1957-1959 and there was a similar pattern in 1951-52 in DD 005.

The decrease in occurrence suggests that the population, although able to increase over large areas, will continue to maintain itself and expand in numbers only under certain conditions. According to fairly widespread detection surveys and aerial reconnaissance, which were verified by the collections analyzed, the only region where this insect caused serious damage in 1960 was along the west coast of Vancouver Island. However, as demonstrated in the outbreak of 1960, populations can increase to tree-killing proportions within an area of less than 100 acres, and the largest individual outbreak was only 6,300 acres. It is therefore important that as soon as a population build-up of this species reaches a level similar to 1958, a widespread ground and aerial survey would be required to detect all the possible small individual infestations which appear to be characteristic of this species. There is an indication that severe defoliation is mainly restricted to stands which are predominantly hemlock.

The data of Tables 33 and 34 suggest that the green-striped looper population can be considered above normal when 20 per cent of the collections in a drainage or a district contain larvae. If the percentage increases to 45 per cent, even though the average number of larvae per collection is small, an outbreak can be expected and the field men should be alerted to this possibility. Severe defoliation can be expected the following year if the average number of larvae per collection reaches 25. Severe defoliation occurred in DD 023 when 71.7 per cent of the collections averaged 30.5 larvae each in 1959, and populations of this size should be considered extremely dangerous.

Data from the other Ranger Districts contain some interesting comparisons (Table 32). Melanolophia populations in the North and South Vancouver districts were larger than on Vancouver Island in 1956, and increased faster in 1957 and 1958. In 1958, populations in the South Vancouver district were very high; over 70 per cent of the collections contained an average of 40.5 larvae each. Heavy defoliation occurred in Stanley Park, Vancouver, and over 600 acres were sprayed to protect the trees. Populations declined in 1959 and no further outbreaks were reported. This outbreak suggests that the 70 per cent and 30 larvae limit is a good indication of impending outbreaks.

No infestations were reported in the other coastal districts, and the records show that populations did not build up to what can be regarded as serious proportions.

The collections by host trees for the outbreak areas are shown in Tables 40 and 41. Although the infestations occurred only where hemlock predominated the green-striped forest looper is commonly found on Douglas fir, cedar, balsam and spruce. In some years, at low as well as high population levels, the percentage of collections from other hosts containing larvae and the average number of larvae per collection exceeded the occurrence on hemlock. It is therefore preferable to include these host trees in any analysis of the population trend of the green-striped forest looper.

#### Western Hemlock Looper, Lambdina fuscicollis lugubrosa (Hulst)

No serious outbreaks of the western hemlock looper have occurred in coastal British Columbia since 1949. This looper was included in the study because, in the past, large volumes of timber have been killed as a result of severe defoliation. The only accepted method to appraise population levels at present is by sampling for eggs, the overwintering stage. This is a very time-consuming task, and is only employed in situations where populations are believed to be high enough to create a hazard. Past records have indicated that populations of this looper are capable of increasing from a relatively low to a damagingly high population in one season (4). Therefore, although there have been no serious outbreaks, the records presented here do contain useful information on the fluctuations of hemlock looper populations.

A general summary by coastal districts is shown in Table 47. With few exceptions, larvae are found throughout the coastal stands in all Ranger Districts. The population was low in 1950, and remained at a low level for several years. The content of collections increased slightly in 1954, and in 1955 and 1956 more than 45 per cent of the collections made in the South Prince Rupert District contained larvae. Content was particularly high in DD 081 and 082 (Table 52), and remained high in 1958, before decreasing in 1959. Populations were considered at a dangerously high level in 1958 when 63.3 per cent of the collections contained an average of 6.3 larvae each. However, no serious defoliation was observed and there were no known outbreaks.

Although the presence of hemlock looper in collections increased in nearly all districts, the only area where populations increased to relatively dangerous levels was in the South Vancouver district. The occurrence and abundance doubled there from 1957 to 1958. As indicated in Table 50, populations were highest in DD 042. The percentage of collections containing larvae in 1959 decreased slightly in this drainage but the average number of larvae increased by 50 per cent. This was due primarily to a localized increase in Stanley Park, which was sprayed in 1959 to prevent severe defoliation and possible top-kill. It should be noted that the circumstances leading to chemical control were different because the park area was involved. Chemical control would not have been recommended for 1959 if this had been a commercial area; instead, the population would have been appraised and predictions would have been made for the following year.

It has been assumed that when Melanolophia larvae are found in over 45 per cent of the collections, the field staff should be alerted. The hemlock looper is considered a more serious defoliator than the green-striped forest looper, but although the occurrence of the hemlock looper reached or surpassed the 45 per cent level in several drainages, no outbreaks developed. It is therefore impossible to fix 'danger limits' based on actual outbreaks of this species. However, the data presented here suggest that impending outbreaks of the hemlock looper can be detected provided that an adequate detection survey is maintained. In the absence of more specific information, populations of the hemlock looper will be assumed to be at a potentially high level when 40 per cent of the collections in any one drainage or District contain larvae. The average number of larvae per collection also appears to follow the same trend as Melanolophia, remaining relatively low until the year before an outbreak and then increasing greatly in relatively small areas. It is therefore imperative that the detection survey be designed to provide the necessary warning so that more comprehensive ground and aerial surveys may be organized.

A review of the collections by host trees shows that western hemlock is usually the preferred host (Tables 55-61). However, in some instances the percentage of collections containing larvae was higher for hosts other than western hemlock, even at low population levels. In many cases the number of collections from hosts other than hemlock was too small for proper comparison, but an indication of distribution is provided in Table 59. In 1958, hemlock looper larvae were common on Douglas fir, cedar, balsam, and spruce. Therefore, although particular attention may be given to collections from hemlock, it is unwise to ignore all other hosts. This would be particularly true if the number of hemlock collections was small.

## DISCUSSION

The results of this study are very promising from the standpoint of the original objectives. The records are not continuous, particularly in the early years of the survey, but improvements have been made as the problems of accessibility are solved. The lack of continuity is most noticeable in the boat districts, e. g., the North Vancouver and the South Prince Rupert districts. Coverage in the former District is expected to improve, but the transportation problems in the South Prince Rupert District are still great and are not yet solved.

Despite such difficulties, it is believed that data presented in this report point up the value of the records which are collected annually. Over-all population trends comparable with those shown by infestation studies have been established, and limits have been selected which seem trustworthy indicators of degrees of abundance for the different species. The major difficulties of the Insect Survey, namely the detection of population increases, and the locating of outbreaks in their early stages, will be eased as a result of the limits which have been set.

As shown in the tables, there are very few years when larvae of any one species cannot be found in coastal British Columbia. Populations of the black-headed budworm decrease to a very low level following the collapse of an infestation, but they are capable of increasing very rapidly again to outbreak proportion. An outstanding example of this is the Queen Charlotte Islands where the infestation collapsed in 1956, remained at a low level in 1957 and 1958, and then suddenly increased in 1959 to a level which required the chemical control measures of 1960. In 1958 it was decided, in view of the low budworm population in 1957, to conduct a late summer survey on the Queen Charlotte Islands, rather than the usual July survey which was designed for optimum sampling of black-headed budworm. Fortunately the ranger observed moths in sufficient numbers to warrant collection of egg samples at selected points. The egg counts verified the increase, so that an expanded detection survey seemed warranted in July, 1959. This located the heavy outbreak which extended along the entire eastern portion of both Graham and Moresby Islands. This experience shows that every effort should be made to survey the Charlottes during July each year. The factors which resulted in this population 'explosion' were apparently inoperative on northern Vancouver Island, where the population declined in 1958 and remained small since, particularly in the drainages where damage had been heaviest.

Population increases of the spruce budworm can be detected by random beating collections before defoliation becomes apparent. From past experiences, populations of this tortricid increase for several years, even after defoliation is visible from the ground or air.

Looper populations also show a tendency to increase for one or more years preceding an outbreak. The increase, based on existing information, is indicated by an increase in distribution, with the number of larvae per collection remaining at a low level. This results in a sparse but widely distributed population in many regions. Once the larvae of either Melanolophia or Lambdina are found in 40 to 45 per cent of all collections made in a drainage or a district, the population has reached a level which requires careful watching. At this point the difference between looper and budworm outbreaks become important. Whereas budworm infestations usually



(develop over large areas, often millions of acres, looper infestations tend to develop in localized pockets and valleys of anywhere from 30 to 10,000 acres.)

It is obviously impossible, with the existing manpower and transportation to organize a ground detection survey comprehensive enough to survey every small watershed or susceptible stand of timber. However, if the survey is forewarned, more intensive surveys in places where an outbreak potential exists can be planned and, in addition, aid can be solicited from the general public. Aerial surveys can also be planned to supplement the ground survey, and should be initiated as soon as the first defoliation is observed.

Although budworm outbreaks usually extend over much larger areas, the above remarks do not imply that they do not require comprehensive ground surveys. Chemical control measures for the black-headed budworm are considered for any region which has sustained two years' heavy defoliation, and where egg surveys indicate that heavy feeding can be expected for the third successive year. The problem in this case is to ensure that the infestation is appraised by ground, aerial, and egg surveys, so that the hazard areas can be mapped annually. This enables the survey to appraise the situation properly, and also provides one year's warning of a possible control operation to the B. C. Forest Service, logging companies concerned, and the Department of Fisheries.

The problem of where to survey or look for possible outbreaks, particularly looper outbreaks, would be greatly simplified if more were known of the reasons for population increases in some regions and not in others, and why populations do not continue to increase in regions where outbreaks have occurred. Some general observations are already used to a limited extent, but verification is required before we can fully accept these guides.

Spruce budworm outbreaks in the Vancouver Forest District have recurred only in the Lillooet River and Lake region, and in the Anderson and Nahatlatch River valleys. These stands are predominantly Douglas fir, and defoliation extends up the mountains only as far as Douglas fir comprises the major portion of the stand. However, Douglas fir is present in considerable quantities in other drainages; so factors other than stand type could be involved.

In the northern portion of the province the preferred hosts are balsam and spruce. These trees form the majority of extensive stands, as evidenced in the current two-year cycle spruce budworm outbreak which expanded to over 7,000,000 acres in 1960. What is not known about the budworm outbreak is whether the build-up and the initial outbreak could occur anywhere within the millions of acres eventually infested, or if, within this area, there are ecological zones or localities which, because of certain factors, become the focal points of outbreaks. Although the latter option appears to have more facts in its favour, until further information is available, surveys must be extended to cover as much of the districts as is possible. As surveys improve, the focal points should be more easily detected, and the proper and complete appraisal of each individual infestation should provide more data on "where and how" outbreaks develop.

The relatively small areas of individual looper outbreaks pose an entirely different problem. Once populations build up to an 'alert' level, the task then is to locate the small areas where outbreaks are already incipient. Both Melanolophia and Lambdina outbreaks have, in the past, occurred in predominantly hemlock stands. This eliminates some regions because of timber type, but hemlock is one of the major tree species in the coastal region. However, the Melanolophia infestations in 1960, and to a lesser extent in 1952, all occurred along the west coast of Vancouver Island - and invariably, all along the shore. This region is sometimes referred to as the fog belt, and is characterized by an excessive amount of fog, cloud cover, and heavy rainfall. No heavy defoliation was observed very far inland or in the central and eastern portions of the Island. This does give the Survey an option; if infestations exist, and time is not available for complete surveys, the hemlock stands close to tide water are given priority. However, these observations are based only on records from one series of outbreaks which occurred mainly in one year, so that caution must be used until more information is obtained.

Hemlock looper outbreaks also have been associated with hemlock stands. The damaging hemlock looper outbreaks in the 1940's occurred in the river valleys of the western side of Vancouver Island. One difference from the Melanolophia outbreaks is notable - the hemlock looper infestations were most severe inland from the coast. This was emphasized in 1960, when hemlock looper populations reached above-normal levels at Power Lake, about four miles inland from the coast, and on the inner border of one of the Melanolophia outbreaks. Moreover hemlock looper outbreaks do not always occur solely in the coastal areas; heavy infestations have occurred in the Big Bend region of the Interior in hemlock-cedar stands very similar to the coastal region, and in the Prince George district, again in a hemlock-cedar stand. However, surveys to detect hemlock looper outbreaks usually are concentrated in mature hemlock stands in the valley bottoms of coastal B. C., inland a short distance from tide water.

Records must be accumulated for many more years before the question of insect population fluctuations can be resolved. However, even the records from 1949-60 reveal one thing which could be important. Generally speaking, the looper populations were reduced during the budworm outbreaks of 1952-57; but as soon as the budworm populations declined, the loopers started to increase, reaching their highest level in 1960 and 1961. (This is a general observation, and one exception occurred at Kitimat, where the one-year-cycle spruce budworm population increased in 1959 and 1960 in the same locality as a saddle-backed looper outbreak. The looper outbreak was controlled in 1961, but the spruce budworm population continued to increase and is expected to reach a new high in 1962.) Nevertheless, as a general rule, budworm and looper outbreaks appear to follow, not accompany, one another. This tendency was first suspected early in the 1950's, when it was observed that the Melanolophia populations on Vancouver Island increased after a decrease in black-headed budworm populations. As the same pattern was repeated again it is possible that the continued accumulation of data will establish its reality. If this proves so, the Survey activities could be geared to the group of insects prevalent at any given point in the "succession". There is also accumulated data, not presented here, to support the idea that the numbers of most loopers increase at the same time. Above-average numbers of Nyctobia limitaria Wlk. were found in association with Melanolophia

larvae, and the occurrence of Nyctobia increased generally throughout the coastal region. The saddle-backed looper increased in numbers, and a severe outbreak which killed a large volume of timber occurred at Kitimat in 1960. Populations of the grey forest looper, Caripeta divisata Wlk., another looper not regarded as a serious pest, increased to outbreak proportions in the Copper (Zymoetz) River valley in 1961. Records for these species have not been analyzed as yet, so it is not possible to determine if the outbreaks could have been detected or recognized from the collection data.

The results of this review of survey records are considered to be promising. Limits have been set for the four species concerned, and these limits, particularly the 'alert' limits, should assist greatly in the annual appraisal of population fluctuations. The tabulated data will also serve as a useful guide for the rangers in the field as the significance of a population level of any of these species can be determined immediately simply by comparing it with those of previous years.

One of the purposes of this report was to determine whether or not detection type of survey was providing the type of information hoped for. The results indicate that this information has been obtained. The beating collections have indicated trends more accurately than even their protagonists suspected. Exceptions occur when outbreaks are confined to small portions of a drainage so that the over-all averages do not indicate presence and abundance as accurately as they should. However, if this factor is kept in mind, the results are encouraging enough to continue with the present collection method indefinitely, rather than change to some other method which would break the continuity of the records.

The quality of the survey records can be improved by improving the distribution of the collections. As more of the forested regions in the province become accessible through new construction of logging and access roads, the detection aspects and the coverage also improve. The amount of boat surveys, which are time consuming, is decreasing as the number of roads increase. However, much of several districts is accessible only by water, so that boats will be used for some time yet.

Another problem is the phenological timing of collections. This can be partially solved by knowing more about insect life cycles and the population level of the injurious species of insects within a district. A rising hemlock looper population in a district would require a detection survey planned to cover the known susceptible hemlock stands at a time when the larvae are present. The timing depends on the type of weather, but as a general rule July is considered good. In a rising black-headed budworm population, the latter part of June is usually ideal, but this also is weather dependent. Collecting for Caripeta divisata larvae would be planned for August. Therefore, in order to ensure that the population level of all species is known, continuous detection surveys are required during the critical months of June, July, and August. For this reason all egg and pupal surveys which can be delayed are not begun until September or October.

In past years there has been a tendency to collect from the more important tree species comprising the coastal forests. While it is true that certain species should be sampled more intensively, it is also desirable to sample all tree species in a district. Plans are now being completed to put collections on a quota system to insure more equal distribution of host trees in the Survey records.

One of the greatest values of the records presented here is their potential value in the study of population dynamics. A useful elaboration of this report would be to determine the timber type and associated ground cover in areas where outbreaks occurred, and then compare these types with other areas where populations reached relatively high levels but did not develop into serious outbreaks. This might enable the Survey to eliminate some areas and define the localities where outbreaks could be expected to occur or start. But timber types will not invariably be an important factor because topography, location, and weather are often more important. For example, a good relationship between weather (rainfall) and the rise and decline of black-headed budworm populations has already been demonstrated (3), and it is therefore entirely feasible that other population fluctuations can be associated with weather. Whatever the factors involved, however, the type of survey data presented here offer the best general foundation for further studies. The potential worth of the coded records is very great, and this is one of the main reasons why further efforts are being made to improve the quality of the detection and appraisal aspects of the Survey.

One more important aspect of the detection survey has been clearly indicated by these records. Population increases can be followed for all species, but the initial increases are characterized by an increase in the percentage of collections containing larvae while the actual number of larvae per collection remains low. In other words, potential outbreaks can only be detected by maintaining continuous detection surveys because the population is too small to cause noticeable defoliation during the initial stages of an infestation. Furthermore, where loopers are involved, defoliation may only become evident the same year that the population has already increased to tree-killing proportions, so that it may be too late to initiate control measures.

#### SUMMARY AND CONCLUSIONS

It has been shown by the analysis of ordinary Survey collections over a 12-year period that population fluctuations and trends can be shown by annual samples obtained by beating trees. It can therefore be assumed that the basic methods for general surveys now used by the survey are producing useful results and that the records, in addition to providing necessary detection information annually, also will become more valuable year by year as material for studies of population dynamics.

Based on the available records, the annual population levels of the four species considered here should be appraised as follows:

Populations at the 'alert' level are considered high enough to develop into infestations within one or two years.

Spruce budworm - 'Alert' when 20 per cent of the collections in a Drainage or District contain an average of 15 larvae. Infestation level when more than 40 per cent of collections contain an average of 15 or more larvae.

Black-headed budworm - 'Alert' when 15 per cent of the collections in a Drainage or District contain an average of five larvae.

Infestation level when 40 per cent of the collections in a Drainage or District contain an average of 25 larvae.

Green-striped forest looper - 'Alert' when 45 per cent of the collections in a Drainage or District contain larvae, the average number may be less than five.

Infestation level if 70 per cent of collections average 30 larvae.

Hemlock looper - 'Alert' when 45 per cent of the collections in a Drainage or District contain larvae; the average number may be less than 5. (No infestation limits selected).

The following methods for improving the quality of the Survey records are now under study:

1. A minimum number of beating collections should be set as a goal for each Ranger District; 300 has been suggested as a tentative target.
2. Beating collections will be distributed as nearly as possible, among the different important tree species in each district, the proportions to be worked out for each individual district.
3. At least 175 of the beating collections will be made during the months of June, July, and August. In an effort to obtain better phenological distribution the quota will be subdivided with an objective of 45 collections for each three-week period starting June 1. The host quota also applies to these collections. (Rangers in the Interior are working on a two-week quota system.)
4. Efforts will be made to obtain better distribution of samples throughout each district with the objective of obtaining relatively complete coverage of all important drainages.

This initial analysis has indicated the need for additional work so that the Survey may be better equipped to perform its primary functions. Work on the following will be initiated as soon as possible.

1. Survey records for these four species will be brought up to date and maintained on an annual basis. Field staff will be provided with complete and up-to-date records.
2. Similar analyses will be considered for other species in the coastal region as well as in the Interior.
3. As time permits, studies on timber type and the association of other factors, including terrain, location, and weather, should be initiated with the objective of pointing to some of the causes of population fluctuations. It is believed that the data presented here are sufficient to provide for such further work.

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Table 2

Summary of Spruce Budworm Collections by Ranger Districts.  
Coastal British Columbia. All hosts included.  
Infestations are indicated by lines.

Year		S.V.I.	N.V.I.	S.V.	N.V.	S.P.R.	W.P.R.	E.P.R.
1949	Total no. collections	193	302	133	58	27	40	57
	% coll. containing species	3.1	7.0	0.8	0	0	12.5	0
	Av. no. specimens per sample	2.6	1.7	1.0	-	-	2.5	-
1950	Total no. collections	158	209	270	51	205	337	205
	% coll. containing species	3.2	5.3	4.1	11.8	7.3	1.2	54.1
	Av. no. specimens per sample	1.0	2.7	2.9	1.8	2.0	1.6	57.0
1951	Total no. collections	433	615	222	266	10	13	240
	% coll. containing species	6.5	1.6	4.1	1.1	10.0	7.7	35.8
	Av. no. specimens per sample	1.5	1.5	4.4	1.8	1.0	1.0	20.0
1952	Total no. collections	283	347	289	28	32	302	310
	% coll. containing species	5.3	1.2	2.8	3.6	0	5.0	42.9
	Av. no. specimens per sample	1.7	1.0	3.7	1.0	-	1.5	26.9
1953	Total no. collections	302	329	181	165	7	200	142
	% coll. containing species	0.7	1.2	17.1	0	14.3	3.0	21.8
	Av. no. specimens per sample	1.0	2.2	14.0	-	1.0	2.3	3.4
1954	Total no. collections	111	197	140	33	131	249	130
	% coll. containing species	0	0.5	27.9	0	4.6	8.4	28.5
	Av. no. specimens per sample	-	1.0	37.6	-	1.8	1.7	15.8
1955	Total no. collections	68	96	146	101	24	86	181
	% coll. containing species	0	0	45.2	1.0	12.5	3.5	22.7
	Av. no. specimens per sample	-	-	25.2	1.0	29.7	1.8	7.6
1956	Total no. collections	88	95	75	84	159	167	175
	% coll. containing species	5.7	1.1	70.7	1.2	0	0	33.7
	Av. no. specimens per sample	1.0	1.0	49.1	1.0	-	-	48.7
1957	Total no. collections	74	145	82	0	0	97	88
	% coll. containing species	0	2.8	30.5	-	-	0	46.6
	Av. no. specimens per sample	-	1.6	48.9	-	-	-	20.9
1958	Total no. collections	58	63	58	120	0	41	48
	% coll. containing species	5.2	1.6	48.3	2.5	-	4.9	83.3
	Av. no. specimens per sample	1.0	1.0	46.7	1.8	-	1.0	50.8
1959	Total no. collections	97	201	159	93	55	92	117
	% coll. containing species	4.1	1.0	13.8	1.1	12.7	10.9	50.4
	Av. no. specimens per sample	2.3	1.0	2.9	1.0	1.3	2.3	83.1
1960	Total no. collections	130	134	79	67	141	267	149
	% coll. containing species	0.8	2.2	24.1	0	9.2	9.4	26.2
	Av. no. specimens per sample	1.0	1.0	4.3	-	4.5	8.0	64.8

Table 3

Summary of Choristoneura fumiferana Collections by Drainage Divisions.  
South Vancouver Island Ranger District. All hosts included.

Year	Drainage Divisions					Total	
	001	002	003	004	005		
1949	Total no. collections	60	43	20		70	193
	% coll. containing species	10.0	0	0		0	3.1
	Av. no. specimens per sample	2.6	-	-		-	2.6
1950	Total no. collections	19	79	41		19	158
	% coll. containing species	0	6.3	0		0	3.2
	Av. no. specimens per sample	-	1.0	-		-	1.0
1951	Total no. collections	159	120	57		97	433
	% coll. containing species	13.2	5.8	0		0	6.5
	Av. no. specimens per sample	1.6	1.2	-		-	1.5
1952	Total no. collections	76	110	46		51	283
	% coll. containing species	14.5	2.7	0		0.	5.3
	Av. no. specimens per sample	1.7	1.8	-		-	1.7
1953	Total no. collections	75	142	54		31	302
	% coll. containing species	2.7	0	0		2.0	0.7
	Av. no. specimens per sample	1.0	-	-		-	1.0
1954	Total no. collections	7	37	26	5	36	111
	% coll. containing species	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1955	Total no. collections	0	38	20	0	10	68
	% coll. containing species	-	0	0	-	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1956	Total no. collections	16	31	15	24	2	88
	% coll. containing species	12.5	3.2	0	4.2	50.0	5.7
	Av. no. specimens per sample	1.0	1.0	-	1.0	1.0	1.0
1957	Total no. collections	5	31	17	13	8	74
	% coll. containing species	0	0.	0	0	0	0
	Av. no. specimens per sample	-	-.	-	-	-	-
1958	Total no. collections	2	26	22	8	0	58
	% coll. containing species	0	7.7	0	12.5	-	5.2
	Av. no. specimens per sample	-	1.0	-	1.0	-	1.0
1959	Total no. collections	11	32	27	8	19	97.
	% coll. containing species	0	12.5	0	0	0	4.1
	Av. no. specimens per sample	-	2.3	-	-	-	2.3
1960	Total no. collections	13	35	43	18	21	130
	% coll. containing species	0	2.9	0	0	0	0.8
	Av. no. specimens per sample	-	1.0	-	-	-	1.0



Table 4

Summary of *Choristoneura fumiferana* Collections by Drainage Divisions.  
North Vancouver Island Ranger District. All hosts included.

Year	Drainage Divisions						Total
	021	022	023	024	025	026	
1949	Total no. collections	189	45	3	65		302
	% coll. containing species	10.6	0	0	1.5		7.0
	Av. no. specimens per sample	1.7	-	-	1.0		1.7
1950	Total no. collections	198	0	8	3		209
	% coll. containing species	5.6	-	0	0		5.3
	Av. no. specimens per sample	2.7	-	-	-		2.7
1951	Total no. collections	387	92	8	128		615
	% coll. containing species	2.6	0	0	0		1.6
	Av. no. specimens per sample	1.5	-	-	-		1.5
1952	Total no. collections	298	5	1	43		347
	% coll. containing species	1.3	0	0	0		1.2
	Av. no. specimens per sample	1.0	-	-	-		1.0
1953	Total no. collections	195	59	36	39		329
	% coll. containing species	2.1	0	0	0		1.2
	Av. no. specimens per sample	2.2	-	-	-		2.2
1954	Total no. collections	57	40	69	2	19	197
	% coll. containing species	0	0	1.4	0	0	0.5
	Av. no. specimens per sample	-	-	1.0	-	-	1.0
1955	Total no. collections	54	27	7	3	5	96
	% coll. containing species	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1956	Total no. collections	47	38	1	1	3	95
	% coll. containing species	0	2.6	0	0	0	1.1
	Av. no. specimens per sample	-	1.0	-	-	-	1.0
1957	Total no. collections	43	62	5	29	1	145
	% coll. containing species	4.7	3.2	0	0	0	2.8
	Av. no. specimens per sample	1.0	2.2	-	-	-	1.6
1958	Total no. collections	43	2	3	14	1	63
	% coll. containing species	0	50.0	0	0	0	1.6
	Av. no. specimens per sample	-	1.0	-	-	-	1.0
1959	Total no. collections	99	30	53	13	5	201
	% coll. containing species	2.0	0	0	0	0	1.0
	Av. no. specimens per sample	1.0	-	-	-	-	1.0
1960	Total no. collections	55	31	46	1	0	134
	% coll. containing species	5.5	0	0	0	-	2.2
	Av. no. specimens per sample	1.0	-	-	-	-	1.0

Table 5

Summary of *Choristoneura fumiferana* Collections by Drainage Divisions  
South Vancouver Ranger District. All hosts included.  
Infestations are indicated by lines.

Year	040	041	042	043	044	045	Total
1949 Total no. collections		28	102	2	0	1	133
% coll. containing species		0	1.0	0	0	0	0.8
Av. no. specimens per sample		-	1.0	-	-	-	1.0
1950 Total no. collections		79	171	7	11	2	270
% coll. containing species		2.5	2.9	0	36.4	0	4.1
Av. no. specimens per sample		1.0	4.8	-	2.2	-	2.9
1951 Total no. collections		58	133	10	17	4	222
% coll. containing species		1.7	0.8	0	41.2	0	4.1
Av. no. specimens per sample		3.5	1.0	-	5.1	-	4.4
1952 Total no. collections		76	184	21	7.	1	289
% coll. containing species		0	2.2	0	57.1	0	2.8
Av. no. specimens per sample		-	1.0	-	6.4	-	3.7
1953 Total no. collections		42	62	19	39	19	181
% coll. containing species		4.8	3.2	21.1	59.0	0	17.1
Av. no. specimens per sample		1.0	1.0	15.9	15.9	-	14.0
1954 Total no. collections	39	8	41	19	26	7	140
% coll. containing species	2.6	0	0	36.8	92.3	100.0	27.9
Av. no. specimens per sample	1.0	-	-	68.5	39.4	6.1	37.6
1955 Total no. collections	12	17	42	8	43	24	146
% coll. containing species	16.7	35.3	2.4	37.5	72.1	95.8	45.2
Av. no. specimens per sample	1.0	13.5	3.5	18.2	27.4	33.3	25.2
1956 Total no. collections	12	3	1	11	13	35	75
% coll. containing species	0	100.0	0	90.9	61.5	91.4	70.7
Av. no. specimens per sample	0	20.0	-	59.1	5.8	59.6	49.1
1957 Total no. collections	5	7	36	10	8	16	82
% coll. containing species	20.0	0	8.3	50.0	37.5	81.3	30.5
Av. no. specimens per sample	80.0	-	5.0	137.6	8.0	31.9	48.9
1958 Total no. collections	3	9	18	6	0	22	58
% coll. containing species	33.3	44.4	0	66.7	-	86.4	48.3
Av. no. specimens per sample	1.0	8.6	-	83.4	-	49.4	46.7
1959 Total no. collections	28	4	52	15	31	29	159
% coll. containing species	0	0	5.8	33.3	38.7	6.9	13.8
Av. no. specimens per sample	-	-	2.7	3.9	2.8	1.0	2.9
1960 Total no. collections	4	5	32	0	25	13	79
% coll. containing species	0	20.0	18.8	-	40.0	15.3	24.1
Av. no. specimens per sample	-	3.5	5.3	-	4.6	1.0	4.3

Table 6

Summary of Choristoneura fumiferana Collections by Drainage Divisions.  
North Vancouver Ranger District. All hosts included.

Year	Drainage Divisions									Total
	060	061	062	063	064	065	066	067	068	
1949	Total no. collections		6		9		30		13	58
	% coll. containing species		0		0		0		0	0
	Av. no. specimens per sample		-		-		-		-	-
1950	Total no. collections		37		8		6		0	51
	% coll. containing species		13.5		12.5		0		-	11.8
	Av. no. specimens per sample		1.5		3.5		-		-	1.8
1951	Total no. collections		143		105		18		0	266
	% coll. containing species		1.4		1.0		0		-	1.1
	Av. no. specimens per sample		1.0		3.5		-		-	1.8
1952	Total no. collections		12		3		12		1	28
	% coll. containing species		8.3		0		0		0	3.6
	Av. no. specimens per sample		1.0		-		-		-	1.0
1953	Total no. collections		79		59		15		12	165
	% coll. containing species		0		0		0		0	0
	Av. no. specimens per sample		-		-		-		-	-
1954	Total no. collections	3	27	0	2	0	1	0	0	33
	% coll. containing species	0	0	-	0	-	0	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1955	Total no. collections	3	10	9	35	21	2	7	0	101
	% coll. containing species	0	0	0	0	4.8	0	0	-	1.0
	Av. no. specimens per sample	-	-	-	-	1.0	-	-	-	1.0
1956	Total no. collections	0	0	0	38	32	2	0	0	84
	% coll. containing species	-	-	-	0	3.1	0	-	-	1.2
	Av. no. specimens per sample	-	-	-	-	1.0	-	-	-	1.0



Table 7

Summary of Choristoneura fumiferana Collections by Drainage Divisions  
South Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions				Total	
	080	081	082	083		
1949	Total no. collections	22	5	0	0	27
	% coll. containing species	0	0	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1950	Total no. collections	28	29	8	140	205
	% coll. containing species	0	6.9	12.5	8.6	7.3
	Av. no. specimens per sample	-	1.0	1.0	2.2	2.0
1951	Total no. collections	9	1	0	0	10
	% coll. containing species	11.1	0	-	-	10.0
	Av. no. specimens per sample	1.0	-	-	-	1.0
1952	Total no. collections	0	4	21	7	32
	% coll. containing species	-	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1953	Total no. collections	0	1	1	5	7
	% coll. containing species	-	0	0	20.0	14.3
	Av. no. specimens per sample	-	-	-	1.0	1.0
1954	Total no. collections	0	49	19	63	131
	% coll. containing species	-	4.1	21.1	0	4.6
	Av. no. specimens per sample	-	2.2	1.6	-	1.8
1955	Total no. collections	1	18	5	0	24
	% coll. containing species	0	11.1	20.0	-	12.5
	Av. no. specimens per sample	-	44.0	1.0	-	29.7
1956	Total no. collections	12	49	8	90	159
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1957	Total no. collections	0	0	0	0	0
	% coll. containing species	-	-	-	-	-
	Av. no. specimens per sample	-	-	-	-	-
1958	Total no. collections	0	0	0	0	0
	% coll. containing species	-	-	-	-	-
	Av. no. specimens per sample	-	-	-	-	-
1959	Total no. collections	6	21	14	14	55
	% coll. containing species	0	4.8	21.4	21.4	12.7
	Av. no. specimens per sample	-	3.5	1.0	1.0	1.3
1960	Total no. specimens	16	36	10	79	141
	% coll. containing species	0	2.8	0	15.2	9.2
	Av. no. specimens per sample	-	3.5	-	4.5	4.5

Table 8

Summary of *Choristoneura fumiferana* Collections by Drainage Divisions  
West Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions							Total	
	100	101	102	103	104	105	106		
1949	Total no. collections	1		15	13	10	1	40	
	% coll. containing species	0		0	23.1	10.0	100.0	12.5	
	Av. no. specimens per sample	-		-	2.7	1.0	3.5	2.5	
1950	Total no. collections	110		85	57	42	43	337	
	% coll. containing species	0		2.4	0	4.8	0	1.2	
	Av. no. specimens per sample	-		2.2	-	1.0	-	1.6	
1951	Total no. collections	0		10	1	1	1	13	
	% coll. containing species	-		10.0	0	0	0	7.7	
	Av. no. specimens per sample	-		1.0	-	-	-	1.0	
1952	Total no. collections	69		43	113	76	1	302	
	% coll. containing species	4.3		9.3	6.2	1.3	0	5.0	
	Av. no. specimens per sample	1.0		1.0	2.0	1.0	-	1.5	
1953	Total no. collections	52		44	51	53	0	200	
	% coll. containing species	1.9		0	5.9	3.8	-	3.0	
	Av. no. specimens per sample	1.0		-	2.7	2.3	-	2.3	
1954	Total no. collections	24	18	8	52	68	51	28	249
	% coll. containing species	0	0	25.0	1.9	20.6	7.8	0	8.4
	Av. no. specimens per sample	-	-	1.0	1.0	2.2	1.0	-	1.7
1955	Total no. collections	3	13	0	7	37	11	15	86
	% coll. containing species	0	0	-	0	5.4	9.1	0	3.5
	Av. no. specimens per sample	-	-	-	-	1.0	3.5	-	1.8
1956	Total no. collections	10	38	0	21	49	43	6	167
	% coll. containing species	0	0	-	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1957	Total no. collections	0	0	6	20	35	35	1	97
	% coll. containing species	-	-	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1958	Total no. collections	0	0	3	0	24	14	0	41
	% coll. containing species	-	-	33.3	-	4.2	0	-	4.9
	Av. no. specimens per sample	-	-	1.0	-	1.0	-	-	1.0
1959	Total no. collections	24	34	6	1	3	16	8	92
	% coll. containing species	0	0	33.3	0	33.3	25.0	37.5	10.9
	Av. no. specimens per sample	-	-	3.5	-	1.0	2.9	1.8	2.3
1960	Total no. collections	55	50	32	22	33	29	46	267
	% coll. containing species	0	0	21.8	18.1	3.0	20.7	15.2	9.4
	Av. no. specimens per sample	-	-	25.0	1.0	1.0	1.8	1.4	8.0

Table 9

Summary of Choristoneura fumiferana Collections by Drainage Divisions.  
 East Prince Rupert Ranger District. All hosts included.  
 Infestations are indicated by lines.

Year	Drainage Divisions					
	120	121	122	123	Total	
1949	Total no. collections	27	17	13		57
	% coll. containing species	0	0	0		0
	Av. no. specimens per sample	-	-	-		-
1950	Total no. collections	24	19	162		205
	% coll. containing species	16.7	15.8	64.2		54.1
	Av. no. specimens per sample	40.0	19.7	58.8		57.0
1951	Total no. collections	74	10	156		240
	% coll. containing species	25.7	0	42.9		35.8
	Av. no. specimens per sample	12.4	-	22.2		20.0
1952	Total no. collections	51	65	194		310
	% coll. containing species	2.0	4.6	66.5		42.9
	Av. no. specimens per sample	3.5	3.5	27.6		26.9
1953	Total no. collections	20	13	109		142
	% coll. containing species	0	15.4	26.6		21.8
	Av. no. specimens per sample	-	1.0	3.6		3.4
1954	Total no. collections	8	12	95	15	130
	% coll. containing species	0	0	38.9	0	28.5
	Av. no. specimens per sample	-	-	15.8	-	15.8
1955	Total no. collections	11	33	127	10	181
	% coll. containing species	0	3.0	30.7	10.0	22.7
	Av. no. specimens per sample	-	1.0	7.9	1.0	7.6
1956	Total no. collections	58	29	80	8	175
	% coll. containing species	8.6	3.4	66.3	0	33.7
	Av. no. specimens per sample	2.9	1.0	53.9	-	48.7
1957	Total no. collections	26	9	49	4	88
	% coll. containing species	7.7	11.1	77.6	0	46.6
	Av. no. specimens per sample	1.0	3.5	22.4	-	20.9
1958	Total no. collections	0	1	47	0	48
	% coll. containing species	-	100.0	83.0	-	83.3
	Av. no. specimens per sample	.	3.5	52.0		50.8
1959	Total no. collections	38	24	48	7	117
	% coll. containing species	15.8	33.3	93.8	0	50.4
	Av. no. specimens per sample	2.7	42.3	101.1		83.1
1960	Total no. collections	38	21	86	4	149
	% coll. containing species	10.5	9.5	38.3	0	26.2
	Av. no. specimens per sample	1.6	4.5	76.1	-	64.8

Table 10

Summary of Choristoneura fumiferana Collections by Host Trees.  
South Vancouver Island Ranger District. All Drainage Divisions Included.

Year		H	F	B	S	Bg	Pl	Pw	Total
1949	Total no. collections	96	60	0	0	25	12	0	193
	% coll. containing species	2.1	6.7	-	-	0	0	-	3.1
	Av. no. specimens per sample	1.0	3.4	-	-	-	-	-	2.6
1950	Total no. collections	80	43	11	3	10	6	5	158
	% coll. containing species	1.3	4.7	0	0	10.0	0	20.0	3.2
	Av. no. specimens per sample	1.0	1.0	-	-	1.0	-	1.0	1.0
1951	Total no. collections	144	186	55	25	13	10	0	433
	% coll. containing species	0	14.5	1.8	0	0	0	-	6.5
	Av. no. specimens per sample	-	1.6	1.0	-	-	-	-	1.5
1952	Total no. collections	109	120	21	0	22	11	0	283
	% coll. containing species	0.9	10.8	0	-	4.5	0	-	5.3
	Av. no. specimens per sample	1.0	1.8	-	-	1.0	-	-	1.7
1953	Total no. collections	125	103	24	17	16	12	5	302
	% coll. containing species	0	1.9	0	0	0	0	0	0.7
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	1.0
1954	Total no. collections	50	36	10	9	3	3	0	111
	% coll. containing species	0	0	0	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1955	Total no. collections	33	25	3	2	2	3	0	68
	% coll. containing species	0	0	0	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1956	Total no. collections	20	41	3	3	13	6	2	88
	% coll. containing species	0	9.8	0	0	7.7	0	0	5.7
	Av. no. specimens per sample	-	1.0	-	-	1.0	-	-	1.0
1957	Total no. collections	35	32	3	2	1	1	0	74
	% coll. containing species	0	0	0	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1958	Total no. collections	26	22	3	2	4	1	0	58
	% coll. containing species	0	13.6	0	0	0	0	-	5.2
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	1.0
1959	Total no. collections	42	35	3	6	9	2	0	97
	% coll. containing species	0	8.6	0	0	11.1	0	-	4.1
	Av. no. specimens per sample	-	2.7	-	-	1.0	-	-	2.3
1960	Total no. collections	70	36	9	4	8	3	0	130
	% coll. containing species	0	2.8	0	0	0	0	-	0.8
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	1.0



Table 11

Summary of *Choristoneura fumiferana* Collection by Host Trees.  
North Vancouver Island Ranger District. All Drainage Divisions included.

Year	Hosts									Total
	H	F	S	Bg	B	Ba	Pl	Pw		
1949	Total no. collections	191	75	0	13	0	0	23	0	302
	% coll. containing species	3.1	17.3	-	7.7	-	-	4.3	-	7.0
	Av. no. specimens per sample	1.4	1.9	-	1.0	-	-	1.0	-	1.7
1950	Total no. collections	85	66	11	13	24	0	5	5	209
	% coll. containing species	2.4	6.1	18.2	15.4	4.2	0	0	0	5.3
	Av. no. specimens per sample	1.0	1.0	2.2	2.2	15.0	-	-	-	2.7
1951	Total no. collections	317	180	37	11	52	0	18	0	615
	% coll. containing species	0	4.4	0	9.1	0	-	5.6	-	1.6
	Av. no. specimens per sample	-	1.3	-	1.0	-	-	3.5	-	1.5
1952	Total no. specimens	165	132	0	9	32	0	9	0	347
	% coll. containing species	0	3.0	-	0	0	-	0	-	1.2
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	1.0
1953	Total no. specimens	173	93	13	0	29	1	9	6	324 <sup>1/</sup>
	% coll. containing species	0	3.2	0	-	3.4	0	0	0	1.2
	Av. no. specimens per sample	-	1.8	-	-	3.5	-	-	-	2.2
1954	Total no. specimens	111	60	7	3	12	2	2	0	197
	% coll. containing species	0	1.7	0	0	0	0	0	0	0.5
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	1.0
1955	Total no. specimens	53	24	1	0	13	2	3	0	96
	% coll. containing species	0	0	0	-	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1956	Total no. specimens	48	23	4	7	7	1	1	4	95
	% coll. containing species	0	4.3	0	0	0	0	0	0	1.1
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	1.0

<sup>1/</sup> Five collections with no hosts

Table 11 - continued

Year	Hosts								Total	
	H	F	S	Bg	B	Ba	Pl	Pw		
1957	Total no. specimens	105	24	2	3	10	0	1	0	145
	% coll. containing species	2.9	4.2	0	0	0	0	0	0	2.8
	Av. no. specimens per sample	1.8	1.0	-	-	-	-	-	-	1.6
1958	Total no. specimens	40	13	5	1	3	1	0	0	63
	% coll. containing species	2.5	0	0	0	0	0	-	-	1.6
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1959	Total no. specimens	121	43	9	11	14	1	2	0	201
	% coll. containing species	0.8	0	11.1	0	0	0	0	-	1.0
	Av. no. specimens per sample	1.0	-	1.0	-	-	-	-	-	1.0
1960	Total no. specimens	68	34	17	4	9	0	2	0	134
	% coll. containing species	1.4	5.8	0	0	0	-	0	-	2.2
	Av. no. specimens per sample	1.0	1.0	-	-	-	-	-	-	1.0

Table 12

Summary of Choristoneura fumiferana Collections by Host Trees.  
South Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	S & Se	B	Bg	Ba	Pl	Pw		
1949	Total no. collections	102	28	0	0	0	0	3	0	133
	% coll. containing species	0	3.6	-	-	-	-	0	-	0.8
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	1.0
1950	Total no. collections	159	73	11	13	0	0	13	1	270
	% coll. containing species	0	9.6	9.1	0	-	-	23.1	0	4.1
	Av. no. specimens per sample	-	2.7	1.0	-	-	-	5.0	-	2.9
1951	Total no. collections	132	67	7	7	4	0	5	0	222
	% coll. containing species	2.3	7.5	0	0	25.0	-	0	-	4.1
	Av. no. specimens per sample	1.8	6.2	-	-	3.5	-	-	-	4.4
1952	Total no. collections	184	77	0	20	0	1	7	0	289
	% coll. containing species	1.1	5.2	-	5.0	-	0.	14.3	-	2.8
	Av. no. specimens per sample	2.3	5.1	-	3.5	-	-	1.0	-	3.7
1953	Total no. collections	103	42	2	23	0	0	7	4	181
	% coll. containing species	6.8	45.2	0	17.4	-	-	0	25.0	17.1
	Av. no. specimens per sample	14.5	17.1	-	10.0	-	-	-	8.0	14.0
1954	Total no. collections	62	67	1	1	7	1	1	0	140
	% coll. containing species	6.5	47.8	0	0	42.9	0	0	-	27.9
	Av. no. specimens per sample	11.7	35.6	-	-	93.3	-	-	-	37.6
1955	Total no. collections	59	72	2	5	0	2	6	0	146
	% coll. containing species	18.6	68.1	50.0	40.0	-	0	50.0	-	45.2
	Av. no. specimens per sample	6.8	27.8	8.0	80.0	-	-	4.2	-	25.2
1956	Total no. collections	20	42	1	0	0	3	6	3	75
	% coll. containing species	50.0	88.1	0	0	0	66.7	50.0	33.3	70.7
	Av. no. specimens per sample	20.5	64.0	-	-	-	15.0	8.8	3.5	49.1

Table 12 - continued

Year	Hosts								Total	
	H	F	S & Se	B	Bg	Ba	Pl	Pw		
1957	Total no. collections	35	37	2	2	5	1	0	0	82
	% coll. containing species	17.1	45.9	50.0	0	20.0	0	-	-	30.5
	Av. no. specimens per sample	15.0	48.8	50.0	-	1.0	-	-	-	48.9
1958	Total no. collections	17	38	2	1	0	0	0	0	58
	% coll. containing species	17.6	65.8	0	0	-	-	-	-	48.3
	Av. no. specimens per sample	6.5	51.5	-	-	-	-	-	-	46.7
1959	Total no. collections	53	84	3	12	0	0	7	0	159
	% coll. containing species	0	23.8	0	0	-	-	28.6	-	13.8
	Av. no. specimens per sample	-	2.8	-	-	-	-	3.5	-	2.9
1960	Total no. collections	25	34	3	8	1	2	6	0	79
	% coll. containing species	8.0	44.1	33.3	0	0	0	16.7	-	24.1
	Av. no. specimens per sample	2.3	4.8	1.0	-	-	-	3.5	-	4.3

Table 13

Summary of *Choristoneura fumiferana* Collections by Host Trees.  
North Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	S & Se	B	Bg	Ba	Pl	Pw		
1949	Total no. collections	49	7	0	0	0	0	2	0	58
	% coll. containing species	0	0	-	-	-	-	0	-	0
	Av. no. specimens per sample	0	-	-	-	-	-	-	-	-
1950	Total no. collections	21	20	1	1	1	0	3	4	51
	% coll. containing species	4.8	15.0	0	0	0	-	66.7	0	11.8
	Av. no. specimens per sample	1.0	1.8	-	-	-	-	2.3	-	1.8
1951	Total no. collections	145	81	9	19	2	0	10	0	266
	% coll. containing species	0	2.5	11.1	0	0	-	0	-	1.1
	Av. no. specimens per sample	-	2.3	1.0	-	-	-	-	-	1.8
1952	Total no. collections	19	7	0	1	0	0	1	0	28
	% coll. containing species	5.3	0	-	0	-	-	0	-	3.6
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1953	Total no. collections	96	35	15	11	0	0	7	1	165
	% coll. containing species	0	0	0	0	-	-	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1954	Total no. collections	20	10	1	1	0	0	1	0	33
	% coll. containing species	0	0	0	0	-	-	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1955	Total no. collections	62	25	6	2	2	2	2	0	101
	% coll. containing species	1.6	0	0	0	0	0	0	-	1.0
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1956	Total no. collections	48	18	11	5	1	0	1	0	84
	% coll. containing species	0	5.6	0	0	0	-	0	-	1.2
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	1.0



Table 14

Summary of *Choristoneura fumiferana* Collections by Host Trees.  
South Prince Rupert Ranger District. All Drainage Divisions included.

Year		Hosts				Total	
		H	F	S & Se	B		Pl
1949	Total no. collections	0	0	19	8	0	27
	% coll. containing species	-	-	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-
1950	Total no. collections	89	0	70	38	8	205
	% coll. containing species	4.5	-	10.0	10.5	0	7.3
	Av. no. specimens per sample	1.0	-	2.1	2.7	-	2.0
1951	Total no. collections	0	0	10	0	0	10
	% coll. containing species	-	-	10.0	-	-	10.0
	Av. no. specimens per sample	-	-	1.0	-	-	1.0
1952	Total no. collections	17	5	6	4	0	32
	% coll. containing species	0	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-
1953	Total no. collections	4	1	0	2	0	7
	% coll. containing species	0	50.0	-	0	-	14.3
	Av. no. specimens per sample	-	1.0	-	-	-	1.0
1954	Total no. collections	77	5	40	8	1	131
	% coll. containing species	2.6	60.0	2.5	0	0	4.6
	Av. no. specimens per sample	1.0	2.7	1.0	-	-	1.8
1955	Total no. collections	15	5	3	1	0	24
	% coll. containing species	13.3	20.0	0	0	-	12.5
	Av. no. specimens per sample	4.5	80.0	-	-	-	29.7
1956	Total no. collections	94	5	51	7	2	159
	% coll. containing species	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1957	Total no. collections	0	0	0	0	0	0
	% coll. containing species	-	-	-	-	-	-
	Av. no. specimens per sample	-	-	-	-	-	-
1958	Total no. collections	0	0	0	0	0	0
	% coll. containing species	-	-	-	-	-	-
	Av. no. specimens per sample	-	-	-	-	-	-
1959	Total no. collections	40	7	5	1	2	55
	% coll. containing species	5.0	42.9	20.0	0	50.0	12.7
	Av. no. specimens per sample	1.0	1.8	1.0	-	1.0	1.3
1960	Total no. collections	75	5	60	0	1	141
	% coll. containing species	5.3	0	15.0	-	0	9.2
	Av. no. specimens per sample	1.0	-	6.0	-	-	4.5

Table 15

Summary of *Choristoneura fumiferana* Collections by Host Trees.  
West Prince Rupert Ranger District. All Drainage Divisions included.

Year		Hosts					Total
		H	S	B	Ba	Pl	
1949	Total no. collections	0	29	11	0	0	40
	% coll. containing species	-	13.8	9.1	-	-	12.5
	Av. no. specimens per sample	-	2.2	3.5	-	-	2.5
1950	Total no. collections	147	140	26	3	21	337
	% coll. containing species	0.7	1.4	0	33.3	0	1.2
	Av. no. specimens per sample	1.0	2.2	-	1.0	-	1.6
1951	Total no. collections	0	11	0	2	0	13
	% coll. containing species	-	9.1	-	0	-	7.7
	Av. no. specimens per sample	-	1.0	-	-	-	1.0
1952	Total no. collections	159	82	33	13	15	302
	% coll. containing species	5.0	2.4	12.1	0	6.7	5.0
	Av. no. specimens per sample	1.0	4.5	1.0	-	1.0	1.5
1953	Total no. collections	100	64	17	11	8	200
	% coll. containing species	4.0	3.1	0	0	0	3.0
	Av. no. specimens per sample	2.3	2.3	-	-	-	2.3
1954	Total no. collections	143	64	26	10	6	249
	% coll. containing species	4.2	6.3	23.1	50.0	0	8.4
	Av. no. specimens per sample	1.8	1.0	2.6	1.5	-	1.7
1955	Total no. collections	64	14	7	1	0	86
	% coll. containing species	4.7	0	0	0	-	3.5
	Av. no. specimens per sample	1.8	-	-	-	-	1.8
1956	Total no. collections	114	30	8	10	5	167
	% coll. containing species	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1957	Total no. collections	57	21	8	5	6	97
	% coll. containing species	0	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-	-
1958	Total no. collections	27	6	1	2	5	41
	% coll. containing species	7.4	0	0	0	0	4.9
	Av. no. specimens per sample	1.0	-	-	-	-	1.0
1959	Total no. collections	58	24	1	8	1	92
	% coll. containing species	6.9	4.2	0	62.5	0	10.9
	Av. no. specimens per sample	2.8	3.5	-	2.0	-	2.3
1960	Total no. collections	159	72	21	10	5	267
	% coll. containing species	4.4	12.5	23.8	40.0	0	9.4
	Av. no. specimens per sample	1.4	1.6	34.1	1.6	-	8.0



Table 16

Summary of *Choristoneura fumiferana* Collections by Host Trees  
East Prince Rupert Ranger District. All Drainage Divisions included.

Year		S	Sw	B	Hosts			F	Total
					Ba	H	Pl		
1949	Total no. collections	15	34	8	0	0	0	0	57
	% coll. containing species	0	0	0	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1950	Total no. collections	19	60	30	62	2	32	0	205
	% coll. containing species	15.8	58.3	36.7	87.1	0	25.0	-	54.1
	Av. no. specimens per sample	8.8	54.4	67.4	66.0	-	11.9	-	57.0
1951	Total no. collections	2	169	0	69	0	0	0	240
	% coll. containing species	0	36.1	-	36.2	-	-	-	35.8
	Av. no. specimens per sample	-	19.9	-	20.4	-	-	-	20.0
1952	Total no. collections	7	144	38	59	6	50	6	310
	% coll. containing species	71.4	43.8	78.9	44.1	0	8.0	83.3	42.9
	Av. no. specimens per sample	6.2	24.7	35.5	32.6	-	3.5	12.9	26.9
1953	Total no. collections	13	54	2	33	1	37	2	142
	% coll. containing species	0	31.5	0	42.4	0	0	0	21.8
	Av. no. specimens per sample	-	3.4	-	3.4	-	-	-	3.4
1954	Total no. collections	11	42	1	44	3	25	4	130
	% coll. containing species	18.2	23.8	0	47.7	0	8.0	50.0	28.5
	Av. no. specimens per sample	3.5	11.1	-	21.6	-	2.3	3.5	15.8
1955	Total no. collections	2	89	0	56	16	15	3	181
	% coll. containing species	50.0	21.3	-	37.5	0	0	0	22.7
	Av. no. specimens per sample	1.0	12.0	-	3.9	-	-	-	7.6
1956	Total no. collections	8	79	0	54	14	17	3	175
	% coll. containing species	0	30.4	-	64.8	0	0	0	33.7
	Av. no. specimens per sample	-	11.2	-	74.3	-	-	-	48.7
1957	Total no. collections	0	30	0	37	9	11	1	88
	% coll. containing species	-	33.3	-	81.1	11.1	0	0	46.6
	Av. no. specimens per sample	-	20.3	-	21.3	15.0	-	-	20.9
1958	Total no. collections	0	23	1	21	0	3	0	48
	% coll. containing species	-	78.3	100.0	95.2	-	33.3	-	83.3
	Av. no. specimens per sample	-	42.8	3.5	62.7	-	3.5	-	50.8
1959	Total no. collections	3	36	2	47	17	12	0	117
	% coll. containing species	0	52.8	0	80.9	11.8	0	-	50.4
	Av. no. specimens per sample	-	121.5	-	68.0	3.5	-	-	83.1
1960	Total no. collections	15	64	1	38	3	26	2	149
	% coll. containing species	20.0	25.0	0	44.7	0	7.6	50.0	26.2
	Av. no. specimens per sample	3.3	37.4	-	112.2	-	3.5	3.5	64.8

Table 17

Summary of *Acleris variana* Collections by Ranger Districts,  
Coastal British Columbia. All hosts included.  
Infestations indicated by lines.

Year		S.V.I.	N.V.I.	S.V.	N.V.	S.P.R.	W.P.R.	E.P.R.
1949	Total no. collections	110	248	116	98	82	54	13
	% coll. containing species	0.9	0	0.9	1.0	0	5.6	15.4
	Av. no. specimens per sample	1.0	-	1.0	1.0	-	3.5	2.3
1950	Total no. collections	97	166	211	20	139	138	37
	% coll. containing species	5.2	0	2.8	0	2.2	13.0	2.7
	Av. no. specimens per sample	2.0	-	1.8	-	1.8	9.3	1.0
1951	Total no. collections	486	651	238	215	17	36	147
	% coll. containing species	6.4	1.7	0.8	1.4	11.8	30.6	12.9
	Av. no. specimens per sample	3.6	1.2	3.5	1.8	1.0	5.3	12.3
1952	Total no. collections	323	367	450	53	30	320	248
	% coll. containing species	17.0	6.5	8.9	0	23.3	31.3	22.2
	Av. no. specimens per sample	10.4	2.1	5.7	-	1.4	13.8	16.2
1953	Total no. collections	382	445	206	181	44	375	260
	% coll. containing species	11.3	11.3	17.0	4.4	22.7	57.1	22.3
	Av. no. specimens per sample	4.1	5.0	5.8	1.6	5.7	35.9	2.9
1954	Total no. collections	112	269	164	31	146	298	107
	% coll. containing species	11.6	28.3	23.8	6.5	40.4	65.8	32.7
	Av. no. specimens per sample	23.3	32.6	10.0	1.0	27.7	31.6	6.1
1955	Total no. collections	59	116	156	68	25	118	199
	% coll. containing species	5.1	31.0	27.6	8.8	80.8	47.5	16.1
	Av. no. specimens per sample	11.5	27.2	6.3	10.8	22.6	41.5	3.3
1956	Total no. collections	195	200	167	181	85	77	114
	% coll. containing species	23.6	55.6	24.0	37.0	63.5	1.3	7.9
	Av. no. specimens per sample	3.1	80.6	3.4	8.1	12.0	3.5	2.1
1957	Total no. collections	192	260	166	58	1	119	91
	% coll. containing species	31.8	54.6	41.0	50.0	0	14.3	11.0
	Av. no. specimens per sample	6.4	15.7	9.1	25.8	-	2.7	2.0
1958	Total no. collections	37	157	44	14	54	84	90
	% coll. containing species	37.8	7.0	31.8	0	1.9	20.2	5.6
	Av. no. specimens per sample	2.6	1.4	3.0	-	1.0	4.4	1.0
1959	Total no. collections	60	130	88	37	62	86	124
	% coll. containing species	10.0	15.4	4.5	16.2	46.8	76.7	16.1
	Av. no. specimens per sample	2.6	1.4	1.0	1.0	8.3	82.9	2.3
1960	Total no. collections	217	332	162	93	146	249	99
	% coll. containing species	1.4	2.1	3.1	1.1	36.3	43.4	2.0
	Av. no. specimens per sample	1.8	2.1	2.5	1.0	14.6	39.4	1.0

Table 18

Summary of Acleris variana Collections by Drainage Divisions  
South Vancouver Island Ranger District. All hosts included.

Year	001	002	003	004	005	Total
1949 Total no. collections	15	17	14		64	110
% coll. containing species	6.7	0	0		0	0.9
Av. no. specimens per sample	1.0	-	-		-	1.0
1950 Total no. collections	7	20	51		19	97
% coll. containing species	0	0	9.8		0	5.2
Av. no. specimens per sample	-	-	2.0		-	2.0
1951 Total no. collections	188	105	70		123	486
% coll. containing species	4.8	1.9	24.3		2.4	6.4
Av. no. specimens per sample	2.9	2.3	4.7		1.0	3.6
1952 Total no. collections	31	113	105		74	323
% coll. containing species	6.5	11.5	28.6		13.5	17.0
Av. no. specimens per sample	1.0	5.2	16.3		1.5	10.4
1953 Total no. collections	149	135	48		50	382
% coll. containing species	3.4	8.1	47.9		8.0	11.3
Av. no. specimens per sample	1.4	1.7	6.2		1.0	4.1
1954 Total no. collections	6	38	34		34	112
% coll. containing species	0	13.2	20.6		2.9	11.6
Av. no. specimens per sample	-	18.2	35.6		1.0	23.3
1955 Total no. collections	0	30	26	0	3	59
% coll. containing species	-	6.7	3.8	-	0	5.1
Av. no. specimens per sample	-	2.3	30.0	-	-	11.5
1956 Total no. collections	5	71	50	31	38	195
% coll. containing species	80.0	29.6	22.0	22.6	7.9	23.6
Av. no. specimens per sample	2.3	3.1	4.2	2.3	1.8	3.1
1957 Total no. collections	9	73	31	19	60	192
% coll. containing species	0	17.8	41.9	15.8	35.0	31.8
Av. no. specimens per sample	-	5.1	16.8	1.0	2.1	6.4
1958 Total no. collections	0	9	14	0	14	37
% coll. containing species	-	11.1	57.1	-	35.7	37.8
Av. no. specimens per sample	-	3.5	2.2	0	3.0	2.6
1959 Total no. collections	0	6	30	0	24	60
% coll. containing species	-	0	13.3	-	8.3	10.0
Av. no. specimens per sample	-	-	1.6	-	2.3	2.6
1960 Total no. collections	19	79	41	6	72	217
% coll. containing species	0	0	2.4	0	2.7	1.4
Av. no. specimens per sample	-	-	3.5	-	1.0	1.8

Table 19

Summary of *Acleris variana* Collections by Drainage Divisions  
North Vancouver Island Ranger District. All hosts included.  
Infestations are indicated by lines.

Year	Drainage Divisions						Total
	021	022	023	024	025	026	
1949	Total no. collections	148	38	3	59		248
	% coll. containing species	0	0	0	0		0
	Av. no. specimens per sample	-	-	-	-		-
1950	Total no. collections	121	0	43	2		166
	% coll. containing species	0	0	0	0		0
	Av. no. specimens per sample	-	-	-	-		-
1951	Total no. collections	414	97	8	132		651
	% coll. containing species	1.4	4.1	0	0.8		1.7
	Av. no. specimens per sample	1.4	1.0	-	1.0		1.2
1952	Total no. collections	311	2	0	54		367
	% coll. containing species	5.1	0	-	14.8		6.5
	Av. no. specimens per sample	2.2	-	-	1.9		2.1
1953	Total no. collections	247	59	36	73		415
	% coll. containing species	7.3	8.5	38.9	13.7		11.3
	Av. no. specimens per sample	6.1	2.0	5.1	4.3		5.0
1954	Total no. collections	56	58	72	35	43	269
	% coll. containing species	7.1	15.5	1.4	65.7	88.4	28.3
	Av. no. specimens per sample	1.6	19.6	1.0	45.3	33.0	32.6
1955	Total no. collections	46	37	0	12	21	116
	% coll. containing species	8.7	35.1	-	50.0	61.9	31.0
	Av. no. specimens per sample	2.9	25.7	-	19.1	39.9	27.2
1956	Total no. collections	64	61	14	13	41	200
	% coll. containing species	17.2	70.5	21.4	100.0	97.6	55.6
	Av. no. specimens per sample	1.9	106.4	53.3	120.7	65.4	80.6
1957	Total no. collections	65	91	20	36	38	260
	% coll. containing species	24.6	61.5	35.0	77.8	86.8	54.6
	Av. no. specimens per sample	3.2	11.3	3.1	40.5	11.9	15.7
1958	Total no. collections	63	48	35	2	4	157
	% coll. containing species	1.6	2.1	25.7	0	0	7.0
	Av. no. specimens per sample	1.0	1.0	1.5	-	-	1.4
1959	Total no. collections	27	0	18	41	39	130
	% coll. containing species	0	-	5.6	19.5	28.2	15.4
	Av. no. specimens per sample	-	-	1.0	1.0	1.7	1.4
1960	Total no. collections	76	70	49	43	87	332
	% coll. containing species	0	2.8	0	2.3	4.5	2.1
	Av. no. specimens per sample	-	2.3	-	3.5	1.6	2.1

Table 20

Summary of *Acleris variana* Collections by Drainage Divisions.  
South Vancouver Ranger District. All hosts included.

Year	Drainage Divisions						Total
	040	041	042	043	044	045	
1949	Total no. collections	17	88	2	2	7	116
	% coll. containing species	0	1.1	0	0	0	0.9
	Av. no. specimens per sample	-	1.0	-	-	-	1.0
1950	Total no. collections	54	152	0	5	0	211
	% coll. containing species	1.9	3.3	-	0	-	2.8
	Av. no. specimens per sample	1.0	2.0	-	-	-	1.8
1951	Total no. collections	69	140	7	18	4	238
	% coll. containing species	2.9	0	0	0	0	0.8
	Av. no. specimens per sample	3.5	-	-	-	-	3.5
1952	Total no. collections	96	238	42	24	50	450
	% coll. containing species	6.3	14.3	0	0	0	8.9
	Av. no. specimens per sample	1.8	6.4	-	-	-	5.7
1953	Total no. collections	67	69	10	44	16	206
	% coll. containing species	20.9	18.8	10.0	15.9	0	17.0
	Av. no. specimens per sample	7.7	5.7	1.0	2.7	-	5.8
1954	Total no. collections	54	2	69	12	17	164
	% coll. containing species	33.3	50.0	21.7	8.3	23.5	23.8
	Av. no. specimens per sample	18.8	3.5	2.0	1.0	4.0	10.0
1955	Total no. collections	33	42	50	7	24	156
	% coll. containing species	21.2	21.4	26.0	28.6	50.0	27.6
	Av. no. specimens per sample	4.7	3.2	4.4	11.5	10.3	6.3
1956	Total no. collections	19	15	60	20	13	167
	% coll. containing species	42.1	6.7	13.3	30.0	61.5	24.0
	Av. no. specimens per sample	5.2	3.5	2.2	5.0	1.9	3.4
1957	Total no. collections	18	11	85	21	10	166
	% coll. containing species	44.4	36.4	49.4	28.6	50.0	41.0
	Av. no. specimens per sample	11.8	5.7	9.9	6.7	4.8	9.1
1958	Total no. collections	3	0	34	3	2	44
	% coll. containing species	33.3	-	38.2	-	-	31.8
	Av. no. specimens per sample	1.0	-	3.2	-	-	3.0
1959	Total no. collections	24	0	53	3	6	88
	% coll. containing species	0	-	7.5	0	0	4.5
	Av. no. specimens per sample	-	-	1.0	-	-	1.0
1960	Total no. collections	22	12	58	4	34	162
	% coll. containing species	4.5	0	5.1	0	2.9	3.1
	Av. no. specimens per sample	1.0	-	2.7	-	3.5	2.5

Table 21

Summary of Acleris variana Collections by Drainage Divisions.  
North Vancouver Ranger District. All hosts included.

Year	Drainage Divisions									Total	
	060	061	062	063	064	065	066	067	068		
1949	Total no. collections		52		9			27		10	98
	% coll. containing species		0		0			0		10.0	1.0
	Av. no. specimens per sample		-		-			-		1.0	1.0
1950	Total no. collections		14		2			4		0	20
	% coll. containing species		0		0			0		-	0
	Av. no. specimens per sample		-		-			-		-	-
1951	Total no. collections		77		118			20		0	215
	% coll. containing species		1.3		0.8			5.0		-	1.4
	Av. no. specimens per sample		1.0		1.0			3.5		-	1.8
1952	Total no. collections		35		4			13		1	53
	% coll. containing species		0		0			0		0	0
	Av. no. specimens per sample		-		-			-		-	-
1953	Total no. collections		74		81			14		12	181
	% coll. containing species		6.8		3.7			0		0	4.4
	Av. no. specimens per sample		1.5		1.8			-		-	1.6
1954	Total no. collections	3	26	0	1	0	1	0	0	0	31
	% coll. containing species	0	7.7	-	0	-	0	-	-	-	6.5
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	-	-	1.0
1955	Total no. collections	0	14	0	13	23	2	9	0	7	68
	% coll. containing species	-	0	-	7.7	4.3	0	44.4	-	0	8.8
	Av. no. specimens per sample	-	-	-	1.0	1.0	-	15.6	-	-	10.8
1956	Total no. collections	0	31	0	48	36	13	18	23	12	181
	% coll. containing species	-	0	-	25.0	52.8	76.9	38.9	69.6	25.0	37.0
	Av. no. specimens per sample	-	-	-	4.2	8.3	12.3	12.7	7.0	2.7	8.1



Table 22

Summary of Acleris variana Collections by Drainage Divisions  
 South Prince Rupert Ranger District. All hosts included.  
 Infestations are indicated by lines.

Year	080	081	082	083	Total	
1949	Total no. collections	0	7	75	0	82
	% coll. containing species	-	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-
1950	Total no. collections	13	14	5	107	139
	% coll. containing species	0	0	0	2.8	2.2
	Av. no. specimens per sample	-	-	-	1.8	1.8
1951	Total no. collections	10	4	3	0	17
	% coll. containing species	10.0	0	33.3	-	11.8
	Av. no. specimens per sample	1.0	-	1.0	-	1.0
1952	Total no. collections	0	4	18	8	30
	% coll. containing species	-	25.0	11.1	50.0	23.3
	Av. no. specimens per sample	-	1.0	1.0	1.6	1.4
1953	Total no. collections	5	20	13	6	44
	% coll. containing species	20.0	20.0	0	83.3	22.7
	Av. no. specimens per sample	1.0	4.0	-	8.1	5.7
1954	Total no. collections	0	59	16	71	146
	% coll. containing species	-	25.4	37.5	53.5	40.4
	Av. no. specimens per sample	-	5.6	3.8	40.2	27.7
1955	Total no. collections	0	19	6	0	25
	% coll. containing species	-	78.9	83.3	-	80.0
	Av. no. specimens per sample	-	27.5	8.0	-	22.6
1956	Total no. collections	12	48	8	17	85
	% coll. containing species	91.7	72.9	25.0	35.3	63.5
	Av. no. specimens per sample	19.1	12.5	1.0	1.8	12.0
1957	Total no. collections	1	0	0	0	1
	% coll. containing species	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1958	Total no. collections	4	28	22	0	54
	% coll. containing species	25.0	0	0	-	1.9
	Av. no. specimens per sample	1.0	-	-	-	1.0
1959	Total no. collections	7	25	13	17	62
	% coll. containing species	14.3	44.0	23.1	82.4	46.8
	Av. no. specimens per sample	3.0	4.3	1.8	8.2	8.3
1960	Total no. collections	11	41	10	84	146
	% coll. containing species	18.2	17.0	0	52.3	36.3
	Av. no. specimens per sample	1.0	8.9	-	16.2	14.6



Table 23

Summary of Acleris variana Collections by Drainage Divisions.  
West Prince Rupert Ranger District. All hosts included.  
Infestations are indicated by lines.

Year	100	101	102	103	104	105	106	Total
1949 Total no. collections	13			20	6	12	3	54
% coll. containing species	7.7			10.0	0	0	0	5.6
Av. no. specimens per sample	3.5			3.5	-	-	-	3.5
1950 Total no. collections	35			45	21	7	30	138
% coll. containing species	14.3			22.2	0	0	10.0	13.0
Av. no. specimens per sample	15.9			6.2	-	-	8.8	9.3
1951 Total no. collections	0			14	6	1	15	36
% coll. containing species	-			42.9	16.7	0	26.7	30.6
Av. no. specimens per sample	-			6.5	3.5	-	4.0	5.3
1952 Total no. collections	78			42	114	85	1	320
% coll. containing species	.50.0			26.2	29.8	17.6	100.0	31.3
Av. no. specimens per sample	.16.0			43.4	6.3	4.3	3.5	13.8
1953 Total no. collections	65			68	117	77	48	375
% coll. containing species	.61.5			47.1	53.8	54.5	77.1	57.1
Av. no. specimens per sample	.79.9			38.9	26.8	16.2	23.8	35.9
1954 Total no. collections	26	19	8	62	94	59	30	298
% coll. containing species	92.3	89.5	12.5	83.9	71.3	47.5	23.3	65.8
Av. no. specimens per sample	55.8	72.3	3.5	26.1	25.6	18.1	6.2	31.6
1955 Total no. collections	3	18	15	22	36	19	5	118
% coll. containing species	100.0	94.4	66.7	18.2	44.4	15.8	60.0	47.5
Av. no. specimens per sample	93.3	83.2	44.9	1.1	3.1	6.5	4.2	41.5
1956 Total no. collections	3	2	0	1	45	26	0	77
% coll. containing species	33.3	0	-	0	0	0	-	1.3
Av. no. specimens per sample	3.5	-	-	-	-	-	-	3.5
1957 Total no. collections	6	11	6	21	45	17	13	119
% coll. containing species	50.0	36.4	0	9.5	11.1	11.8	7.7	14.3
Av. no. specimens per sample	2.7	4.5	-	1.0	1.0	4.5	3.5	2.7
1958 Total no. collections	6	16	4	8	22	16	12	84
% coll. containing species	66.7	37.5	50.0	37.5	0	0	16.7	20.2
Av. no. specimens per sample	6.9	3.8	3.5	4.1	-	-	2.2	4.4
1959 Total no. collections	38	24	0	7	1	2	14	86
% coll. containing species	60.5	79.2	-	100.0	100.0	100.0	100.0	76.7
Av. no. specimens per sample	161.7	82.4	-	14.7	1.0	1.0	5.1	82.8
1960 Total no. collections	56	51	29	22	24	23	44	249
% coll. containing species	67.8	58.8	17.2	72.7	0	0	43.1	43.4
Av. no. specimens per sample	71.1	16.9	4.8	39.9	-	-	20.3	39.4

Table 24

Summary of Acleris variana Collections by Drainage Divisions.  
East Prince Rupert Ranger District. All hosts included.

Year	120	121	122	123	Total
1949 Total no. collections	10	1	2	0	13
% coll. containing species	20.0	0	0	-	15.4
Av. no. specimens per sample	2.3	-	-	-	2.3
1950 Total no. collections	13	3	21	0	37
% coll. containing species	0	0	4.8	-	2.7
Av. no. specimens per sample	-	-	1.0	-	1.0
1951 Total no. collections	80	13	54	0	147
% coll. containing species	20.0	0	5.6	-	12.9
Av. no. specimens per sample	14.1	-	4.0	-	12.3
1952 Total no. collections	47	52	149	0	248
% coll. containing species	27.7	36.5	15.4	-	22.2
Av. no. specimens per sample	18.9	31.2	2.4	-	16.2
1953 Total no. collections	60	48	152	0	260
% coll. containing species	15.0	43.8	18.4	-	22.3
Av. no. specimens per sample	7.2	2.1	2.3	-	2.9
1954 Total no. collections	4	8	82	13	107
% coll. containing species	0	37.5	31.7	46.2	32.7
Av. no. specimens per sample	-	1.0	7.1	4.6	6.1
1955 Total no. collections	45	31	114	9	199
% coll. containing species	8.9	16.1	17.5	33.3	16.1
Av. no. specimens per sample	2.9	5.7	2.9	1.8	3.3
1956 Total no. collections	48	15	43	8	114
% coll. containing species	2.1	13.3	14.0	0	7.9
Av. no. specimens per sample	1.0	1.0	2.7	-	2.1
1957 Total no. collections	40	16	31	4	91
% coll. containing species	12.5	6.3	12.9	0	11.0
Av. no. specimens per sample	1.0	3.5	2.8	-	2.0
1958 Total no. collections	13	30	43	4	90
% coll. containing species	0	3.3	9.3	0	5.6
Av. no. specimens per sample	-	1.0	1.0	-	1.0
1959 Total no. collections	40	27	50	7	124
% coll. containing species	10.0	25.9	16.0	14.3	16.1
Av. no. specimens per sample	3.4	1.7	2.6	1.0	2.3
1960 Total no. collections	38	18	39	4	99
% coll. containing species	2.6	0	2.5	0	2.0
Av. no. specimens per sample	1.0	-	1.0	-	1.0

Table 25

Summary of Acleris variana Collections by Host Trees.  
South Vancouver Island Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	B	Bg	Ba	S	C	Pl		
1949	Total no. collections	91	0	0	19	0	0	0	0	110
	% coll. containing species	0	-	-	5.3	-	-	-	-	0.9
	Av. no. specimens per sample	-	-	-	1.0	-	-	-	-	1.0
1950	Total no. collections	83	0	14	0	0	0	0	0	97
	% coll. containing species	4.8	-	7.1	-	-	-	-	-	5.2
	Av. no. specimens per sample	2.3	-	1.0	-	-	-	-	-	2.0
1951	Total no. collections	129	179	51	0	0	24	95	8	486
	% coll. containing species	10.1	7.3	5.9	-	-	4.2	1.1	0	6.4
	Av. no. specimens per sample	5.2	2.7	2.7	-	-	1.0	1.0	-	3.6
1952	Total no. collections	157	99	34	11	0	22	0	0	323
	% coll. containing species	26.1	6.1	11.8	0	-	18.2	-	-	17.0
	Av. no. specimens per sample	13.0	3.0	2.6	-	-	3.4	-	-	10.4
1953	Total no. collections	143	159	28	32	0	20	0	0	382
	% coll. containing species	21.0	3.1	21.4	3.1	-	5.0	-	-	11.3
	Av. no. specimens per sample	5.2	1.0	2.7	1.0	-	1.0	-	-	4.7
1954	Total no. collections	55	34	11	0	1	8	3	0	112
	% coll. containing species	18.2	2.9	9.1	-	0	12.5	0	-	11.6
	Av. no. specimens per sample	33.2	1.0	1.0	-	-	8.0	-	-	23.3
1955	Total no. collections	31	20	2	0	1	2	2	1	59
	% coll. containing species	6.5	5.0	0	-	0	0	0	0	5.1
	Av. no. specimens per sample	16.8	1.0	-	-	-	-	-	-	11.5
1956	Total no. collections	73	61	14	8	0	14	17	8	195
	% coll. containing species	32.9	13.1	28.6	50.0	-	28.6	0	25.0	23.6
	Av. no. specimens per sample	1.7	2.3	1.6	3.4	-	5.1	-	1.0	3.1

Table 25 - continued

Year	Hosts									Total
	H	F	B	Bg	Ba	S	C	Pl		
1957	Total no. collections	98	68	8	2	1	7	8	0	192
	% coll. containing species	50.0	10.3	25.0	0.	100.0	14.3	12.5	-	31.8
	Av. no. specimens per sample	1.6	2.4	2.3	-	1.0	15.0	1.0	-	6.4
1958	Total no. collections	23	9	2	2	0	1	0	0	37
	% coll. containing species	56.5	0	0	0	-	100.0	-	-	37.8
	Av. no. specimens per sample	2.7	-	-	-	-	1.0	-	-	2.6
1959	Total no. collections	40	6	5	0	0	4	5	0	60
	% coll. containing species	15.0	0	0	-	-	0	0	-	10.0
	Av. no. specimens per sample	2.6	-	-	-	-	-	-	-	2.6
1960	Total no. collections	110	50	14	8	0	9	22	4	217
	% coll. containing species	1.8	0	0	0	-	11.1	0	0	1.4
	Av. no. specimens per sample	2.3	-	-	-	-	1.0	-	-	1.8

Table 26

Summary of Acleris variana Collections by Drainage Divisions  
North Vancouver Island Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	B	Bg	Ba	S	C	Pl		
1949	Total no. collections	227	0	0	21	0	0	0	0	248
	% coll. containing species	0	-	-	0	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1950	Total no. collections	126	0	40	0	0	0	0	0	166
	% coll. containing species	0	-	0	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1951	Total no. collections	317	180	52	0	0	37	43	18	647
	% coll. containing species	3.2	0	0	-	-	0	2.3	0	1.7
	Av. no. specimens per sample	1.3	-	-	-	-	-	1.0	-	1.2
1952	Total no. collections	190	109	51	0	6	11	0	0	367
	% coll. containing species	8.9	1.8	5.9	-	16.7	9.1	-	-	6.5
	Av. no. specimens per sample	2.3	1.0	2.7	-	1.0	1.0	-	-	2.1
1953	Total no. collections	230	121	33	8	1	14	0	8	415
	% coll. containing species	15.2	1.7	27.3	12.5	0	0	-	0	11.3
	Av. no. specimens per sample	5.3	1.0	5.1	1.0	-	-	-	-	5.0
1954	Total no. collections	177	61	16	1	2	7	5	0	269
	% coll. containing species	39.5	6.6	12.5	0	0	0	0	-	28.3
	Av. no. specimens per sample	40.7	1.0	25.0	-	-	-	-	-	32.6
1955	Total no. collections	74	21	12	0	2	3	1	3	116
	% coll. containing species	41.9	0	33.3	0	0	33.3	0	0	31.0
	Av. no. specimens per sample	29.7	-	13.0	-	-	8.0	-	-	27.2
1956	Total no. collections	131	31	9	8	2	7	11	1	200
	% coll. containing species	74.0	29.0	44.4	0	50.0	0	0	0	55.6
	Av. no. specimens per sample	91.0	2.3	22.5	-	3.5	-	-	-	80.6



Table 27

Summary of Acleris variana Collections by Host Trees.  
South Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	B	Bg	Ba	S	C	Pl		
1949	Total no. collections	116	0	0	0	0	0	0	0	116
	% coll. containing species	0.9	-	-	-	-	-	-	-	0.9
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1950	Total no. collections	186	0	25	0	0	0	0	0	211
	% coll. containing species	2.7	-	4.0	-	-	-	-	-	2.8
	Av. no. specimens per sample	2.0	-	1.0	-	-	-	-	-	1.8
1951	Total no. collections	112	62	6	0	0	6	47	5	238
	% coll. containing species	1.8	0	0	-	-	0	0	0	0.8
	Av. no. specimens per sample	3.5	-	-	-	-	-	-	-	3.5
1952	Total no. collections	266	128	42	1	0	13	0	0	450
	% coll. containing species	12.0	0.8	16.7	0	-	0	-	-	8.9
	Av. no. specimens per sample	6.7	3.5	1.7	-	-	-	-	-	5.7
1953	Total no. collections	124	57	23	0	0	2	0	0	206
	% coll. containing species	19.4	1.8	43.5	-	-	0	-	-	17.0
	Av. no. specimens per sample	7.1	1.0	4.1	-	-	-	-	-	5.8
1954	Total no. collections	81	59	6	0	2	2	14	0	164
	% coll. containing species	32.1	13.6	50.0	-	50.0	0	7.1	-	23.8
	Av. no. specimens per sample	13.8	2.2	3.3	-	1.0	-	1.0	-	10.0
1955	Total no. collections	74	48	8	0	5	4	11	6	156
	% coll. containing species	36.5	25.0	25.0	-	0	0	9.1	16.7	27.6
	Av. no. specimens per sample	6.7	5.9	9.4	-	-	-	1.0	1.0	6.3
1956	Total no. collections	73	53	5	0	4	4	21	7	167
	% coll. containing species	21.9	35.8	0	-	50.0	25.0	9.5	0	24.0
	Av. no. specimens per sample	4.6	2.6	-	-	3.5	3.5	2.2	-	3.4

Table 27 - continued

Year	Hosts								Total	
	H	F	B	Bg	Ba	S	C	Pl		
1957	Total no. collections	91	58	2	6	1	4	4	0	166
	% coll. containing species	51.6	27.6	50.0	50.0	0	25.0	0	-	41.0
	Av. no. specimens per sample	10.6	3.4	8.0	17.7	-	3.5	-	-	9.1
1958	Total no. collections	27	13	0	0	4	0	0	0	44
	% coll. containing species	37.0	7.7	-	-	75.0	-	-	-	31.8
	Av. no. specimens per sample	3.6	1.0	-	-	1.8	-	-	-	3.0
1959	Total no. collections	50	23	8	0	0	0	7	0	88
	% coll. containing species	6.0	0	0	-	-	-	14.3	-	4.5
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0	-	1.0
1960	Total no. collections	59	63	10	2	3	4	10	11	162
	% coll. containing species	3.3	3.1	0	0	0	0	0	9.0	3.1
	Av. no. specimens per sample	2.2	2.3	-	-	-	-	-	3.5	2.5



Table 28

Summary of *Acleris variana* Collections by Host Trees.  
North Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	B	Bg	Ba	S+Se	C	Pl		
1949	Total no. collections	97	0	0	1	0	0	0	0	98
	% coll. containing species	1.0	-	-	0	-	-	-	-	1.0
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1950	Total no. collections	19	0	1	0	0	0	0	0	20
	% coll. containing species	0	-	0	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1951	Total no. collections	103	48	17	0	0	8	34	5	215
	% coll. containing species	1.0	2.1	0	-	-	0	0	20.0	1.4
	Av. no. specimens per sample	1.0	1.0	-	-	-	-	-	3.5	1.8
1952	Total no. collections	31	21	1	0	0	0	0	0	53
	% coll. containing species	0	0	0	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1953	Total no. collections	107	40	12	3	0	19	0	0	181
	% coll. containing species	6.5	0	0	33.3	-	0	-	-	4.4
	Av. no. specimens per sample	1.7	-	-	1.0	-	-	-	-	1.6
1954	Total no. collections	19	10	1	0	0	1	0	0	31
	% coll. containing species	10.5	0	0	-	-	0	-	-	6.5
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	-	1.0
1955	Total no. collections	41	10	1	1	1	2	12	0	68
	% coll. containing species	14.6	0	0	0	0	0	0	-	8.8
	Av. no. specimens per sample	10.8	-	-	-	-	-	-	-	10.8
1956	Total no. collections	100	26	6	1	0	28	19	1	181
	% coll. containing species	51.0	15.4	16.7	100.0	-	35.7	0	0	37.0
	Av. no. specimens per sample	9.8	1.6	8.0	1.0	-	2.5	-	-	8.1



Table 29

Summary of *Acleris variana* Collections by Host Trees.  
South Prince Rupert Ranger District. All Drainage Divisions included

Year		Hosts						Pl	Total
		H	F	B	Ba	S 1/	C		
1949	Total no. collections	82	0	0	0	0	0	0	82
	% coll. containing species	0	-	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1950	Total no. collections	85	0	21	0	33	0	0	139
	% coll. containing species	2.4	-	0	-	3.0	-	-	2.2
	Av. no. specimens per sample	2.2	-	-	-	1.0	-	-	1.8
1951	Total no. collections	8	3	1	0	5	0	0	17
	% coll. containing species	0	33.3	0	-	20.0	-	-	11.8
	Av. no. specimens per sample	-	1.0	-	-	1.0	-	-	1.0
1952	Total no. collections	12	0	3	0	6	9	0	30
	% coll. containing species	41.7	-	33.3	-	16.7	0	-	23.3
	Av. no. specimens per sample	1.5	-	1.0	-	1.0	-	-	1.4
1953	Total no. collections	23	4	5	0	8	4	0	44
	% coll. containing species	34.8	0	40.0	-	0	0	-	22.7
	Av. no. specimens per sample	6.3	-	3.5	-	-	-	-	5.7
1954	Total no. collections	77	5	8	0	40	16	0	146
	% coll. containing species	49.4	20.0	37.5	-	42.5	0	-	40.4
	Av. no. specimens per sample	38.5	3.5	21.2	-	6.1	-	-	27.7
1955	Total no. collections	15	2	2	0	2	4	0	25
	% coll. containing species	100.0	50.0	50.0	-	50.0	50.0	-	80.0
	Av. no. specimens per sample	28.3	1.0	15.0	-	8.0	2.3	-	22.6
1956	Total no. collections	52	5	2	0	24	0	2	85
	% coll. containing species	65.4	40.0	100.0	-	62.5	-	50.0	63.5
	Av. no. specimens per sample	17.2	3.5	2.3	-	2.9	-	1.0	12.0
1957	Total no. collections	0	1	0	0	0	0	0	1
	% coll. containing species	-	0	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1958	Total no. collections	33	10	4	1	6	0	0	54
	% coll. containing species	3.0	0	0	0	0	-	-	1.9
	Av. no. specimens per sample	1.0	-	-	-	-	-	-	1.0
1959	Total no. collections	40	8	1	0	5	8	0	62
	% coll. containing species	62.5	25.0	0	-	20.0	12.5	-	46.8
	Av. no. specimens per sample	9.1	1.0	-	-	3.5	8.0	-	8.3
1960	Total no. collections	72	5	0	0	58	10	1	146
	% coll. containing species	56.9	0	-	-	18.9	10.0	0	36.3
	Av. no. specimens per sample	17.5	-	-	-	4.9	1.0	-	14.6

1/ S, Sb, Sw, Se.



Table 30 - continued

Year	Hosts								Total	
	H	F	B	Ba	Bg	S	C	Pl		
1957	Total no. collections	80	0	0	6	0	33	0	0	119
	% coll. containing species	16.3	-	-	0	-	12.1	-	-	14.3
	Av. no. specimens per sample	3.2	-	-	-	-	1.0	-	-	2.7
1958	Total no. collections	61	0	2	0	3	18	0	0	84
	% coll. containing species	26.2	-	0	-	0	5.6	-	-	20.2
	Av. no. specimens per sample	4.5	-	-	-	-	1.0	-	-	4.4
1959	Total no. collections	55	0	1	1	0	24	5	0	86
	% coll. containing species	94.4	-	100.0	100.0	-	45.8	40.0	-	76.7
	Av. no. specimens per sample	106.4	-	1.0	1.0	-	3.5	2.3	-	82.9
1960	Total no. collections	150	0	17	10	0	67	2	3	249
	% coll. containing species	56.0	-	11.7	0	-	32.8	0	0	43.4
	Av. no. specimens per sample	48.9	-	3.5	-	-	6.4	-	-	39.4

Table 31

Summary of Acleris variana Collections by Host Trees.  
East Prince Rupert Ranger District. All Drainage Divisions included.

Year	Hosts								Total	
	H	F	B	Ba	S	Sw	Pl	C		
1949	Total no. collections	2	0	7	0	0	4	0	0	13
	% coll. containing species	0	-	14.3	-	-	25.0	-	-	15.4
	Av. no. specimens per sample	-	-	1.0	-	-	3.5	-	-	2.3
1950	Total no. collections	0	0	8	0	7	22	-	-	37
	% coll. containing species	-	-	0	-	0	4.5	-	-	2.7
	Av. no. specimens per sample	-	-	-	-	-	1.0	-	-	1.0
1951	Total no. collections	3	4	8	65	2	65	0	0	147
	% coll. containing species	100.0	0	37.5	10.8	0	9.2	-	-	12.9
	Av. no. specimens per sample	10.3	-	222.0	11.2	-	9.8	-	-	12.3
1952	Total no. collections	5	0	47	27	2	118	49	0	248
	% coll. containing species	100.0	-	27.7	55.6	0	17.8	2.0	-	22.2
	Av. no. specimens per sample	2.5	-	16.0	38.3	-	45.5	1.0	-	16.2
1953	Total no. collections	7	4	3	62	20	96	67	1	260
	% coll. containing species	100.0	0	33.3	54.8	5.0	14.6	0	100.0	22.3
	Av. no. specimens per sample	4.1	-	3.5	2.7	8.0	2.7	-	1.0	2.9
1954	Total no. collections	5	4	1	44	11	41	0	1	107
	% coll. containing species	100.0	25.0	0	40.9	18.2	19.5	-	0	32.7
	Av. no. specimens per sample	8.0	3.5	-	7.8	2.0	3.4	-	-	6.1
1955	Total no. collections	17	6	0	58	2	113	0	3	199
	% coll. containing species	17.6	16.7	-	24.1	50.0	11.5	-	0	16.1
	Av. no. specimens per sample	1.8	3.5	-	4.0	3.5	2.7	-	-	3.3
1956	Total no. collections	9	2	0	40	8	44	11	0	114
	% coll. containing species	11.1	0	-	12.5	25.0	2.3	0	-	7.9
	Av. no. specimens per sample	1.0	-	-	2.5	2.3	1.0	-	-	2.1

Table 31 - continued

Year	H	F	B	Ba	S	Hosts Sw	Pl	C	Total
1957 Total no. collections	19	1	0	30	1	40	0	0	91
% coll. containing species	15.8	0	-	16.7	0	5.0	-	-	11.0
Av. no. specimens per sample	1.8	-	-	2.4	-	1.0	-	-	2.0
1958 Total no. collections	13	0	2	28	0	47	0	0	90
% coll. containing species	0	-	0	14.3	-	2.1	-	-	5.6
Av. no. specimens per sample	-	-	-	1.0	-	1.0	-	-	1.0
1959 Total no. collections	18	2	2	43	6	51	0	2	124
% coll. containing species	22.2	0	0	16.3	16.7	15.7	-	0	16.1
Av. no. specimens per sample	1.6	-	-	2.1	1.0	3.1	-	-	2.3
1960 Total no. collections	3	2	1	17	15	42	19	0	99
% coll. containing species	0	0	0	5.8	0	2.3	0	-	2.0
Av. no. specimens per sample	-	-	-	1.0	-	1.0	-	-	1.0

Table 32

Summary of Melanolophia imitata Collections by Ranger Districts,  
Coastal British Columbia. All hosts included.  
Infestations are indicated by lines.

Year	Ranger Districts							
	S.V.I.	N.V.I.	S.V.	N.V.	S.P.R.	W.P.R.	E.P.R.	
1949	Total no. collections	376	557	321	379	83	38	2
	% coll. containing species	10.4	9.7	11.5	8.4	8.4	2.6	0
	Av. no. specimens per sample	2.6	2.9	3.6	2.4	1.0	1.0	-
1950	Total no. collections	142	263	366	47	72	57	1
	% coll. containing species	7.0	7.6	10.1	8.5	1.4	1.8	0
	Av. no. specimens per sample	2.9	2.9	4.5	5.8	1.0	8.0	-
1951	Total no. collections	447	587	281	337	13	34	5
	% coll. containing species	8.5	6.5	4.3	2.7	7.7	2.9	0
	Av. no. specimens per sample	15.2	3.4	3.4	1.5	1.0	1.0	-
1952	Total no. collections	314	309	400	62	10	165	115
	% coll. containing species	5.4	3.2	1.5	0	0	0	0
	Av. no. specimens per sample	25.4	1.0	2.2	-	-	-	-
1953	Total no. collections	313	297	131	184	7	242	168
	% coll. containing species	14.1	2.0	11.5	3.8	57.1	30.6	1.2
	Av. no. specimens per sample	3.5	1.0	2.0	1.4	3.4	2.6	1.0
1954	Total no. collections	39	163	83	24	124	208	62
	% coll. containing species	2.6	2.5	16.9	0	4.8	13.9	0
	Av. no. specimens per sample	1.0	2.3	1.4	-	1.8	2.2	-
1955	Total no. collections	67	131	155	111	24	106	181
	% coll. containing species	0	3.1	6.5	10.8	37.5	16.0	1.1
	Av. no. specimens per sample	-	1.0	1.2	1.4	3.9	1.6	1.0
1956	Total no. collections	205	188	170	180	163	45	37
	% coll. containing species	9.3	4.3	32.4	39.4	23.3	15.6	0
	Av. no. specimens per sample	1.9	1.0	2.9	3.1	3.6	1.4	-
1957	Total no. collections	174	252	158	59	1	94	77
	% coll. containing species	24.1	30.2	61.4	62.7	0	2.1	6.5
	Av. no. specimens per sample	2.6	1.5	14.0	9.4	-	1.0	1.5
1958	Total no. collections	135	260	114	100	63	41	30
	% coll. containing species	46.7	56.2	70.2	34.0	31.7	14.6	3.3
	Av. no. specimens per sample	3.2	6.3	40.5	7.0	4.3	2.6	1.0
1959	Total no. collections	151	314	214	104	59	121	126
	% coll. containing species	57.0	49.7	50.9	63.5	42.4	28.1	8.7
	Av. no. specimens per sample	24.8	19.8	12.0	4.7	5.6	2.9	2.5
1960	Total no. collections	243	344	135	68	150	179	56
	% coll. containing species	37.4	42.2	25.2	29.4	15.3	16.2	0
	Av. no. specimens per sample	39.9	6.3	1.9	2.1	2.0	3.4	-



Table 33

Summary of *Melanolophia imitata* Collections by Drainage Divisions.  
 South Vancouver Island Ranger District. All hosts included.  
 Infestations are indicated by lines.

Year	001	002	003	004	005	Total
1949 Total no. collections	124	80	69		103	376
% coll. containing species	8.9	20.0	4.3	.	8.7	10.4
Av. no. specimens per sample	3.2	3.1	1.0	.	1.5	2.6
1950 Total no. collections	18	45	60		19	142
% coll. containing species	5.6	6.7	8.3		5.3	7.0
Av. no. specimens per sample	1.0	2.6	3.4		3.5	2.9
1951 Total no. collections	121	133	71		122	447
% coll. containing species	6.6	6.0	7.0		13.9	8.5
Av. no. specimens per sample	3.4	2.9	34.3		19.7	15.2
1952 Total no. collections	31	94	97		92	314
% coll. containing species	3.2	4.3	4.1		8.7	5.4
Av. no. specimens per sample	1.0	2.7	46.8		28.2	25.4
1953 Total no. collections	118	111	48		36	313
% coll. containing species	5.9	3.6	56.3		16.7	14.1
Av. no. specimens per sample	1.4	3.4	4.3		2.7	3.5
1954 Total no. collections	3	18	17		1	39
% coll. containing species	0	5.6	0		0	2.6
Av. no. specimens per sample	-	1.0	-		-	1.0
1955 Total no. collections		30	25		12	67
% coll. containing species		0	0		0	0
Av. no. specimens per sample		-	-		-	-
1956 Total no. collections	19	70	49	31	37	205
% coll. containing species	10.5	8.6	10.2	19.4	0	9.3
Av. no. specimens per sample	2.2	2.3	1.5	1.8	-	1.9
1957 Total no. collections	8	69	24	19	54	174
% coll. containing species	0	14.5	33.3	68.4	20.4	24.1
Av. no. specimens per sample	-	3.2	2.5	2.1	2.4	2.6
1958 Total no. collections	4	32	22	11	66	135
% coll. containing species	0	46.9	63.6	27.3	47.0	46.7
Av. no. specimens per sample	-	3.4	5.6	2.7	2.1	3.2
1959 Total no. collections	11	49	38	10	43	151
% coll. containing species	9.1	26.5	81.6	30.0	88.4	57.0
Av. no. specimens per sample	1.0	3.4	12.2	3.8	44.6	24.8
1960 Total no. collections	7	92	46	29	69	243
% coll. containing species	28.6	14.1	30.5	13.8	84.6	37.4
Av. no. specimens per sample	1.0	4.4	13.8	1.5	58.1	39.9

Table 34

Summary of *Melanolophia imitata* Collections by Drainage Divisions.  
North Vancouver Island Ranger District. All hosts included.  
Infestations are indicated by lines.

Year	021	022	023	024	025	026	Total
1949 Total no. collections		374	73	6	104		557
% coll. containing species		10.7	12.3	0	4.8		9.7
Av. no. specimens per sample		3.0	9.0	-	1.5		2.9
1950 Total no. collections		190	3	70			263
% coll. containing species		7.9	33.3	5.7			7.6
Av. no. specimens per sample		3.1	1.0	4.0			2.9
1951 Total no. collections		352	96	8	131		587
% coll. containing species		6.8	6.3	0	6.1		6.5
Av. no. specimens per sample		2.9	6.8	-	2.8		3.4
1952 Total no. collections		253	2	0	54		309
% coll. containing species		4.0	0		0		3.2
Av. no. specimens per sample		10.0	-		-		1.0
1953 Total no. collections		187	64	3	43		297
% coll. containing species		1.6	4.7	0	0		2.0
Av. no. specimens per sample		1.0	1.0	-	-		1.0
1954 Total no. collections	48	41	1	30	41	2	163
% coll. containing species	2.1	2.4	0	0	4.9	0	2.5
Av. no. specimens per sample	1.0	1.0	-	-	3.5	-	2.3
1955 Total no. collections	60	36	6	8	21	0	131
% coll. containing species	1.7	5.6	0	0	4.8	-	3.1
Av. no. specimens per sample	1.0	1.0	-	-	1.0	-	1.0
1956 Total no. collections	63	61	3	13	41	7	188
% coll. containing species	4.8	4.9	0	0	4.9	0	4.3
Av. no. specimens per sample	1.0	1.0	-	-	1.0	-	1.0
1957 Total no. collections	71	91	7	36	37	10	252
% coll. containing species	19.7	36.3	14.3	19.4	51.4	20.0	30.2
Av. no. specimens per sample	2.1	2.2	3.5	2.8	2.7	1.0	1.5
1958 Total no. collections	78	53	39	13	72	5	260
% coll. containing species	46.2	50.9	82.1	69.2	51.4	100.0	56.2
Av. no. specimens per sample	4.5	2.2	14.4	3.4	5.2	3.5	6.3
1959 Total no. collections	104	48	60	53	43	6	314
% coll. containing species	21.2	20.8	71.7	75.5	83.7	83.3	49.7
Av. no. specimens per sample	3.9	2.5	30.5	17.2	26.6	2.4	19.8
1960 Total no. collections	92	63	48	44	88	6	341
% coll. containing species	38.0	38.1	0	47.7	69.3	83.3	42.8
Av. no. specimens per sample	3.7	3.2	-	4.3	10.1	2.8	6.3

Table 35

Summary of *Melanolophia imitata* Collections by Drainage Divisions.  
 South Vancouver Island Ranger District. All hosts included.  
 Infestations are indicated by lines.

Year	Drainage Divisions						Total	
	040	041	042	043	044	045		
1949	Total no. collections		58	231	5	9	18	321
	% coll. containing species		12.1	13.0	0	0	0	11.5
	Av. no. specimens per sample		2.8	3.6	-	-	-	3.6
1950	Total no. collections		103	232	6	24	1	366
	% coll. containing species		8.7	11.6	0	4.2	0	10.1
	Av. no. specimens per sample		2.4	5.2	-	3.5	-	4.5
1951	Total no. collections		70	179	10	18	4	281
	% coll. containing species		7.1	3.9	0	0	0	4.3
	Av. no. specimens per sample		2.5	4.1	-	-	-	3.4
1952	Total no. collections		85	253	45	15	2	400
	% coll. containing species		0	1.6	4.4	0	0	1.5
	Av. no. specimens per sample		-	2.9	1.0	-	-	2.2
1953	Total no. collections		53	56	3	18	1	131
	% coll. containing species		15.1	12.5	0	0	0	11.5
	Av. no. specimens per sample		1.6	2.4	-	-	-	2.0
1954	Total no. collections	12	0	56	5	1	9	83
	% coll. containing species	0	-	19.6	20.0	0	22.2	16.9
	Av. no. specimens per sample	-	-	1.5	1.0	-	1.0	1.4
1955	Total no. collections	31	35	47	8	22	12	155
	% coll. containing species	9.7	2.9	6.4	0	9.1	8.3	6.5
	Av. no. specimens per sample	1.0	1.0	1.0	-	2.2	1.0	1.2
1956	Total no. collections	26	18	59	19	11	37	170
	% coll. containing species	26.9	0	44.1	26.3	27.3	37.8	32.4
	Av. no. specimens per sample	2.7	-	3.4	1.0	1.0	4.2	2.9
1957	Total no. collections	18	10	81	18	10	21	158
	% coll. containing species	72.2	0	76.5	38.9	70.0	38.1	61.4
	Av. no. specimens per sample	15.7	-	17.0	3.1	7.8	4.9	14.0
1958	Total no. collections	3	10	82	5	2	12	114
	% coll. containing species	33.3	20.0	82.9	40.0	50.0	50.0	70.2
	Av. no. specimens per sample	3.5	2.2	50.6	5.8	1.0	4.9	40.5
1959	Total no. collections	27	5	110	11	37	24	214
	% coll. containing species	29.6	0	77.3	36.4	21.6	16.7	50.9
	Av. no. specimens per sample	4.0	-	14.6	2.2	2.6	2.9	12.0
1960	Total no. collections	16	12	43	5	34	25	135
	% coll. containing species	31.3	16.7	39.5	0	20.6	12.0	25.2
	Av. no. specimens per sample	3.0	2.3	1.6	-	1.7	1.8	1.9

Table 36

Summary of Melanolophia imitata Collections by Drainage Divisions.  
North Vancouver Ranger District. All hosts included.

Year	Drainage Divisions									Total
	060	061	062	063	064	065	066	067	068	
1949	Total no. collections	223		72			49		35	379
	% coll. containing species	13.9		0			0		2.9	8.4
	Av. no. specimens per sample	2.4		-			-		1.0	2.4
1950	Total no. collections	39		2			6		0	47
	% coll. containing species	7.7		50.0			0		-	8.5
	Av. no. specimens per sample	2.7		15.0			-		-	5.8
1951	Total no. collections	208		116			13			337
	% coll. containing species	2.9		2.6			0			2.7
	Av. no. specimens per sample	1.8		1.0			-			1.5
1952	Total no. collections	43		6			12		1	62
	% coll. containing species	0		0			0		0	0
	Av. no. specimens per sample	-		-			-		-	-
1953	Total no. collections	76		87			8		13	184
	% coll. containing species	6.6		1.1			0		7.7	3.8
	Av. no. specimens per sample	1.5		1.0			-		1.0	1.4
1954	Total no. collections	3	21	0	0	0	0	0	0	24
	% coll. containing species	0	0	-	-	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-	-
1955	Total no. collections	0	20	3	39	24	2	8	0	111
	% coll. containing species	-	25.0	0	2.6	4.2	50.0	0	-	10.8
	Av. no. specimens per sample	-	1.5	-	1.0	1.0	1.0	-	-	1.4
1956	Total no. collections	0	31	0	47	36	13	18	23	180
	% coll. containing species	-	3.2	-	48.9	50.0	53.8	50.0	39.1	39.4
	Av. no. specimens per sample	-	3.5	-	3.7	3.9	1.7	1.8	2.1	3.1

Table 36 - continued

Year	Drainage Divisions									Total	
	060	061	062	063	064	065	066	067	068		
1957	Total no. collections	0	29	0	12	4	13	0	0	1	59
	% coll. containing species	-	41.4	-	83.3	75.0	92.3	-	-	-	62.7
	Av. no. specimens per sample	-	10.1	-	5.3	6.5	12.8	-	-	-	9.4
1958	Total no. collections	0	55	0	31	14	0	0	0	0	100
	% coll. containing species	-	14.5	-	48.4	78.6	-	-	-	-	34.0
	Av. no. specimens per sample	-	1.9	-	6.1	11.8	-	-	-	-	7.0
1959	Total no. collections	3	46	4	10	17	11	11	2	0	104
	% coll. containing species	100.0	82.6	25.0	60.0	23.5	63.6	45.5	100.0	-	63.5
	Av. no. specimens per sample	1.8	4.5	1.0	4.6	5.8	5.7	6.2	4.5	-	4.7
1960	Total no. collections	1	44	3	5	8	7	0	0	0	68
	% coll. containing species	100.0	31.8	0	60.0	12.5	14.3	-	-	-	29.4
	Av. no. specimens per sample	3.5	2.3	-	1.8	1.0	1.0	-	-	-	2.1

Table 37

Summary of *Melanolophia imitata* Collections by Drainage Divisions.  
South Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions				Total	
	080	081	082	083		
1949	Total no. collections	0	7	76	0	83
	% coll. containing species	-	14.3	7.9	-	8.4
	Av. no. specimens per sample	-	1.0	1.0	-	1.0
1950	Total no. collections	0	12	7	53	72
	% coll. containing species	-	0	14.3	0	1.4
	Av. no. specimens per sample	-	-	1.0	-	1.0
1951	Total no. collections	9	4	0	0	13
	% coll. containing species	11.1	0	-	-	7.7
	Av. no. specimens per sample	1.0	-	-	-	1.0
1952	Total no. collections	0	0	2	8	10
	% coll. containing species	-	-	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1953	Total no. collections	0	1	1	5	7
	% coll. containing species	-	0	0	80.0	57.1
	Av. no. specimens per sample	-	-	-	3.4	3.4
1954	Total no. collections	0	52	16	56	124
	% coll. containing species	-	5.8	0	5.4	4.8
	Av. no. specimens per sample	-	1.8	-	1.8	1.8
1955	Total no. collections	0	18	6	0	24
	% coll. containing species	-	50.0	0	-	37.5
	Av. no. specimens per sample	-	3.9	-	-	3.9
1956	Total no. collections	12	50	6	95	163
	% coll. containing species	25.0	52.0	16.7	8.4	23.3
	Av. no. specimens per sample	1.0	4.2	1.0	2.9	3.6
1957	Total no. collections	1	0	0	0	1
	% coll. containing species	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1958	Total no. collections	4	32	27	0	63
	% coll. containing species	50.0	31.3	29.6	-	31.7
	Av. no. specimens per sample	16.7	2.9	2.9	-	4.3
1959	Total no. collections	7	24	12	16	59
	% coll. containing species	71.4	41.7	25.0	43.8	42.4
	Av. no. specimens per sample	15.2	3.2	5.0	2.4	5.6
1960	Total no. collections	16	41	9	84	150
	% coll. containing species	25.0	12.1	11.1	15.4	15.3
	Av. no. specimens per sample	1.0	1.0	1.0	2.4	2.0

Table 38

Summary of Melanolophia imitata Collections by Drainage Divisions.  
West Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions							Total
	100	101	102	103	104	105	106	
1949	4			17	10	6	1	38
	25.0			0	0	0	0	2.6
	1.0			-	-	-	-	1.0
1950	1			32	2	2	20	57
	0			0	0	0	5.0	1.8
	-			-	-	-	8.0	8.0
1951	0			24	2	1	7	34
	-			4.2	0	0	0	2.9
	-			1.0	-	-	-	1.0
1952	66			30	48	21	0	165
	0			0	0	0	-	0
	-			-	-	-	-	-
1953	60			30	69	41	42	242
	48.3			10.0	44.9	24.4	2.4	30.6
	2.9			1.8	2.8	2.0	1.0	2.6
1954	26	19	3	58	58	14	30	208
	0	5.3	33.3	10.3	25.9	28.6	6.7	13.9
	-	1.0	3.5	1.8	2.2	3.5	1.0	2.2
1955	3	18	15	29	22	19	0	106
	0	0	13.3	17.2	13.6	36.8	-	16.0
	-	-	1.0	1.5	1.0	2.1	-	1.6
1956	0	27	0	0	17	1	0	45
	-	7.4	-	-	29.4	0	-	15.6
	-	1.0	-	-	1.5	-	-	1.4
1957	6	6	0	14	24	30	14	94
	16.7	0	-	0	4.2	0	0	2.1
	1.0	-	-	-	1.0	-	-	1.0
1958	0	0	1	8	22	2	8	41
	-	-	0	12.5	22.7	0	0	14.6
	-	-	-	3.5	2.4	-	-	2.6
1959	24	39	0	7	10	6	35	121
	25.0	12.8	-	28.6	70.0	50.0	31.4	28.1
	4.2	3.9	-	2.3	2.7	1.0	2.8	2.9
1960	46	47	29	16	10	3	28	179
	23.9	8.5	10.3	25.0	20.0	66.7	10.7	16.2
	3.6	1.6	6.5	4.6	2.3	2.3	1.8	3.4

Table 39

Summary of Melanolophia imitata Collections by Drainage Divisions.  
East Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions				Total	
	120	121	122	123		
1949	Total no. collections	2	0	0	0	2
	% coll. containing species	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1950	Total no. collections	0	0	1	0	1
	% coll. containing species	-	-	0	-	0
	Av. no. specimens per sample	-	-	-	-	-
1951	Total no. collections	5	0	0	0	5
	% coll. containing species	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1952	Total no. collections	9	8	98	0	115
	% coll. containing species	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-
1953	Total no. collections	28	21	119	0	168
	% coll. containing species	0	4.8	0.8		1.2
	Av. no. specimens per sample	-	1.0	1.0		1.0
1954	Total no. collections	2	5	45	10	62
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1955	Total no. collections	45	29	99	8	181
	% coll. containing species	0	0	2.0	0	1.1
	Av. no. specimens per sample	-	-	1.0	-	1.0
1956	Total no. collections	19	9	9		37
	% coll. containing species	0	0	0		0
	Av. no. specimens per sample	-	-	-		-
1957	Total no. collections	29	17	27	4	77
	% coll. containing species	13.8	0	3.7	0	6.5
	Av. no. specimens per sample	1.6	-	1.0	-	1.5
1958	Total no. collections	2	10	15	3	30
	% coll. containing species	0	0	6.7	0	3.3
	Av. no. specimens per sample	-	-	1.0	-	1.0
1959	Total no. collections	32	26	61	7	126
	% coll. containing species	6.3	11.5	6.6	28.6	8.7
	Av. no. specimens per sample	1.0	5.0	1.6	2.3	2.5
1960	Total no. collections	24	8	21	3	56
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-



Table 40

Summary of *Melanolophia imitata* Collections by Host Trees.  
 South Vancouver Island Ranger District. All Drainage Divisions included.

Year	Hosts							Total	
	H	F	C	B	Bg	S	Pl		
1949	Total no. collections	123	94	70	20	38	31	0	376
	% coll. containing species	7.3	13.8	10.0	10.0	13.2	9.7	-	10.4
	Av. no. specimens per sample	2.1	2.5	2.7	2.2	3.4	1.0	-	2.6
1950	Total no. collections	80	31	13	14	4	0	0	142
	% coll. containing species	8.8	3.2	0	7.1	25.0	-	-	7.0
	Av. no. specimens per sample	3.4	3.5	-	1.0	1.0	-	-	2.9
1951	Total no. collections	142	150	77	40	73	25	0	447
	% coll. containing species	13.4	9.3	2.6	5.0	0	0	-	8.5
	Av. no. specimens per sample	23.8	5.3	15.5	9.2	-	-	-	15.2
1952	Total no. collections	137	79	49	27	0	22	0	314
	% coll. containing species	5.8	3.8	8.2	3.7	-	4.5	-	5.4
	Av. no. specimens per sample	42.5	1.0	17.4	8.0	-	1.0	-	25.4
1953	Total no. collections	106	103	45	25	20	14	0	313
	% coll. containing species	25.5	6.8	2.2	24.0	0	21.4	-	14.1
	Av. no. specimens per sample	4.7	1.3	1.0	4.5	-	1.8	-	3.5
1954	Total no. collections	20	16	1	0	0	2	0	39
	% coll. containing species	0	6.3	0	-	-	0	-	2.6
	Av. no. specimens per sample	-	1.0	-	-	-	-	-	1.0
1955	Total no. collections	35	24	3	3	0	2	0	67
	% coll. containing species	0	0	0	0	-	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-	-
1956	Total no. collections	75	71	19	13	13	14	0	205
	% coll. containing species	6.7	14.1	5.3	7.7	15.4	0	-	9.3
	Av. no. specimens per sample	1.5	2.2	1.0	1.0	2.2	-	-	1.9

Table 40 - continued

Year	Hosts							Total	
	H	F	C	B	Bg	S	Pl		
1957	Total no. collections	88	64	8	6	2	6	0	174
	% coll. containing species	22.7	26.6	25.0	0	100.0	16.7	-	24.1
	Av. no. specimens per sample	2.7	2.5	3.5	-	2.2	1.0	-	2.6
1958	Total no. collections	79	31	7	8	5	5	0	135
	% coll. containing species	50.0	48.4	57.1	12.5	40.0	60.0	-	46.7
	Av. no. specimens per sample	3.5	2.2	2.2	8.0	5.7	2.7	-	3.2
1959	Total no. collections	80	31	12	11	7	7	3	151
	% coll. containing species	67.5	29.0	58.3	63.6	28.6	85.7	33.3	57.0
	Av. no. specimens per sample	26.5	25.1	49.0	7.6	2.2	11.7	1.0	24.8
1960	Total no. collections	119	66	27	15	7	5	4	243
	% coll. containing species	46.2	24.2	44.4	26.7	14.3	60.0	0	37.4
	Av. no. specimens per sample	43.8	37.2	46.3	8.3	1.0	12.0	-	39.9

Table 41

Summary of Melanolophia imitata Collections by Host Trees.  
North Vancouver Island Ranger District. All Drainage Divisions included.

Year	Hosts							Total	
	H	F	C	B	Bg	Ba	S		
1949	Total no. collections	255	112	77	0	22	44	47	557
	% coll. containing species	9.8	17.0	6.5	-	9.1	0	6.4	9.7
	Av. no. specimens per sample	3.0	3.3	2.5	-	4.5	-	1.0	2.9
1950	Total no. collections	139	44	28	47	5	0	0	263
	% coll. containing species	5.0	15.9	10.7	4.3	20.0	-	-	7.6
	Av. no. specimens per sample	2.7	3.5	2.7	2.3	3.5	-	-	2.9
1951	Total no. collections	304	147	40	51	10	0	35	587
	% coll. containing species	6.9	5.4	7.5	5.9	10.0	-	5.7	6.5
	Av. no. specimens per sample	3.8	4.3	3.0	2.7	1.0	-	1.0	3.4
1952	Total no. collections	150	87	21	42	0	0	9	309
	% coll. containing species	2.7	5.7	0	2.4	-	-	0	3.2
	Av. no. specimens per sample	1.0	1.0	-	1.0	-	-	-	1.0
1953	Total no. collections	134	94	34	17	7	0	11	297
	% coll. containing species	1.5	3.2	0	0	14.3	-	0	2.0
	Av. no. specimens per sample	1.0	1.0	-	-	1.0	-	-	1.0
1954	Total no. collections	125	36	1	0	0	0	1	163
	% coll. containing species	3.2	0	0	-	-	-	0	2.5
	Av. no. specimens per sample	2.3	-	-	-	-	-	-	2.3
1955	Total no. collections	84	27	2	15	0	0	3	131
	% coll. containing species	3.6	0	0	6.7	-	-	0	3.1
	Av. no. specimens per sample	1.0	-	-	1.0	-	-	-	1.0
1956	Total no. collections	126	29	10	9	8	2	4	188
	% coll. containing species	4.8	3.4	0	0	12.5	0	0	4.3
	Av. no. specimens per sample	1.0	1.0	-	-	1.0	-	-	1.0

Table 41 - continued

Year	H	F	C	B	Bg	Hosts		Total
						Ba	S	
1957 Total no. collections	178	42	6	16	5	0	5	252
% coll. containing species	34.3	21.4	16.7	0	60.0	0	40.0	30.2
Av. no. specimens per sample	2.5	1.6	1.0	-	1.8	-	1.0	1.5
1958 Total no. collections	168	37	13	18	9	1	14	260
% coll. containing species	56.5	70.3	69.2	22.2	77.8	0	35.7	56.2
Av. no. specimens per sample	7.4	3.3	5.5	2.3	2.8	-	2.0	6.3
1959 Total no. collections	180	49	24	30	11	2	18	314
% coll. containing species	60.0	26.5	41.7	23.3	54.5	50.0	61.1	49.7
Av. no. specimens per sample	23.6	5.8	28.1	11.0	1.8	1.0	9.2	19.8
1960 Total no. collections	183	54	23	35	3	0	43	341
% coll. containing species	47.5	38.9	52.2	25.7	100.0	-	32.6	42.8
Av. no. specimens per sample	7.2	2.9	5.5	4.8	2.6	-	8.6	6.3

Table 42

Summary of Melanolophia imitata Collections by Host Trees.  
South Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts							Total	
	H	F	C	B	Bg	Ba	S		
1949	Total no. collections	188	52	60	10	0	0	11	321
	% coll. containing species	14.4	3.8	13.3	0	-	-	0	11.5
	Av. no. specimens per sample	4.2	3.5	2.2	-	-	-	-	3.6
1950	Total no. collections	194	77	63	32	0	0	0	366
	% coll. containing species	10.8	9.1	12.7	3.1	-	-	-	10.1
	Av. no. specimens per sample	4.2	5.1	5.2	1.0	-	-	-	4.5
1951	Total no. collections	136	67	60	7	4	0	7	281
	% coll. containing species	3.7	7.5	3.3	0	0	-	0	4.3
	Av. no. specimens per sample	2.9	4.5	2.2	-	-	-	-	3.4
1952	Total no. collections	210	88	62	33	0	0	7	400
	% coll. containing species	1.9	2.3	0	0	-	-	0	1.5
	Av. no. specimens per sample	2.9	1.0	-	-	-	-	-	2.2
1953	Total no. collections	66	26	10	19	0	0	10	131
	% coll. containing species	12.1	11.5	10.0	15.8	-	-	0	11.5
	Av. no. specimens per sample	2.6	1.0	1.0	1.8	-	-	-	2.0
1954	Total no. collections	52	24	6	0	0	0	1	83
	% coll. containing species	19.2	16.7	0	-	-	-	0	16.9
	Av. no. specimens per sample	1.2	1.6	-	-	-	-	-	1.4
1955	Total no. collections	73	59	11	8	0	0	4 <sup>1/</sup>	155
	% coll. containing species	8.2	6.8	0	0	-	-	0	6.5
	Av. no. specimens per sample	1.0	1.6	-	-	-	-	-	1.2
1956	Total no. collections	77	56	24	5	0	4	4	170
	% coll. containing species	32.5	30.4	45.8	0	-	25.0	25.0	32.4
	Av. no. specimens per sample	3.4	2.6	2.3	-	-	1.0	3.5	2.9

Table 42 - continued

Year	H	F	C	B	Hosts Bg	Ba	S	Total
1957 Total no. collections	85	57	4	2	6	0	4	158
% coll. containing species	69.4	57.9	25.0	50.0	50.0	-	0	61.4
Av. no. specimens per sample	18.6	7.5	8.0	1.0	2.7	-	-	14.0
1958 Total no. collections	68	38	1	1	0	4	2	114
% coll. containing species	80.9	57.9	0	0	-	75.0	0	70.2
Av. no. specimens per sample	44.4	24.5	-	-	-	4.2	-	40.5
1959 Total no. collections	106	81	24	0	0	0	3	214
% coll. containing species	65.1	32.1	58.3	-	-	-	0	50.9
Av. no. specimens per sample	16.2	3.8	6.3	-	-	-	-	12.0
1960 Total no. collections	55	60	9	6	1	1	3	135
% coll. containing species	29.1	21.7	55.6	0	0	0	0	25.2
Av. no. specimens per sample	1.8	1.8	2.5	-	-	-	-	1.9

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Table 43

Summary of Melanolophia imitata Collections by Host Trees.  
North Vancouver Ranger District. All Drainage Divisions included.

Year	Hosts						Total	
	H	F	C	B	Bg	S		
1949	Total no. collections	193	67	62	27	2	28	379
	% coll. containing species	9.8	10.4	6.5	7.4	0	0	8.4
	Av. no. specimens per sample	3.3	1.0	1.0	2.3	-	-	2.4
1950	Total no. collections	18	15	13	1	0	0	47
	% coll. containing species	11.1	13.3	0	0	-	-	8.5
	Av. no. specimens per sample	9.3	2.3	-	-	-	-	5.8
1951	Total no. collections	153	89	66	18	2	9	337
	% coll. containing species	2.6	2.2	3.0	0	50.0	0	2.7
	Av. no. specimens per sample	1.0	1.0	3.5	-	1.0	-	1.5
1952	Total no. collections	28	21	12	1	0	0	62
	% coll. containing species	0	0	0	0	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1953	Total no. collections	100	36	16	12	2	18	184
	% coll. containing species	4.0	5.6	0	0	0	5.6	3.8
	Av. no. specimens per sample	1.0	2.3	-	-	-	1.0	1.4
1954	Total no. collections	14	9	0	0	0	1	24
	% coll. containing species	0	0	-	-	-	0	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1955	Total no. collections	61	24	15	2	3	6	111
	% coll. containing species	8.2	16.7	13.3	0	33.3	0	10.8
	Av. no. specimens per sample	2.0	1.0	1.0	-	1.0	-	1.4
1956	Total no. collections	100	26	19	6	1	28	180
	% coll. containing species	44.0	38.5	47.4	0	100.0	25.0	39.4
	Av. no. specimens per sample	3.3	3.2	2.4	-	8.0	1.7	3.1
1957	Total no. collections	36	16	1	1	0	5	59
	% coll. containing species	66.7	43.8	100.0	100.0	-	80.0	62.7
	Av. no. specimens per sample	12.2	4.4	3.5	3.5	-	4.0	9.4
1958	Total no. collections	59	32	8	1	0	0	100
	% coll. containing species	37.3	31.3	12.5	100.0	-	-	34.0
	Av. no. specimens per sample	8.8	3.9	1.0	3.5	-	-	7.0
1959	Total no. collections	71	24	1	0	0	8	104
	% coll. containing species	69.0	66.7	0	-	-	12.5	63.5
	Av. no. specimens per sample	5.2	3.1	-	-	-	3.5	4.7
1960	Total no. collections	42	15	3	0	0	8	68
	% coll. containing species	28.6	53.3	0	-	-	0	29.4
	Av. no. specimens per sample	2.2	2.3	-	-	-	-	2.1

Table 44

Summary of Melanolophia imitata Collections by Host Trees.  
South Prince Rupert Ranger District. All Drainage Divisions included.

Year	Hosts						Total	
	H	F	C	B	S	Sw		
1949	Total no. collections	83	0	0	0	0	0	83
	% coll. containing species	8.4	-	-	-	-	-	8.4
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0
1950	Total no. collections	70	2	0	0	0	0	72
	% coll. containing species	0	50.0	-	-	-	-	1.4
	Av. no. specimens per sample	-	1.0	-	-	-	-	1.0
1951	Total no. collections	8	0	0	0	5	0	13
	% coll. containing species	0	-	-	-	20.0	-	7.7
	Av. no. specimens per sample	-	-	-	-	1.0	-	1.0
1952	Total no. collections	4	1	2	2	1	0	10
	% coll. containing species	0	0	0	0	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1953	Total no. collections	4	1	1	1	0	0	7
	% coll. containing species	50.0	0	100.0	100.0	0	0	57.1
	Av. no. specimens per sample	1.0	-	8.0	3.5	-	-	3.4
1954	Total no. collections	65	3	14	6	36 <sup>1/</sup>	0	124
	% coll. containing species	7.7	0	7.1	0	0	-	4.8
	Av. no. specimens per sample	1.5	-	3.5	-	-	-	1.8
1955	Total no. collections	15	2	4	1	2	0	24
	% coll. containing species	40.0	0	25.0	100.0	50.0	-	37.5
	Av. no. specimens per sample	6.2	-	3.5	3.5	1.0	-	3.9
1956	Total no. collections	94	5	6	7	30	21	163
	% coll. containing species	31.9	20.0	50.0	0	10.0	4.8	23.3
	Av. no. specimens per sample	3.4	3.5	6.5	-	2.7	3.5	3.6
1957	Total no. collections	0	1	0	0	0	0	1
	% coll. containing species	-	0	-	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1958	Total no. collections	33	10	10	4	4	2 <sup>2/</sup>	63
	% coll. containing species	39.4	10.0	20.0	50.0	50.0	0	31.7
	Av. no. specimens per sample	2.9	1.0	2.7	15.5	2.2	-	4.3
1959	Total no. collections	40	6	8	0	5	0	59
	% coll. containing species	5.3	0	50.0	-	0	-	42.4
	Av. no. specimens per sample	4.9	-	9.5	-	-	-	5.6
1960	Total no. collections	75	5	10	0	60	0	150
	% coll. containing species	24.0	0	10.0	-	6.7	-	15.3
	Av. no. specimens per sample	1.9	-	1.0	-	2.2	-	2.0

<sup>1/</sup> Includes three Se

<sup>2/</sup> Includes two Sb



Table 45

Summary of *Melanolophia imitata* Collections by Host Trees.  
West Prince Rupert Ranger District. All Drainage Divisions included.

Year	Hosts						Total	
	H	C	B	Ba	S	Sw		
1949	Total no. collections	38	0	0	0	0	0	38
	% coll. containing species	2.6	-	-	-	-	-	2.6
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0
1950	Total no. collections	57	0	0	0	0	0	57
	% coll. containing species	1.8	-	-	-	-	-	1.8
	Av. no. specimens per sample	8.0	-	-	-	-	-	8.0
1951	Total no. collections	24	0	0	0	10	0	34
	% coll. containing species	4.2	-	-	-	0	-	2.9
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0
1952	Total no. collections	89	17	17	0	42	0	165
	% coll. containing species	0	0	0	-	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1953	Total no. collections	115	42	12	3	70	0	242
	% coll. containing species	43.5	35.7	33.3	0	7.1	-	30.6
	Av. no. specimens per sample	2.7	3.1	1.0	-	2.0	-	2.6
1954	Total no. collections	111	29	18	0	46	4	208
	% coll. containing species	16.2	27.6	16.7	-	0	0	13.9
	Av. no. specimens per sample	2.4	1.9	1.8	-	-	-	2.2
1955	Total no. collections	63	15	10	4	8	6	106
	% coll. containing species	14.3	26.7	20.0	25.0	12.5	0	16.0
	Av. no. specimens per sample	2.1	1.0	1.0	1.0	1.0	-	1.6
1956	Total no. collections	29	4	2	0	8	2	45
	% coll. containing species	13.8	25.0	50.0	-	0	50.0	15.6
	Av. no. specimens per sample	1.6	1.0	1.0	-	-	1.0	1.4
1957	Total no. collections	52	13	0	6	22	1	94
	% coll. containing species	3.8	0	-	0	0	0	2.1
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0
1958	Total no. collections	31	2	2	0	5	1	41
	% coll. containing species	16.1	0	50.0	-	0	0	14.6
	Av. no. specimens per sample	2.8	-	1.0	-	-	-	2.6
1959	Total no. collections	82	6	3	0	30	0	121
	% coll. containing species	35.4	16.7	66.7	-	6.7	-	28.1
	Av. no. specimens per sample	3.3	1.0	1.0	-	1.0	-	2.9
1960	Total no. collections	113	1	15	1	49	0	179
	% coll. containing species	21.2	0	26.6	0	2.0	-	16.2
	Av. no. specimens per sample	3.4	-	4.0	-	1.0	-	3.4



Table 47

Summary of *Lambdina f. lugubrosa* Collections by Ranger Districts.  
Coastal British Columbia. All hosts included.

Year	Ranger Districts							
	S.V.I.	N.V.I.	S.V.	N.V.	S.P.R.	W.P.R.	E.P.I.	
1949	Total no. collections	278	472	283	287	206	89	24
	% coll. containing species	1.1	2.1	3.2	2.8	22.3	15.7	0
	Av. no. specimens per sample	1.0	1.3	1.8	1.9	2.4	3.4	-
1950	Total no. collections	140	254	365	55	157	296	8
	% coll. containing species	0	0.4	4.4	0	3.2	0.7	0
	Av. no. specimens per sample	-	3.5	1.9	-	1.7	1.0	-
1951	Total no. collections	359	526	229	203	7	2	6
	% coll. containing species	0.8	1.5	6.6	1.0	28.6	0	0
	Av. no. specimens per sample	1.0	1.6	2.0	1.0	3.5	-	-
1952	Total no. collections	332	305	384	34	30	204	80
	% coll. containing species	1.5	2.0	6.5	0	10.0	4.9	1.3
	Av. no. specimens per sample	3.4	1.4	2.6	-	1.8	2.3	1.0
1953	Total no. collections	399	470	201	196	47	339	190
	% coll. containing species	2.0	1.7	14.4	17.3	17.0	16.5	2.6
	Av. no. specimens per sample	2.5	1.6	3.2	3.8	1.6	3.1	2.5
1954	Total no. collections	96	246	161	31	143	278	101
	% coll. containing species	6.3	1.6	19.3	9.7	11.9	26.6	10.9
	Av. no. specimens per sample	9.0	2.2	4.6	13.0	8.7	6.3	3.6
1955	Total no. collections	60	112	113	108	23	167	223
	% coll. containing species	8.3	1.8	12.4	11.1	47.8	26.9	4.9
	Av. no. specimens per sample	3.9	1.0	2.2	2.2	2.3	5.5	3.3
1956	Total no. collections	153	144	118	137	55	27	12
	% coll. containing species	4.6	1.4	22.0	8.8	45.5	11.1	0
	Av. no. specimens per sample	1.7	2.3	2.4	2.0	5.6	1.0	-
1957	Total no. collections	139	227	140	46	1	84	14
	% coll. containing species	2.9	1.8	20.7	17.4	0	2.4	0
	Av. no. specimens per sample	1.0	1.0	4.0	2.6	-	1.0	-
1958	Total no. collections	68	248	93	75	60	39	16
	% coll. containing species	11.8	7.3	46.2	16.0	60.0	15.4	0
	Av. no. specimens per sample	1.9	2.0	9.7	4.5	4.8	1.8	-
1959	Total no. collections	92	190	150	66	61	107	66
	% coll. containing species	7.6	14.2	35.3	20.0	19.7	6.5	1.5
	Av. no. specimens per sample	2.7	3.2	11.7	1.7	2.0	1.7	1.0
1960	Total no. collections	225	336	144	89	148	213	63
	% coll. containing species	5.3	6.1	12.5	6.7	4.1	3.3	0
	Av. no. specimens per sample	1.7	4.4	3.1	2.7	3.0	1.7	-

Table 48

Summary of *Lambdina f. lugubrosa* Collections by Drainage Divisions.  
South Vancouver Island Ranger District. All hosts included.

Year	Drainage Divisions					Total	
	001	002	003	004	005		
1949	Total no. collections	71	70	39		98	278
	% coll. containing species	2.8	0	0		1.0	1.1
	Av. no. specimens per sample	1.0	-	-		1.0	1.0
1950	Total no. collections	18	57	52		13	140
	% coll. containing species	0	0	0		0	0
	Av. no. specimens per sample	-	-	-		-	-
1951	Total no. collections	94	101	61		103	359
	% coll. containing species	0	0	3.3		1.0	0.8
	Av. no. specimens per sample	-	-	1.0		1.0	1.0
1952	Total no. collections	55	124	68		85	332
	% coll. containing species	0	0	7.4		0	1.5
	Av. no. specimens per sample	-	-	3.4		-	3.4
1953	Total no. collections	159	132	49		59	399
	% coll. containing species	0	0	16.3		0	2.0
	Av. no. specimens per sample	-	-	2.5		-	2.5
1954	Total no. collections	5	32	23	1	35	96
	% coll. containing species	0	0	21.7	0	2.9	6.3
	Av. no. specimens per sample	-	-	10.1	-	3.5	9.0
1955	Total no. collections	0	28	23	0	9	60
	% coll. containing species	-	3.6	13.0	-	11.1	8.3
	Av. no. specimens per sample	-	1.0	5.0	-	1.0	3.9
1956	Total no. collections	4	57	50	7	35	153
	% coll. containing species	0	1.8	10.0	0	2.9	4.6
	Av. no. specimens per sample	-	1.0	2.0	-	1.0	1.7
1957	Total no. collections	8	48	19	19	45	139
	% coll. containing species	0	0	21.1	0	0	2.9
	Av. no. specimens per sample	-	-	1.0	-	-	1.0
1958	Total no. collections	2	20	22	9	15	68
	% coll. containing species	0	5.0	27.3	0	6.7	11.8
	Av. no. specimens per sample	-	1.0	2.2	-	1.0	1.9
1959	Total no. collections	0	27	33	4	28	92
	% coll. containing species	-	0	18.2	0	3.6	7.6
	Av. no. specimens per sample	-	-	3.0	-	1.0	2.7
1960	Total no. collections	19	88	37	5	76	225
	% coll. containing species	0	2.3	8.1	0	9.2	5.3
	Av. no. specimens per sample	-	2.3	1.8	-	1.3	1.7

Table 49

Summary of Lambdina f. lugubrosa Collections by Drainage Divisions.  
North Vancouver Island Ranger District. All hosts included.

Year	Drainage Divisions						Total	
	021	022	023	024	025	026		
1949	Total no. collections	304	65	3	100		472	
	% coll. containing species	2.3	3.1	0	1.0		2.1	
	Av. no. specimens per sample	1.0	2.2	-	1.0		1.3	
1950	Total no. collections	194	0	58	2		254	
	% coll. containing species	0.5	-	0	0		0.4	
	Av. no. specimens per sample	3.5	-	-	-		3.5	
1951	Total no. collections	314	81	8	123		526	
	% coll. containing species	0.6	6.2	0	0.8		1.5	
	Av. no. specimens per sample	2.2	1.5	-	1.0		1.6	
1952	Total no. collections	255	2	1	47		305	
	% coll. containing species	2.4	0	0	0		2.0	
	Av. no. specimens per sample	1.4	-	-	-		1.4	
1953	Total no. collections	289	65	37	79		470	
	% coll. containing species	1.7	4.6	0	0		1.7	
	Av. no. specimens per sample	1.5	1.8	-	-		1.6	
1954	Total no. collections	51	48	71	31	40	5	246
	% coll. containing species	0	6.3	1.4	0	0	0	1.6
	Av. no. specimens per sample	-	2.7	1.0	-	-	-	2.2
1955	Total no. collections	44	35	6	8	19	0	112
	% coll. containing species	4.5	0	0	0	0	-	1.8
	Av. no. specimens per sample	1.0	-	-	-	-	-	1.0
1956	Total no. collections	37	55	2	9	41	0	144
	% coll. containing species	5.4	0	0	0	0	-	1.4
	Av. no. specimens per sample	2.3	-	-	-	-	-	2.3
1957	Total no. collections	57	90	7	31	38	4	227
	% coll. containing species	1.8	0	0	3.2	5.3	0	1.8
	Av. no. specimens per sample	1.0	-	-	1.0	1.0	-	1.0
1958	Total no. collections	73	49	39	11	72	4	248
	% coll. containing species	1.4	4.1	17.9	0	11.1	0	7.3
	Av. no. specimens per sample	1.0	1.0	1.4	-	3.4	-	2.0
1959	Total no. collections	25	31	56	38	36	4	190
	% coll. containing species	8.0	0	23.2	13.2	19.4	0	14.2
	Av. no. specimens per sample	2.3	-	2.3	5.3	5.4	-	3.2
1960	Total no. collections	68	70	49	48	95	6	336
	% coll. containing species	2.9	2.9	0	10.4	12.6	0	6.1
	Av. no. specimens per sample	1.0	2.3	-	1.0	6.7	-	4.4

Table 50

Summary of *Lambdina f. lugubrosa* Collections by Drainage Divisions.  
South Vancouver Ranger District. All hosts included.

Year	Drainage Divisions						Total	
	040	041	042	043	044	045		
1949	Total no. collections	51	205	9	3	15	283	
	% coll. containing species	3.9	2.9	0	33.3		3.2	
	Av. no. specimens per sample	1.0	2.3	-	1.0		1.8	
1950	Total no. collections	101	236	6	21	1	365	
	% coll. containing species	4.0	4.7	0	4.8	0	4.4	
	Av. no. specimens per sample	2.2	1.9	-	1.0	-	1.9	
1951	Total no. collections	66	136	6	17	4	229	
	% coll. containing species	4.5	8.8	0	0	0	6.6	
	Av. no. specimens per sample	1.8	2.1	-	-	-	2.0	
1952	Total no. collections	95	252	19	16	2	384	
	% coll. containing species	4.2	7.5	10.5	0	0	6.5	
	Av. no. specimens per sample	1.6	3.0	1.0	-	-	2.6	
1953	Total no. collections	71	73	11	45	1	201	
	% coll. containing species	12.7	12.3	18.2	20.0	0	14.4	
	Av. no. specimens per sample	4.2	3.9	1.0	2.1	-	3.2	
1954	Total no. collections	47	6	65	19	14	10	161
	% coll. containing species	14.9	0	13.8	21.1	28.6	70.0	19.3
	Av. no. specimens per sample	2.8	-	2.7	1.0	2.9	11.8	4.6
1955	Total no. collections	17	14	42	6	22	12	113
	% coll. containing species	0	0	14.3	16.7	27.3	8.3	12.4
	Av. no. specimens per sample	-	-	1.8	3.5	2.7	1.0	2.2
1956	Total no. collections	17	15	28	10	11	37	118
	% coll. containing species	0	0	25.0	30.0	36.4	32.4	22.0
	Av. no. specimens per sample	-	-	1.7	2.3	1.0	3.0	2.4
1957	Total no. collections	18	6	75	17	9	15	140
	% coll. containing species	22.2	0	26.7	11.8	11.1	13.3	20.7
	Av. no. specimens per sample	2.5	-	5.0	4.5	3.5	2.2	4.0
1958	Total no. collections	2	3	69	5	2	12	93
	% coll. containing species	0	0	59.4	0	0	16.7	46.2
	Av. no. specimens per sample	-	-	8.1	-	-	2.2	9.7
1959	Total no. collections	20	0	94	8	11	17	150
	% coll. containing species	5.0	-	53.2	0	9.1	5.9	35.3
	Av. no. specimens per sample	1.0	-	12.3	-	1.0	1.0	11.7
1960	Total no. collections	20	9	61	4	18	32	144
	% coll. containing species	10.0	0	16.4	0	0	18.8	12.5
	Av. no. specimens per sample	4.5	-	3.8	-	-	1.4	3.1

Table 51

Summary of Lambdina f. lugubrosa Collections by Drainage Divisions.  
North Vancouver Ranger District. All hosts included.

Year	Drainage Divisions									Total
	060	061	062	063	064	065	066	067	068	
1949	Total no. collections	171		47			46		23	287
	% coll. containing species	2.9		0			0		13.0	2.8
	Av. no. specimens per sample	1.5		-			-		2.7	1.9
1950	Total no. collections	40		6			9			55
	% coll. containing species	0		0			0			0
	Av. no. specimens per sample	-		-			-			-
1951	Total no. collections	87		105		11				203
	% coll. containing species	0		1.9		0				1.0
	Av. no. specimens per sample	-		1.0		-				1.0
1952	Total no. collections	13		6		14			1	34
	% coll. containing species	0		0		0			0	0
	Av. no. specimens per sample	-		-		-			-	-
1953	Total no. collections	78		91		14			13	196
	% coll. containing species	16.7		15.4		0			53.8	17.3
	Av. no. specimens per sample	6.8		1.7		-			2.1	3.8
1954	Total no. collections	3	26	0	2	0	0	0	0	31
	% coll. containing species	0	11.5	-	0	-	-	-	-	9.7
	Av. no. specimens per sample	-	13.0	-	-	-	-	-	-	13.0
1955	Total no. collections	0	19	3	37	24	2	10	0	108
	% coll. containing species	-	15.8	0	2.7	8.3	50.0	0	-	38.5
	Av. no. specimens per sample	-	2.8	-	1.0	1.0	1.0	-	-	5.4
1956	Total no. collections	0	1	0	47	36	13	5	23	137
	% coll. containing species	-	0	-	4.3	13.9	7.7	0	4.3	25.0
	Av. no. specimens per sample	-	-	-	3.5	1.5	1.0	-	1.0	2.7





Table 52

Summary of *Lambdina f. lugubrosa* Collections by Drainage Divisions.  
South Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions				Total	
	080	081	082	083		
1949	Total no. collections	72	40	94	0	206
	% coll. containing species	2.8	10.0	42.6	-	22.3
	Av. no. specimens per sample	1.0	2.2	2.5	-	2.4
1950	Total no. collections	0	29	8	120	157
	% coll. containing species	-	3.4	12.5	2.5	3.2
	Av. no. specimens per sample	-	1.0	1.0	1.5	1.7
1951	Total no. collections	4	0	3	0	7
	% coll. containing species	25.0	-	33.3	-	28.6
	Av. no. specimens per sample	3.5	-	3.5	-	3.5
1952	Total no. collections	0	4	18	8	30
	% coll. containing species	-	0	16.7	0	10.0
	Av. no. specimens per sample	-	-	1.8	-	1.8
1953	Total no. collections	5	23	13	6	47
	% coll. containing species	0	17.4	7.7	50.0	17.0
	Av. no. specimens per sample	-	1.6	1.0	1.8	1.6
1954	Total no. collections	0	59	16	68	143
	% coll. containing species	-	10.2	68.8	0	11.9
	Av. no. specimens per sample	-	14.6	5.1	-	8.7
1955	Total no. collections	0	17	6	0	23
	% coll. containing species	-	47.1	50.0	-	47.8
	Av. no. specimens per sample	-	1.9	1.8	-	2.3
1956	Total no. collections	12	37	6	0	55
	% coll. containing species	8.3	54.1	66.7	-	45.5
	Av. no. specimens per sample	3.5	6.2	2.7	-	5.6
1957	Total no. collections	1	0	0	0	1
	% coll. containing species	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-
1958	Total no. collections	4	30	26	0	60
	% coll. containing species	25.0	63.3	61.5	-	60.0
	Av. no. specimens per sample	1.0	6.3	3.2	-	4.8
1959	Total no. collections	7	25	13	16	61
	% coll. containing species	28.6	32.0	15.4	0	19.7
	Av. no. specimens per sample	2.2	1.9	2.2	-	2.0
1960	Total no. collections	11	40	9	88	148
	% coll. containing species	1.8	0	0	4.5	4.1
	Av. no. specimens per sample	4.5	-	-	2.2	3.0

Table 53

Summary of *Lambdina f. lugubrosa* Collections by Drainage Divisions  
West Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions							Total	
	100	101	102	103	104	105	106		
1949	Total no. collections		1		30	34	23	1	89
	% coll. containing species		0		16.7	20.6	4.3	100.0	15.7
	Av. no. specimens per sample		-		3.9	2.8	1.0	8.0	3.4
1950	Total no. collections		112		85	47	9	43	296
	% coll. containing species		0		2.4	0	0	0	0.7
	Av. no. specimens per sample		-		1.0	-	-	-	1.0
1951	Total no. collections		0		0	1	1	0	2
	% coll. containing species		-		-	0	0	-	0
	Av. no. specimens per sample		-		-	-	-	-	-
1952	Total no. collections		67		22	75	39	1	204
	% coll. containing species		0		9.1	8.0	5.1	0	4.9
	Av. no. specimens per sample		-		2.2	2.1	1.0	-	2.3
1953	Total no. collections		60		53	111	73	42	339
	% coll. containing species		0		3.8	31.5	26.0	0	16.5
	Av. no. specimens per sample		-		8.0	3.1	2.4	-	3.1
1954	Total no. collections	26	19	5	58	82	58	30	278
	% coll. containing species	0	0	0	15.5	48.8	39.7	6.7	26.6
	Av. no. specimens per sample	-	-	-	6.7	6.7	5.3	1.0	6.3
1955	Total no. collections	5	18	15	30	48	46	5	167
	% coll. containing species	0	0	0	26.7	47.9	28.3	20.0	26.9
	Av. no. specimens per sample	-	-	-	8.0	6.8	4.3	1.0	5.5
1956	Total no. collections	0	0	0	0	27	0	0	27
	% coll. containing species	-	-	-	-	11.1	-	-	11.1
	Av. no. specimens per sample	-	-	-	-	1.0	-	-	1.0
1957	Total no. collections	0	0	4	19	30	23	8	84
	% coll. containing species	-	-	0	0	3.3	0	12.5	2.4
	Av. no. specimens per sample	-	-	-	-	1.0	-	1.0	1.0
1958	Total no. collections	0	0	1	8	22	1	7	39
	% coll. containing species	-	-	0	12.5	22.7	0	0	15.4
	Av. no. specimens per sample	-	-	-	1.0	2.0	-	-	1.8
1959	Total no. collections	24	36	6	1	8	4	28	107
	% coll. containing species	8.3	0	0	100.0	0	0	14.3	6.5
	Av. no. specimens per sample	2.3	-	-	3.5	-	-	1.0	1.7
1960	Total no. collections	52	49	30	23	10	4	45	213
	% coll. containing species	0	0	10.0	4.3	0	25.0	4.4	3.3
	Av. no. specimens per sample	-	-	1.0	1.0	-	3.5	2.3	1.7

Table 54

Summary of *Lambdina f. lugubrosa* Collections by Drainage Divisions.  
East Prince Rupert Ranger District. All hosts included.

Year	Drainage Divisions				Total	
	120	121	122	123		
1949	Total no. collections	12	10	2	24	
	% coll. containing species	0	0	0	0	
	Av. no. specimens per sample	-	-	-	-	
1950	Total no. collections	3	2	3	8	
	% coll. containing species	0	0	0	0	
	Av. no. specimens per sample	-	-	-	-	
1951	Total no. collections	3	0	3	6	
	% coll. containing species	0	-	0	0	
	Av. no. specimens per sample	-	-	-	-	
1952	Total no. collections	11	22	47	80	
	% coll. containing species	0	4.5	0	1.3	
	Av. no. specimens per sample	-	1.0	-	1.0	
1953	Total no. collections	35	33	122	190	
	% coll. containing species	0	0	4.1	2.6	
	Av. no. specimens per sample	-	-	2.5	2.5	
1954	Total no. collections	4	8	76	13	101
	% coll. containing species	0	0	5.3	53.8	10.9
	Av. no. specimens per sample	-	-	2.9	4.1	3.6
1955	Total no. collections	42	35	136	10	223
	% coll. containing species	0	5.7	3.7	40.0	4.9
	Av. no. specimens per sample	-	2.3	3.4	4.0	3.3
1956	Total no. collections	2	3	3	4	12
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1957	Total no. collections	2	4	6	2	14
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1958	Total no. collections	0	5	8	3	16
	% coll. containing species	-	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-
1959	Total no. collections	11	16	34	5	66
	% coll. containing species	0	0	2.9	0	1.5
	Av. no. specimens per sample	-	-	1.0	-	1.0
1960	Total no. collections	26	8	26	3	63
	% coll. containing species	0	0	0	0	0
	Av. no. specimens per sample	-	-	-	-	-

Table 55

Summary of *Lambdina f. lugubrosa* Collections by Host Trees.  
 South Vancouver Island Ranger District. All Drainage Divisions included.

Year	H	F	C	B	S	Total
1949 Total no. collections	113	76	60	0	29	278
% coll. containing species	0.9	2.6	0	-	0	1.1
Av. no. specimens per sample	1.0	1.0	-	-	-	1.0
1950 Total no. collections	85	38	17	0	0	140
% coll. containing species	0	0	0	-	-	0
Av. no. specimens per sample	-	-	-	-	-	-
1951 Total no. collections	123	141	71	0	24	359
% coll. containing species	1.6	0	1.4	-	0	0.8
Av. no. specimens per sample	1.0	-	1.0	-	-	1.0
1952 Total no. collections	132	111	65	0	24	332
% coll. containing species	3.8	0	0	-	0	1.5
Av. no. specimens per sample	3.4	-	-	-	-	3.4
1953 Total no. collections	137	152	63	27	20	399
% coll. containing species	5.1	0	0	3.7	0	2.0
Av. no. specimens per sample	2.7	-	-	1.0	-	2.5
1954 Total no. collections	50	34	3	0	9	96
% coll. containing species	10.0	0	0	-	11.1	6.3
Av. no. specimens per sample	10.6	-	-	-	1.0	9.0
1955 Total no. collections	30	24	3	3	0	60
% coll. containing species	13.3	4.2	0	0	-	8.3
Av. no. specimens per sample	4.6	1.0	-	-	-	3.9
1956 Total no. collections	69	45	12	13	14	153
% coll. containing species	4.3	2.2	0	7.7	14.3	4.6
Av. no. specimens per sample	1.8	1.0	-	1.0	2.2	1.7
1957 Total no. collections	70	53	7	4	5	139
% coll. containing species	5.7	0	0	0	0	2.9
Av. no. specimens per sample	1.0	-	-	-	-	1.0
1958 Total no. collections	34	23	4	5	2	68
% coll. containing species	17.6	0	25.0	20.0	0	11.8
Av. no. specimens per sample	1.8	-	1.0	3.5	-	1.9
1959 Total no. collections	65	16	6	0	5	92
% coll. containing species	9.2	0	16.7	-	0	7.6
Av. no. specimens per sample	3.0	-	1.0	-	-	2.7
1960 Total no. collections	122	53	24	16	10	225
% coll. containing species	7.4	0	8.3	0	10.0	5.3
Av. no. specimens per sample	1.8	-	1.0	-	1.0	1.7

Table 56

Summary of *Lambdina f. lugubrosa* Collections by Host Trees.  
North Vancouver Island Ranger District. All Drainage Divisions included.

Year		H	F	C	B	Ba	S	Total
1949	Total no. collections	245	106	75	0	0	46	472
	% coll. containing species	2.0	1.9	2.7	-	-	2.2	2.1
	Av. no. specimens per sample	1.5	1.0	1.0	-	-	1.0	1.3
1950	Total no. collections	153	70	31	0	0	0	254
	% coll. containing species	0.7	0	0	-	-	-	0.4
	Av. no. specimens per sample	3.5	-	-	-	-	-	3.5
1951	Total no. collections	304	147	40	0	0	35	526
	% coll. containing species	2.0	0	0	-	-	5.7	1.5
	Av. no. specimens per sample	1.8	-	-	-	-	1.0	1.6
1952	Total no. collections	159	111	26	0	0	9	305
	% coll. containing species	2.5	0	0	-	-	22.2	2.0
	Av. no. specimens per sample	1.6	-	-	-	-	1.0	1.4
1953	Total no. collections	237	141	45	33	0	14	470
	% coll. containing species	3.0	0	2.2	0	-	0	1.7
	Av. no. specimens per sample	1.7	-	1.0	-	-	-	1.6
1954	Total no. collections	173	60	5	0	0	8	246
	% coll. containing species	1.7	1.7	0	-	-	0	1.6
	Av. no. specimens per sample	1.8	3.5	-	-	-	-	2.2
1955	Total no. collections	76	21	1	14	0	0	112
	% coll. containing species	0	4.8	0	7.1	-	-	1.8
	Av. no. specimens per sample	-	1.0	-	1.0	-	-	1.0
1956	Total no. collections	106	20	3	9	2	4	144
	% coll. containing species	0.9	0	0	0	0	25.0	1.4
	Av. no. specimens per sample	3.5	-	-	-	-	1.0	2.3
1957	Total no. collections	166	35	6	14	0	6 <sup>1/</sup>	227
	% coll. containing species	1.2	0	0	0	-	33.3	1.8
	Av. no. specimens per sample	1.0	-	-	-	-	1.0	1.0
1958	Total no. collections	166	37	13	18	0	14	248
	% coll. containing species	7.8	0	15.4	0	-	21.4	7.3
	Av. no. specimens per sample	2.3	-	2.3	-	-	1.8	2.0
1959	Total no. collections	138	22	18	0	0	12	190
	% coll. containing species	14.5	9.1	16.7	-	-	16.7	14.2
	Av. no. specimens per sample	3.5	1.0	3.5	-	-	1.0	3.2
1960	Total no. collections	174	54	26	31	1	50	336
	% coll. containing species	4.5	1.8	15.3	3.2	0	14.0	6.1
	Av. no. specimens per sample	5.3	1.0	1.6	1.0	-	5.9	4.4

<sup>1/</sup> Includes 1 Sw

Table 57

Summary of Lambdina f. lugubrosa Collections by Host Trees.  
South Vancouver Ranger District. All Drainage Divisions included.

Year		H	F	C	B	Ba	S	Total
1949	Total no. collections	171	49	54	0	0	9	283
	% coll. containing species	4.7	0	1.9	-	-	0	3.2
	Av. no. specimens per sample	1.6	-	3.5	-	-	-	1.8
1950	Total no. collections	208	88	69	0	0	0	365
	% coll. containing species	5.3	2.3	4.3	-	-	-	4.4
	Av. no. specimens per sample	2.4	1.0	1.0	-	-	-	1.9
1951	Total no. collections	112	62	49	0	0	6	229
	% coll. containing species	10.7	0	4.1	-	-	16.7	6.6
	Av. no. specimens per sample	1.6	-	3.5	-	-	3.5	2.0
1952	Total no. collections	212	91	74	0	0	7	384
	% coll. containing species	9.0	2.2	5.4	-	-	0	6.5
	Av. no. specimens per sample	2.9	2.2	1.6	-	-	-	2.6
1953	Total no. collections	104	52	21	23	0	1	201
	% coll. containing species	16.3	9.6	9.5	21.7	-	0	14.4
	Av. no. specimens per sample	3.4	2.0	1.0	4.8	-	-	3.2
1954	Total no. collections	85	59	15	0	0	2	161
	% coll. containing species	17.6	22.0	20.0	-	-	0	19.3
	Av. no. specimens per sample	2.7	7.2	2.7	-	-	-	4.6
1955	Total no. collections	54	49	6	4	0	0	113
	% coll. containing species	9.3	18.4	0	0	-	-	12.4
	Av. no. specimens per sample	1.5	2.7	-	-	-	-	2.2
1956	Total no. collections	46	51	13	1	3	4	118
	% coll. containing species	17.4	23.5	30.8	0	33.3	25.0	22.0
	Av. no. specimens per sample	1.9	2.6	2.2	-	3.5	3.5	2.4
1957	Total no. collections	79	51	4	2	0	4	140
	% coll. containing species	26.6	13.7	25.0	0	-	0	20.7
	Av. no. specimens per sample	4.5	3.7	3.5	-	-	-	4.0
1958	Total no. collections	62	29	1	0	0	1	93
	% coll. containing species	58.1	24.1	0	-	-	0	46.2
	Av. no. specimens per sample	9.8	9.2	-	-	-	-	9.7
1959	Total no. collections	91	40	17	0	0	2	150
	% coll. containing species	49.5	10.0	23.5	-	-	0	35.3
	Av. no. specimens per sample	13.2	2.9	3.4	-	-	-	11.7
1960	Total no. collections	63	56	11	10	1	3	144
	% coll. containing species	22.2	3.6	18.2	0	0	0	12.5
	Av. no. specimens per sample	3.6	1.0	1.0	-	-	-	3.1

Table 58

Summary of *Lambdina f. lugubrosa* Collections by Host Trees.  
North Vancouver Ranger District. All Drainage Divisions included.

Year	H	F	C	B	S	Total
1949 Total no. collections	162	52	48	0	25	287
% coll. containing species	4.3	0	0	-	4.0	2.8
Av. no. specimens per sample	1.7	-	-	-	3.5	1.9
1950 Total no. collections	22	20	13	0	0	55
% coll. containing species	0	0	0	-	-	0
Av. no. specimens per sample	-	-	-	-	-	-
1951 Total no. collections	106	51	39	0	7	203
% coll. containing species	0.9	2.0	0	-	0	1.0
Av. no. specimens per sample	1.0	1.0	-	-	-	1.0
1952 Total no. collections	19	8	7	0	0	34
% coll. containing species	0.	0	0	-	-	0
Av. no. specimens per sample	-	-	-	-	-	-
1953 Total no. collections	106	40	19	12	19	196
% coll. containing species	21.7	0	15.8	25.0	26.3	17.3
Av. no. specimens per sample	3.5	-	11.5	1.8	1.5	3.8
1954 Total no. collections	20	10	0	0	1	31
% coll. containing species	15.0	0	-	-	0	9.7
Av. no. specimens per sample	13.0	-	-	-	-	13.0
1955 Total no. collections	64	24	15	2	3	108
% coll. containing species	15.6	0	6.7	0	33.3	11.1
Av. no. specimens per sample	2.0	-	3.5	-	3.5	2.2
1956 Total no. collections	76	19	14	5	23	137
% coll. containing species	11.8	5.3	0	0	8.7	8.8
Av. no. specimens per sample	2.4	1.0	-	-	1.0	2.0
1957 Total no. collections	30	9	1	1	5	46
% coll. containing species	23.3	0	0	100.0	0	17.4
Av. no. specimens per sample	2.8	-	-	1.0	-	2.6
1958 Total no. collections	51	19	4	1	0	75
% coll. containing species	19.6	10.5	0	0	-	16.0
Av. no. specimens per sample	5.0	2.3	-	-	-	4.5
1959 Total no. collections	47	16	0	0	3	66
% coll. containing species	21.3	0	-	-	33.3	20.0
Av. no. specimens per sample	1.8	-	-	-	1.0	1.7
1960 Total no. collections	45	22	3	2	17	89
% coll. containing species	11.1	0	33.3	0	0	6.7
Av. no. specimens per sample	2.5	-	3.5	-	-	2.7

Table 59

Summary of Lambdina f. lugubrosa Collections by host trees.  
South Prince Rupert Ranger District. All Drainage Divisions included.

Year	H	F	C	B	S	Total	
1949	Total no. collections	159	0	14	8	25	206
	% coll. containing species	28.3	-	0	0	4.0	22.3
	Av. no. specimens per sample	2.4	-	-	-	1.0	2.4
1950	Total no. collections	70	0	31	0	56	157
	% coll. containing species	0	-	9.7	-	3.6	3.2
	Av. no. specimens per sample	-	-	1.0	-	1.0	1.7
1951	Total no. collections	0	3	0	0	4	7
	% coll. containing species	-	33.3	-	-	25.0	28.6
	Av. no. specimens per sample	-	3.5	-	-	3.5	3.5
1952	Total no. collections	12	0	9	3	6	30
	% coll. containing species	16.7	-	0	0	16.7	10.0
	Av. no. specimens per sample	2.2	-	-	-	1.0	1.8
1953	Total no. collections	23	4	7	5	8	47
	% coll. containing species	17.4	0	14.3	40.0	12.5	17.0
	Av. no. specimens per sample	1.6	-	3.5	1.0	1.0	1.6
1954	Total no. collections	77	5	16	8	37	143
	% coll. containing species	20.8	0	6.3	0	0	11.9
	Av. no. specimens per sample	9.1	-	3.5	-	-	8.7
1955	Total no. collections	15	2	4	0	2 <sup>1/</sup>	23
	% coll. containing species	46.7	50.0	75.0	-	0	47.8
	Av. no. specimens per sample	3.1	1.0	1.0	-	-	2.3
1956	Total no. collections	40	4	0	0	11	55
	% coll. containing species	47.5	25.0	-	-	45.5	45.5
	Av. no. specimens per sample	4.6	1.0	-	-	10.1	5.6
1957	Total no. collections	0	1	0	0	0	1
	% coll. containing species	-	0	-	-	-	0
	Av. no. specimens per sample	-	-	-	-	-	-
1958	Total no. collections	32	10	10	4	4	60
	% coll. containing species	62.5	50.0	40.0	75.0	100.0	60.0
	Av. no. specimens per sample	5.5	2.5	2.2	5.0	6.2	4.8
1959	Total no. collections	40	7	8	1	5	61
	% coll. containing species	20.0	0	25.0	100.0	20.0	19.7
	Av. no. specimens per sample	2.2	-	1.0	1.0	3.5	2.0
1960	Total no. collections	76	5	10	0	57	148
	% coll. containing species	6.5	0	0	-	1.7	4.1
	Av. no. specimens per sample	3.4	-	-	-	1.0	3.0



Table 60

Summary of *Lambdina f. lugubrosa* Collections by Host Trees.  
West Prince Rupert Ranger District. All Drainage Divisions included.

Year		H	C	B	Ba	S	Sw	Total
1949	Total no. collections	36	8	14	0	31	0	89
	% coll. containing species	22.2	12.5	14.3	-	9.7	-	15.7
	Av. no. specimens per sample	4.6	3.5	2.2	-	1.0	-	3.4
1950	Total no. collections	125	56	0	0	115	0	296
	% coll. containing species	0.8	0	-	-	0.9	-	0.7
	Av. no. specimens per sample	1.0	-	-	-	1.0	-	1.0
1951	Total no. collections	0	0	0	0	2	0	2
	% coll. containing species	-	-	-	-	0	-	0
	Av. no. specimens per sample	-	-	-	-	-	-	-
1952	Total no. collections	103	24	28	10	39	0	204
	% coll. containing species	2.9	12.5	3.6	0	7.7	-	4.9
	Av. no. specimens per sample	1.0	3.5	1.0	-	2.7	-	2.3
1953	Total no. collections	152	55	26	11	91	4	339
	% coll. containing species	14.5	20.0	11.5	63.6	12.1	50.0	16.5
	Av. no. specimens per sample	3.1	3.0	3.0	3.4	3.6	2.2	3.1
1954	Total no. collections	137	46	23	11	55	6	278
	% coll. containing species	24.1	52.2	4.3	45.5	14.5	50.0	26.6
	Av. no. specimens per sample	8.6	4.9	1.0	3.5	4.0	2.7	6.3
1955	Total no. collections	92	28	12	11	10	14	167
	% coll. containing species	28.3	35.7	16.7	18.2	30.0	14.3	26.9
	Av. no. specimens per sample	5.8	4.6	2.3	3.5	11.5	1.0	5.5
1956	Total no. collections	22	0	0	0	5	0	27
	% coll. containing species	9.1	-	-	-	20.0	-	11.1
	Av. no. specimens per sample	1.0	-	-	-	1.0	-	1.0
1957	Total no. collections	63	0	0	0	21	0	84
	% coll. containing species	1.6	-	-	-	4.8	-	2.4
	Av. no. specimens per sample	1.0	-	-	-	1.0	-	1.0
1958	Total no. collections	30	2	2	0	5	0	39
	% coll. containing species	13.3	50.0	0	-	20.0	-	15.4
	Av. no. specimens per sample	1.0	3.5	-	-	3.5	-	1.8
1959	Total no. collections	73	4	1	3	26	0	107
	% coll. containing species	6.8	0	0	66.7	0	-	6.5
	Av. no. specimens per sample	2.0	-	-	1.0	-	-	1.7
1960	Total no. collections	135	2	16	4	56	0	213
	% coll. containing species	2.9	0	6.3	0	3.5	-	3.3
	Av. no. specimens per sample	1.6	-	3.5	-	1.0	-	1.7

