



FOREST ENTOMOLOGY AND PATHOLOGY LABORATORY VICTORIA, B. C.

Report on the Green-striped Forest Looper

Queen Charlotte Islands

by

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Above average larval populations of the green-striped forest looper Melanolophia imitata Wlk., were encountered during the general detection survey on the Queen Charlotte Islands in 1963. As shown in the following summary the largest populations are on Graham Island.

	Total no. samples collected during larval period		Percentage of samples containing larvae		Av. no. of larvae per collection	
	1962	1963	1962	1963	1962	1963
Graham Island	17	30	35.3	53.3	8.4	18.5
Moresby Island	54	43	7.4	16.3	1.0	3.4

The increase in the percentage of samples containing larvae and the average number of larvae per collection is indicative of a rising population. The largest collections in 1963 were at Tlell, 180 and 44 larvae, and Port Clements, 50 larvae. No defoliation was observed during the normal detection survey in July, 1963.

The first indication of serious damage was reported by Mr. W. Pearson of MacMillan, Bloedel, and Powell River Company on November 25, 1963. At the request of G. T. Silver, Mr. Pearson took several pupal samples in Lot 1828 near Port Clements. The relatively large number of pupae indicated that the population had reached a relatively high level which warranted further investigation.

During the week of February 3 - 7, 1964, a pupal and damage survey was conducted by R. L. Fiddick, H. A. Richmond, and W. Pearson. Duff samples were taken at six locations from Kumdis Bay east to Tlell and south to Lawn Point. One-foot-square duff samples were taken against the base of the tree and at a point midway between the base and the periphery of the crown on opposite sides of each tree. Three trees were sampled at each locality. The average number of pupae per square foot in the 12 samples is considered representative of the pupal population at each locality.

Defoliation estimates on 20 or more trees selected at random were made at each sample point. Estimates were based on total foliage lost on the upper and lower portions of the crowns.

Aerial surveys were not attempted at this time of year because accurate identification of light to moderate defoliation would be most difficult, if not impossible, except from very low altitudes at very low speed.

Pupal Counts

The number of pupae per square foot for nine locations sampled in February, and earlier by W. Pearson are shown in Table 1. The location of sample points is shown in Map 1. Pupal counts in the area around Port Clements ranged from 3.75 to a high of 10.75 per square foot. Samples at Lot 362 and near Tlell and Lawn Point contained from 1.17 to 2.25 pupae per square foot.

Defoliation

Visible defoliation was recorded at all sample points from Port Clements to Tlell (Table 2). Without exception the heaviest feeding occurred in the upper half of the crowns. The heaviest feeding in 1963 occurred on the west end of Lot 1828 where five of 24 hemlock and seven of 20 cedar trees were completely stripped, and the remaining trees were severely defoliated. Heavy defoliation was also recorded at the east end of Lot 1828, and at Lots 405 and 412. Defoliation was conspicuous but lighter at Lots 413 and 362. It is noteworthy that cedar was severely defoliated in the westerly portion of Lot 1828.

Natural control

Pupae collected in November, 1963, were retained by the Insect Survey. These were examined in January; more than 30% were parasitized.

Approximately 400 pupae were collected in February. These have been set up under varying conditions to determine if a fungus disease, Cordyceps militaris (Fr.) Link. is present in the population. Cordyceps is believed responsible for the high mortality of overwintering pupae of the green-striped forest looper on the west coast

of Vancouver Island in the spring of 1961.

Discussion

The green-striped forest looper, until the recent infestations on the west coast of Vancouver Island in 1960, was not considered a dangerous threat to coastal forests. Survey records indicated that this species was capable of building up to very high population levels, but no serious defoliation occurred. However, the outbreaks in 1960 were convincing proof that this looper is capable of causing heavy tree mortality. Not much information is available on what pupal population is required to produce a larval population capable of killing trees. Lacking this information, it is necessary to base predictions on the performance of other loopers with similar habits.

The decision to spray the saddle-backed looper at Kitimat was based on the assumption that a pupal population of around eight per square foot was capable of producing a potentially damaging larval population the following year. Studies carried out at Kitimat indicated that the potential of the pupal counts had been greatly underestimated. Some bark samples at Kitimat produced over 2,000 larvae per square foot in a locality where pupal counts the preceding winter averaged 11.9 per square foot and where the forests were completely defoliated. Based on this information it was estimated that under good conditions as few as one to two pupae per square foot would result in a population heavy enough to warrant spraying. It is realized that these data might not be directly comparable for the green-striped forest looper, but it is believed that a green-striped forest looper population of between two and four sound pupae per square foot represents a population capable of severely defoliating stands of timber and resulting in a tree mortality.

It is estimated, therefore, that the pupal populations in the area around Port Clements (Lots 413, 412, 1828, and 405) represent a serious threat to the timber in these areas. This is particularly true in Lot 1828 where defoliation has been so severe in 1963 that some tree mortality is already certain, but the population in the other areas is expected to be as great, and probably greater, than the populations in 1963.

Lots 1828, 414, 412, and 413, all contain high pupal populations. These lots form a more or less continuous stand of timber extending from Stewart Bay around and north of Kumdis Bay. The timber in Lots 405, 406, and areas to the east and south are isolated pockets separated by scrub spruce and swamp. The timber is mostly a mixture of pole-sized hemlock and cedar, in areas interspersed with lodgepole pine and spruce. Diameters range from 10 to 14 inches for hemlock and cedar, and from 12 to 18 inches for spruce. Growing sites range from poor (S. I. 100) in the western part of Lot 1828 and Lot 362 to fair or good (S. I. 110-140) in Lots 412, 413, 405, 406, 1748, and 117.

Samples at Mayer Lake, Tlell, and Lawn Point indicate that the green-striped forest looper outbreak could be extensive. Reliable

reports have been received of insect defoliation in stands near the north end of Mayer Lake. High winds and ice during the recent survey prevented an examination of this area. There is also no information on the northernmost extent of the outbreak.

Recommendations based on pupal counts, although reliable enough at this stage for planning purposes, are subject to certain modifying factors which could have a bearing on any final control decisions. Overwintering mortality cannot be accurately determined. Parasitism, although relatively high, is not great enough in itself to reduce the population to safe or acceptable levels. Some pupae usually fail to survive the winter; this proportion cannot yet be estimated. The presence or absence of Cordyceps has yet to be determined. Weather conditions during the moth flight period could affect mating and oviposition. Nevertheless, unless mortality from unforeseen factors is greater than normal, the population in 1964 is expected to be heavy enough to cause severe defoliation in most of the areas sampled.

Summary and Recommendations

1. The green-striped forest looper population reached tree-killing proportions in the west portion of Lot 1828 in 1963. The over-all population seems to be rising and should reach its peak in 1964.
2. Based on pupal counts, populations in the stands in or adjacent to Lots 1828, 412, 413, and 405 are expected to be high enough in 1964 to cause severe defoliation. Unless the populations are controlled tree mortality may occur in these areas.
3. The population could increase to severe proportions in areas other than those specifically outlined in this report. Intensive surveys would be required to ensure the detection of such populations at an early stage in 1964.
4. A decision for or against a control program should be made in the near future. Additional surveys are necessary to estimate the infestation areas with sufficient accuracy for detailed plans to be made. Plans will be formulated for the 1964 survey program as soon as the organizations concerned make their decisions regarding the recommendations presented in this report.

February 14, 1964.

Table 1

Number of Pupae per Square Foot of Duff at the Base
and Mid-crown Positions for Three Trees at Each Location

Locality	Tree no.	Number of pupae				Total	Average no. pupae per sq. ft.
		Base		Mid-crown			
		1	2	1	2		
Lot 413 Kumdis Bay	1	9	12	0	9	30	7.50
	2	14	19	7	5	45	11.25
	3	2	5	0	1	8	2.00
		25	36	7	15	83	6.92
Lot 412 Kumdis Bay	1	2	13	14	2	31	7.75
	2	18	13	0	5	36	9.00
	3	15	3	13	8	39	9.75
		35	29	27	15	106	8.83
* West end of Lot 1828 Port Clements	1	-	-	-	-	14	3.50
	2	-	-	-	-	19	4.75
	3	-	-	-	-	12	3.00
						45	3.75
Center of Lot 1828 *	1	8	6	25	10	49	12.25
	2	-	-	-	-	37	9.25
						86	10.75
*East end of Lot 1828	1	-	-	-	-	11	2.75
	2	-	-	-	-	9	2.25
	3	-	-	-	-	44	11.00
						64	5.33
Lot 405 Kumdis Cr.	1	7	9	0	4	20	5.00
	2	8	16	8	22	54	13.50
	3	1	3	8	9	21	5.25
		16	28	16	35	95	7.91
Lot 362 S. W. corner Mayer Lake	1	1	5	1	0	7	1.75
	2	1	10	2	2	15	3.75
	3	2	3	0	0	5	1.25
		4	18	3	2	27	2.25

* Samples were taken by a company forester in November 1963 and were not recorded individually. Samples at the base of the tree were not right against the trunk and numbers of pupae may be slightly lower than more recent samples.

Table 1 - continued

Locality	Tree no.	Number of pupae				Total	Average no. pupae per sq. ft.
		Base		Mid-crown			
		1	2	1	2		
Lot 1748 Tlell	1	0	0	2	6	8	2.00
	2	2	0	1	0	3	0.75
	3	2	0	0	4	6	1.50
		4	0	3	10	17	1.42
Lot 117 North of Lawn Point	1	0	6	0	1	7	1.75
	2	0	0	0	0	0	0.
	3	0	5	0	2	7	1.75
		0	11	0	3	14	1.17

Table 2

Ocular Estimate of Per Cent Defoliation on Trees Selected
at Random at Sample Points. February, 1964

Locality	Host	No. trees	No. trees 100% defoliated	Average per cent defoliation	
				upper 1/2	lower 1/2
Lot 413 Kumdis Bay	Hemlock	20	0	26	15
Lot 412 Kumdis Bay	Hemlock	20	0	46	21
Lot 1828 west end	Hemlock	24	5	93	81
	Cedar	20	7	92	86
Lot 1828 east end	Hemlock	17	0	61	29
	Cedar	3	0	42	33
Lot 405 Kumdis Cr.	Hemlock	20	0	48	22
Lot 362 Mayer Lake	Hemlock	20	0	28	13
Lot 1748 Tlell	Hemlock	20	0	10	trace
Lot 117 Lawn Pt.	Defoliation not visible				

