

**CURRENT TREND OF THE WESTERN HEMLOCK LOOPER
(*LAMBINA F. LUGUBROSA*) IN THE COASTAL FORESTS OF BRITISH
COLUMBIA (*Lepidoptera, Geometridae*)¹**

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An outbreak of the western hemlock looper (*Lambdina fiscellaria lugubrosa* Hlst.) reached serious proportions in sections of the coastal forests of British Columbia during 1945. Only in that year was damage of this present cycle particularly noticeable and as indicated below there was little evidence of any degree of natural control. Further destruction of timber is expected during 1946.

This current outbreak represents the first appearance of the looper since the large outbreak of 1930. Although records of this insect date back to 1882 (de Gryse, 1934:523-527) it is only in recent years that specific data have been recorded on the prevalence of this insect in British Columbia. While these records are not necessarily complete, they indicate past outbreaks as follows: Stanley Park 1911-13 (Swaine, 1918); Vancouver Island 1913-14 (Jaenicke, 1929); Quatsino Sound, Vancouver Island 1925 (recounted by residents); south coastal mainland 1928-30 (Hopping, 1934: 12-13); and in the Interior, the Big Bend of the Columbia River and Nakusp region 1937-38 (unpublished records).

The last coastal outbreak subsided in 1930 but records of the occurrence of the hemlock looper have been obtained each year since 1937, the year of the inauguration of the Forest Insect Survey in British Columbia.

The present cycle first came into prominence in 1944, when the looper appeared in moderate numbers in the Lens Creek valley (upper San Juan drainage) although it was undoubtedly increasing in other areas where severe defoliation occurred in 1945.

During 1945 the major infestation occurred on the south west portion of Vancouver Island extending roughly from San Juan River north to the Alberni Inlet, an area of some 900 square miles. Throughout this region severe defoliation was irregularly distributed as is typical of looper attack. Viewed from the air in March 1946, some 140 square miles of timber appeared to be almost totally stripped of foliage. The timber concerned is some of the best of the west coast hemlock and Douglas fir. The most widespread infestation occurred in the Caycuse River valley, where extremely heavy defoliation extended from the mouth of the river on Lake Nitinat to its headwaters at McClure Lake and through to the headwaters of Walbran Creek. From the Caycuse it swept into the Nitinat valley where 400 million feet of timber are infested. North of the Nitinat an infestation as serious as that in the Caycuse valley, is centred in the Klanawa River valley, and covers some 12 square miles. Further infestations occur in the Pachena valley (moderate), lower Sarita (very severe), and at Coleman Creek (heavy). Endemic looper populations were recorded at the headwaters of the San Juan River, Lens Creek, Port San Juan, and Carmanah Creek. On the mainland further attack was reported from Clowhom Lake near Sechelt Inlet and in two areas on the Greater Vancouver watershed.

CURRENT LOOPER SITUATION.—Present indications point to a very marked increase in looper population in 1946 on the basis of overwintering egg counts. In such examinations, four areas were considered, the Caycuse valley, Nitinat valley, Pachena and Coleman Creek. While the past history of these infestations is not definite, Pachena alone appears to be of

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1945 origin, the others are probably two years old. Egg population data were obtained through the examination of moss samples, taken from tree trunks at 20 foot intervals from ground level to the top. Old egg shells were recorded as well as sound eggs from which a ratio was obtained between remaining egg chorions of previous years, and the overwintering eggs of the current year. While there is no suggestion that such a ratio indicates the true increase for 1946, it is of interest in a relative sense in comparing one area with another. Defoliation figures were derived by examination of 1/5 acre plots adjacent to trees analyzed for egg counts. A summary of these averages follows:

TABLE I.—Defoliation and Eggs in Moss, Western Hemlock Looper.

AREA	Per Cent Defoliation of Hemlock	AV. EGGS PER SQ. FOOT MOSS		Ratio Between Old & Current Eggs
		Old Chorions	Current Eggs	
Caycuse	62	12.0	96.0	1: 8.0
Nitinat	51	7.5	95.2	1:12.7
Pachena	47	5.1	55.0	1:10.8
Coleman Cr.	81	22.0	96.0	1: 4.4

These figures represent conditions only at the points sampled and defoliation percentages should not be considered as typical of the entire area. There is a suggestion of a fairly serious situation for 1946, since it is felt that these indications are in no way an exaggeration of the overall picture. Nevertheless, such calculations cannot be regarded as more than approximations without extensive and adequate sampling, considering relative elevations, forest density and light intensity.

In estimating populations, the absolute elevation may not be as important as the relative height in a valley system. Thus the floor of the upper Caycuse valley, 750 feet elevation, was as severely defoliated as that of the Nitinat at 80 feet. In higher tributary valleys this characteristic was still evident in the severe attack in the gullies of small streams. That elevations are of minor importance, however, is not suggested, since in the Nitinat where 20 sampling points were selected with 92 moss samples examined, defoliation aver-

aged 82% with an egg count of 226 sound eggs per square foot of moss at 80 feet elevation. At 1400 feet mean defoliation was 10% with 0.3 eggs per square foot of moss. The lack of a direct correlation between absolute elevation and looper abundance, however, eliminates any hard and fast rule in sampling a stand for mean defoliation.

There appears, furthermore, a marked variation in population according to light intensity. Dominant trees averaged 10% higher defoliation than intermediate trees and there was consistently greater feeding and more eggs in trees near forest openings adjacent to streams and swamps.

NATURAL CONTROL.—Records obtained from the Caycuse valley, the oldest apparent infested region in 1945, showed a larval parasitism of 5% and pupal parasitism somewhat less. No egg parasites were found in 1259 eggs incubated in January 1946. Of another 2000 eggs collected in March 1946, 93% hatched and no parasites were recorded. Neither de Gryse (1934) nor Watson (1934) reported parasites of primary importance in looper outbreaks in eastern Canada. Hopping (1934) recorded 14 species of parasites on the coast of British Columbia, but a high of only some 21% parasitism of larvae and pupae combined. He did, however, obtain 25% parasitism of eggs in the Seymour Arm region. In the light of the past records and in view of the trend suggested by current winter investigations, there appears to be little likelihood of any immediate slackening in the present hemlock looper situation. The eventual termination of the current cycle through the prevalence of disease is a

strong possibility, since there were minor indications of the appearance of disease in 1945. It is yet too early, however, to predict the trend of insect diseases and the future of this present outbreak of the hemlock looper.

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RESUME OF INFESTATIONS AND CONTROL OF THE COLORADO POTATO BEETLE IN BRITISH COLUMBIA, 1911-1946.

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The potato beetle (*Leptinotarsa decemlineata* (Say)) was first recorded in British Columbia in 1911 at Newgate on the International Boundary in the extreme south-eastern portion of the Province. It appears that this infestation originated from the adjoining State of Montana.

No systematic eradication or control measures were adopted when the pest was first observed and the area of infestation grew considerably year by year. In 1922 E. C. Hunt, District Horticulturist, Nelson, B.C., and J. W. Eastham, Provincial Plant Pathologist, made a survey of the Newgate country and recommended that help be given to the growers. The following year control measures were adopted to a limited degree.

In 1926 the Dominion Entomological Branch in co-operation with the Provincial Department of Agriculture undertook to investigate the extent of the potato beetle infestation and to work out a systematic control program. The district then infested consisted of two areas:

(1) The larger area extended from Newgate north to Fernie and north-west through Cranbrook to Premier Lake in the Kootenay-Columbia Valley.

(2) The smaller area extended from Rykerts, B.C. on the International Boundary north to Creston and Wynndel.

It is believed that this infestation came to the Creston district, some sixty (airline) miles west of Newgate, from the State of Idaho to the south during 1923 or 1924.

The total area infested in the two districts amounted to approximately 665 square miles in which some 880 acres of potatoes were grown.

Supervised control measures were undertaken in 1927 and a total of 32,965 pounds of calcium arsenate 1-6 dust were used during the year. The late A. A. Dennys of the Dominion Division of Entomology was placed in charge. A reduction in the intensity of the infestation was noted. During the following year a spot infestation occurred 100 miles farther afield near Golden, B.C., in the upper Columbia Valley. This area was dusted thoroughly by Mr. Dennys and up until this year (1946) there has been no recurrence of the infestation.

In spite of improved and annual control, new infestations have occurred from time to time in isolated parts of southern British Columbia. In the early 1930's a spot in-