

## Eastern Hemlock Looper

*Lambdina fiscellaria fiscellaria* (Guenée)

Lepidoptera: Geometridae

Dobesberger, E. J. 1989. A sequential decision plan for the management of eastern hemlock looper, *Lambdina fiscellaria fiscellaria* (Lepidoptera: Geometridae), in Newfoundland. Canadian Journal of Forest Research 19: 911-916.

**Objectives:** To develop a sequential sampling plan to aid in monitoring population density; and to crudely forecast the potential damage of *L. fiscellaria fiscellaria*.

**Abstract:** The eastern hemlock looper, *Lambdina fiscellaria fiscellaria* (Guenée), causes severe defoliation, growth loss, and subsequent mortality in balsam fir, *Abies balsamea* (L.) Mill., stands. The young larvae feed on a variety of hosts, but survive best on newly developing balsam fir needles. Older larvae feed indiscriminately, and defoliation is usually evident by late July to early August. A sequential sampling plan that classifies defoliation levels as light or severe was derived for *L. fiscellaria fiscellaria* egg populations in Newfoundland, Canada.

More eggs were found on mid-crown balsam fir branches than on other sampling substrates, including ground mosses, loose bark from white birch, *Betula papyrifera* Marsh., and crown lichens. An average of less than 6 mid-crown branches is required to reach a decision. Infestations were classified as light (<25% defoliation;  $\leq 4$  eggs per branch) or severe (75% defoliation;  $\geq 10$  eggs per branch).

**Sampling Procedure:** Remove one mid-crown branch randomly from balsam fir with pole pruners. Soak branches in 2% solution of sodium hypochlorite (NaOCl) for 45 min. Agitate the solution vigorously for 5 min then filter through a nest of sieves to extract eggs, which were classified as fertile (brown), infertile (green), or parasitized (black). The relationship between defoliation and egg density suggests a damage boundary of  $\leq 4$  eggs per branch for light infestations (<25% defoliation), and  $\geq 10$  eggs per branch for severe infestations (>75% defoliation). Consult Table 3 for the number of samples required to reach a decision (error = 10%). Continue sampling until the cumulative number of eggs reaches or exceeds a decision threshold. Defoliation below the lower limit is predicted to be light, while those that exceed the upper limit will be severe. No more than six branches should be required to reach a decision.

**Note:** These data are specific to spruce-fir forests of Newfoundland and may not yield statistically sound decisions in other regions

### Table:

Table 3. Sequential sampling table for hemlock looper, *Lambdina fiscellaria fiscellaria* (Guenée), egg populations on whole branch samples of balsam fir, *Abies balsamea* (L.) Mill., in Newfoundland.

No. of whole branch samples	No. of eggs <sup>a</sup>		
	Cumulative total eggs	Lower limit	Upper limit
1	---	0	19
2	---	0	25

3	---	5	32
4	---	11	38
5	---	17	44

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<sup>a</sup> Sampling should be continued until cumulative total eggs exceeds or equals upper limit or is less than or equals lower limit. For lower limit, light defoliation is recommended, whereas for upper limit, severe defoliation is recommended.

**Table 3 redrawn with permission from the Canadian Journal of Forest Research, January 15, 2001.**