Larch Casebearer

Coleophora laricella (Hübner)
Lepidoptera: Coleophoridae

Cielsa, W. M.; Bousfield, W. E. 1974. Forecasting potential defoliation by larch casebearer in the northern Rocky Mountains. *Journal of Economic Entomology* 67: 47-51.

Objective: To predict defoliation by *C. laricella* using counts of overwintering larvae.

Abstract: The larch casebearer, *Coleophora laricella* (Hübner), is an introduced species first recorded in Massachusetts in 1886. It now occurs throughout most of the range of larch, *Larix* spp. Larch casebearer overwinters as third instar larvae within a larval case attached to the base of needle fascicles (i.e., spur shoots) after the trees have shed their foliage. Heavy losses result from reduced growth and twig mortality. Trees defoliated completely for two or more consecutive years are usually killed.

The quadratic regression model, $Y = 4.015+0.4419X-0.001036X^2$, for forecasting defoliation potential by *C. laricella*, was developed on western larch (Fig. 4). The model uses counts of overwintering third instar *C. laricella* on 40 branch samples per sample point (X) to forecast feeding injury, which is expressed as a numerical rating (Y), and can be translated into negligible, light, moderate, and heavy defoliation. The procedure classified defoliation levels correctly on 83% of the sample plots for the first year's data, and 64% for the second year's data. Predictions were within one defoliation class 98% of the time during both generations.

Sampling Procedure: Collect four branch samples of at least 100 spur shoots (25 per branch) from the mid-crown of 10 dominant or codominant western larch with pole pruners (n = 1000). In the laboratory, count the number of overwintering third instar larvae on the terminal 100 spur shoots per sample (X). Compare this value to the threshold limits in Table 3 to determine the predicted defoliation class as negligible (no visible defoliation or discoloration), light (<26% foliage discolored), moderate (26-50% foliage discolored) or heavy (>50% foliage discolored).

Notes: Other variables such as elevation, natural enemy abundance, foliage volume, infestation age and climatic factors can alter the relationships observed in this study. This study was conducted in natural stands of western larch, 9-15 m in height, adjacent to logging roads. The applicability of these results may be limited to similar stands.
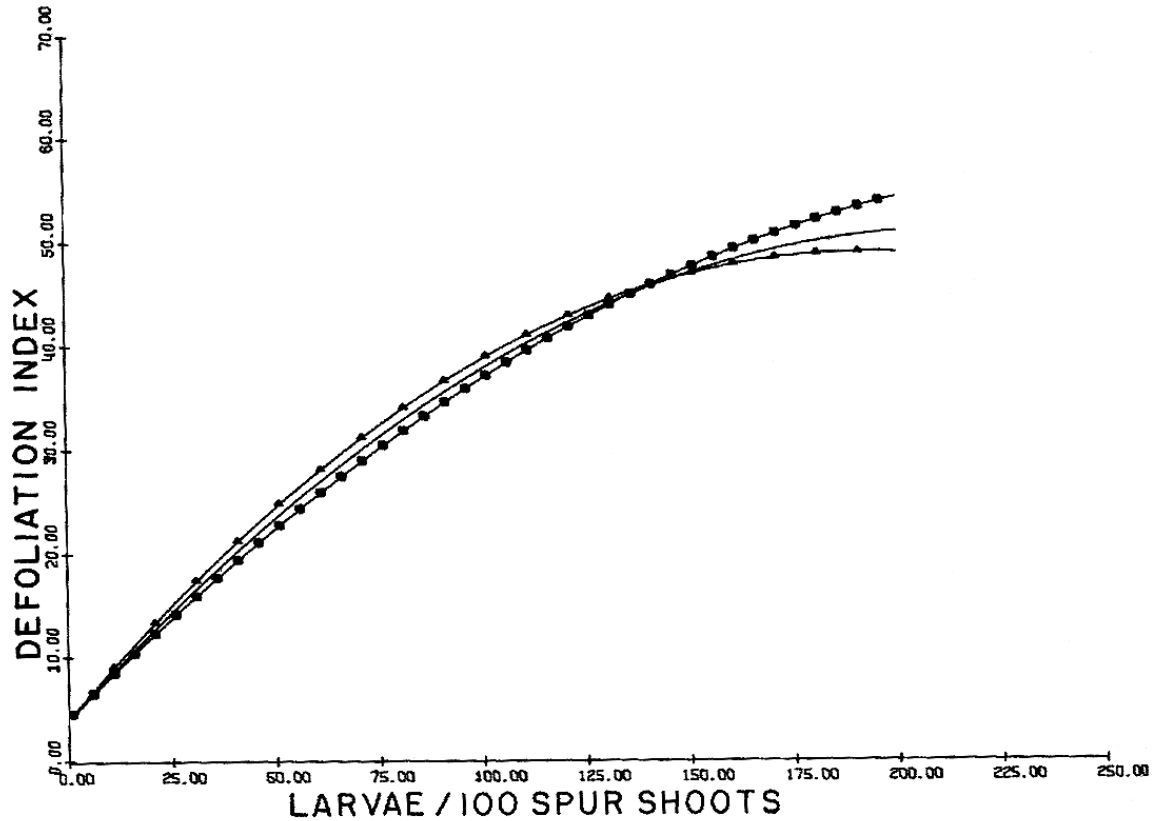
Figure and Table:

Fig. 4. Curve of larch casebearer defoliation; prediction equation Y = 4.015+0.4419x-0.001036x2, based on 2-year data, data vs. curves for the 1970-71 generation (circles) and 1971-72 generation (triangles).

Table 3. Overwintering larch casebearer population density and predicted defoliation based on the equation $Y = 4.015 + 0.4419x - 0.00104x^2$.

No. overwintering larvae/100 spur shoots (x)	Defoliation index (y)	Predicted defoliation
0 - 11.5	0 - 8.9	Negligible
11.6 - 60.4	9.0-26.9	Light
60.5 - 136.5	27.0 - 44.9	Moderate
136.6 - 236.75[a]	45.0	Heavy

[a]Highest population density observed.

Table 3 redrawn and Figure 4 reprinted with permission from the Journal of Economic Entomology, January 15, 2001.