

## Western Black-headed Budworm

*Acleris gloverana* (Walsingham)

Lepidoptera: Tortricidae

Harris, J. W. E.; Collis, D. G.; Magar, K. M. 1972. Evaluation of the tree-beating method for sampling defoliating forest insects. *Canadian Entomologist* 104: 723-729.

**Objective:** To reduce sampling effort and improve sampling accuracy for populations of *A. gloverana*.

**Abstract:** Western blackheaded budworm, *Acleris gloverana* (Walsingham), is an occasional pest of western hemlock, *Tsuga heterophylla* (Raf.) Sarg., in the western US and Canada. The Canadian Forestry Service includes this species in its annual Forest Insect and Disease Survey (FIDS). The authors focused on *A. gloverana* in a study conducted to examine the appropriateness of the standard 3-tree sample used to monitor populations of insect defoliators. The standard method of sampling 3 trees using a beat sheet was appropriate for *A. gloverana* as large variances were associated with samples of only 1 or 2 trees. A total of 17 samples, calculated from 51 trees, were required for estimating low populations of *A. gloverana* over a sampling area of 60,703 hectares, with a 95% confidence level of remaining within 50% of the arithmetic mean. This relatively small sampling effort was deemed appropriate as the survey focuses on broad population changes over large areas. In addition, samples collected from roadsides did not vary significantly from those collected randomly throughout the area of interest, or those collected from stands of a certain percentage of tree species. Weather did affect the abundance of *A. gloverana*, with fewer larvae collected in the rain or on wet foliage.

**Sampling Procedure:** Randomly sample 3 trees of each species of interest at each selected site by laying a 2.1 by 2.7 m white sheet under a tree and beating the branches with a 3.7 m pole for approximately 30 secs. Identify and count the *A. gloverana* larvae that fall onto the sheet. Sampling from locations that are easily accessible by roads or waterways, *i.e.* "roadside sampling", is convenient, economical, and statistically appropriate. To obtain a true estimate of larval populations, surveys for *A. gloverana* should be conducted in dry weather when the foliage is not wet. Current infestation levels can be compared to previous FIDS reports as a rough interpretation of whether populations are increasing, decreasing, or remaining stable.

**Notes:** The green-striped forest looper, *Melanolophia imitata* (Walker), is a common defoliator of conifers that produced top-kill and tree mortality in western hemlock in British Columbia during the 1960's, but has not had an outbreak since then. The authors recorded data on *M. imitata* during this study and found similar results as for *A. gloverana*, with the exception that *M. imitata* was less abundant on clear, sunny days. A total of 16 samples, calculated from 51 trees, was required for estimating low populations of *M. imitata* over a sampling area of 60,703 hectares, with a 95% confidence level of remaining within 50% of the arithmetic mean.