

Western Hemlock Looper

Lambdina fiscellaria lugubrosa (Hulst)

Lepidoptera: Geometridae

Liang, Q.; Otvos, I. S.; Bradfield, G. E. 1997. Forest roadside sampling of larvae and adults of the western hemlock looper, *Lambdina fiscellaria lugubrosa*. Forest Ecology and Management 93: 45-53.

Objectives: To compare densities of *L. fiscellaria lugubrosa* along roads and within stands; to determine the optimum distance between adjacent sampling sites along roads.

Abstract: Western hemlock looper, *Lambdina fiscellaria lugubrosa* (Hulst), is an important defoliator of western hemlock, *Tsuga heterophylla* (Raf.) Sarg., and other conifers in the United States and Canada. Periodical damage generally occurs in mature or senescing stands, where defoliation results in growth reduction, top kill, and tree mortality.

Research conducted in British Columbia suggests that *L. fiscellaria lugubrosa* populations can be surveyed along roads, which has the advantage of assessing large areas in less time compared to surveys conducted within stands. Pheromone trap captures and larval sampling were compared along roads and within stands in the Kamloops Forest Region. Larval densities along roads were positively related to those within stands ($r^2 = 0.97$; $P < 0.05$). Likewise, pheromone trap catches along roads were closely related to trap catches within stands ($r^2 = 0.88$; $P < 0.05$). These results suggest a means of predicting population trends using roadside sites, but additional research is required before population densities within stands can be predicted using roadside densities.

Spatial analysis of pheromone trap catches along roads in three Vancouver watersheds indicated that male moth captures remained similar when traps were placed less than 3 km apart along roads. In this region, pheromone traps should be placed at least 3 km apart along roads to reduce the number of necessary sampling sites and maximize sampling effort. However, spatial analysis of the data from the Kamloops site indicated that trap catches were similar when installed up to 7.25 km apart. At this location pheromone traps should be installed at least 7.25 km apart on roadways to maximize sampling effort. Clearly, the optimum distance between adjacent sampling points may vary among locations and should be validated for new areas as well as modified with new data when available.

Sampling Procedure:

Larval sampling: Select sampling sites along roads at least 3 km apart. At each site, randomly select two western hemlock trees accessible from the road. Cut two 45-cm branch tips from the lower crown of each tree using pole pruners with an attached collection basket. Examine branch tips for larvae.

Adult trapping: Select sampling sites along roads at least 3 km apart. Place one Multi-trap baited with 200 μg of a 1:1 ratio of isomeric 5,11-dimethylheptadecane and 2,5- dimethylheptadecane (Pherotech, Vancouver, B.C.) at each sampling site. Hang traps in the tree canopy approximately 1.5 m above ground. Traps should be installed before adult emergence.

Note: The optimum distance between adjacent sampling sites may vary among regions. The recommended distance of 3 km between sites may not be appropriate outside of Vancouver, B.C.