

## Western Spruce Budworm

*Choristoneura occidentalis* Freeman

Lepidoptera: Tortricidae

Harris, J. W. E. 1977. Egg-sampling for western spruce budworm on Douglas-fir. Res. Notes 33. *Canadian Forest Service*; 26-27.

**Objective:** To determine if sample unit size and crown level explained a significant proportion of the variation in egg mass density.

**Abstract:** The western spruce budworm, *Choristoneura occidentalis* Freeman, is an important pest of Douglas-fir, *Pseudotsuga menziesii* (Mirb.) Franco, true firs, *Abies* spp., Englemann spruce, *Picea englemannii* Parry ex. Englem., and larch, *Larix occidentalis* Nutt., in the western USA and Canada. Infestations in mature stands cause growth loss, top kill, and occasional tree mortality. Douglas-fir that is defoliated severely or top-killed is often subsequently attacked by the Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins.

Traditional methods of sampling *C. occidentalis* egg masses involve a choice of branches, or parts of branches, from different crown levels. Carolin and Coulter (1972) used a sample unit of 61-cm long branch tips, but did not test the reliability and accuracy of smaller sizes that would reduce sampling costs. A 25-cm branch tip, 46-cm branch tip, and a longitudinal half of each branch were compared for estimating egg mass density in the lower, mid- and upper crown. There were significant between-tree, between-crown level, and between-sample unit differences indicating no single sample unit could provide absolute estimates of whole-tree populations. The 25-cm branch tips yielded comparable results at all crown levels. However, they were subject to zero counts at low density levels. The authors recommended the use of the 46-cm branch tip sample from either of the upper two crown levels.

**Sampling Procedure:** Remove two branches from each of 20 trees per plot (mid- or upper crown), and count and record the number of egg masses per 46-cm branch tip. Branch length should be measured from the base of the foliage to the tip. Branch width is measured perpendicular from the midrib to the outermost edge. Estimate foliated area per branch by dividing the product of length and width by two. Determine the number of egg masses per 0.645 m<sup>2</sup>. The number of samples can be reduced to 15 trees if three branches are examined, or 10 trees if five are examined.

### Reference:

\*Carolin, V.M. and W.K. Coulter. 1972. Sampling populations of western spruce budworm and predicting defoliation on Douglas-fir in eastern Oregon. Res. Pap. PNW-149. Portland: *U.S. Department of Agriculture*,

*Forest Service, Pacific Northwest Forest and Range Experiment Station;*  
38 p.