

Spruce Budworm

Choristoneura fumiferana (Clemens)

Lepidoptera: Tortricidae

Fowler, G. W.; Simmons, G. A. 1982. Spruce budworm egg mass density on balsam fir: low to extreme population levels (Lepidoptera: Tortricidae). *Great Lakes Entomology* 15: 277-286.

Objective: To determine the best sample location to estimate egg mass densities of *C. fumiferana*.

Abstract: The spruce budworm is the most destructive defoliator of balsam fir, *Abies balsamea* (L.) Mill., and white spruce, *Picea glauca* (Moench) Voss, in eastern North America. The last three larval instars cause most of the defoliation. Periodic outbreaks occur every 30 years and epidemics can last 5-10 years. A study was initiated in Michigan's Upper Peninsula to determine the best sampling locations for *C. fumiferana* egg masses. Two stands, each consisting of 10 extremely and 10 moderately defoliated fir trees, for a total of 40 trees, were sampled in 1979. In 1980, five stands consisting of four lightly-defoliated balsam fir and white spruce trees, for a total of 40 trees, were sampled. The live crown of each tree was divided into three levels (lower, mid- and upper crown) with each level being divided into quadrants representing the north, south, east, and west aspects.

Aspect did not explain a significant proportion of the variation in egg mass density. Overall, the majority of egg masses were found in the mid-crown of fir and spruce. In addition, egg mass density at the mid-crown position was higher than that of the entire tree. Because of the considerable variation in estimates encountered in this study, results should be treated with caution until further studies are conducted.

Sampling Procedure: Begin sampling shortly after *C. fumiferana* egg deposition is completed (i.e., early August). Randomly select the center of each group of trees to be sampled in a representative area of each stand. Groups of trees should be located 10-50 m from roads, trails or other groups of trees to be sampled. Trees should be ~9-18 m tall with no dead tops. Divide the live crown into lower, mid-, and upper crown levels if necessary. With a set of pole pruners, cut the appropriate-sized branch from the mid-point of each crown level, lowering the sample carefully to avoid losing any egg masses. Estimate the area of new and old foliage, and determine the number and location (new vs. old foliage) of egg masses, for each branch sampled. Egg mass density can be expressed by surface area of new versus old foliage, all foliage, etc., providing that methods are consistent from sample to sample.