

Spruce Budworm
Choristoneura fumiferana (Clemens)
Lepidoptera: Tortricidae

Sanders, C. J. 1988. Monitoring spruce budworm population density with sex pheromone traps. Canadian Entomologist 120: 175-183.

Objective: To evaluate the use of pheromone traps to monitor changes in *C. fumiferana* populations.

Abstract: Spruce budworm, *Choristoneura fumiferana* (Clemens), 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, while epidemics can last 5-10 years.

Pheromone traps are extremely useful in monitoring adult populations of *C. fumiferana* as rising trap catches can indicate a potential outbreak. Trap catches were positively correlated to larval densities over a 21-year period in Ontario ($r^2 = 81\%$). In general, land managers should consider their management options when trap catches increase over 3 successive years or when >50 moths are captured per trap. Branch sampling may pinpoint where control options should best be applied in the near future as larval populations increase. Pheromone traps are now used as an early warning system for increasing densities of *C. fumiferana* in eastern North America.

Sampling Procedure: Use high-capacity traps such as Uni-traps (International Pheromone Systems, Wirral, U.K.), which are less likely to become saturated with captured adults. Sticky traps can be used in areas that generally have had low densities, but with the risk of trap saturation with increasing population density. Bait traps with the lure recommended for the current year. Lures with a very low potency (0.0003% [w/w]) are recommended as they remain effective in attracting male moths but do not lead to trap saturation. Traps should include a killing agent to immobilize attracted male moths.

Deploy traps in stands with at least 50% balsam fir and/or white spruce 1-2 weeks before the adult flight period. In the center of each stand, hang traps 2 m above ground in a triangular cluster with 20 m between each trap. Leave traps in place until the flight period has ended, then collect traps and count the number of moths in each trap. Land managers should consider their management options when trap catches increase over 3 successive years or when >50 moths are captured per trap. Traps should be set out each year to monitor population trends of *C. fumiferana* over time and provide an early warning of potential outbreak densities.

Note: Land managers may consider initiating branch sampling when trap catches reach this “early warning threshold” as larval densities sufficiently high to warrant control measures may still not occur for several seasons. Branch sampling may pinpoint where control options should best be applied in the near future as larval populations increase.