European Pine Shoot Moth

Rhyacionia buoliana (Denis & Schiffermüller)
Lepidoptera: Tortricidae

Regan, R. P.; De Angelis, J. D.; Gredler, G. 1991. Predicting seasonal flight of European pine shoot moth (Lepidoptera: Tortricidae) in western Oregon. Environmental Entomology 20: 1403–1406.

Objective: To predict seasonal flight of *R. buoliana* in Oregon using degree-day accumulations.

Abstract: European pine shoot moth, *Rhyacionia buoliana* (Denis & Schiff.), has become an important pest of two- and three-needle pines (*Pinus* spp.) in ornamental settings in the Pacific Northwest, the Lake States, the upper Midwest, and northeastern USA, as well as in southern Canada.

Red pine (*Pinus resinosa* Ait.) is heavily damaged by *R. buoliana*, but other susceptible hosts include Scotch pine (*Pinus sylvestris* L.), lodgepole pine (*Pinus contorta* Dougl.), and ponderosa pine (*Pinus ponderosa* Laws.) This insect primarily infests terminal shoots causing severe deformation and reduced growth.

Currently, chemical control of *R. buoliana* is directed towards the adults in early summer, preferably before mating occurs, or against newly hatched larvae. Adult activity can be predicted by estimating pupal densities, with first flight occurring when populations consist of approximately 20% larvae and 80% pupae (Antonelli and Campbell 1985), or based on phenological observations of needle development on host trees. However, degree-day accumulation offers a less time-consuming and less laborious method of predicting adult activity than population sampling. Likewise, it may be more practical for nurseries growing many different cultivars with differing phenologies.

Cumulative trap catch of adult male *R. buoliana* (Y) was related positively to degree-day accumulation above a base temperature of -2.2°C (X) ($Y = -267.8 + 0.162X$; $r^2 = 0.965$; $P > 0.001$). Insecticide applications could be timed to coincide with adult activity, as predicted by degree-day accumulations. However, optimal timing of insecticide application against adult *R. buoliana* remains to be developed, as populations in western Oregon are currently insufficient for testing.

Sampling Procedure: Monitor emergence of male *R. buoliana* using Pherocon II pheromone traps (Trécé, Inc., Salinas, CA). Bait traps using a 97:3 blend of E-9-dodecenyl acetate and E-9-dodecenyl alcohol (1% active ingredient) embedded as a controlled-release formulation in polyvinylchloride. Hang traps in the canopies of Scotch pine, lodgepole pine, or mugo pine at 1.5–2 m above ground. Space traps at least 25 m apart. Check traps three times a week beginning the second week of May until the end of July. Replace lures 3–4 times during the flight period.

Starting January 1, monitor degree-day accumulations above the base temperature of -2.2˚C. Use the following model to predict the cumulative male moth trap catch:

$$Y = -267.8 + 0.162X$$

where Y = percent cumulative trap catch of male *R. buoliana* between 5 and 95% and X = number of degree-days above -2.2˚C. Reference the table below for the predicted degree-day accumulations for 10, 50, and 90% trap catch.

% Cumulative trap catch	Accumulated degree-days
10%	1,712
50%	1,958
90%	2,205

Land managers can time insecticide applications to coincide with adult activity as predicted by degree-day accumulations. However, optimal timing of insecticide application against adult *R. buoliana* has not been determined.

Notes: This model was developed in western Oregon and should be used with caution in other regions. Insufficient densities of R. buoliana occur in western Oregon to determine the optimal timing of chemical control for this pest.

Reference:

Antonelli, A. L.; Campbell, R. L. 1985. European pine shoot moth. Washington State University College of Agriculture Extension Bulletin 1011.