Nantucket Pine Tip Moth

Rhyacionia frustrana (Comstock)
Lepidoptera: Tortricidae

Malinoski, M. K.; Paine, T. D. 1988. A degree-day model to predict Nantucket pine tip moth, *Rhyacionia frustrana* (Comstock) (Lepidoptera: Tortricidae), flights in southern California. Environmental Entomology 17: 75–79.

Objective: To develop a degree-day model for *R. frustrana* flight periods in order to improve the timing of treatment applications in southern California.

Abstract: Nantucket pine tip moth, *Rhyacionia frustrana* (Comstock), is a common pest of young loblolly, *Pinus taeda* L., shortleaf, *P. echinata* Mill., and Virginia, *P. virginiana* Mill., pine plantations in the eastern USA. In southern California it prefers Monterey pine, *P. radiata* D. Don, which is grown as Christmas trees. Larval feeding can cause shoot mortality and tree deformity, reductions in height and volume growth, and occasional tree mortality. Young larvae are very small and can be difficult to sample on the foliage. Larvae tunnel into shoots, where they are protected from insecticide sprays, before shoot injury becomes apparent. The aesthetic value of pines grown as Christmas trees is high enough that current control practices for *R. frustrana* include preventive sprays based on calendar date.

A degree-day model (ºC) based on field data was developed to predict when early-instar *R. frustrana* would be feeding on Monterey pine foliage in Christmas tree plantations in southern California. This is when insecticide sprays are most effective in controlling *R. frustrana*. The model predicts that a mean total of 575 degree-days (575DD) accumulate between the capture of the first male in pheromone-baited traps and peak flight period. Lower and upper thresholds of 5.50º and 37.25ºC, respectively, are incorporated in the model to account for when development would cease due to lower and higher temperatures in California. Early instars are found feeding on foliage at 111DD after peak flight period, or at 686DD after the first moth is found in the pheromone-baited trap. Insecticide applications are most effective when applied at this time. Pheromone traps and degree-day monitoring should be conducted for each of the four flight periods of *R. frustrana* in southern California. Compared to current control practices for *R. frustrana*, using this model should reduce the number of insecticide sprays applied and identify when larvae are the most vulnerable to chemical control.

Sampling Procedure: Install delta traps baited with *R. frustrana* pheromone lures in early January. Hang traps on the outer canopy of Monterey pines 1.5–1.8 m above ground. Inspect traps daily for moth capture. Replace lures every 4 weeks. Four generations of *R. frustrana* occur in southern California and traps should be deployed prior to the start of each flight period. Replace traps as needed throughout the year.

Begin monitoring degree-day (ºC) accumulation at the start of each flight period, as indicated by when the first moth is found in the pheromone-baited traps. Do not include degree-days above the upper threshold of 37.25ºC or below the lower threshold of 5.50ºC. Expect peak flight to occur at 575DD after the capture of the first moth in the traps. Apply treatments against first instars 111DD after peak flight, or 686DD after the first moth is captured in the pheromone trap.