



Pine Tip Moth

Biology, Impact and Management Options



What is pine tip moth?

The Nantucket pine tip moth (*Rhyacionia frustrana*) is a small insect that can severely damage recently-planted or young pine seedlings in open areas. The insect has 2 to 5 generations per year and each generation poses a threat to pines, particularly during the first five years of growth. In the Western Gulf Coast, adult moths (shown above) first emerge from early February through mid-March. The eggs are laid on new foliage and the first-stage larvae usually feed on the surface of new needles. Later-stage larvae feed within the new shoots and buds, usually killing them. The insects pupate within the infested tips and emerge to repeat the life cycle at 6-8 week intervals through September. Winter is passed in the pupal stage within infested shoots.

What is the impact of tip moth infestations on pine seedling growth?

Research by the Forest Pest Management Cooperative (FPMC), based in Lufkin, Texas, has shown that tip moth infestations can have a significant impact on pine seedling growth. Tip moth larval feeding causes bud and shoot mortality which results in tree deformation, reduced height and diameter growth, and occasionally tree mortality (see photo above). Loss of tree form is common where heavy attacks cause forks, crooks, or multiple trunks. Damage is generally most severe on seedlings and saplings under five years of age and 15 feet, but decreases as crowns close. Loblolly pine protected from tip moth attack for two years in the Western Gulf Region had 64% more volume than unprotected trees at age five (FPMC, unpublished data).

Ten years after planting on northeast Florida sandhills, unprotected loblolly pine trees were 9 feet shorter in height, 1.5 inches smaller in dbh, and had about one fourth as much wood as protected pines. Pine trees protected from Nantucket pine tip moth attack grew significantly faster than unprotected trees during the first 6 years after planting and that volume differences (30%) between protected and unprotected trees were still increasing after 15 years in Georgia and North Carolina (C.W. Berisford, University of Georgia, unpublished data).

Are some sites more susceptible to tip moth damage than others?

Technological developments in pine plantation management and tree improvement programs within the past three decades have dramatically increased rates of tree growth. Intensive management of southern pines typically includes mechanical site preparation and/or one or more herbicide applications plus fertilization on most sites. Although these practices increase tree growth, sometimes dramatically, they can favor tip moth attacks that may substantially reduce potential tree growth.

Tip moth levels have been observed to be higher in plantations compared to natural stands and in plantations with the widest tree spacing. A recent FPMC survey of over 200 sites in the Western Gulf Region also found a significant increase in tip moth damage as the intensity of site preparation, weed control and fertilization increased.

What control options are currently available?

To obtain season-long control of tip moths with foliar insecticide sprays, applications may be necessary for each generation. Effective use of pesticides is dependent on precise timing for spraying, which should be carried out after eggs are laid up until second-stage larvae are present. Ordinarily, pheromone-baited traps have been used to determine time of spraying. In areas where tip moth have 3 – 4 generation per year, trees should be sprayed ten days after the first adult moth is captured. This must be repeated for each generation. However, a model was recently developed to easily predict the optimal spray interval prior to each Nantucket pine tip moth generation at numerous sites across the South without the need for population monitoring. (see <http://texasforests.tamu.edu> for literature citations) .

To make control tip moth economical in large forest plantations, a systemic chemical is needed that can be applied when seedlings are planted or after planting and can protect seedlings for 2 or more years. Two new systemic insecticides , PTM (fipronil) and SilvaShield Forestry Tablet (imidacloprid) have been registered recently and have been shown to meet the criteria mentioned above. Unlike foliage sprays that tend to provide immediate protection against insect pests, systemics require adequate soil moisture and some period of time to be taken up by the plant roots and transported to the areas of the plant where insects feed. Thus, systemic insecticide applications should be made one to three months prior to insect exposure. PTM solution is applied with soil injectors (Kioritz or PTM Spot Gun) at planting or next to seedlings after planting. The SilvaShield Forestry tablets can be deposited into plant holes or pushed into the soil next to seedlings.



Kioritz (A) and PTM spot gun (B) soil injectors for application of PTM solution. (Photos by Don Grosman & Harold Quicke, BASF); SilvaShield Forestry Tablets (C) (Photo by Don Grosman).