Biology and Control of Zimmerman Pine Moth in Christmas Tree Fields
Michigan State University Extension Service
Eileen A. Eliason, Research Assistant, Department of Entomology; Deborah G. McCullough, Assistant Professor, Department of Entomology and Department of Forestry
February 1996
2 pages

Biology and Control of Zimmerman Pine Moth in Christmas Tree Fields

Eileen A. Eliason
Research Assistant
Department of Entomology
Michigan State University

Deborah G. McCullough
Assistant Professor,
Department of Entomology
and Department of Forestry,
Michigan State University

MSU Extension Bulletin E-2600
New February 1996

MICHIGAN STATE UNIVERSITY EXTENSION

Zimmerman pine moth (*Dioryctria zimmermani* [Grote]) damages pine trees from Mexico to Canada. It primarily attacks Scotch and Austrian pine but will also feed on red, jack, eastern white, mugho and Japanese red pine. Reports of Zimmerman pine moth damage seem to be increasing recently in lower Michigan, Indiana and other North Central states. Two closely related species (*D. abietivorella* [Grote] and *D. cambiicola* [Dyar]) have similar life cycles and are occasionally found with Zimmerman pine moth.

BIOLOGY

Zimmerman pine moth has only one generation per year. Single eggs are laid beneath bark scales or in crevices on the trunks or branches of trees in late July or August. A female moth can lay 10 to 80 eggs. Eggs hatch in about 2 weeks. The young larvae spin small silk shelters in protected areas on the bark and settle in for the winter. No feeding occurs until the next spring.

In early April, the tiny larvae emerge from their silk shelters. They may briefly move about the tree, but the caterpillars soon chew their way under the outer bark and into the layer of inner bark called phloem. The larvae feed in tunnels in the phloem for most of the summer. Some larvae leave their original feeding tunnels, move to different locations on the same tree, then begin new tunnels under the bark. The pinkish green caterpillars keep their feeding tunnels clean by pushing the sawdustlike frass (fecal material) and pitch out of the entrance holes of their tunnels. Reddish frass mixed with soft, oozing pitch on the bark indicates the location of actively feeding Zimmerman pine moth larvae.

Fig. 1 **Zimmerman pine moth adults are small and dark-colored. The moths do not feed. They are usually present from late July to early August.**

Fig. 2 **Pitch masses accumulate where Zimmerman pine moth caterpillars are feeding under the bark.**

The larvae feed until mid- to late July, eventually reaching 1 to 1.5 inches in length. They pupate in the feeding tunnels near the entrance holes within the pitch mass. When the adult moths emerge 2 to 3 weeks later, they don't have far to travel to leave the feeding tunnel.

Adult Zimmerman pine moths are small, dark-colored moths with distinctive markings. The moths are active at dusk and during the night and are rarely seen during the day. Each moth lives only a few days — just long enough to mate and for the females to lay eggs. Because larvae and pupae mature at different rates, moths may be present in a given field for 3 to 5 weeks.

DAMAGE

Attacks by Zimmerman pine moth larvae frequently occur on the trunk, especially around the branch whorls.

Fig. 3 **Zimmerman pine moth feeding can result in large pitch masses, dead branches and weakened stems.**

Larvae may also feed on large branches and occasionally at the base of the terminal leader.

Feeding sites are marked by soft, oozing pitch masses, with reddish frass mixed with the pitch. When larvae have finished feeding, the pitch masses harden and take on a dull whitish-yellow color. Old pitch masses may remain on trees for several months.

Feeding tunnels on a large branch often girdle the branch, causing the needles on that branch to die and turn red. Trees attacked by Zimmerman pine moth will frequently have patches of red (dead) foliage in an otherwise green canopy.

When the stem is attacked, the larval tunneling may reduce the transport of carbohydrates from the canopy down to the root system. This causes the stem to swell above the feeding tunnel. The stem below the tunnel is smaller and weaker. Trees may break off at the point of constriction during high winds, harvest or baling. When trees are repeatedly or heavily attacked, the girdling may kill the upper part of the tree or even the entire tree.

CONTROL

Cultural: Preventing Zimmerman pine moth from becoming a problem in your field will be more effective and more efficient than trying to control an infestation once it becomes established.

Begin scouting fields for evidence of Zimmerman pine moth damage when trees are 4 to 5 years old. Some trees act like "brood" trees and are repeatedly attacked. Female moths may be attracted to fresh pitch from earlier attacks or wounds and may lay eggs on those trees year after year.

When only a few trees are affected, you may be able to use a pocket knife to cut out the pitch mass and kill larvae in the feeding tunnels. Be aware that large pitch masses may mean several larvae are feeding under the bark.

When infestations are heavy, affected trees should be cut and destroyed by chipping, burning or other methods no later than early July. Even when infested trees are cut very early in the spring, the larvae can continue to feed and will complete their development in the dead trees. Therefore, infested trees that are cut and left in or near fields can still produce moths that will infest live trees.

Biological: Relatively little is known about the natural enemies of Zimmerman pine moth. At least five parasitoid wasps attack Zimmerman pine moth eggs or larvae. Late-stage larvae are easily parasitized because they are near the exit hole in the pitch mass or under a thin layer of bark in the feeding tunnel. A fungal disease, *Hirsutella nodulosa*, also killed Zimmerman pine moth larvae in southwestern Michigan. The importance of the fungus, which is spread by mites, has not been determined.

Chemical: Effective chemical control of Zimmerman pine moth is difficult to achieve. Late summer foliar cover sprays aimed at controlling adults are generally not effective in preventing damage. The moths do not feed on trees but emerge over a period of 3 to 5 weeks and lay eggs within a few days.

Insecticides are best directed at larvae but must be applied early in the spring, before larvae burrow into the inner bark. In southern Michigan, this usually means that sprays must be applied by early April (25 degree-days base 50). In some years, wet ground or other conditions will restrict access to fields in early spring.

Spraying with a persistent insecticide such as Lorsban in early spring is more effective than spraying trees in late summer or fall. The tiny larvae that emerge from eggs in August or September will not actively feed or move about on the tree and will have little opportunity to contact the insecticide.

Obtaining adequate coverage is another problem, particularly on sheared Scotch pine Christmas trees. To be effective, the insecticide must be applied to the tree trunk and large branches. Thorough coverage of tree trunks on Scotch pine Christmas trees with dense canopies is often difficult to accomplish.

Damage by Zimmerman pine moth in Christmas tree plantations can be most effectively controlled by combining careful monitoring, timely destruction of infested trees and appropriate use of insecticides.

New 2/96-2M-KMF,CP, .75 for sale only