E-40-W

Ornamentals & Turf

Department of Entomology

MANAGING THE ZIMMERMAN PINE MOTH

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The Zimmerman pine moth is the most important economic pest of pine trees in Indiana and the Midwest. The larva is capable of attacking and severely damaging most pine species in the north central part of the U.S. and poses a real threat to Christmas tree plantations. In Indiana, the insect causes greatest injury to Scotch and Austrian pines.

DISTRIBUTION

The Zimmerman pine moth was first found in the U.S. in 1879. Since then, it has been reported in 23 states, primarily in the northern part of the country. It was discovered in northern Indiana in 1956 and has now spread south of U.S. Hwy 40. Damage in the state has been reported as high as 65 percent infestation in a single plantation.

SYMPTOMS AND DAMAGE

Early symptoms of Zimmerman pine moth (ZPM) attack are usually the wilting and browning of new tree growth. Infested terminals wilt and curve downward to resemble a “fish-hook” or “shepherd’s crook.” Eventually entire branches or tree tops will turn brown and break off.

Infestations can be detected by the presence of resin masses covered with white, sawdust-sized crumbs near the whorls. These masses will be white, soft, and shiny if infestations are active. They will be gray, hard and dull if old or inactive.

Zimmerman pine moth spends the winter as a young caterpillar in a shallow pit that it digs in the bark. When the weather warms in early April, this caterpillar crawls out of its resting place along the exposed bark surface to where the pine tree branches join the main trunk. It then bores into the tree where it feeds for several months. In younger pines, this feeding may occur near the top of the tree, causing the leader to curl and turn brown. In older trees, injury is often further down the trunk. Late in June and through July, when the caterpillars are deep in the trunk, wounds are gummy and covered with white crumbs of caterpillar excrement. In early August, the moths emerge and lay eggs on the tree trunk. Eggs hatch into caterpillars that feed in bits of bark until they dig their shallow pits where they spend the winter.

The moth seems to be attracted to wounds and previously infested trees. Larvae are also frequently attracted to sapsucker feeding sites.

DESCRIPTION

Adult: The moth is small, with a wingspan of about 1 to 1-1/2 inches. The body is gray; the fore-wings gray and mottled with zig-zag lines of red and gray; and the hind wings light tan, becoming darker near the edges. Adults are active only at night and are, therefore, rarely seen.

Eggs: These are round and initially cream-colored but turn light brown as they develop. Each female lays 20-30 eggs under bark flakes near wounds.

Larva: The full-grown caterpillar is about 3/4 inch long, has a brown head and a pink to greenish body, depending on the host and food supply. The body is covered with small black dots and resembles a black-spotted, pink European corn borer. The larvae overwinter in a small cocoon-like structure (hibernaculum) under bark scales.

Pupa: As the moth develops within the pupal skin, the pupa turns from light to dark brown. It is about 3/4 inch long and has no spines. It is found at the end of a tunnel just beneath the bark.

TREES ATTACKED

The Zimmerman pine moth is known to attack any of these pine species common to the northern U.S.:

Scotch pine, P. sylvestris (L.)
Austrian pine, P. nigra (Arnold)
Mugho pine, P. mugo (Turra)
Douglas fir, Pseudotsuga taxifolia (Britt.)
Red pine, Pinus resinosa (Ait.)
Corsican pine, P. nigra poireniana (Ant.)
Japanese red pine, P. densiflora (Sieb. and Zucc.)

Western yellow pine, P. ponderosae (Dougl.)
Lodgepole pine, P. contorta (Dougl.)
Eastern white pine, P. strobus (L.)
Jack pine, P. banksiana (Lamb)
Swiss stone pine, P. cembra (L.)
Japanese white pine, P. parviflora (Sieb. and Zucc.)
Himalayan pine, P. griffithi (McClelland), "Russian pine"

POSSIBILITIES FOR CONTROL

Natural Control. A number of species of parasites have been reported to attack the Zimmerman pine moth, the most abundant in Indiana being Calliephialtes comstockii (Cress). To date, however, parasitism has not been sufficient to control the moth. No important predators are reported in Indiana, although small black ants have been found feeding on dead larvae.

Applied Control. Like other borers, prevention of this problem starts by reducing environmental stresses on your tree. In landscapes, be sure to mulch your trees, provide adequate water. Mulching is not an option for Christmas tree growers and nurseries.

Control requires both sanitation and spraying of insecticide. Landscape managers should remove and destroy trees with extensive dieback in the landscape before late July when adults fly and lay eggs. Christmas tree and nursery producers should remove all trees with visible signs of Zimmerman pine moth infestations.

Early April is a great time for chemical control of Zimmerman pine moth because all the caterpillars become active and crawl out on the trunk surface when the weather warms. You can kill these caterpillars by soaking the tree and especially the trunk with a long lasting insecticide around April 1, before the temperature warms. When the caterpillars start crawling about and begin to dig deep into the trunk they will be killed by the poison residue on the bark. Be sure to soak the trunk with insecticide for effective control. For Christmas tree growers and nursery producers, this means using at least 100 gallons of total spray volume per acre, especially if you are using a mist blower.

Repeat the spray application in August to kill young caterpillars that hatch from the eggs. Permethrin (Spectracide Bug Stop, Eight), can be used by the home owner to control this pest. Permethrin (Astro EC) is available for use by commercial landscapes to control this pest. Christmas tree growers have the option to use permethrin, or chlorpyrifos (Dursban).

Branch damage

Top damage

Mid tree damage

Close-up of mid tree damage

Zimmerman pine moth, *Dioryctria zimmermani* (Grote)

READ AND FOLLOW ALL LABEL INSTRUCTIONS. THIS INCLUDES DIRECTIONS FOR USE, PRECAUTIONARY STATEMENTS (HAZARDS TO HUMANS, DOMESTIC ANIMALS, AND ENDANGERED SPECIES), ENVIRONMENTAL HAZARDS, RATES OF APPLICATION, NUMBERS OF APPLICATIONS, REENTRY INTERVALS, HARVEST RESTRICTIONS, STORAGE AND DISPOSAL, AND ANY SPECIFIC WARNINGS AND/OR PRECAUTIONS FOR SAFE HANDLING OF THE PESTICIDE.

Revised 4/2002