Colorado State University
Extension

Ponderosa Pine Needle Miners

Fact Sheet No. **5.544** Insect Series | **Trees and Shrubs**

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Historically, needle miners have caused considerable damage to ponderosa pine foliage in several Colorado localities. Although needle miner feeding usually has not been serious from the standpoint of tree health, it is considered a problem because it detracts from tree appearance. This is particularly true where trees have high value, as in urban situations, or around homes in mountain subdivisions.

Description and Life Cycle

The adult ponderosa pine needle miner, *Coleotechnites ponderosae* Hodges and Stevens, is a small, fragile, dark gray moth with a wingspan of about 1/2 inch. Like many insects, needle miners go through four life stages: egg, larva, pupa and adult. The larval or caterpillar stage of this moth feeds inside pine needles, hollowing them out (Figure 1). This habit gives the insect its common name.

There is at least one other species of pine needle miner in this area, *Coletechnites edulicola*, found in pinyon. Its life history and habits are similar to those of the ponderosa pine needle miner. So far, it has not been considered a serious pest in Colorado.

The ponderosa pine needle miner has one generation per year (Figure 2). Adults fly and lay eggs in late summer, often inside old, previously mined needles. The eggs hatch in early fall. The tiny larvae move to green needles, bore in near the needle tip, and begin mining. Development continues slowly through the winter, then accelerates rapidly with the coming of warm spring weather. Each larva completes its development in a single needle and pupates in the mined-out needle in midsummer. Mined needles drop prematurely.

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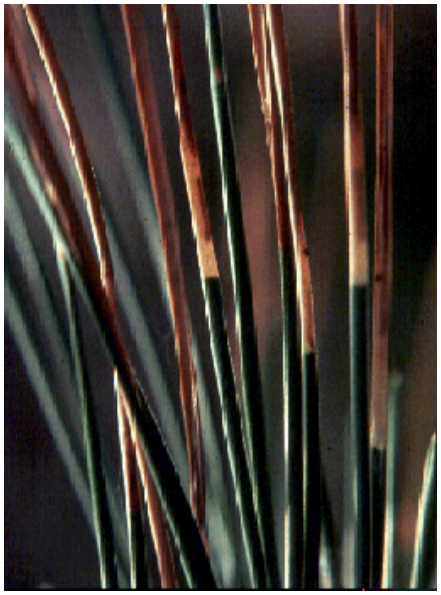

Figure 1: Ponderosa pine needle miner larvae in mined needles.

Signs of Infestation

Browning of foliage is the first readily noticeable evidence of needle miner activity. Close inspection, including holding the needles so the light can shine through them, reveals that some of the needles have been hollowed out from within, a sure sign of needle miner activity. Other factors such as total tree death caused by bark beetles, needle diseases, or misuse of herbicides also cause needles to fade. However, only needle miners hollow out the needles.

Needle miner activity is sometimes confused with bark beetle damage, particularly mountain pine beetle. However, mountain pine beetles cause all the needles to fade, not just some of them. Also, only the outer portions of needle miner-infested needles fade; the inner parts remain green.

Effects of Infestation

So far, most needle miner-caused defoliation has been an aesthetic problem only. Miners prefer older needles, and these

Quick Facts

- Needle miners are tiny caterpillars that feed inside pine needles.
- Needle miners cause needles to turn brown and drop prematurely.
- Infested trees look unhealthy. Persistent infestation may affect tree vigor.
- Chemical controls have been developed for high-value situations.

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Table 1. Treatments for ponderosa pine needle miners.

Treatments	Materials	Time to Apply
Foliar sprays	Acephate in Orthene tree and ornamental spray	When eggs hatch, around mid-September
Trunk implants	Acephate in Acecap 97 implants	Mid-June to mid-September

provide relatively little food to the tree. However, recent evidence suggests that several years of heavy feeding does result in visible tree decline, as shown by reduced needle length and numbers. Increased numbers in the population can affect many trees and these may be visible from the air. (Figure 3.)

Control

Although needle miners have the usual complement of natural controls, including parasitic insects (a biotic factor) and adverse weather (an abiotic or physical factor), these have not been effective lately in keeping numbers of needle miners below damaging levels.

Research has shown that high-value trees can be protected against needle miners using either of two chemical control approaches. The more conventional is individual tree spraying with commercial hydraulic spray equipment. The other uses insecticide implants inserted into holes drilled into the tree trunk.

Both techniques depend on the same insecticide, acephate (Orthene). Both are aimed at preventing establishment of the young larvae in green, uninfested needles. Timing is highly critical in the case of the foliar spray. In either case, some time is necessary before the trees' appearance will improve, as the old mined needles drop off. Treatments are summarized in Table 1.

References

Stevens, Robert E. *A Ponderosa Pine Needle Miner in the Colorado Front Range*. USDA Forest Service Research Note RM-228, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo., 1973.

Stevens, Robert E., and David A. Leatherman. *Implants and Sprays for Control of Ponderosa Pine Needle Miner in Individual Trees*. USDA Forest Service Research Note RM-420, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo., 1982.

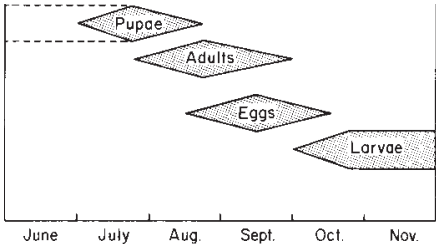

Figure 2: Life cycle of ponderosa pine needle miner.

Figure 3: Aerial view of Ponderosa pine needle damage. Notice light discoloration of trees.