

SEQUOIA PITCH MOTH

Integrated Pest Management for Home Gardeners and Landscape Professionals

The sequoia pitch moth, *Synanthedon sequoiae*, occurs from California north through British Columbia. This clear-wing moth (family Sesiidae) infests most conifer species, including Douglas fir, pines, and spruces. In California it most often attacks pines, especially those in urban coastal areas of northern California, from Monterey Bay to the San Francisco Bay Area. A similar clear-wing species, the Douglas-fir pitch moth (*Synanthedon novoaromensis*), infests Douglas fir, pines, and spruces from northern California to Alaska.

DAMAGE

Sequoia pitch moth is primarily an aesthetic pest. The main effect of larval feeding is to cause infested pines to produce copious amounts of unsightly resin. Sequoia pitch moth larvae cause very little injury to cambium and wood. This relatively minor damage does not usually cause girdling of the trunk and

rarely kills trees. Larval feeding sometimes causes one or more limbs to die or become weak enough to break, especially if infested trees are young. Pines with pruning wounds or other injuries are more frequently attacked than uninjured pines. Damage is prevalent in certain pines planted in landscapes, such as Monterey pine (Table 1).

IDENTIFICATION

Infestations are recognizable by the gray, pink, reddish, or yellowish pitch masses that protrude from infested trunks and limbs. Pitch masses initially are small, soft, glistening, and reddish brown to pink. As the larva feeds and grows beneath each mass, the gummy exudate enlarges, hardens, and becomes darker gray. A brownish pupal case may protrude from the mass after the larva has matured and emerged as an adult. Old pitch masses can remain on bark for several years. Abandoned pitch

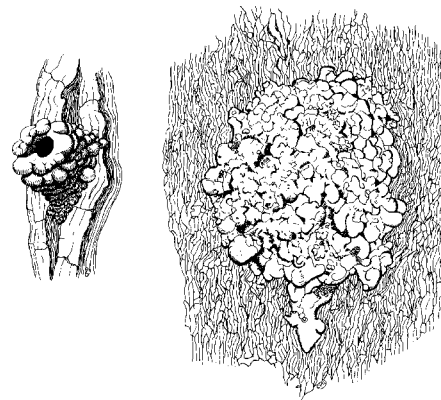


Figure 1. Differences in appearance of a bark beetle pitch tube (left) and a sequoia pitch moth pitch mass. Bark beetle pitch tubes have a distinct round hole in their center, whereas the pitch mass of the sequoia pitch moth often lacks a distinct emergence hole.

masses are often reinfested because egg-laying females are attracted to these injury sites.

People unfamiliar with the damage sometimes confuse pitch moth pitch masses with bark beetle pitch tubes (Fig. 1). Bark beetle pitch tubes are usually less than 1/2 inch in diameter and typically have a distinct round hole in the center made by an adult beetle. Bark beetle pitch tubes often resemble the end of a large gummy drinking straw protruding from bark. Sequoia pitch moth masses are much larger and vary in shape from roundish to elongate oval.

Resinous ooze from pine bark can have other causes, including Diplodia canker, western gall rust, injuries such as pruning wounds, and the serious pitch canker disease, which is caused by the fungus *Fusarium circinatum* (=F. *subglutinans* f. sp. *pini*). Unlike the distinct protrusions

Table 1. Relative Susceptibility of Pines (*Pinus* spp.) to Sequoia Pitch Moth.

COMMON NAME	SCIENTIFIC NAME
MOST SUSCEPTIBLE	
Afghan, Aleppo, Brutia, Calabrian, Mondel, Turkish, and others ¹	<i>P. brutia</i> , <i>P. eldarica</i> , <i>P. halepensis</i>
Bishop	<i>P. muricata</i>
Japanese black	<i>P. thunbergiana</i>
Mexican	<i>P. patula</i>
Monterey	<i>P. radiata</i>
Ponderosa	<i>P. ponderosa</i>
Shore or Beach	<i>P. contorta</i>
LEAST SUSCEPTIBLE	
Canary Island	<i>P. canariensis</i>
Italian stone	<i>P. pinea</i>

Pines are more susceptible to pitch moths if pruned or otherwise injured.

¹ Various common and scientific names are used for these closely related Asian and European natives. Many species are quite susceptible, but their susceptibility varies and confusion among names makes them difficult to distinguish.

Adapted from Frankie et al. 1986.

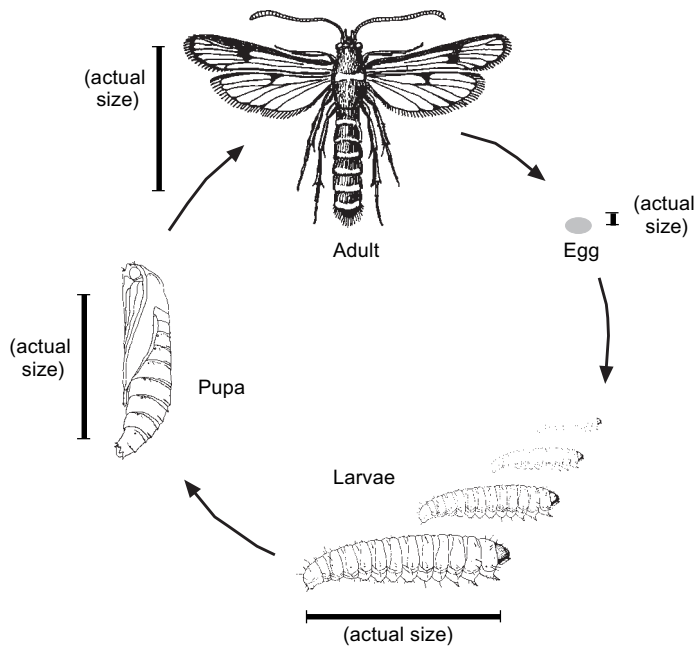


Figure 2. The stages and life cycle of sequoia pitch moth.

caused by bark beetle pitch tubes and sequoia pitch moth pitch masses, injuries, and pathogenic diseases usually cause bark to become coated with a thin layer of resin resembling thick syrup. Bark discolors due to pitch canker; bark around beetle and pitch moth attacks is not discolored. Pitch canker can infect pine tissue of any age, including young branches and terminal shoots the diameter of a pencil; bark beetles and sequoia pitch moth primarily attack the main trunk, though sometimes large limbs several inches in diameter can also be attacked. Yellow and red dying and dead branches scattered throughout the tree are a characteristic symptom of pitch canker, eventually followed by death of the entire pine tree; branches rarely die from sequoia pitch moth. Depending on the species of bark beetle and other factors affecting tree health, branch dieback (from the red turpentine beetle) is rare, or dieback appears first only at the tree top (due to *Ips* beetles), or the entire tree fades and dies (from *Dendroctonus* spp. and others) without being preceded by scattered branch dieback. For more information, see *Pest Notes: Bark Beetles*

and *Pest Notes: Pitch Canker* listed in Suggested Reading.

Sequoia pitch moth adults are day-flying moths distinguished from other moths by their mostly clear wings. The wings have bluish black margins with some yellow at the base. The moth's head and thorax are brownish black, with some yellow. The legs are mostly bright yellow. The abdomen is covered with blackish and yellow hairs in alternating bands, resembling that of a yellowjacket wasp. Females are somewhat larger and plumper than males. Unlike females, male clearwing moths have many fine hairlike projections along their antennae. The adult's body is about 3/4 inch long with a wingspan of 3/4 to 1 1/4 inches. Although the colors and erratic flight behavior of adults resemble those of paper wasps, clearwing moths are not wasps and are stingless and harmless to people and pets.

The adult Douglas-fir pitch moth is bright orange and blackish, instead of yellow and dark colored as with sequoia pitch moth. Douglas-fir pitch

moth biology, life history, and management are similar to those of sequoia pitch moth.

LIFE CYCLE

Because not all individuals emerge from pupae at the same time, adult moths can be present anytime from May through early September. Adults emerge earlier at warmer inland sites, and later at cooler sites near the coast. Peak moth emergence occurs in June and July. Adults live only a few days, during which they mate and females lay eggs. Eggs are laid individually on bark, usually in crevices around pruning wounds and other injury sites. Eggs are 1/16 inch in diameter, reddish brown, oval, and somewhat flattened. They hatch in about 2 weeks. The dirty white, grayish, or pink larvae feed for several months, excavating a shallow cavity that penetrates the inner bark to the cambium surface of wood. After feeding, about one month is spent in the pupal stage. The dark brown pupae are about 3/4 inch long and occur in silk-lined chambers within the pitch mass. Before adults emerge, the pupae force about half of their length through the pitch surface, leaving a brown, paper-like case after they emerge. Although a few individuals may complete their development within a year, most sequoia pitch moths require 2 years to develop from egg to adult (Fig. 2). The insect spends most of its life in the larval stage.

MANAGEMENT

Protect trees from injury. Moths prefer to lay eggs on bark near pruning wounds and other injury sites. Provide trees with proper cultural care (especially appropriate irrigation) to reduce the frequency of borer attack and increase the trees' ability to tolerate damage. Carefully scrape away pitch masses to expose and kill larvae. No other control aside from minimizing injuries to trees is recommended. Pines are not seriously harmed by this insect.

Sticky traps baited with clearwing moth pheromone (sex attractant) are commercially available for monitoring the sum-

mer flight period of adults. However, such traps are primarily used to time the application of insecticides, and no effective insecticides have been found for controlling sequoia pitch moth.

Cultural Control

Small limbs infested with larvae and pitch masses can be pruned off, but this may lead to future infestations around the pruning wound. If pines must be pruned, prune only from October through January so that injuries begin to close before the egg-laying adults emerge in spring. Prune in a way that enhances wound closure, such as by making cuts just outside the branch bark ridge.

Stake pines only if needed to protect or support the trunk or to anchor the rootball during the first year or so after planting. If the tree was rigidly staked in the nursery, remove the stakes and (if needed) restake the plant. Do not fasten trunks firmly; allow the main stem to flex without rubbing on stakes because some movement with the wind is needed for trunks to develop strength. Remove ties and stakes promptly when they are no longer needed, usually within 2 years after planting. For more information, see *Planting Landscape Trees* listed in Suggested Reading.

Keep weed trimmers and lawn mowers away from trunks; for example, maintain a several-foot-wide area around trunks free of turf and other vegetation. Protect trunks from other sources of injury, such as from vehicle bumpers.

Plant only species that are properly adapted to the area. Certain pines are much less susceptible to sequoia pitch moth than others. Consider planting a more resistant species (Table 1). Learn the cultural requirements of pines and provide proper care to maintain vigorous growth. Appropriate irrigation is especially important to tree health. Inappropriate watering is probably the most common problem with landscape plants. Trees are damaged by watering too frequently or by inadequate irrigation. When irrigating trees, apply water beneath the outer canopy, not near trunks. Avoid frequent, shallow watering that is often used for lawns. A general recommendation is to irrigate infrequently (possibly once a month during drought periods) but with sufficient amounts so that the water penetrates 1 to 2 feet into the soil. This can be achieved by applying water slowly through drip emitters that run continuously for about 1 to 3 days. The specific amount and frequency of water needed varies greatly depending on the site and tree species.

Physical Control

Scraping away or prying off resinous pitch cankers is the only direct method of controlling pitch masses and larvae, except possibly for pruning off smaller branches. If resin masses are carefully excised, larvae or pupae can be found and killed. Properly removing pitch masses from all nearby trees, along with appropriate cultural practices, can reduce reinfestations and control local clearwing moth populations. Inadequate application of pitch mass removal technique allows the larva or pupa to survive and mature into an adult that can reinfest trees. Only one larva or pupa occurs in each pitch mass, although several adjoining masses sometimes merge. Unless the mass has become reinfested, no insect will be present in masses older than about 2 years because the insect will have matured and emerged as an adult.

Each pitch mass gradually enlarges, hardens, and darkens as the larva beneath it matures. Learn to distinguish newer pitch masses from older ones in order to recognize where the insect is most likely to be found (Table 2). Larvae are easily overlooked because their pinkish to gray color resembles the color of pitch. Young larvae (those found in smaller, pinkish masses)

Table 2. How to Distinguish New Pitch Masses from Older Ones and Where to Locate the Borer.

PITCH MASS APPEARANCE	INSECT APPEARANCE	INSECT LOCATION
<p>YOUNG PITCH MASS smaller, soft, glistening, pink to reddish brown</p>	larva white, pink, or yellowish with a brownish head; larva can be as small as 1/12 inch, but pitch is usually overlooked until larva is about 1/8 inch	larva usually beneath pitch mass in bark cavity on phloem wood; scoop inside and slightly upward within cavity to remove pitch and kill the larva
<p>OLDER MASS larger (up to about 3–5 inches), harder, darker grayish</p>	larva up to about 1 inch long; body is dark gray to black before forming a dark brown pupa	larva usually in pitch mass or pupating in tunnel near surface of mass
<p>ABANDONED MASS darker gray, relatively dry, often cracked and more flattened than young masses</p>	no insect present; old mass can remain on bark for several years after insect emergence; mass may become reinfested	an empty, brownish, papery pupal case may protrude from mass
<p>REINFESTED MASS abandoned mass (hard, gray, larger) exhibits newer pitch exuding from center, margins, or both; pitch may appear fresh (glistening, reddish brown to pink) or older (grayish) depending on age of reinfestation</p>	Insect appearance and location vary depending on age as described above.	

typically occur below the bark surface within a small cavity that they have chewed in the inner bark. Pupae and older, larger larvae occur in grayish pitch masses. These older insects are usually found near the surface of the mass, somewhat outward from the bark cavity they had created when younger. If pitch masses are simply scraped away without actually locating and killing or disposing of the larva or pupa, the insect can survive and cause a new pitch mass to develop at that site. Pupae or older larvae can survive in discarded pitch masses unless insects are crushed or bagged and disposed of away from trees.

Gently pry or scrape the pitch mass off bark with a screwdriver or stiff putty knife. Locate the insect on the under-

side of the mass or in the tree wound and puncture or crush the larva or pupa. Work carefully to avoid further wounding of the bark. Because they are harder and larger, older masses are relatively easy to remove by prying at several locations around their edges until the whole mass can be lifted off (Fig. 3). Smaller masses have a softer, stickier consistency that may have to be scooped out. Unless the larva is definitely located and killed during pitch removal, scrape slightly upward within the bark cavity and remove as much of the pitch as possible to increase the likelihood of killing the young larva.

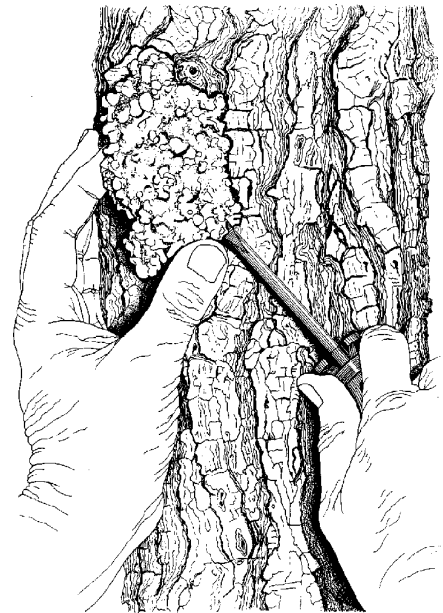


Figure 3. Pitch mass around a pruning wound being pried off the trunk in order to locate and kill the borer larva or pupa underneath.

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SUGGESTING READING

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Produced by IPM Education and Publications, UC Statewide IPM Program, University of California, Davis, CA 95616-8620

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This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Pest Management.

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This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.

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Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

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