
Cone and Seed Insect Pest Leaflet No. 13

British Columbia Ministry of Forests and Range,
Tree Improvement Branch, Saanichton, BC



SEQUOIA PITCH MOTH *(Synanthedon sequoiae)* and DOUGLAS-FIR PITCH MOTH *(S. novaroensis)*



Synanthedon sequoiae adult recently emerged from pitch mass on
lodgepole pine (W. Strong)

TAXONOMY:

Order: Lepidoptera (moths and butterflies)

Family: Sesiidae (clearwing moths)



Preserved adult of *Synanthedon novaroensis* (W. Strong)

HOSTS: Various hard pines, especially lodgepole pine (*Pinus contorta*) and ponderosa pine (*P. ponderosae*) as well as spruces (*Picea* spp.), and Douglas-fir (*Pseudotsuga menziesii*).

DISTRIBUTION: Widespread in western North America from Alaska to California and east to Montana and Colorado.

DAMAGE: *Synanthedon* larvae tunnel for two years in the cambial layer of host tree stems producing distinctive masses of pitch and frass on the stem at feeding sites. The pitch masses are soft and whitish-pink when fresh, hardening and darkening with age. Pitch masses range from 1 - 2.5 cm (first year larvae) to 8 cm (second year larvae) in diameter and can be found anywhere on host stems and larger branches, often at grafting sites, wounds, branch crotches, or near the root collar. Pitch masses can persist for many years, becoming hard and brittle after the larvae have left.



Synanthedon sequoiae pitch masses on a lodgepole pine stem
(D. Manastyrski)

IMPORTANCE: Pitch moth attacks on larger trees generally do not affect tree health. However, repeated attacks on smaller trees can impact seed production through breakage or girdling of branches and stems or tree mortality.



Mature *Synanthedon sequoiae* larva exposed in a pitch mass on bole of lodgepole pine (J. Corrigan)

Description

LIFE HISTORY: Life cycle takes two years to complete; overlapping generations allow adult flight every year.

EGG: Eggs are laid singly in June and July in bark crevices or in wounds on host trees. Female moths are readily attracted to freshly pruned trees. Old pitch masses may be re-infested in subsequent years, enlarging older wounds.

Eggs are rarely observed. They are oblong, slightly flat, red-brown, approximately 1.5 mm long and 0.7 mm in diameter and hatch in about two weeks.

LARVA: Young larvae bore into the inner bark and outer sapwood and feed until fall. Larvae overwinter within their feeding tunnels and pitch; feeding resumes in the spring of the following year. Mature larvae are up to 28 mm long and off-white with a reddish-brown head capsule. Larvae spend their entire lives within the cambial tunnels and pitch.



Synanthedon sequoiae larva in an opened pitch mass (arrow indicates head capsule) (W. Strong)

PUPA: In late spring or early summer, mature larvae pupate in silk-lined chambers just under the surface of the pitch mass. The anterior end of each pupa usually protrudes slightly from the pitch mass to allow easy exit by the adult moth. Pupae are brown with prominent spines across the top of each abdominal segment, about 15-20 mm long. The pupal stage lasts approximately thirty days.



Synanthedon sequoiae pupa dissected from a pitch mass (arrows indicate spines on terminal abdominal segments) (D. Manastyrski)



Empty pupal case protruding from pitch mass

(J. Corrigan)

ADULT: Adults emerge and mate about thirty days after pupation. Empty pupal cases can often be found with the open head end protruding slightly from the pitch mass. Adults are clear-winged, slender moths that mimic yellow-jacket wasps because of their yellow (*Synanthedon sequoiae*) or orange (*Synanthedon novaroensis*) banding on black body colour. Adult wingspan ranges from 20 to 27 mm. Adults are present from May through July.

Detection, Monitoring and Management

Adult male moths can be monitored with wing traps baited with a commercially available sex pheromone. The information collected from trap catches can only be used to track population densities. Larval activity can be monitored through regular annual inspection of stems for active pitch masses. An inspection in September will detect all new (1st-year) pitch masses. At this point, 1st year larvae will have caused little damage to affected trees.

No insecticide treatments have been found to provide effective control of *Synanthedon* populations. After the adult flight period, manual excavation of pitch masses and removal of larvae can provide effective control. Excavation of pitch masses should not be done during adult flight (May - July) because this may serve to attract female moths. Removal of new (1st-year) masses and larvae will prevent the more destructive 2nd-year larvae from developing.

Monitoring and removal programs should be done on a regular annual basis to avoid the potential for population build-up and significant damage.

Wounds from spring or summer pruning are attractive to ovipositing females. To reduce attractiveness to female moths, pruning should be done in fall or winter when adults are not present and to allow some time for wounds to heal before the next adult flight.

Key References

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