

Yellow-headed Spruce Sawfly

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Additional information on this insect can be obtained from your local USDA Alaska Cooperative Extension Service office, Alaska State Forestry office, or from:

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or:

<http://www.fs.fed.us/r10/spf/fhp/fhpr10.htm>

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Yellow-headed Spruce Sawfly



The yellow-headed spruce sawfly, *Pikonema alaskensis* (Rohwer) (Hymenoptera: Tenthredinidae), is a native defoliator of spruce throughout the northern United States and Canada. Young open-grown trees such as ornamentals in landscape plantings, shelterbelts, plantations, and nurseries are especially vulnerable. This insect rarely causes injury to closed-canopied spruce forests.

The yellow-headed spruce sawfly attacks all native Alaska spruce species and most exotic ornamentals such as Norway and Colorado blue spruce. Trees typically become susceptible to defoliation three to five years after planting and remain at risk until a height of 18 feet or more is reached. Environmental factors, such as aspect, soil conditions, and temperature, affect host preference and the ability of trees to tolerate defoliation.

Description and Life History

Adult yellow-headed spruce sawflies are small stingless wasps, approximately 1/3 inch in length. They vary in color from yellowish-brown to nearly black with four shiny, transparent wings (figure 1). Adults emerge in spring from late May to mid-June when spruce buds begin to swell. Females deposit eggs singly into shallow slits in the bark of spruce branch tips at the base of the new needles.

The newly laid egg is very tiny, oblong, pale green to pearly white, with a thin, transparent, finely stippled shell. Eggs hatch in 4 to 12 days; eggs in sunny locations take less time to develop than those in shaded locations.

Duration of larval feeding varies from 30 to 40 days. Young larvae immediately begin feeding gregariously on succulent new foliage. Small larvae consume only small parts of the new needle. As the larvae develop, however, they first skeleton-



Figure 1. Adult sawfly.

ize new needles and then consume them entirely. Older larvae move on to feed on the previous years' foliage. If complete defoliation occurs, larvae may begin feeding on cortical tissues of the branch tips. While feeding, the larva's posterior end curves either downward or upward. Disturbed larvae characteristically arch both ends and exude a liquid from their mouths.

Newly hatched larvae are 1/8 inch in length, yellowish with no markings, with yellow heads that become brownish-yellow after feeding (figure 2). Mature larvae are 3/4 inch in length with a brown to yellowish-brown head and a dark glossy olive-green body marked with three gray-green longitudinal stripes along each side and a dark linear spot just above the base of each leg (figure 3).

Mature larvae stop feeding and drop to the ground in mid to late summer, enter the soil surface, and spin cocoons in which they overwinter. The cocoon is a dark brown fibrous structure approximately 1/2 inch in length, with one end slightly larger and blunter than the other, with soil particles adhering to it. Larvae do not pupate immediately



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Figure 2. *Young sawfly larva, note the yellow head.*

after cocooning, but remain as prepupae for several months. The advent of warm weather the following spring initiates the development of the pupae and emergence of adults from the cocoons. Some individual prepupae may undergo prolonged prepupal diapause for two or more years as a survival mechanism in unpredictable environments.



Figure 3. *Mature sawfly larva feeding on needles.*

Newly emerged females fly directly to host trees and search for suitable egg laying sites, with a preference for spruce growing in full sunlight. Mating is not required to initiate oviposition, although non-mated females produce only male offspring. Male adults hover around host trees and search foliage to locate females. The sawfly completes one generation per year.

Yellow-headed spruce sawfly larvae may be confused with spruce budworm larvae. However, budworm emerges much earlier and spins a conspicuous web around feeding larvae.

Damage Caused

The yellow-headed spruce sawfly is not considered a major forest pest in Alaska; however, aesthetic value of ornamental trees can be greatly affected. Young larvae feed exclusively on the current year's needles resulting in loss of the most photosynthetically active tissue. Once new growth is eaten, older larvae move on to previous years' needles. Damage first appears most intense in the upper crowns of infested trees, where the remaining, partially chewed, needles impart a brownish color and ragged appearance to the tree. As larvae move on to the older foliage, the entire tree may become defoliated. Heavy defoliation for a single year causes reduction of shoot and needle growth, two or more years may result in branch dieback, topkill, and possibly tree death.

Guidelines for Reducing Damage

Environmental factors affect the ability of trees to tolerate defoliation by the yellow-headed spruce sawfly. Environmental stresses, including soil compaction, poor nutrient availability, and water stress, may all increase host susceptibility. Care should be

taken to maintain the vigor of planted spruce trees to minimize impact.

Many natural predators feed on sawfly larvae, including birds, rodents, spiders, and beetles. Since cocoons are buried in the soil, a certain amount of predation by rodents such as mice and shrews as well as ground beetles may be expected. Several species of wasp and fly parasites are known to infest sawfly eggs and larvae. Parasitized eggs can be recognized by their black color. However, predators and parasites are not effective controls when environmental factors are favorable for this insect.

When larvae are found, several alternative methods of control can be applied:

- ▲ Handpicking the larvae from foliage may be a viable alternative for control for ornamental trees.
- ▲ For large infestations, a mixture of one teaspoon dish soap per gallon of water can be used in a high pressure spray to knock larvae from the tree and interfere with the respiration of the remaining insects.
- ▲ It has been suggested that the crowns of severely infested trees be pruned to encourage new growth.
- ▲ Chemical control has been necessary in some cases, especially plantations, shelterbelts, and nurseries. Correct timing is critical to the effectiveness of the product used. Spraying should occur after bud-break, when damage is first noted, prior to the emergence of natural enemies, such as parasites.

Check with your local Cooperative Extension Service office for insecticides that are currently registered for sawfly control.

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Figures 1–3: The University of Alaska Fairbanks Cooperative Extension Service, Anchorage, AK.

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