Larch Sawfly

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Since the larch sawfly (*Pristiphora erichsonii* [Hartig]) was described in 1837, it has been reported as a pest of larches (*Larix* spp.) throughout the northern hemisphere. This sawfly was first reported in North America in 1880 at the Arnold Arboretum near Boston, Mass., where specimens were found on European larch (*L. decidua* Mill.). During the next 30 years, sawfly outbreaks were reported as far west as Minnesota and Alberta and were generally widespread throughout the range of the native North American host, tamarack (*L. laricina* [Du Roi] K. Koch). The first record of this insect's presence on western larch (*L. occidentalis* Nutt.) was made in 1930 in British Columbia. Five years later it was reported attacking this same host in northwestern Montana, and by 1965 it could be found from Maine to Washington and in the tamarack outpost of Alaska. Larch sawfly infestations have been noted as far south as Maryland and West Virginia. The insect has also been reported on scattered ornamental larches in industrialized areas of New Jersey.

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Outbreaks of the larch sawfly on tamarack in the Northeast during the latter part of the 19th century and in the Lake States in the first quarter of the 20th century reportedly killed much of the mature timber.

Records collected in 1955 during the sawfly outbreak in northern Minnesota indicate that 7 years' moderate to heavy defoliation will kill an occasional tamarack. On the other hand, studies of increment cores from this area showed that large numbers of sapling- and small pole-size trees withstood defoliation for 10–20 years in the earlier outbreak. There is also good evidence that Japanese larch planted on good sites can withstand at least 18 years' moderate to complete defoliation without mortality. Larch needles are shed naturally each fall, and larches seem to withstand defoliation by insects better than "evergreen" conifers. Continuous outbreaks of sawflies can, however, reduce growth to a standstill.

Certain larches grow rapidly, and they are in great demand for State and industrial reforestation in the Northeast. Particularly in New York and Pennsylvania, European, Japanese (*Larix leptolepis* [Sieb. & Zucc.] Gord.), and

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the Dunkeld hybrid (*L. eurolepis* Henry) larches are planted extensively. Evidence that the sawfly is present usually can be found in these plantations within 15 to 20 years of planting. However, relatively few of the sawflies complete their life cycle, and their populations remain very low.

Host Trees

In North America the larch sawfly infests the three native species of larch: tamarack, western larch, and subalpine larch (*Larix lyallii* Parl.). The sawfly has been found attacking such planted species as European larch, Japanese larch, the Dunkeld hybrid, Siberian larch (*L. sibirica* Ledeb.), and Dahurian larch (*L. gmelini* var. *gmelini* [Rupr.] Kuzeneva).

Evidence of Infestation

After the eggs are laid in the new terminal twigs (fig. 1, *left*), the twigs develop a characteristic curl, which remains for several years. The rows of eggs or egg slits in these curled twigs can be seen with the unaided eye (fig. 1, *right*). After the eggs hatch, the larvae can usually be found feeding on the foliage behind the curled twig. If the tree has been heavily attacked, sawfly cocoons may be found after late summer in the duff under the tree crown.

Damage Caused

Sawfly larvae eat the needles on the older parts of the twigs, and if the attack is heavy they may completely strip the tree (fig. 2). After a few years of heavy defoliation small trees may die. Larger tamarack growing in deep bogs survive many successive defoliations but show practically no increase in size. Tamarack on thin, well-drained bog soils have died after 7 years of moderate to heavy defoliation. Larch planted on good sites can be expected to survive at least 18 years of successive moderate to complete defoliations.

Figure 1.—*Left,* Adult larch sawfly laying eggs; *right,* new twig with eggs. Note twig curl caused by egg-laying activity.

Description

Adult females are about 3/8 inch long with black antennae and bodies. The abdomen, which has a broad orange band, tapers sharply toward the rear. The males have yellowish antennae and an orange abdominal band, but the abdomen is cylindrical and rounded at the rear. The translucent eggs are about 1/16 inch long. There are five larval stages. The newly hatched larvae have brown heads and cream-colored bodies. The heads darken and the bodies become greenish as feeding progresses, and in the fifth or final stage the heads are a shiny, jet black, and the bodies are gray green along the back and whitish beneath (fig. 3). Upon completion of feeding the larvae drop to the ground to spin their cocoons, which are capsule shaped and measure about 7/16 by 3/16 inch.

Figure 2.—Complete defoliation of 50-foot tamarack near Laporte, Minn., July 1955.

Life History

Emergence of adults in north central Minnesota starts from mid-May to early June. The warmer the weather and the lower the water levels, the earlier they appear. Under normal conditions most of this emergence occurs between the first and third week in June, and by the first of July it is practically complete. Less than 2 percent of the adults are males, and reproduction is accomplished without mating. Each female lays 20–200 eggs, depositing them in rows under the bark of the current terminal twigs. In about 8 days the eggs hatch, and the larvae move back to the foliage on the older twigs to commence feeding; they do not prefer the leaves on the new shoots. Generally the larvae feed in groups unless they are dispersed by wind, heavy rainstorms, or depletion of the foliage.

The feeding period for an individual colony lasts about 20 days.

Figure 3.—Mature fifth-stage larvae feeding on tamarack.

Because adults emerge during a 6-week period approximately, cocooned larvae and pupae, adults, and various stages of larvae, and even new cocoons may all be found in the field during early summer. The mature larvae drop to the ground, enter the duff, and spin tough, papery, brown cocoons in which they winter. Some larvae spend two winters before they pupate and emerge as adults.

Applied Control

In the forest, the larch sawfly is a difficult insect to control satisfactorily. This is because of its prolonged adult emergence period, which provides new eggs throughout much of the late spring and early summer. Fortunately, the tree can live through successive defoliations for many years. Therefore, an occasional control operation that would protect foliage for a season may be all that is necessary to keep the trees alive. If the environment is such that the outbreak can continue, the sawfly might be expected to build up its population to serious levels within 2 years.

Malathion may be used to control the larch sawfly. Relatively low quantities of it destroy young larvae rapidly. More insecticide is required to kill the large larvae. Because the generations overlap, two applications may be necessary. Spray first when the earliest mature (fifth instar) larvae are found. The second application may be applied in another 2 weeks. The recommendation for hydraulic sprayers is as follows: Add 1 gallon of 25-percent malathion emulsifiable concentrate to 99 gallons of water.

For use with a garden sprayer, add 2 teaspoonfuls of 25-percent malathion emulsifiable concentrate per gallon of water. A light, but thorough coverage of the trees is all that should be necessary.

Natural Control

Natural losses of larvae through drowning and predation by small mammals are considerable in bog sites, but do not generally stop an outbreak. At one time a wasplike parasite greatly reduced outbreak populations. Since the 1940's, the larch sawfly in much of the eastern half of Canada and the United States has developed an immunity to this parasite (*Mesoleius tenthredinis* Morl.). In the Far West, the larch sawfly is still susceptible to *Mesoleius*.

Canadian specialists have released a Bavarian strain of the parasite which tests have shown is successful against the sawfly. They have also imported another wasplike parasite (*Olesicampe benefactor* Hinz) from Europe and established it in the forest. They report that *Olesicampe* has good possibilities.

Pesticide Precautions

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key — out of the reach of children and animals — and away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or when they may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or

gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

WARNING: Recommendations for use of pesticides are reviewed regularly. The registrations on all suggested uses of pesticides in this publication were in effect at press time. Check with your county agricultural agent, State agricultural experiment station, or local forester to determine if these recommendations are still current.

References

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