



**HEMLOCK LOOPER**  
*Lambdina fiscellaria* (Gn.)

**Insect and Disease Laboratory • 168 State House Station • 50 Hospital Street • Augusta, Maine • 04333-0168**

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The hemlock looper is native to North America and has been found throughout much of the eastern half of the continent on a wide variety of coniferous and deciduous hosts. It is the strong larval preference for defoliating hemlock that has resulted in its common name and recognition as a serious pest. Hemlock looper has caused serious defoliation in some parts of its range over the years, but it did not become a serious problem in Maine until 1989 when roughly 450 acres of heavy to severe hemlock defoliation were observed near Sebago Lake and Springfield. Approximately 20,000 acres were defoliated in 1990, and heavy to severe defoliation increased to 225,000 acres in 1991. Surveys late in 1991 indicate that acreage in 1992 is expected to be close to that of 1991.

**Damage** - When hemlock looper populations are heavy, 30-60% of the new needles and 95-100% of the old needles may be lost in any one season. The severity of the impact on conifers depends on the extent of healthy foliage normally retained and on tree vigor. Healthy hemlock generally retains needles for two or at most three years and is much more fragile and sensitive to disruption than some other conifers which hold their needles for longer periods. As a result, heavy populations of loopers can kill hemlock in one season whereas it might take two or more years of such defoliation to kill balsam fir or spruce. Deciduous hosts are generally much less affected and should recover quickly.

**Hosts** - The hemlock looper has been recorded from every native conifer and many deciduous hosts in Maine as well as some shrubs and ornamentals. It has a decided preference for hemlock, balsam fir, and white spruce and it is these species which are likely to feel the greatest impact during the current outbreak.

**Life Cycle and Description** - The season begins as the tiny inconspicuous eggs hatch over a period of weeks from mid-June through July. Newly hatched first instar larvae are tiny (1/8" or less), grey and white banded, black-headed loopers which feed briefly on new foliage and then retreat to older foliage where they go through a series of four molts, growing and changing with each. Their head changes from black to grey following the first molt (the second instar) while the body color remains similar. Following the second molt (the third instar) the body darkens and begins to gain the more typical banded and spotted pattern of mature larvae. In the last, or fifth instar, most larvae are roughly 1" in length and 1/8" or more across. At this time larvae range in color from nearly black through light green to straw yellow. All, however, have a broad, distinct and usually lighter band down their back containing paired (4 per segment) dark spots and have a light underside. Two pair of dark spots are also evident on the top of their head. The larger larvae are very messy feeders, moving about "nipping" foliage (which later dies) and, when disturbed, dropping from the trees on to undergrowth where defoliation is often heaviest. Although much of the defoliation by mature larvae occurs on older foliage, when this is gone new foliage may be stripped as well. The ground beneath heavily infested trees may also be covered with a mat of "nipped" or partly chewed needles. In late July, larvae begin seeking out protected spots to pupate. The variable, brown and green, spotted pupa has no cocoon and is formed in cracks and crevices on the tree bole, objects nearby or in the litter. By mid-August, after a pupal period of 2-3 weeks, the frail, tan moths begin to appear and flutter about. Although the color intensity may vary widely within the species, most moths are basically dark straw yellow with a variable dusting of tan or brown to brownish purple scales. Each forewing has an angular, often darker, band set off by two narrow dark lines. A darker spot is also usually visible in the center of this band on each forewing. When at rest, these moths lay very flat in a broad wedge shape. In heavily infested stands it is not uncommon to find large numbers of moths resting on trunks of trees and on low deciduous vegetation. These fly readily when disturbed. Moths are present from mid-August to October. Mating takes place on resting sites and "coupled" pairs of moths often show different color variations. The very tiny eggs are deposited singly or in small clusters on foliage, twigs, bark, understory vegetation, debris or in the litter.

**Problem Assessment** - The hemlock looper is likely to be more of a problem in forested areas with a high component of hemlock or balsam fir. In some coastal sections of the state, stands with a high component of balsam fir and white spruce have also been affected. Growers of Christmas trees and wreath brush should be alert to the potential for infestation especially if their plantations are adjacent to infested forest stands. Landowners with a few susceptible trees around their home grounds should be aware of the situation but they too would likely be affected only if their trees were adjacent to infested stands. Hardwoods are most likely to be defoliated only in proximity to infested conifers and should not be impacted greatly. Should advice be necessary, contact:

For Christmas trees, wreath brush, homeowner & spray situations:	For Forested areas:
Richard Bradbury, Maine Forest Service	Henry Trial, Jr., Maine Forest Service
22 State House Station	Box 415, Airport Road
Augusta, ME 04333	Old Town, ME 04468
Tel. 287-2791	Tel. 827-6191

**Control\*** - In forested areas advice should be sought as to a course of action. The preferred pesticide registered for use against the hemlock looper in forest situations in 1991 is *Bacillus thuringiensis* (Bt.). Bt. can be used for both aerial and ground applications but requires careful timing. It is critical that you have early detection for looper if you plan to use Bt., as it must be applied before the peak of the third instar to be effective. Larvae at this point are still small (less than 1/2" long). This is the only pesticide to be used aurally or near water.

**Growers of Christmas trees and wreath brush** are advised to monitor their own conditions using the following method: Beginning June 1, susceptible softwood should be randomly checked on a weekly basis through July 1 using a 3x3 square cloth beating frame (simply tack a piece of white muslin or sheeting to some form of stable light wooden frame). Insert (carefully) the frame into the canopy so that it remains flat and beneath a 3 ft. branch. While holding the beating frame with one hand, gently rap the entire branch with a light stick or rod in your other hand using a downward motion toward the sheet. If loopers are present, they should then fall on to the sheet. Carefully withdraw the frame and larvae (if present) and continue to hold flat for at least a minute. Hemlock loopers play "possum" and often will not move for a minute or two. If loopers are present they will, however, begin to rear up and wave about or move within a couple of minutes. Remember that these early larvae are tiny (see description). If you're unsure that the insects you observe are indeed hemlock looper, save some larvae in alcohol and send them to the Insect & Disease Laboratory, 50 Hospital Street, Augusta, ME 04330-6514, Telephone 287-2431) for positive identification. Control decisions for individual Christmas tree plantations should be determined for each situation. Should native fir and/or hemlock in the adjacent area be heavily defoliated and larvae be found in monitoring checks, growers should seek more advice. For growers of Christmas trees and wreath brush it is necessary to achieve a more rapid control of such defoliators than usually achieved by Bt. Registered pesticides for use in these situations would include: Diazinon\*\*, fluvalinate (Mavrik), carbaryl (Sevin), methoxychlor and malathion.

**Small landowners** (for conifers only) should follow the same monitoring procedures as those suggested for Christmas tree growers. The need for control would be based on desired results (aesthetic or simply protection) and previous defoliation or stress. A beating yielding one to five larvae would probably indicate low defoliation except where the trees were heavily defoliated the season before. Five to ten larvae per sample could produce noticeable feeding damage in the current season. Hemlock would be more likely to suffer permanent injury than other species. Insecticides registered for use in these situations include: Bt., malathion, methoxychlor and carbaryl (Sevin).

**\*NOTE:** These recommendations are not a substitute for pesticide labeling. Read the label before applying any pesticide. Pesticide recommendations are contingent on continued EPA and Maine Board of Pesticides Control registration and are subject to change.

\*\* Some formulations are restricted-use pesticides and may only be purchased or used by certified pest applicators.

**Caution** - For your own protection and that of the environment, apply the pesticide only in strict accordance with label directions and precautions.