



SPRUCE BUDWORM
Choristoneura fumiferana (Clem.)

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On Ornamentals and Christmas Trees

Damage

The spruce budworm has long been recognized as a regular component of Maine's spruce-fir forests. Under normal (endemic) conditions populations of this insect are often so low as to be difficult to detect. Periodically, however, the budworm undergoes a population explosion (epidemic) and becomes so abundant that serious feeding damage occurs. Heavily infested stands appear reddish in July due to masses of dead, chewed needles clinging to the branches. Tree mortality may occur after several years of heavy feeding. The prime concern of the Christmas tree plantation owner, wreath maker, and homeowner is attractive foliage; therefore to these people budworm feeding damage in any degree is less acceptable than in the case of forest trees.

Hosts

In Maine, the spruce budworm feeds primarily on balsam fir and white spruce, but also readily attacks black and red spruce, larch and hemlock. Douglas fir, Norway spruce and Colorado blue spruce are among the more common planted trees which the budworm finds an acceptable part of its diet. Feeding on such trees as white and other pines and even hardwoods has been reported, but is generally considered rare and of little importance.

Life Cycle

The adults which are greyish-brown moths marked with white and black spots and bars emerge in July and flit about the trees. The small moths are about 1.5 cm long with a 2.5 - 3 cm wing span and are often referred to as "millers." Large numbers occasionally amass in heavily infested stands and move great distances with the wind. Late in July the female moths lay their eggs in shingle fashion in light green masses of about 20 eggs each on the underside of fir needles or on spruce needles. A single female lays a total of approximately 200 eggs.

The eggs hatch in about 10 days and the very tiny larvae wander briefly and then spin small silken hibernacula over cracks and crevices to spend the winter. Just before bud swell in the spring the tiny (2 mm) tannish larvae emerge to mine the needles. At this stage they are difficult to recognize by the untrained eye, however, over the next five weeks as they feed on opening buds and developing foliage they grow and become more conspicuous. Fifth and sixth instar larvae are voracious feeders and consume a great amount of foliage. Mature or sixth instar larvae are about 1" long, dark reddish brown with white spots and have a black head. After completion of feeding (mid to late June) the sixth instar larvae molt for the last time and become pupae.

Pupae are banded brown and cream and form in the foliage where they can be seen within the mass of larval webbing and clippings on the fir or spruce twigs. This webbing of clipped off dead needles gives the trees the conspicuous reddish cast which is so distinctive of heavy populations and which is used as a basis for aerial surveys. The adult moths emerge in about 10 to 14 days after pupation occurs.

Control*

The spruce budworm seldom needs control except under epidemic conditions and at this time such a control is best accomplished by air on a large scale. At times, however, it may be desirable to control the spruce budworm on a small scale (100 acres or less) or even on single trees from the ground. *Bacillus thuringiensis* (Bt) or carbaryl can be used for small scale control purposes. Diazinon** can also be used in Christmas tree plantations or aerial applications.

(over)

Plantations: Determinations of potential population levels should be made prior to mid-April. Assistance may be obtained from Forest Health & Monitoring Division personnel in the Maine Forest Service to do this.

Individual Shade or Ornamental Trees: To determine numbers of larvae on ornamental spruce and fir the homeowner should watch the trees carefully for the tiny caterpillars during the time the buds are swelling in May. A white card, piece of paper, or sheet can be placed beneath a branch and the branch beat lightly so that any caterpillars will fall onto the light surface where they are readily visible. If an infestation is indicated, apply insecticide after the buds have begun to open and the needles are flaring (late May to early June).

***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 be purchased or used only by certified applicators.**

Caution

For your own protection and that of the environment apply the insecticide only in strict accordance with label use instructions and precautions.