CFS CANADIAN FOREST SERVICE
SCF SERVICE CANADIEN DES FORÊTS

No. 1
ISSN 1712-6134

PEST Notes

Spruce Budworm

6th instar spruce budworm larva

What is it?

The spruce budworm, *Choristoneura fumiferana* (Clem.), is one of the most destructive insects of softwood trees. In Atlantic Canada, it feeds mostly on balsam fir (*Abies balsamea* L.), but may also attack spruce (*Picea* spp.), larch (*Larix* spp.), and hemlock (*Tsuga canadensis* (L.) Carr.) in years of severe infestation.

What does it look like?

The adult budworm moth is grayish with dark brown and pale markings, and is about 1.5 cm long, with a wingspan of about 2.5–3 cm. Adults mate during the last half of July. They are most active between 7:30 and 11:30 p.m. They can disperse over long distances (>25 km), transported on prevailing wind currents. Under storm conditions, they may be dispersed hundreds of kilometers away from their point of origin. Females lay their eggs on the undersurfaces of needles of the host tree. However, if budworm populations are high, eggs may be laid almost anywhere. The eggs are laid in masses of 15 to 50 in overlapping rows. In general, female moths deposit an average of ten egg masses, a portion of which are laid near where the female emerges. The remaining eggs are laid after the female has migrated to new sites. After laying the eggs, the female moths die (male moths die after mating). The eggs are light green and about 1 mm long and 0.2 mm wide. They hatch after about 10–14 days. The young larvae crawl into crevices on the twigs and branches, where they spin a small silken shelter, or hibernaculum, in which they overwinter. About the time the buds begin to swell, the larvae emerge from their hibernacula and start feeding, mining the needles and buds. When fully grown (about June 15–30 in Fredericton, NB), the caterpillar can be found in a thin web on the foliage; it is about 2.5 cm long and pale brown with light spots and a dark (brown-black) head. The caterpillar changes into a brown pupa within the web and, about 10 days later, the moth emerges to mate and lay eggs for the next generation.

What damage does it cause?

Balsam fir, the tree most seriously affected by spruce budworm in Atlantic Canada, is a commercial species commonly used for wreath and garland making and for Christmas trees; attractive, unblemished foliage is a must for these industries. Feeding by budworm mars the appearance of the foliage and destroys its commercial value. During outbreaks, the larvae may destroy most or all of the new foliage and, sometimes, all the buds and shoots. Damaged needles turn reddish brown, giving the tree a scorched appearance. Trees will put out new growth the next year and will recover unless the attack remains severe for 3 or more years. After 3 years of severe defoliation, many balsam fir trees may have dead tops, be stunted, or have died. Small trees are seldom killed, unless growing under larger trees. In areas of moderate to severe infestation, however, trees of the size used for Christmas trees are likely to sustain sufficient damage to cause downgrading or rejection. Balsam fir is also used in the pulp and paper industry and for dimensional lumber; widespread destruction of fir stands by spruce budworm compromises the sustainability of the wood supply in Atlantic Canada.

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Spruce Budworm . . .

In years of severe defoliation, spruce and larch species may be equally affected by spruce budworm infestation and, if left unchecked, can have a major impact on wood supply, removing up to two thirds of the softwood component. In the last outbreak, extensive areas of black spruce stands and larch trees within some infested areas were completely stripped of new foliage for one or more years.

Where is it found?

The spruce budworm is native to North America and periodic outbreaks are part of the natural cycle in spruce–fir forests. Tree-ring analysis has shown that outbreaks occurred as far back as 1704 in Quebec and published records kept for over 150 years show that outbreaks occur, on average, every 35 years. The last outbreak in Atlantic Canada began in the late 1960s, reaching its peak in New Brunswick and Prince Edward Island in 1975, in Nova Scotia in 1976, and in Newfoundland and Labrador in 1977. Only very low, or endemic, levels of budworm have been found since the mid-1980s in the Atlantic provinces. However, given that balsam fir and spruce are major components of the forests across Atlantic Canada, a new outbreak of this pest in this region will undoubtedly occur in the near future.

For further information, please consult:

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Spruce budworm defoliation

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