

MORE INFORMATION

For more information
on Spruce Budworms call:
The Tree Line
(204) 945-7866.

Or write:
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Forest Health and Ecology
200 Saulteaux Crescent
Winnipeg, Manitoba R3J 3W3
Web site:
www.gov.mb.ca/natres/forestry/

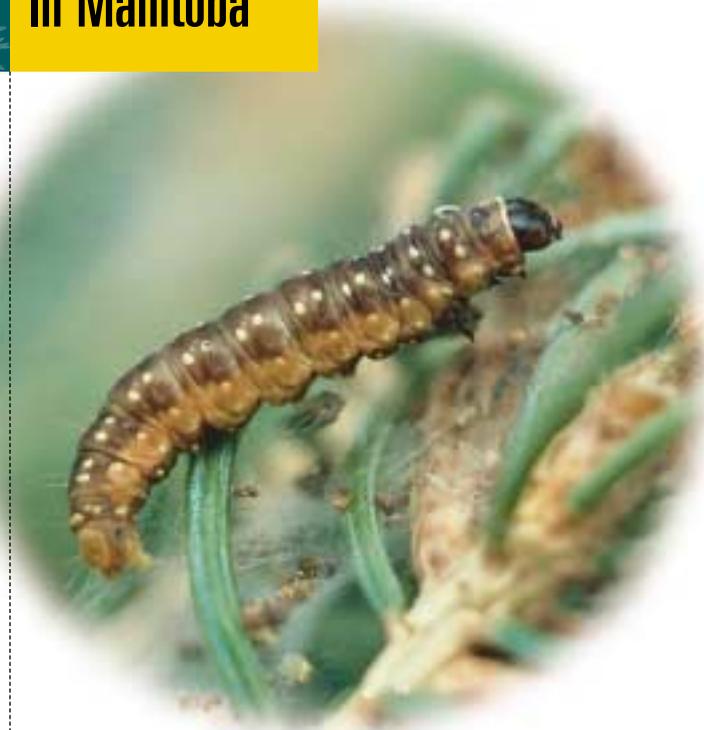


Photos courtesy of
Canadian Forest Service,
Great Lakes Forest Research Centre,
Sault Ste. Marie, Ontario and
Northern Forest Research Centre,
Edmonton, Alberta.

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The Spruce Budworm In Manitoba



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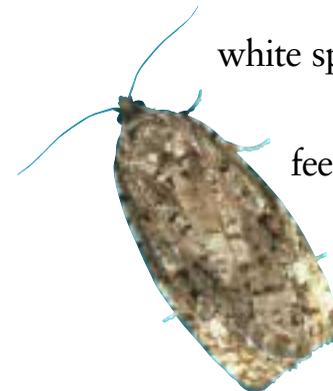
The spruce budworm, *Choristoneura fumiferana* (Clemens), is the most destructive and widely distributed forest defoliator in North America.

The destructive phase of this pest is the larval or caterpillar stage. Massive budworm outbreaks occur periodically, destroying hundreds of thousands of hectares of valuable fir and spruce.



Aerial view of budworm damage

In eastern Canada the budworm's preferred food is balsam fir, white spruce and red spruce. In Manitoba, the budworm feeds primarily on white spruce and balsam fir, and, less frequently, on black spruce.



DESCRIPTION OF LIFE STAGES

The adult moth has a wingspread of 21 to 30 mm. It is grey-brown in colour with silvery white patches on the forewings.

Light green eggs are deposited on the underside of needles in elongate masses consisting of two to 60 eggs. Eggs are laid in two rows, which overlap like the shingles on a roof.

A mature larva is about 20 to 23 mm long. Its head is dark brown. Rows of small pale spots are present on the back of the dark greenish-brown body. There are six and sometimes seven stages called “instars” during larval development.

The pupa is pale green when first formed. Later it turns reddish-brown and is about 12 mm long.



Pupa
(Not actual size)

4

Adult moth
(Not actual size)

1



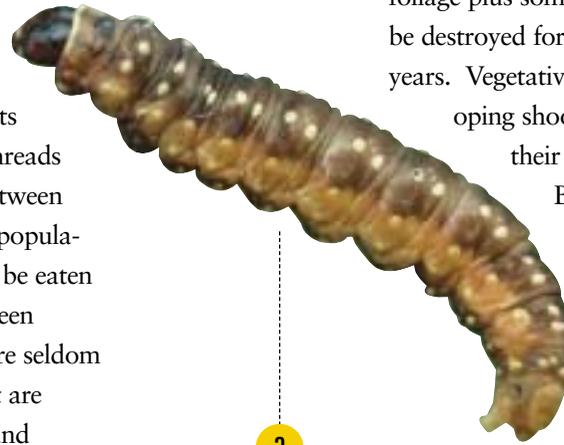
Egg mass
(Not actual size)

2

LIFE CYCLE

The female moth lays its eggs in July on the underside of needles. Normally, the eggs hatch in 10 days. The tiny larvae spin silken covers called

“hibernacula” under buds and in bark crevices. The larvae molt to the second instar and remain in the shelter until the following spring. They emerge with the warm weather in early May just prior to bud expansion. Larvae mine old needles, unopened buds or, when available, staminate flowers. Later they feed in the expanding buds and as the new shoots grow, they spin fine silk threads among the needles and between shoots. During epidemic populations, old foliage will also be eaten once all new foliage has been consumed. The needles are seldom completely consumed, but are often clipped at the base and webbed together. Heavy feeding gives trees a scorched appearance in mid-summer. Feeding is completed in approximately five weeks depending on weather conditions. Adults emerge in early July, mate, and lay their eggs. There is only one generation per year.



Mature larva
(Not actual size)

3

DAMAGE

In light and moderate infestations damage is restricted to a partial loss of new foliage, particularly in the upper crown of the tree.

Repeated loss of new foliage over a number of years results in reduced vigor of the trees.

These weakened trees become more susceptible to secondary insects and diseases. During severe persisting infestations all of the new foliage plus some old foliage may be destroyed for several successive years. Vegetative buds and developing shoots may be killed in their formative stages.

Branch and top mortality of white spruce results after three to four years of severe infestation. Complete tree mortality can often occur following five to six years of severe infestation. Balsam fir, possessing less foliage than spruce, may be killed after three years of severe feeding damage.



Severe budworm defoliation

CONTROL

Various insecticides are used against the spruce budworm to protect valuable spruce and fir trees. Large-scale chemical and biological control operations are carried out aerially in various parts of Canada to reduce tree mortality. Currently, registered products to control spruce budworm in commercial aerial operations include the biological insecticide *Bacillus thuringiensis* (*Bt*), a naturally occurring bacterium, and *Tebutozide* (*Mimic*), a growth regulator hormone.

Ground spray equipment is often used when spraying ornamentals around the home or cottage. Currently, registered products for domestic use include malathion, carbaryl, dimethoate, permethrin, acephate, aminocarb, trichlorfon and *Bacillus thuringiensis*.

Insecticides are applied when larval development has reached third to fourth instar (approximately six to 10 mm in length), in synchrony with the elongation and flaring open of current shoots. At this point, larvae are exposed and vulnerable to the insecticide. Successful application controls the larvae before they reach the fifth and sixth instars, when the majority of feeding takes place.