



FACT SHEET WESTERN SPRUCE BUDWORM (Choristoneura occidentalis)

Overview: Western spruce budworm is a native feeder on needles found in mixed fir forests throughout the Intermountain West and Canada. Budworm plays an important role in forest dynamics and ecosystem processes.

Hosts: Grand fir, subalpine fir, Engelmann spruce, Douglas-fir, western larch

Quick ID:

- Foliage with scorched or blighted appearance at tips
- Needles bound together with webbing at branch tips
- Defoliation caused by 1" or smaller caterpillars
- Caterpillars brown with green markings, white spots on sides, not hairy
- Topkill or death following defoliation

Affected trees will have foliage with a scorched or blighted (as by frost) appearance at the tips of branches.

Life History:

- Adult insects are orange-brown triangular moths, a little less than an inch across; egg masses on needles are pale green.
- Larvae go through several development stages, beginning as tiny green caterpillars with brown heads and finishing as 1" long, olive-brown caterpillars with pronounced ivory "warts" on either side.
- Younger larvae that are carried by the wind to other trees.
- The tallest trees are preferred by the egg-laying adults, and larvae are blown to shorter, intermediate or overtopped trees.
- Life cycle generally takes 12 months, producing one generation per year. At high elevation sites the life cycle can take two years to complete.
- Budworm outbreaks occur in cycles lasting 3 to 10 years in moist stands and up to 30 years in dry stands.

Predisposing Factors:

- Physiological stress in host trees influences susceptibility to attack and concurrent damage. Agents of stress include drought, overstocking, disease, insect attack, poor site conditions, fire, harsh frost events, etc.

- Fire suppression has led to conditions (e.g. overstocked stands; fir taking over pine sites) that favor the spruce budworm.
- Pure stands of firs and spruce are more susceptible to infestation and receive more damage than mixed stands.
- Warm, dry spring weather and warm, dry sites in general favor budworms.

Forest Impacts:

Western spruce budworm is a defoliating insect, it doesn't necessarily kill trees. However, severe defoliation will kill a conifer in one year, and repeated infestation year after year will severely weaken the tree, causing loss in growth and predisposing it to attack by bark beetles (which do kill the tree).

Control:

Complete control of western spruce budworm is not possible, desirable, or necessary. This insect has many natural enemies that help control populations.

Control can be accomplished with insecticides on selected trees but is difficult on a large scale. Chemical spraying operations (insecticides such as malathion, carbaryl, and acephate) are effective in the short-term at reducing budworm populations, but may have undesirable impacts on the ecosystem.

Insecticides are applied in spring (just as buds begin to open; timing depends on temperature and elevation) when larvae are feeding on old needles and before they enter the buds. Applications in June and July control larvae on new growth. Always read the insecticide label for directions on pests controlled, application, and disposal.

A naturally-occurring bacteria, *Bacillus thuringiensis*, is specific to moths and butterflies and effective in reducing the budworm population without having any adverse effects on the environment.

In the long-term control of budworm includes silvicultural treatments to maintain stands at a proper stocking level and increase stand vigor. Outbreak severity can be reduced over the long term by forest management strategies that favor young, vigorous, even-aged stands

Information compiled by Jodie Canfield, Landscape Ecologist, 7/11/06

More in-depth reading: search the internet for "western spruce budworm" - many good web sites. Try also: <http://dnrc.mt.gov/forestry/assistance/pests/default.asp>

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Adult



Larval



Defoliation

MORE PHOTOS

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