

The Western Spruce Budworm

B.t.k. Information Sheet



Western spruce budworm mature larvae (caterpillars)



Western spruce budworm moth

What is the western spruce budworm?



The western spruce budworm is an important **native** defoliator of interior Douglas-fir in British Columbia. **It is not an introduced species.** Outbreaks have been recorded in British Columbia since the early 1900's to the present day. In 1987 and again in 2007-2008, over 800,000 ha were under attack by the budworm, mostly in the southern interior of the province. Budworm outbreaks may be sustained for up to 25 years.

The western spruce budworm feeds primarily on Douglas-fir. True firs, larch and spruce may also be impacted. The caterpillars feed on the new needles, but will move onto the older needles if all new foliage is consumed. **Trees appear reddish in colour** once needles have been fed upon.

Will the western spruce budworm kill my trees?



Occasionally. Trees of all ages are susceptible, although forests dominated by mature trees are preferentially attacked. Mortality most often occurs in the understory with **suppressed or intermediate trees** being the most vulnerable. Mature trees can also be killed by the budworm depending upon the longevity and severity of the outbreak, and the general vigour of the stand and individual trees.

The western spruce budworm emerges in the spring as a small caterpillar from overwintering sites on the trees and spin loose webs as they feed. Mature larvae are about 25 mm long. They have a brown body and brownish-black head with **four distinct yellowish spots on each segment.**

What is *B.t.k.*?



Bacillus thuringiensis var. *kurstaki* (*B.t.k.*) is a bacterium that occurs naturally on dead or decaying matter in the soil. **It is not a synthetic chemical** and is only activated when eaten by a susceptible species of insect. *B.t.* is the **most widely used naturally occurring pest control product in the world.** *B.t.k.* is specific to the Lepidoptera (moths and butterflies). Caterpillars must actively feed upon *B.t.k.*-treated trees in order to be affected. When *B.t.k.* is ingested by a susceptible caterpillar, the highly alkaline environment (pH 9.5) of the caterpillar's gut triggers the *B.t.k.* bacterium to release a crystalline protein called an "endotoxin" that poisons the insect's digestive system. The insect may not die immediately after ingesting *B.t.k.*, but generally stops eating and will die within a few days.

Can I apply *B.t.k.* to my infested trees?



Yes. However, in order for *B.t.k.* to be effective, the caterpillars **MUST** feed on sprayed foliage. This means that buds must be fully flushed and needles open to the *B.t.k.* spray. There must not be rain immediately after treatment or the *B.t.* will be washed off. Insects prefer to feed in warm, dry weather, so the spray should be applied when temperatures are at least 20°C. If you have more than a few small, infested trees, it is impractical to attempt to protect them. Most treatment for western spruce budworm is done at a landscape level scale using aircraft.

For more information on western spruce budworm and its control, please contact:

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