

## **FREQUENTLY ASKED QUESTIONS (FAQ) CONCERNING WESTERN SPRUCE BUDWORM/DOUGLAS-FIR TUSSOCK MOTH**

### **Why is the Whitefish Area Fire Safe Council even interested in this subject?**

Because a healthy forest is a Fire Safe forest.

### **Why are my trees turning brown?**

Two different defoliating insects have infested trees across the Flathead Valley: western spruce budworm and Douglas-fir tussock moth.

### **What kinds of trees are affected or in danger?**

The western spruce budworm attacks Douglas-fir, grand fir, subalpine fir, spruce, and larch. It also will occasionally feed on pines during an outbreak.<sup>†</sup>

The Douglas-fir tussock moth attacks Douglas-fir, true firs, and spruce.<sup>‡</sup>

### **How can I distinguish between budworm and tussock moth attacks?**

Western spruce budworm are smooth caterpillars with parallel rows of white dots on their backs. They are small and light green in the early summer and grow larger and brown as the season progresses.

Evidence of their feeding is characterized by silken masses of chewed needles; needle loss; and branch and crown dieback. Caterpillars feed primarily on current year growth but will also feed on old needles until new growth emerges. Subsequent years of heavy defoliation can cause reduced growth, branch dieback, top kill, and mortality.<sup>†</sup>

Douglas-fir tussock moth caterpillars are quite hairy with distinct tufts of hairs on their back. Needle loss is often concentrated at the top of the tree; insect evidence can be detected year round (eggs in winter, caterpillars in spring, adults flying in late summer). Moths feed on current and previous years' growth. During outbreaks, entire trees may be defoliated and killed.<sup>‡</sup>

### **What are the stages of the western spruce budworm and Douglas-fir tussock moth? How do I identify them to be sure that I need to treat for them?**

Western spruce budworm caterpillars feed on needles in the spring, feeding first on old needles and buds until the new foliage emerges. Later in the summer, they spin silken shelters in which they feed and pupate. Coppery brown moths emerge in August, mate, and lay eggs on the underside of needles. Eggs hatch in late summer and the young caterpillars migrate to bark crevices for the winter.<sup>†</sup>

As of August 2011, the budworm is in its moth phase; the moths are coppery brown, about an inch long, and are probably noticeable around your yard or woods.

Tussock moth females do not fly. Upon emerging from the pupal case, they mate and lay eggs. The eggs overwinter in a mass, encased with hairs from the mother's body. Eggs hatch at approximately the same time as budburst. Larvae feed on new foliage and pupate in late summer. Moths emerge August through September.<sup>‡</sup>

As of August 2011, the tussock moth is concluding its crown-deforestation phase and becoming more visible as colorful caterpillars drop from trees on long silk threads. The tussock moth caterpillars are easily identified by the furry tufts protruding from their heads and tails and buff-colored, hairy bodies.

### **What is the typical lifecycle/habit of these insects? How long will this outbreak last?**

Budworm populations may occur cyclically with long periods between outbreaks, or populations may be chronically present with only short durations between outbreaks.<sup>†</sup> August 2011 is the third year of budworm infestation in some parts of the Flathead Valley; initial years were quite light in most places.

Tussock moth outbreaks are cyclical and generally last for two to three years before a natural virus drastically reduces the population.<sup>‡</sup> A tussock moth outbreak has affected the Flathead Valley for the last two years.

### **Should I plan to cut down dying trees this fall?**

We've had four summers with cooler temperatures and normal rainfall, so trees are not as stressed as in previous years. Thus, many of the larger trees are in a good position to survive these outbreaks, though landowners may lose some of their understory. A large tree that looks sick today could easily survive the winter, so hold off on removing big trees until you can judge their condition next spring.

### **What about thinning trees? Is that recommended?**

Management activities that emulate the effects of fire are often beneficial in reducing the impact of western spruce budworm and tussock moths. Reducing overstory tree density will also enhance the vigor of residual trees by removing competition for light, water, and nutrient resources. Vigorous trees will more effectively rebound after defoliation subsides.<sup>†,‡</sup>

When thinning, retain trees that appear to be less impacted; these trees may have advantageous genetic traits. Retain pole-sized, intermediate trees along with non-host species, such as ponderosa pine and western larch.<sup>†,‡</sup>

### **How can I tell if a tree will survive the winter?**

Check the bud ends of the trees. If the buds are still vibrant, that tree has a good chance of surviving the winter.

### **What insecticide should I use to spray? Where can I find it?**

Various chemical and bacterial treatments are currently registered for western spruce budworm and tussock moth control. The bacterial insecticide *Bacillus thuringiensis kurstaki* (commonly referred to as Btk) is naturally occurring and only affects moths, butterflies, and skippers. Insecticide applications must be done at critical times and require monitoring of insect development. As always, closely read and follow the label! Please contact the DNRC Forest Pest Management Program coordinator or a licensed forest pesticide applicator to discuss this option.<sup>†,‡</sup>

According to <http://www.ext.colostate.edu/pubs/insect/05543.html>, insecticides containing Btk can be found under the trade names Dipel™, Thuricide™, Biobit™, and Foray™ (for aerial spraying). Check your local feed and supply store or garden center for these products.

Carbaryl insecticide, sold as Sevin™ (<http://www.ext.colostate.edu/pubs/insect/05543.html>) among other brand names, also can be used to control western spruce budworm. Note that Carbaryl kills both targeted and beneficial insects (e.g., honeybees). See <http://npic.orst.edu/factsheets/carbgen.pdf> for more information.

Spraying for budworm is only effective for one year. It's a fine option to ensure green in a stand for a season, but over the long term, it does not impact the population of moths significantly. Silvicultural strategies such as thinning, avoiding multi-storied crowns, and maintaining species diversity remain the best long-term solutions. For more information, see <http://dnrc.mt.gov/forestry/Assistance/Pests/Documents/FIDLs/WSpruceBudworm053.pdf>.

### **How does Btk affect water sources and the surrounding environment?**

From [http://www.nr.gov.nl.ca/nr/forestry/insect\\_disease/facts\\_btk.pdf](http://www.nr.gov.nl.ca/nr/forestry/insect_disease/facts_btk.pdf):

Btk is naturally occurring and can be found in the soil, water and on plants around the world. Btk has been extensively studied; in over 25 years of safe use, no significant environmental problems have been observed.

Btk does not kill other types of insects such as honeybees, helpful insect predators or parasites. Btk has no impact when eaten by fish, earthworms, frogs, birds, mammals or humans; none of these organisms have the alkaline gut necessary to activate Btk.

As Btk is sensitive to sunlight, it breaks down quickly in the environment. Several days of sunlight or heavy rain can cause the Btk spray to become non-effective.

**Why can't I spray now or later this fall?**

Insecticide is only effective when the insects are active, usually co-occurring when buds are just beginning to open and new growth is flush, and about 2-3 weeks thereafter (commonly early to mid-June). Because trees bud out in different time frames, multiple applications of insecticide may be required.

**What kind of systemic bug control is sometime used? Where can I find it?**

Some landowners have had success using *Bayer Advanced 12 Month Tree & Shrub Insect Control Landscape Formula*™. This is a systemic product that is applied in the fall for year-round control of a variety of insects. For more information, see [www.bayeradvanced.com](http://www.bayeradvanced.com). To find stores that sell this product, see [www.bayeradvanced.com](http://www.bayeradvanced.com) and choose their "locate-a-store" tab.

**If I use systemic controls, should I also spray in the spring?**

No, not on the same trees. Spraying is a more cost-effective approach for large stands of infected trees.

**What about other bugs? Are my stressed trees in danger of getting attacked in other ways?**

Anytime a tree becomes stressed, it has a greater chance of falling prey to other insects.

**If I want to replace trees that I have removed, what is the best species to replant?**

Species diversity is a sustainable management practice in any forest. Planting ponderosa pine and western larch could help reduce the likelihood of future outbreaks of these particular insect pests.

**What is the best long-term prevention strategy for future attacks of these insects?**

Good forest management practices may be the most effective means of preventing future outbreaks of western spruce budworm and Douglas-fir tussock moth. Sustainable forest management has the added benefit of making forests less susceptible to highly damaging fires. Strategies include diversifying species within forest stands, maintain uniform crown heights, and thinning dense stands, among others.

**Will this budworm infestation materialize into a potential wildfire issue/concern?**

Yes. Dead trees are easily ignited when fire danger is high. Tree infestations and wildfires can also spread more easily in dense forests, underscoring the importance of thinning as a forest management strategy.

***Montana DNRC Sources Cited:***

†<http://dnrc.mt.gov/forestry/Assistance/Pests/tussockmoth.asp>

‡<http://dnrc.mt.gov/forestry/Assistance/Pests/WesternSpruceBudworm.asp>

***See also:***

<http://dnrc.mt.gov/forestry/Assistance/Pests/Documents/FIDLs/WSpruceBudworm053.pdf>

<http://dnrc.mt.gov/forestry/Assistance/Pests/Documents/FIDLs/DFTussockMoth086.pdf>

**Disclaimer:** The answers provided are for informational purposes only. Since forest conditions vary widely, landowners should consider consulting with their own experts before deciding on a course of action.