



## **Douglas-fir Tussock Moth Frequently Asked Questions**

### **OUTBREAKS AND TUSSOCK MOTH BIOLOGY**

**Q: What is the Douglas-fir tussock moth (DFTM)?**

A: DFTM is a native defoliator (needle-eating caterpillar) that occurs throughout western North America. It often causes explosive outbreaks that can last for several years before subsiding. This moth overwinters as an egg, larvae hatch and caterpillars feed from June to August. Caterpillars then pupate and develop into adult moths in middle to late August. Female moths cannot fly, and after mating in the fall, lay eggs in hairy, gelatinous egg masses.

**Q: What species of trees are affected?**

A: Douglas-fir and grand fir are the primary hosts of the DFTM, with Engelmann spruce, ornamental spruce and subalpine fir occasionally being attacked. Ponderosa pine, lodgepole pine and western larch are rarely fed upon.

**Q: How often do these outbreaks occur?**

A: In southern Idaho, DFTM outbreaks have occurred in the Owyhee mountains approximately every 10 years. Outside of the Owyhee outbreaks, the last major outbreak in southern Idaho occurred between 1990 and 1993. At its peak, over 390,000 acres were defoliated. Most defoliation occurred on the Boise and Sawtooth National Forests in Boise, Elmore, and Camas Counties.

**Q: Where do the outbreaks occur?**

A: DFTM outbreaks can occur wherever the preferred host species (Douglas-fir and grand fir) grow, however defoliation tends to occur in the same general areas. In southern Idaho, the Owyhee Mountains, the Long Valley area of Valley and Adams Counties, the Wood River Valley and the Boise and Sawtooth National Forests have recorded periodic outbreaks. DFTM outbreaks regularly occur in northern Idaho (Latah, Benewah, Idaho, and Kootenai Counties) approximately every 8 to 12 years.

**Q: I have lived in Garden Valley for over 30 years, and I don't remember any damage due to DFTM. Where did this outbreak come from?**

A: Resident populations of DFTM occur in many of Idaho's forests, but outbreaks only occur when environmental conditions are favorable. Because female moths do not fly and caterpillars cannot spread very far, low-level populations have always been in the area. There was very limited defoliation of the Packer John State Forest in 1991; most of the damage in the immediate area was to the northwest of Smiths Ferry.

**Q: How do the outbreaks spread?**

A: Female DFTM moths are flightless and cannot fly from tree to tree to lay eggs. Young larvae are dispersed by the wind and can blow from tree to tree over short distances.

**Q: How long do the outbreaks last?**

A: Outbreaks usually last from 2 to 4 years. In southern Idaho, outbreaks typically cause three years of defoliation before natural controls cause the outbreaks to collapse.

**Q: What causes the outbreaks to collapse after 2 to 4 years?**

A: Because DFTM is a native insect, there are natural controls that keep the populations in check. These controls include predators (birds, ants, small mammals, predatory insects), parasites (wasps and flies that attack eggs, larvae and pupae), and a naturally occurring viral disease that is specific to DFTM. This virus is called a nucleopolyhedrosis virus (NPV), and it causes widespread mortality in DFTM populations usually within 3 years after the outbreak starts.

**Q: When will this outbreak end?**

A: Some areas of Valley and Boise counties experienced their second year of defoliation in 2018. Past history indicates that 2019 will be the last year of the outbreak. There is a chance that the outbreak will continue into 2020 and then collapse. Egg mass surveys will be conducted by IDL in September 2019 and will give us a better idea when the outbreak is anticipated to collapse.

**Q: Will a cold winter kill the tussock moth?**

A: DFTM is a native insect and has evolved with its hosts. It is adapted to the climate conditions in this area. Cold conditions in the spring when the eggs hatch, or a late frost that kills the new needles, can affect DFTM populations, but a cold winter will not kill the eggs.

## **DAMAGE AND MORTALITY**

**Q: What kind of damage can occur?**

A: Defoliation can damage trees by causing growth loss, top-kill or outright mortality. Mortality from 2018 defoliation on the Packer John State Forest and adjacent private lands has been extensive. High populations of larvae combined with very hot and dry conditions have contributed to extreme levels of mortality of Douglas-fir and grand fir. Douglas-fir tussock moth feeding does not always kill trees, but weakened trees can be attacked and killed by bark beetles later.

**Q: My trees are defoliated now; does that mean that the tree is dead?**

A: A tree is not necessarily dead after one year of defoliation. Even if the tree had red needles last summer, if the tree developed buds, it will usually form new needles the following spring. Repeated defoliation is most damaging to trees. Trees can be killed by DFTM, but they can also recover. Do not assume that trees defoliated in 2019 are dead. WAIT UNTIL SPRING 2020 to see if the tree develops a new flush of growth. Severely defoliated trees can be weakened enough that they are more susceptible to bark beetles in subsequent years.

**Q: How much damage does it take to kill trees?**

A: Most mortality and top-kill occur in trees that are heavily defoliated. Published research from the Blue Mountains of Oregon shows that most mortality occurs when a tree experiences defoliation of at least 90% of its crown. Experience in Idaho indicates that mortality can occur when defoliation reaches 75%. Hot, dry weather during the growing season can increase the likelihood of mortality.

**Q: Which trees are most vulnerable to being killed or damaged?**

A: Smaller trees are most susceptible to top-kill and mortality. Smaller trees have less stored energy to develop buds and re-foliate. Larger trees can tolerate more defoliation and have more stored reserves.

## **DOUGLAS-FIR TUSSOCK MOTH MANAGEMENT**

**Q: What is the best way to manage DFTM?**

A: Douglas-fir tussock moth prefers Douglas-fir and grand fir hosts. It will occasionally feed on Engelmann spruce, western larch and pines, but the feeding is usually incidental. The best option is to manage for these less-preferred species through forest management treatments.

**Q: Is there anything that I can spray to control DFTM?**

A: Several insecticides are registered for control of DFTM. Some insecticides from home centers have labeling for ornamental trees. As a private landowner, it is often impractical and expensive to aerially spray forest acreages. Consult with a forest entomologist, or Extension Agent for specific product recommendations.