



Forest Health Note

Douglas-fir Tussock Moth (*Orgyia pseudotsugata*)

Hosts:

Forests - Douglas-fir, white fir, grand fir, and sub-alpine fir.

Ornamental conifers - Colorado blue spruce, Engelmann spruce.

Importance:

The Douglas-fir tussock moth is a major defoliator of true firs and Douglas-fir in the western United States. Tussock moths occur in most forests in Oregon, but episodes of severe defoliation are restricted to the Blue Mountains of northeast Oregon, and Klamath and Lake Counties (Figure 1). Defoliation by this insect can cause top kill, reduce radial growth, and result in up to 40 percent tree mortality.

Photo: Dave Overhulser, ODF



Figure 2: Trees infested by tussock moth leave thin upper crowns.

Look For:

June – Mid-July

After egg hatch in late May or early June, young larvae aggregate at the tops of trees and produce silk threads that are attached to foliage. These threads

Photo: Ken Gibson, USDA FS, Bugwood



Figure 1: Douglas-fir tussock moth defoliation in the Blue Mountains.

separate from the foliage and allow the larvae to be carried by the wind to adjacent trees. The residual silk at the top of the tree forms a small tent that is one of the first visible signs of a tussock moth infestation.

Larvae feed initially on the current year's foliage, causing it to shrivel and brown (Figure 2).

Mid-July – August

Maturing larvae gradually develop the tufts of hair or tussocks from which they get their name (Figure 3). In July, larvae consume both new and old foliage, which completely strips the crown of some infested trees.

Biology:

Egg hatch coincides with bud burst and shoot elongation of host trees in May-June. Young larvae move onto new foliage and begin feeding. As larvae mature they consume proportionately more, feeding on both new and old foliage as they complete their development. Pupation occurs from late July-August inside a thin cocoon of silken webbing mixed with larval hairs (Figure 4).

Adults emerge from late July-November, and after mating, the flightless females



Photo: Dave Overhulser, ODF

Figure 3: Tussock moth larvae have distinctive tufts of hair and dark bodies.



Figure 4: Douglas-fir tussock moth cocoon with egg mass on surface.

lay eggs in a gray, woolly mass on the surface of the cocoon. After egg laying is complete, the female dies, leaving the eggs to overwinter attached to the cocoon. The Douglas-fir tussock moth has one generation per year.

Infestation Characteristics:

Isolated infestations on ornamental trees, particularly spruce, are common one or two years before a major outbreak. On forest land, outbreaks develop suddenly over hundreds to thousands of acres and collapse after one or two years of intense defoliation (Figure 5). Infestations do not spread significantly because the female tussock moth is flightless. Sites with severe defoliation often contain host

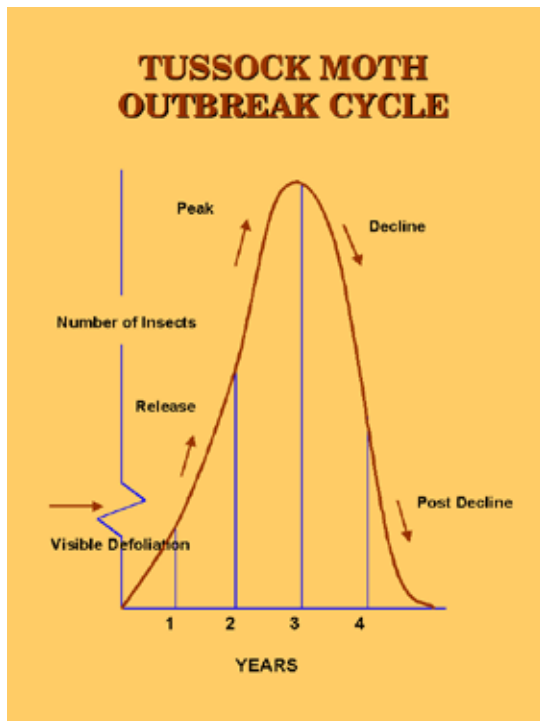


Figure 5: The four phases of a tussock moth outbreak are shown above. Outbreak populations decline naturally after 1-2 years of tree defoliation.

trees >50 years old and are located on upper slopes and ridge tops. Tree defoliation by this insect is particularly destructive because larvae consume both old and new foliage. When trees are stripped of most of their foliage, they may die or suffer top-kill. Trees that survive the outbreak in a weakened condition are often killed by bark beetles two or three years later.

Human Health Concerns:

Tussock moth larvae are covered with tiny irritating hairs that produce an allergic reaction in humans called “tussockosis”. Symptoms of “tussockosis” can resemble those of hay fever, but more intense reactions such as welt-like rashes also occur. Because of the allergic reaction to these hairs, visitors shun campgrounds and recreation areas affected by tussock moth defoliation.

Control:

Natural

Douglas-fir tussock moth outbreaks normally collapse in one or two years from the combined effects of parasites, predators, disease, and starvation. Birds, ants, and spiders are known to be important tussock moth predators.

Silvicultural

Stand susceptibility to defoliation can be avoided by converting stands from fir to pine where fire suppression and logging practices have allowed firs to become the dominant tree. On true fir sites, non-host species such as western larch should be favored during thinning operations.

Do not thin stands during or immediately after an outbreak. There is no way to identify which trees will fully recover from defoliation and escape bark beetle attack.

Insecticides

Insecticides should be applied near the release phase of the outbreak cycle (Figure 5) to minimize tree damage. A pesticide application after newly hatched larvae have dispersed to new foliage and begun to feed is most effective in reducing larval populations and preserving foliage. The following insecticides are registered for tussock moth control:

- **Aerial application to forest trees**

- Bacillus thuringiensis (B.t.)

- carbaryl

- nucleopolyhedrosis virus (USFS sole source)

- **Ground application to ornamental trees**

Bacillus thuringiensis (B.t.)

carbaryl

cyfluthrin

diflubenzuron

spinosad

tebufenozide

REMEMBER, WHEN USING INSECTICIDES ALWAYS
READ AND FOLLOW THE LABEL

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