



UI Extension Forestry Information Series II

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Douglas-fir Tussock Moth

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Northern Idaho Extension, U.S. Forest Service, and state forestry offices have been getting many calls this summer about caterpillars falling from Douglas-fir and grand fir trees which are losing their needles. The main insect currently causing this kind of damage on family and industry-owned forests here is the Douglas-fir tussock moth. Because the species it feeds on are found in so many parts of the state, Douglas-fir tussock moth can be found throughout Idaho. It most commonly causes problems on drier sites such as ridgetops and upper slopes, but during epidemic years, it can be found on moist sites as well. Historically, Moscow Mountain, McCroskey State Park, the Coeur d'Alene Indian Reservation, and the Owyhee Mountains have all experienced large outbreaks. Currently outbreaks are developing south of Post Falls, around Twin Lakes, and near Plummer.

Identification

As with most defoliating moths and butterflies, larvae ("caterpillars") are the stage of tussock moth that defoliate trees. Young tussock moth larvae are gray to black, 1/8th to 1/4 inch long, and covered with long, fine hairs. As the caterpillars mature, they develop four distinctive tan "tussocks" (compacted hair tufts) on top and long, dark, hair "horns" (two in front and one in back). Mature larvae are also covered with short hairs radiating from red button-like centers. They can grow to 1 1/4 inches long.

Another distinctive characteristic of this insect is the grayish-brown, hairy cocoons on which the female moths lay their egg cases. They are most commonly found on the underside of small twigs on the branches, but amidst heavy outbreaks,



Figure 1. A mature Douglas-fir tussock moth larvae (Photo by Chris Schnepf.)



Figure 2. Douglas-fir tussock moth cocoons. (Photo Chris Schnepf.)

they can be found all over the place (e.g., under fence rails). Adult tussock moths are relatively nondescript brown to gray moths. The female moth is wingless and flightless.

The most obvious difference between tussock moth and the western spruce budworm, another insect that commonly defoliates the same trees as tussock moth, is that budworm larva is brown with distinct white spots and lacks the many dense hairs that tussock moth larvae have. Spruce budworm is also currently causing a lot of defoliation in Idaho this year, but most of it is on federal lands. If you are not sure what you have, don't hesitate to bring a sample in to the local UI Extension office for positive identification.

Damage

The primary hosts of Douglas-fir tussock moth in Idaho are Douglas fir, grand fir, subalpine fir,



Figure 3. Damage typical to a moderate DFTM outbreak. (Photo by Chris Schnepf.)

and spruce, but if populations are high and they have used up preferred species, larvae will feed on other species such as larch, understory shrubs, or even pines. Tussock moth caterpillars start feeding in late spring in new foliage at the top of the tree. Small larvae can be blown from tree to tree in the wind. As the larvae mature, they start feeding on older foliage and lower in the tree. Tussock moth defoliation often kills the top of the tree and slows tree growth. Heavy defoliation can kill the tree, especially if it is repeated the next year.

Management

Douglas-fir tussock moth is native to Idaho forests. There is typically some endemic level of tussock moth activity here every year, but it often goes unnoticed until populations boom – usually about every 8-10 years, and most often on sites that have previously had tussock moth problems. As populations of the insect grow, so do populations of tussock moth's natural enemies (birds, predatory insects, parasites, etc.). If populations are high enough for a long time, a native virus typically builds up and kills the larvae, drastically reducing tussock moth populations quickly (usually within a year). For some infestations, the population may crash for lack of additional suitable food. Tussock moth outbreaks typically last three years in Idaho.

Lightly defoliated trees often bounce back no worse for the wear, save for some reduced growth. For landscape trees, supplemental watering and fertilization may help this. For forest trees, especially those stands that are hit by every cycle of the insect, the best long-term solution is to favor species that are less attractive to the insect, such as pines and larch. Top kill from tussock moth defoliation often results in a fork-topped tree as lateral branches compete to become the new top. If you are thinning in such a stand, these dead or forked trees should be removed in favor of trees with single live tops.

For home landscape trees, and in forest settings if populations are large and growing, and the cost of losing trees or their growth is high, pesticides may be used to kill the insects or at least reduce the severity and longevity of the outbreak. Several chemical insecticides and a microbial pesticide called *Bacillus thuringiensis* (or "Bt." for short) are labeled for tussock moth. These pesticides can also kill other non-target insects where they are applied. The most precise pesticide was developed from the previously mentioned virus specific to Douglas-fir tussock moth (it is not currently available for public use). Generally these materials must be applied when the larvae are young (their second instar, which usually means mid-June in northern Idaho). Insecticides become less effective against larger larvae. You may want to touch base with your local UI Extension office or state forestry office for the most specific local recommendations on timing.

Pesticides present an additional challenge of getting the material to the top of the tree where the insects are. For a homeowner, that usually means hiring someone with the equipment and a pesticide applicators license. For forest infestations it means hiring an aerial spray service to apply the material with a plane or helicopter. Both options can be expensive, so the costs and benefits of spraying should be evaluated thoughtfully.

One of the key strategies in managing Douglas-fir tussock moth in forests is to anticipate cyclic population increases. To this end, you may have noticed triangular box traps in the woods - these have sticky surfaces and a pheromone bait inside to monitor tussock moth populations. Similar boxes with different pheromones are used to monitor other insect populations, such as gypsy moth. State and Federal agencies also make aerial and ground surveys for tussock moth populations in regions that have historically had outbreaks. In the Idaho Panhandle, landscape spruce trees by defoliated tussock moth are often a harbinger of defoliation of forest trees in succeeding years.

Tussockosis

Be careful working around trees that are loaded with tussock moth larvae. The fine hairs from tussock moth larvae can give some people a skin rash or other allergic reactions, a condition referred to as "tussockosis". Wearing protective clothing and other measures designed to minimize contact with these hairs should reduce risk of allergic reactions. Cocoons and egg masses also contain these hairs, so handle them with care.

Conclusion

Before partial cutting and fire exclusion gave an edge to grand fir and Douglas-fir in Idaho, pines and larch would have dominated most of the sites where tussock moths cause the most damage. One can make the case that tussock moths are simply nature's way of taking out tree species that are poorly adapted to these sites.

So again, as with so many forest insect or disease problems, the main issue is the favoring the right species for the site. Getting away from pure stands of grand fir and Douglas-fir will reduce your forests' vulnerability to defoliators such as spruce budworm and tussock moth. It will also reduce problems with root diseases and other insects and disease which plague these tree species in Idaho.

For more information, see "Douglas-fir Tussock Moth Management" at http://www.fs.fed.us/r1-r4/spf/fhp/mgt_guide/tussock_moth/index.html

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