TREES & SHRUBS

Douglas-Fir Tussock Moths no. 5.542

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(Revised 2/09)

Caterpillars of the Douglas-fir tussock moth, Orgyia pseudotsugata (McDunnough), chew the needles of spruces, Douglas-fir and true firs. During outbreaks they may cause extensive defoliation, with injury typically first concentrated at the top of the tree. Older caterpillars may rapidly defoliate a tree and tops may be killed, sometimes after only a single season of severe injury. Following repeated attacks over several seasons whole trees may die or be weakened to the point of inviting fatal attacks by bark beetles.

Problems in urban forests along the Colorado Front Range primarily involve blue spruce. Historically, outbreaks in our native forests have involved Douglas-fir and been infrequent, although lately, probably due to the accumulated effects of fire suppression practices, these have occurred more often. The insect is much more important as a forest pest in the northwestern US.

Douglas-fir tussock moth caterpillars also can cause problems because the larval hairs can be irritating and are capable of producing a painful rash. Individual reactions to the hairs are highly variable with some people reacting strongly following exposure while others have little reaction.

Quick Facts...

Douglas-fir tussock moth caterpillars feed on needles of spruces, Douglas-fir and true firs

Sporadically outbreaks of Douglas-fir tussock moth occur in several Front Range communities. Less commonly it occurs as a forest pest in Colorado.

Numerous natural enemies attack Douglas-fir tussock moth and these will often control outbreaks after a season or two.

Several insecticides can be used to control Douglas-fir tussock moth during outbreaks.

Description

Young tussock moth caterpillars are blackish with long body hairs, producing brightly colored tufts of hair as they grow larger. A mature larva is 1.2-1.4 inches long, with a gray to brown body and shiny black head. Two long tufts of black hairs project forward from the head, and a similar tuft projects backward from the rear of the body. Dense, light brown patches of hairs and red spots occur on the first four and the last abdominal segment and there is an orange stripe on each side.

The cocoon surrounding the pupal stage is brownish gray and covered with hairs from the body of the larva. Cocoons usually are attached to foliage but may be found on tree trunks, rock, or other objects in the vicinity of a previously infested tree.

The adult males are moths with rusty-colored forewings and gray-brown hind wings, with a wing-span of about one inch. Females are thick-bodied and wingless, found in close association with the spot where they earlier pupated.

The egg mass, laid on the pupal cocoon of the female, contains about 300 white spherical eggs laid in several layers. The entire mass is covered with a frothy substance that is intermixed with body hairs of the mother. Movement of Douglas-fir tussock moth into new locations around the state sometimes result from humans incidentally moving construction materials or other items that have attached egg masses.

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Life History and Habits

Douglas-fir tussock moth spends the winter as an egg within the egg mass. Eggs hatch in the spring, often in late May, typically following bud break. The small, hairy caterpillars migrate, moving to the new growth but also often dispersing upwards in the trees. This latter habit allows some of the caterpillars to be disperse by winds, which will carry the small, hairy caterpillars. Since the adult female moths do not fly, wind-blown movement of young larvae is an important means of initiating new infestations.

Figure 1: Adult mailes of the Douglas fir tussock moth.

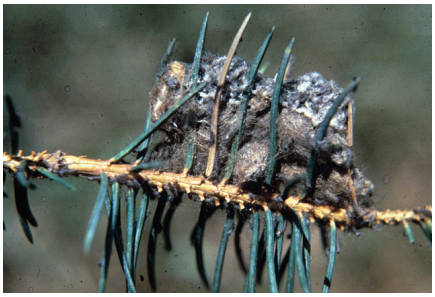

Figure 2: Tussock moth egg mass at egg jhatch.

The caterpillars first feed solely on the newer foliage, and partially eaten needles may wilt and turn brown. Later, the older caterpillars will move to older needles as the more tender needles are eaten. During feeding, particularly when disturbed, larvae may drop from branch to branch on long silken strands. By mid-July or August, the larvae become full grown and many may migrate away from the infested tree. They pupate in brownish spindle-shaped cocoons in the vicinity of the infested trees.

Figure 3: Douglas firTtssock moth larvae.

In forests another defoliating insect, the western spruce budworm, favors the same hosts as Douglas-fir tussock moth and often occurs coincidently with it. As these two develop on slightly different schedules - tussock moth egg hatch usually lags behind the initiation of budworm larval feeding in the spring by as much as 3 weeks - care should be taken to properly identify the two and determine which is the more damaging. This becomes particularly important if controlling actions are taken. Applying insecticides for one species at the ideal timing of the other may result in effective treatments for both.

The adults emerge from late July through mid-August. The males are winged and are strong fliers, but the females have only minute, non-functional wings. Mating occurs in the immediate vicinity of the female pupal case and they then lay their characteristic mass of eggs covered with grayish hairs. There is one generation produced per year.

Figure 4: Douglas fir tussock moth larval damage

Figure 5: Top-down defoliation pattern typical of Douglas fir tussock moth.

Management in Landscape Plantings

Outbreaks of Douglas-fir tussock moth are cyclical due to effects of several natural controls. At least seven species of parasitic wasps and a tachinid fly have been identified as parasites that are locally present. Caterpillars may be killed by general predators, notably spiders. A nuclear polyhedrosis virus disease, known as the “wilt disease”, also can be an important mortality agent during outbreaks. Bird predation on tussock moth caterpillars is considerable during the early larval stages but the longer, dense hairs on larger caterpillars makes predation by most bird species difficult. In addition, severe weather, particularly following egg hatch, can be important in

Figure 6: Douglas fir tussock moth larvae with a disease, nucleo-polihydrosis virus.

limiting Douglas-fir tussock moth populations. The cumulative effects of these natural controls rarely allow Douglas-fir outbreaks to persist more than a couple of years before reverting to a normal non-damaging population level.

Surveying the site for the presence of egg masses in winter and early spring provides an outbreak potential estimate. When egg masses are easily found in the vicinity of known host trees, a higher risk exists for subsequent injury. However, trees should be monitored shortly after bud break to confirm the presence of a potentially damaging population.

Chemical controls can be effective but need to be applied thoroughly to the top of the tree. In addition, younger larvae are much more effectively controlled than older larvae, so treatment timing is best shortly after eggs have hatched. In landscape plantings, pyrethroids such as permethrin (Astro), cyfluthrin (Tempo), bifenthrin (Talstar, Onyx) and lambda-cyhalothrin (Scimitar) are effective against Douglas-fir tussock moth caterpillars. Carbaryl (Sevin, Sevimol), teburenozide (Confirm, Mimic) and spinosad (Conserve) are alternative treatments that can provide good control.

In forest settings considerations surrounding treatments and insecticide options differ. Applications are typically made by air so large areas are simultaneously sprayed with insecticide. As a result, the potential for contamination of fish-bearing surface waters exists. Also, the presence of endangered species, such as the Pawnee Skipper, becomes particularly important to decision making. Where Douglas-fir tussock moth outbreaks are sufficiently threatening to warrant treatment, insecticide options include the microbial insecticide Bacillus thuringiensis (Foray, Dipel) and the insect growth regulators diflubenzuron (Dimilin) or tebufenozide (Confirm, Mimic).

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