



Forest Health Note

Douglas-Fir Beetle (*Dendroctonus Pseudotsugae*)

Hosts:

Douglas-fir

Importance:

The Douglas-fir beetle infests standing and down trees with a breast height diameter greater than 8 inches. In most years, beetles infest scattered trees weakened by root disease, fire or wind damage, and beetle populations remain low. Douglas-fir beetle outbreaks occur when major storms damage trees, or large areas of forest are weakened by defoliation from the Douglas-fir tussock moth or western spruce budworm.

Photo: Dave Overhulser, ODF



Figure 1: From April - June, Douglas-fir beetles bore into the bark of trees, producing piles of reddish or yellowish dust.

Distribution:

The Douglas-fir beetle can be found almost anywhere its host occurs. However, it is rarely associated with Douglas-fir mortality in the lower elevations of interior southwest Oregon. In this area of Oregon, the flatheaded fir borer is the usual cause of tree mortality.

Look For:

April - June

Reddish or orange boring dust in the bark crevices of trees is the first sign of Douglas-fir beetle attack (Figure 1). When a standing tree is attacked, boring dust often forms piles around the base of the tree. Streams of resin dripping down the bark are visible on the mid- and upper-bole of green trees under attack.

East of the Cascades, the foliage of trees attacked the previous spring change from green to a pale yellow-green, and eventually to red (Figure 2). A Douglas-fir beetle attack can be confirmed by removing a patch of bark to reveal the beetle's distinctive gallery pattern (Figure 3).

July - October

On the west side of the Cascades, about 50 percent of beetle-attacked trees show fading foliage during the year of attack.

The other 50 percent of attacked trees retain green crowns until the following spring. Removing the bark of a tree infested that year will reveal the beetle or its gallery (Figure 4).



Figure 2: A clump of trees killed by Douglas-fir beetle with characteristic red foliage.

Photo: Dan Miller, USDA FS, Bugwood.org



Figure 3: Douglas-fir beetles construct a long, central gallery (5- to 36-inches in length) that runs parallel to the wood grain, with larval galleries radiating to the sides of the central gallery.

Photo: Ken Gibson, USDA FS, Bugwood

Photo: USDA FS Archives, Bugwood.org



Figure 4: The Douglas-fir beetle is brown to black in color and about 3/16-inch long.

Infestation Characteristics:

The Douglas-fir beetle has one generation per year, but there are two periods when trees come under attack. An initial attack flight occurs from April to early June, and secondary flight takes place in July - August. Attacks by the Douglas-fir beetle are most abundant halfway up the tree.

The lower 10-15 feet of a tree may escape attack the first year, but it is attacked the following year by either the Douglas-fir beetle or flatheaded fir bores. Immature stages as well as adults overwinter under the bark of infested trees.

A common scenario for beetle outbreaks involves a population buildup in patches of windthrown timber. One or two years after the blowdown, beetle populations increase to a level where nearby standing green trees are attacked.

In eastern Oregon, defoliation by the Douglas-fir tussock moth or western spruce budworm can increase tree susceptibility to Douglas-fir beetle attack. When trees are defoliated by the tussock moth, Douglas-fir beetle attacks peak two years after the last defoliation. During western spruce budworm outbreaks, which can last for more than a decade, Douglas-fir beetle infests heavily defoliated trees during the later half of outbreak.

Douglas-fir with more than 50 percent of its crown or 25 percent of the cambium damaged by fire has a high probability of beetle attack. Either the Douglas-fir beetle or flatheaded fir borer commonly attack and kill fire-damaged Douglas-fir.

Control:

Salvage

Following a storm event, windthrow must be removed during the one-year interval between beetle attack and emergence to prevent the buildup of beetle populations and mortality in standing green trees. Beetle infestations accelerate sapwood deterioration by facilitating the entry of wood-destroying fungi. After years, wood decay reduces the board foot scale by 10 percent, and after four years it can be reduced by 25 percent. Rapid removal of down logs helps to preserve the commodity value of the wood.

Beetle Repellents

A naturally occurring beetle repellent, methylcyclohexenone (MCH), can be applied to down logs or standing green trees to prevent Douglas-fir beetle attacks (Figure 5). When down logs are treated with the repellent, beetles do not breed in the down logs, preventing an increase to numbers at which they can attack standing trees. This technique is useful in parks, camps or habitat conservation areas where salvage is not possible, but there is a desire to preserve the remaining standing trees. MCH

has also proven effective at protecting standing trees from attack during a beetle outbreak. To be effective, MCH capsules must be applied to trees before beetle flight in April.

Call the Forest Health Management Unit at (503) 945-7396 for information on the availability and requirements for using the repellent formulation.



Photo: Dave Overhulser, ODF

Figure 5: Beetle repellent (MCH) bubble capsules can be attached to trees to prevent infestation.

For further information about the Oregon Department of Forestry's Forest Health Program,

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