Douglas-Fir Beetle

Forest Health Fact Sheet

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DFB galleries are 5-10" long

Douglas-fir beetle (*Dendroctonus pseudotsugae*) is a bark beetle that preferentially infests >10" dbh downed trees and then moves to nearby standing trees that are stressed, injured or less vigorous. At normal population levels, mortality from this pest is scattered on the landscape and often present in stands weakened by root disease, fire or wind damage. Population outbreaks typically follow storm events that cause blowdown, or defoliation from Douglas-fir tussock moth or western spruce budworm outbreaks. Douglas-fir beetle outbreaks can be prevented by removing large-diameter downed trees before the first April after a storm event. If removal is delayed, a repellant pheromone (MCH) may instead be applied at this time to prevent infestation. Blowdown can also be removed before the second April after the event to prevent beetles from attacking standing trees, although wood in downed trees may become discolored by beetle-vectored fungi.

Hosts

- Major: >10" dbh Douglas-fir
- Minor: downed western larch

Douglas-fir beetle (DFB) can be found almost anywhere Douglas-fir occurs. In the lower elevations of interior southwest Oregon the flatheaded fir borer is also a prominent pest of Douglas-fir, and the two species can overlap.

Biology

DFB has one generation per year, but there are two flight periods when trees come under attack. The initial attack flight occurs from April to early June and is generally the heaviest. A secondary flight takes place in July - August. Attacks by DFB are most abundant midway up the tree. The bottom 10-15' of the bole may escape attack the first year, but is often attacked the following year by either DFB or flatheaded fir borer (where present). Adults and sometimes larvae overwinter under the bark of infested trees. Adults are brown/black and 4-7mm long.

Damage

Orange-tan boring dust (frass) in bark crevices is the first sign of DFB attack. Frass may form piles around the base of the tree or may collect in spider webs. Thin streams of resin dripping down the bark may be visible on the mid to upper-bole of green trees under attack. DFB attack can be confirmed by removing a patch of bark to reveal the beetle's distinctive gallery pattern (5-10" vertical line with alternating clusters of horizontal lines).

Christine Buhl, ODF

Orang-tan boring dust (frass)

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 DFB attack. DFB attacks typically peak two years after the end of a Douglas-fir tussock moth defoliation event. During western spruce budworm outbreaks, which can last for more than a decade, DFB infests heavily defoliated trees during the latter half of the outbreak.

Christine Buhl, ODF

Streaming pitch

On the west side of the Cascades, about 50% of beetle-attacked trees show fading foliage July - October the year of attack. The other 50% of attacked trees remain green until the following spring. Crowns fade from green to yellow then brick red.

Management

Natural

Predacious beetles and parasitic wasps provide important natural control of DFB populations.

Silvicultural

After a storm event, >10" diameter windthrown trees should be removed before the following April to prevent Douglas-fir beetle infestation. Downed trees should be removed at least before the second April to trap and remove beetles that have already infested the material. These removals prevent buildup of beetle populations in windthrown trees that will spread to standing green trees in subsequent years. Trees with low vigor should also be removed to reduce stand susceptibility to outbreaks. Large amounts of cull trees created by logging operations also should not be left on site, particularly in shaded areas. Fire-damaged trees are also at risk for attack. Douglas-fir with damage to >50% of the crown or >25% of the cambium have a high probability of beetle attack and should be removed to prevent an outbreak. DFB will generally not attack trees dead for over a year.

Like many other bark beetles, DFB vectors sapstain/bluestain fungus which quickly clogs vascular tissues, thereby hastening tree death and staining the wood. Although sapstain is not a fungal rot, it causes defect by discoloring the wood. Staining can be avoided by prompt removal (within a couple of months of beetle infestation) and processing of salvage timber. If prompt removal is not possible, apply MCH to prevent beetle attack and subsequent introduction of the fungus.

Insecticidal

A naturally occurring beetle repellent, MCH (methylcyclohexenone), can be applied to downed logs or standing green trees to prevent DFB attacks (which start in April). MCH pouches are most often applied in a grid layout within a stand to effectively deter DFB infestation (see ODF factsheet on MCH). 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 may also be used to prevent infestation when silvicultural management of blowdown is delayed.

When using pesticides, always read and follow the label

Management highlights

- Remove >10" diameter windthrown (or culled) Douglas-fir before the first or second April following a storm event
- Apply Douglas-fir beetle repellant (MCH) before April attack flights
- Remove trees with >50% crown scorch or >25% cambium damage from fire

More information:

Oregon Dept. of Forestry, Forest Health
http://tinyurl.com/odf-foresthealth
2600 State St. Bldg. D, Salem, OR 97310
503-945-7200

Other references:

USFS Forest Health Protection
www.fs.usda.gov/goto/fhp/fidls

OSU Forestry Extension
http://extensionweb.forestry.oregonstate.edu/