



Fir Engraver Beetle

Forest Health Fact Sheet

April 2018



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Fir engraver adult (4mm long) has a “sawed-off” appearance.

Donald Owen, CA Dept. of Forestry, Bugwood.org

The fir engraver beetle (*Scolytus ventralis*) is a bark beetle that is a significant pest of mature and pole-sized true fir. Although this insect is considered a secondary pest it can be a major contributor to mortality, particularly for drought-stressed true fir. Outbreaks of this pest in Oregon are often associated with drought events. In addition to drought, other stressors such as root disease, defoliator outbreaks and stand disturbance from logging and other activity also contribute to increased susceptibility to beetle attacks. Non-lethal attacks from fir engraver (strip or patch kills) can cause physical defect in wood and introduce staining fungi.

Hosts

- Major: pole to mature-size grand, white, red and noble firs
- Minor: Douglas-fir and Engelmann spruce

Distribution of fir engraver coincides with the range of its preferred hosts: white, grand and red fir. Landscape level fir mortality from fir engraver has historically followed periods of drought.

Biology

Adults initiate attack flights in June, with the majority of activity occurring from July - August. They have one generation per year and development lasts 1-2 years depending on climatic conditions. Fir engraver typically overwinters as larvae. Adults are approximately 4mm long and have a ‘sawed-off’ ventral posterior.

Damage

An attack site favored by this beetle is the branch collar (junction of a branch and the trunk). These beetles may also attack slash and windthrown trees. Indicators of infestation include orange-tan or white boring dust (frass) in bark crevices or clear pitch streaming down the bark from the point of attack. Trees with more than 10 pitch streams on the main bole have a high probability of dying. Rough and/or bulging patches of bark may



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Rough patches of bark from fir engraver damage to cambium (left) and galleries (right). Galleries feature a 2-6” long horizontal groove with larval galleries running perpendicularly above and below.

Chris Schnepf, Univ. Of ID, Bugwood.org; Christine Buhl, ODF

indicate where the cambium layer beneath has been killed by fir engraver galleries. Attacks can be confirmed by removing patches of bark to reveal the distinctive horizontal galleries etched into sapwood that are made by fir engravers.

In stressed trees attacks from fir engravers may result in:



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Topkill and branch mortality from fir engraver attacks

(1) dead branches, (2) top kill, or (3) complete tree mortality. Needles on attacked portions of trees turn yellow-green and eventually red. Some trees fade in the fall after an attack, and others may fade the next spring.



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Embedded scar from fir engraver attack

Unlike some bark beetles, fir engravers need only a strip of cambium to successfully reproduce thus attacks are often non-lethal in healthier trees and cause only strip or patch kills. Defects may occur where portions of cambium attacked by fir engravers heal over leaving brown pitch pockets in the wood. Additional defect from fir engraver attacks may result in ring shake or discoloration from a non-decaying brown stain fungus vectored by these beetles.

Beetle outbreaks often occur in the years following a

More information:

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

Management

- Plant fir in sites that receive adequate moisture
- Manage for root disease
- Thin overstocked stands and reduce competing vegetation
- Remove damaged or less vigorous trees (those with weak crowns)
- Remove infested trees and avoid creating >4" slash Jan. - July to reduce beetle populations

period of subnormal precipitation or logging activity. Logging operations can cause shock following the opening of a stand, which temporarily lowers the vigor of crop trees. Logging also creates slash which is a preferred material for fir engraver. Despite this preference, slash does not predispose a stand to fir engraver outbreaks, although it may cause some increase in fir engraver populations.

Outbreaks of defoliating insects such as the western spruce budworm and Douglas-fir tussock moth can cause fir engraver outbreaks, which may peak 1-3 years after large defoliation events.

Management

Silvicultural

Grand, noble and red fir are best grown in moist sites, planting outside this range reduces their vigor and resilience to fir engraver. If fir engraver attacks are associated with a root disease pocket, the best strategy is to follow root disease management guidelines. Overstocked fir stands should be thinned to reduce competition and increase tree vigor. Fir engravers can breed in fresh slash with a diameter >4". In droughted or otherwise stressed stands, avoid creating large pieces of true fir slash from January - July to reduce beetle breeding potential.

Salvage

Beetle populations can be reduced by removing recently killed trees (those still holding yellow or red needles) from the stand before the beetle flight in June. Remove injured or less vigorous true fir to reduce breeding material for fir engravers. Poor crown condition and live crown ratios have been associated with susceptibility to engraver beetle attack in white fir and red fir. These declining trees should be harvested whenever possible.

Other references:

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

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