



Forest Health Note

Fir Engraver Beetle (*Scolytus ventralis*)

Hosts:

Grand fir, white fir, red fir, noble fir, Douglas-fir, and Engelmann spruce.

Importance:

The fir engraver beetle is a significant pest of mature and pole-sized true fir. Since the 1990's, two fir engraver outbreaks have occurred that affected over 300,000 forest acres in eastern Oregon. Long-term losses to the fir engraver may be greater since attacks not causing tree mortality provide entrance points for decay organisms. True firs weakened by disease and stand disturbance, such as drought, defoliator outbreaks, and logging activity, are particularly susceptible to beetle attacks. Outbreaks in Oregon are often associated with drought events.

Trees under attack display reddish-brown or white boring dust in bark crevices.

Look For:

June – August

Trees under attack display reddish-brown or white boring dust in bark crevices. An attack site favored by this beetle is the branch collar, the junction of a branch and the trunk. Frequently streams of clear pitch flow down the bark from the point of beetle attack. Trees with more than ten pitch streams on the main bole have a high probability of dying.

September – June

Individual branches or the entire crown of trees under attack turn yellow-green and eventually red. A portion of recently attacked trees may fade in the fall; the remainder fade the next spring. Fir engraver attacks on dead trees can be confirmed by removing patches of bark and finding the beetle (Figure 1) or its distinctive gallery (Figure 2).

Infestation Characteristics:

The fir engraver beetle has one generation per year and attacks host trees from June–September with the most activity occurring from July - August. Unlike other bark beetles, the fir engraver needs only to kill a strip of cambium near its



Photo: Don Owen, CDF, Bugwood.org

Figure 1: The fir engraver beetle is a shiny black color, has a “sawed-off” appearance and is approximately 4mm in length.



Photo: USDA FS Archives, Bugwood.org

Figure 2: The fir engraver beetle gallery is etched into the sapwood across the wood grain and is 4- to 12-inches in length.

gallery to successfully reproduce. Because it doesn't necessarily kill the tree, fir engraver attacks result in a variety of tree symptoms: (1) dead branches, (2) top kill, and (3) complete tree mortality (Figure 3).

Photo: Ken Gibson, USDA FS, Bugwood.org



Figure 3: Top and branch kill from fir engraver attacks in white fir.

Endemic fir engraver populations maintain themselves by attacking trees weakened by root disease or killing patches of bark on otherwise healthy trees. Beetle outbreaks often occur in the years following a period of subnormal precipitation or logging activity (Figure 4).

Logging operations can contribute to outbreaks in two ways: (1) fresh slash with a diameter >4 inches provides breeding material for the beetles, and (2) the shock of

opening the stand can temporarily lower the vigor of crop trees. Outbreaks of defoliating insects such as the western spruce budworm and Douglas-fir tussock moth may be

followed by fir engraver beetle outbreaks that peak one to three years later. A sustained drought event, such as the one that affected parts of eastern Oregon in the late 1980s and early 1990s, can result in entire fir stands being killed by the fir engraver beetle rather than a few individual trees.

Fir engraver attacks that do not produce tree mortality cause scars clearly visible on the outer bark. Various defects such as stain, ring-shake, and decay are associated with old attack scars (Figure 5). These defects can reduce the value of true fir for solid wood markets.

Management:

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 decadent true fir that might provide breeding material for the fir engraver beetle. 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.

Silvicultural

If fir engraver attacks are associated with a root disease pocket, the best strategy is to follow root disease management guidelines.

The fir engraver beetle can breed in fresh slash with a diameter >4 inches. Avoid creating large pieces of true fir slash from January - July.

Overstocked fir stands should be thinned to reduce competition and increase tree vigor.

Photo: Dave Overhulser, ODF



Figure 4: Fir engraver outbreaks often occur during periods of drought or following defoliation events.

Photo: Don Owen, CDF, Bugwood.org

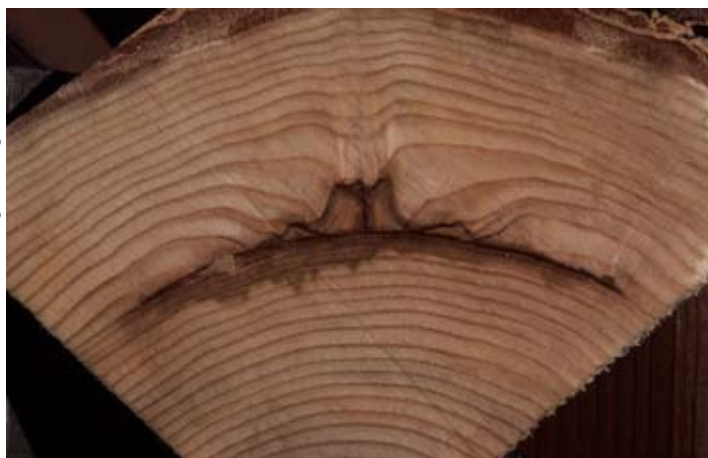


Figure 5: Non-lethal fir engraver attacks (patch kill) can allow decay organisms to enter the wood.

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