

Fir Engraver Beetle (*Scolytus ventralis*)

Hosts

In Idaho, fir engraver beetle (FE) attacks grand fir (*Abies grandis*), but also attacks white fir (*Abies concolor*) in adjacent states.

Distribution

Fir engraver occurs West-wide and throughout Idaho wherever grand fir occurs. It is the most common bark beetle attacking grand fir in Idaho.

Life Cycle

Adult beetles (Figure 1) feed under the bark, excavating horizontal egg galleries. Hatching larvae feed in the phloem upward and downward from the parent gallery (Figure 2). When larvae are ready to pupate they move into the bark and adults chew their way out of the bark several weeks later, leaving small exit holes (1/16" diameter). Fir engraver has one generation per year, and overwinters as a larva. Beetles emerge between June and September to attack new trees. Pheromones have not been identified for fir engraver.

Damage

Fir engraver beetle usually attacks stressed trees in small groups or scattered throughout a stand. Trees typically turn red the following season, though fading can occur in the same season during dry years. Fir engraver attacks do not always kill trees. If the density of attacking beetles is not enough to cause mortality, old attack sites are covered by new wood (Figure 3). Raised areas called "blowouts" may be evident on the tree for many years (Figure 4). Trees with this damage are often suppressed and not usually suitable for saw logs due to ring shake (separation of wood fibers at the annual rings).

Recognition

The first indication of attack is reddish brown boring dust in the bark crevices or around the base of green trees during the summer months. Pitch tubes, often seen with some pine bark beetles do not occur with fir engraver. Beneath the bark, horizontal galleries can be observed (Figure 2), which are diagnostic for fir engraver. The concave abdomen of adult beetles (Figure 1) is also diagnostic.



Figure 1. Adult fir engraver beetle showing concave abdomen.



Figure 2. Typical horizontal galleries of fir engraver beetle in grand fir.



Figure 3. Old fir engraver gallery under green wood of live tree.



Figure 4. Fir engraver "blowouts" on live tree indicating unsuccessful attack.

Fir Engraver Beetle Management

Predisposing Factors Fir engraver is attracted to trees growing under stress, so every effort should be made to keep fir trees in a healthy condition. Due to fire suppression and past management practices, grand fir is growing in drier areas that are better suited to tree species such as ponderosa pine, lodgepole pine, western larch, or possibly Douglas-fir. During years with normal precipitation these trees may not experience problems. When conditions are drier, grand fir on these sites may experience drought stress and become more susceptible to fir engraver. Other stresses such as root disease, crowding in dense stands, or wet soil due to a perched water table can also predispose grand fir to fir engraver.

Thinning Fir engraver attacks trees of all sizes. Unlike bark beetles attacking pines or Douglas-fir, fir engraver does not preferentially attack larger trees or those growing in dense stands. Because of this characteristic, thinning stands below a certain density will not prevent fir engraver attacks. Thinning does have other benefits such as making more sunlight, water and nutrients available, which can reduce the stress on the remaining trees. ***If the stand has evidence of root disease, thinning the stand may make the root disease problem worse.*** Root disease fungi can live as saprophytes (wood decayers) on dead stumps, and root contact between growing grand fir and infected stumps can increase root disease mortality over time.

Sanitation and Salvage Timely removal of infested trees will reduce live beetles within a stand, though it is very difficult to identify infested trees before they fade from green to red. By the time the needles are red, the beetles have usually left the tree. Fir engraver transmits wood decay fungi (pouch fungus), which aggressively decays the sapwood of grand fir (Figure 6). Pouches usually appear on the bark surface a year after the beetles emerge, and indicate that sapwood decay is underway. If you wait too long, the sapwood will effectively be lost and this will impact the value of logs when they are scaled (Figure 7).

Reduce Host Component in Stand The most effective way to reduce losses to fir engraver is to reduce the amount of grand fir growing in the stand. In northern Idaho, grand fir is much more prevalent than it was historically. Grand fir growing on drier sites is more likely to be attacked by fir engraver. If it is consistent with the landowner's management objectives, converting stands to tree species better adapted to drier sites and those less susceptible to root disease may be the best option.



Figure 5. Grand fir killed by fir engraver beetles on west facing slope, May 2016.



Figure 6. Pouch fungus conks on grand fir bark.



Figure 7. Sapwood decay of grand fir. This volume will be lost during salvage when the log is scaled.