



# Forest Insect & Disease Leaflet

## Fir Engraver



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### Fir Engraver Beetle

The fir engraver (*Scolytus ventralis* LeConte) attacks most species of fir in the Western United States. Primary hosts include white fir, grand fir, and red fir. In Utah, white fir is the primary host. Hosts that are attacked occasionally include Douglas-fir, subalpine fir, mountain hemlock, and Engelmann spruce.

Fir engravers preferentially attack host trees under stress due to root disease, defoliator injury, fire injury, drought, tree age, increased stand density and many other factors. It has been shown that outbreaks often develop during periods of drought and subside quickly when moisture conditions improve. Each year of consecutive drought conditions would likely increase tree susceptibility to fir engraver.



Fir engraver top kill of white fir

Photo: Colorado State Forestry

Fir engraver beetles have one generation per year throughout most of their range, but may have a two year life cycle at higher elevations. Adult flight typically occurs June through September, with peak flight in July and August. For fir engraver, killing the host tree is not required for successfully completing the life cycle.

### How to tell if a tree is infested:



Fir engraver galleries

Fir engraver attacks the upper bole and may kill individual branches. Commonly, only the tops of host trees are killed, but whole trees may also be killed. Following attack, foliage fades (turns yellow and then red) over 3 to 6 months. One to several branches or the entire tree may fade. The appearance of fading branches in a generally green tree is commonly called “flagging” and is one of the first highly noticeable symptoms. Other indications of engraver attack includes; streams of pitch on the trunk, often around branch collars, reddish-brown boring dust along the trunk and in bark crevices or cobwebs. The definitive sign of fir engraver is seen when the bark is removed above an entrance hole and the galleries are revealed. Fir engraver entrance holes are about 0.1 inch wide and are generally found in bark crevices or in the rough bark at the base of a branch. Fir engraver egg galleries have a characteristic pattern, which cuts horizontally across the grain of the wood and engraves the sapwood. Larval galleries extend at right angles to the egg gallery and run along the grain. During initial gallery construction the bark beetle will often introduce a fungus, which invades the wood producing a yellowish-brown stain around beetle galleries. This stain is the result of the fungus (*Trichosporium symbioticum* Wright), which is carried by the beetles.

There are many natural enemies of the fir engraver such as woodpeckers, and several insect predators and parasites. However, they are not effective in preventing outbreaks. If the tree has just a few areas of attack then direct control may not be needed. If however, the tree has a current large infestation then you may wish to attempt to control the population. Fir engraver populations may be controlled in individual trees in several ways:

- 1) The infested tree can be felled (cut down) and the bark burned in place or peeled and then burned.

2) If you wish to use the wood as fire wood then the tree can be cut into 18” lengths then, piled in a tent like shape, in full sun, and covered with 10ml **clear** plastic and sealed around the plastic base of the tent, with dirt to contain any beetles that may still remain.

3) The infested tree can be felled, limbed and lopped into manageable lengths and placed fully exposed to the sun to dry. Logs must be rolled every few days to expose all parts of the bark to full sun. This method may not be useful if the tree is felled between June and September, as the logs will not have enough time to dry before the beetles in the log are ready to exit and attack a new host. Fir engraver can breed in fresh slash with a diameter >4 inches. Avoid creating large pieces of true fir slash from January-July and remove or treat wind thrown trees and logging slash before fir engraver flight (June-September).

4) Remove injured or decadent true fir that might provide breeding material for the fir engraver. Poor crown condition and live crown ratios have been associated with susceptibility to fir engraver attacks in white fir. These declining trees should be harvested whenever possible.

The effectiveness of these methods over extensive areas is unrealistic. It is not practical to search out and remove the many trees which may be infested. However, trees previously damaged or killed by fir engraver sometimes pose a hazard, including dead tops or branches that may break off during wind events.

Infested trees might contain only a few active broods and may recover completely if less than 30 percent of the tree crown has been killed. Silvicultural activities aimed at increasing the vigor of individual trees and maintaining healthy stand conditions offer the best chance for minimizing losses from the fir engraver. Diseased, decadent, or injured trees should be removed, and overly dense stands should be thinned to reduce between tree completion. Since the fir engraver preferentially infests weakened trees, blowdown, and freshly cut green logs, windthrown trees and green logs should be removed or treated within the year before the beetles have time to complete thier life cycle.

**NOTE: Currently, chemical controls are not available which will provide effective protection or control for fir engraver beetles, including beetle pheromone lures or repellents. General host terpene lures are available for population monitoring when used with a funnel or panel trap**

### **For more information please contact:**



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