

Pine Engraver (*Ips pini*)

Hosts

Pine engraver beetles (Figure 1) can attack most pine species in Idaho. Outbreaks are most severe in small diameter ponderosa and lodgepole pines.

Distribution

This species occurs throughout Idaho wherever the hosts occur.

Life Cycle

In the spring when daytime temperatures average over 60°F, overwintering adults emerge from the ground or from old host material. These adults colonize green pine slash, wind-thrown or winter damaged trees > 3" diameter. They don't typically attack standing trees at this time. Females lay eggs beneath the bark, and larvae feed and develop over the next six weeks before becoming new adults. These adults emerge from the slash in late spring or early summer and infest additional green slash, standing small diameter trees, or tops of larger trees. There are typically 2-3 generations per year depending on elevation and climate.

Damage

Pine engraver kills small trees (2-8" diameter), often close to fresh piles of slash, newly cut logs or wind thrown trees (Figure 2). Mortality can also occur in the tops of larger trees (Figure 3). Mature trees are sometimes killed outright, especially during periods of drought. Trees usually begin to fade from green to red in mid summer after they have been attacked. By this time, it is often too late for management actions. In late summer, beetles typically move to overwintering sites. In hot and dry conditions, they may move on to attack additional trees, which turn red in fall.

Recognition

The first indication of attack is reddish-orange boring dust in the bark crevices or around the base of the tree (Figure 4). The male beetle initiates attack and attracts several females with a pheromone. Egg galleries from multiple females form a Y, H, or star-shaped design under the bark (Figure 5). Egg galleries are free of frass, but larval galleries, leading off horizontally from egg galleries, are packed with frass.



Figure 1. Adult pine engraver beetle. Photo N. Wright bugwood.org



Figure 2. Classic mortality of young ponderosa pine near slash pile.



Figure 3. Ponderosa pine top kill by pine engraver.

Pine Engraver Management

Predisposing Factors– Pine engraver outbreaks are usually associated with the availability of green pine slash in the spring. Green slash, fresh cut logs or areas of winter damage provide breeding material for emerging overwintered adults. Beetles that are produced in the slash emerge in the summer and can infest standing trees. Dense (dog hair) pine stands, drought stressed stands and trees growing on rocky-sandy soils are especially susceptible to infestation. Outbreaks often intensify during drought, but are usually of short duration. **If green slash is not available the following spring, outbreaks usually subside after one year.**

Slash Management– Timing of management activities in pine is important to prevent pine engraver outbreaks (Figure 6). It is best to avoid creating slash from about December through mid-July. Slash created by November usually has sufficient time to dry before spring and is unattractive to beetles. Winter or spring logging in low-elevation areas is commonly done due to accessibility, but increases the risk of pine engraver induced mortality. If precautions are taken to treat the slash, winter logging of pines can be done with less chance of unwanted mortality. Slash management options include:

- Minimizing the amount of slash created by cutting to a 4" top and removing most of the tree.
- Treating slash by bucking tops and logs and allowing them to dry in the sun (lop and scatter), mastication, or dozer trampling. Using a slash mat for harvesting equipment will also reduce soil compaction, decreasing further stress to the residual stand. Chipping or mastication of slash eliminates the food supply for pine engraver. However, due to the attractive smells that are emitted during the chipping process, it is best to do in late summer or fall after beetles flown for the season.
- The size and placement of slash piles can have an influence on pine engraver behavior. Small piles created in the winter or spring are often fully colonized by April or May. Beetles will then emerge to infest nearby trees and cause mortality later in the summer (Figure 2). Piles that are large (at least 10 ft. X 10 ft. X 20 ft.) can remain green through the flight season and emerging beetles may reenter the pile rather than attack standing trees. Piles should be well distributed throughout the unit. During drought, however, even large piles can dry out and infestation of standing trees can occur.
- ***The safest option is to conduct management activity in pines between mid-July and November to avoid the availability of green slash in the spring.***

Thinning– Dense stands of small diameter trees are very vulnerable to pine engraver mortality (Figure 6). Thinning these types of stands will decrease beetle susceptibility, but should be done in two stages to promote desirable branching. The first thinning should be to approximately 6 foot spacing between trees, and a later entry (~15 years later) can open the stand up to 10-12 foot spacing. Thinned stands have more available resources and are less attractive to pine engraver. Thinning larger diameter trees to a basal area of about 80 ft² per acre will increase resistance to pine engraver and other bark beetles. Care must be taken not to remove more than 25% of the basal area to reduce chance of wind damage. Lodgepole pine is shallow rooted and is susceptible to windthrow and stem breakage if thinned too heavily.



Figure 4. Piles of boring dust on down pine slash.



Figure 5. Typical star shaped galleries under pine bark.



Figure 6. Pine engraver mortality associated with wind thrown tree.