



# Forest Health Note

## Western Pine Shoot Borer (*Eucosma sonomana*)

### Hosts:

*Ponderosa*, *Jeffrey*, *lodgepole*, and *knobcone* pine.

### Importance:

The western pine shoot borer is a moth larva feeding in the pith tissue of new terminal or lateral shoots (Figure 1). Tree damage is common in young pine plantations located in eastern and southwestern Oregon. Infested terminal shoots are usually stunted, but survive, while infested lateral shoots usually die (Figure 2). Each attack on the terminal shoot reduces annual height growth by 25% and sometimes damages tree form. Tree genetics affects susceptibility to shoot borer attack and can confound growth data collected at pine progeny test sites.



Figure 2: Dead lateral shoots in the upper whorl of a ponderosa pine as a result of shoot borer infestation.

### Look For:

#### July - February

Western pine shoot borer infestations can usually be diagnosed by examining the morphology of the current terminal. External symptoms of shoot borer infestations include shortened needles at the top of the terminal and reduced elongation of the shoot. The shortened needles give the terminal a clubbed appearance (Figure 3A). Because the infested terminal does not fully elongate, lateral shoots are often longer than the infested terminal. A normal (uninfested) terminal shoot is usually 25-40% longer than lateral shoots on the same tree (Figure 3B). Another external sign of shoot borer infestation is an exit



Figure 1: During June and July western pine shoot borer larvae feed in the pith area of pine terminals.

hole found near the middle of the shoot where the larva has emerged out from the pith area (Figure 4).

Shoot borer infestations can also be detected by destructive sampling of pine terminals. Clipping a pine terminal in the upper third of its length will expose the pith tissue fed on by the larva. The pith of infested terminals will have a dark brown color where larval feeding has occurred (Figure 5). Sometimes a larva is present if the shoot is dissected between June and early August. Uninfested terminals will have white pith with no indication of larval feeding.

The symptoms of shoot borer attacks in lodgepole pine are similar to those in ponderosa pine, but less obvious at a distance. Larval feeding is more destructive in the small diameter



Figure 3: (A) infested terminals have short, bunched needles at the top; (B) uninfested terminals have needles of equal length equally distributed along their length.



**Figure 4:** After August an emergence hole can be located in the lower half of the pine terminal.

lodgepole terminals and emergence holes can weaken the stem, resulting in breakage. Frequently the tip of infested lodgepole pine terminals will die by late fall. Laterals often compete with infested terminals for dominance, but the effects on tree form are usually minor. The annual reduction in height growth from

shoot borer infestation in lodgepole pine terminals has been estimated at 25%.

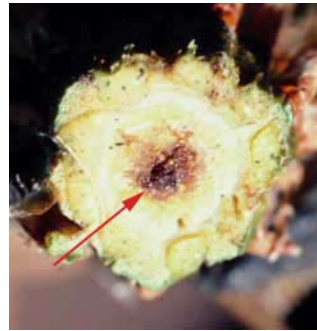
***Infestation Characteristics:***

Western pine shoot borer attacks start when pines are approximately 4 to 5 feet in height and gradually increase over the next 25 to 30 years. In older plantations it is common for 50% of the trees to be attacked on an annual basis. Fast growing pines are more likely to be attacked than slow growing trees with short terminals.

Intensive site preparation and brush control designed to increase growth in pine plantations results in a higher level of shoot borer infestation. Ponderosa pine grown on drier sites often suffer high levels of infestation, while pine plantations at higher elevations show low levels of shoot borer damage.

***Control:***

Insecticides, contact or systemic, have proven ineffective at controlling western pine shoot borer damage. A technique using synthetic pheromone bait to attract male moths



**Figure 5:** A cross section through an infested terminal reveals a darkly stained pith area. The pith of uninfested terminals is a yellow white color.

and kill them has proven effective at reducing damage in pine plantations and is registered for use. Pines must be treated with this hand-applied formulation by mid-March, before any moth flight has occurred. The product is named LastCall™ EucosmaAK and is available through Advanced Pheromone Technologies, Inc. of Portland, Oregon.

**Remember, when using pesticides, always read and follow the label.**

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