



Western Pine Beetle

Forest Health Fact Sheet

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Christine Buhl, ODF

Western pine beetle caught in sap flow

Western pine beetle (*Dendroctonus brevicomis*) is a bark beetle that infests the boles of >6" dbh ponderosa pine trees. This beetle can cause tree mortality in mature and second-growth ponderosa and outbreaks usually occur in trees weakened by drought, fire, root disease, soil compaction or mechanical damage. Infestations increase dramatically following periods of drought. Second-growth ponderosa pine stands growing in the oak zone of southwestern Oregon and on the east flank of Mt. Hood are particularly susceptible to attack during dry years. The flaking of ponderosa bark by woodpeckers that feed on these insects is a common diagnostic for identifying western pine beetle attack.

Hosts

- Major: ponderosa pine

Western pine beetle (WPB) is distributed throughout most of the western states but the heaviest losses in large diameter ponderosa from this pest have occurred in Oregon, Washington and California.

Biology

Western pine beetles have two generations a year, except in southwestern Oregon where three or four generations are possible. Females may produce 1-3 overlapping broods per generation. Larvae feed within the phloem then move to the outer bark midway through development to pupate. This insect can overwinter at any stage. Because they often attack larger trees that have thicker bark they are protected from the elements, and temperatures must reach -20F to cause heavy winter mortality. Adults are dark brown and 3-5mm long. Attack flights start around March-April and continue into September. Their galleries are meandering and spaghetti-like. Pitch tubes created at attack sites are usually <6.5mm. Trees may not produce pitch tubes during drought periods when internal moisture levels are low



David McComb, USFS, Bugwood.org

Western pine beetle's spaghetti-like galleries

('blind attacks'), although orange-tan boring dust (frass) will still be present.

Western pine beetle is associated with a variety of other beetles that also infest pine. *Ips* beetles attack the top of a tree, mountain pine beetles attack the main bole, and red turpentine beetles colonize the lower bole and root collar as secondary pests.

Damage

Western pine beetle attacks can be confirmed by removing the bark beneath pitch tubes exposing their



Kenneth Gibson, USFS, Bugwood.org

WPB pitch tubes

winding, crisscrossing galleries. Western pine beetle vectors fungi that hasten tree death by disrupting water transport, this fungi also stains (but does not decay) sapwood. Even while the foliage is still green in the winter, infested trees can be identified by bark flaking activity by foraging woodpeckers that exposes underlying lighter patches of bark.

Tree mortality associated with western pine beetle attacks follows two characteristic patterns: 1) dying old growth trees scattered within a stand, and 2) clumped mortality of second-growth ponderosa pine in overstocked stands. WPB attacks >6" dbh trees along the bole (but not in branches). The foliage of successfully attacked trees first turns pale green, then yellow, and eventually a brownish-orange. When attacks occur between spring and mid-summer, the foliage normally fades by fall. Trees attacked in the late summer and fall may not fade until the following spring. The rate at which foliage fades depends on the weather, and how rapidly fungi vectored by adults blocks conducting vessels in sapwood.

Management

Silvicultural

Thinning overstocked ponderosa pine stands reduces the susceptibility of western pine beetle attack. In general,

More information:

Oregon Dept. of Forestry, Forest Health
<http://tinyurl.com/odf-foresthealth>
 2600 State St. Bldg. D, Salem, OR 97310
 503-945-7200

Management highlights

- Maintain appropriate stocking levels for site and conditions
- More info: *Ecology and Management of Eastern Oregon Forests* (OSU Extension)
- Remove trees with >50% crown scorch or >25% cambium damage from fire
 - Remove trees showing signs and symptoms of infestation
 - Manage slash to simultaneously prevent *Ips* outbreaks

reducing stocking levels to 55-70% of the basal area needed for full site utilization lowers the risk of beetle infestation. It is important during thinning to also manage slash properly to prevent outbreaks from slash-infesting *Ips* beetles.

Salvage

Salvage infested trees in the winter months to reduce western pine beetle populations on site. During the summer months, beetles often leave trees before the foliage changes color. In contrast, trees that change color during the winter months usually contain beetles. If attempting a salvage operation in the winter, complete it before beetle emergence in March-April. Remove all green trees with pitch tubes or woodpecker feeding, as well as trees with yellow or red crowns but not those with many tiny exit holes.



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Woodpecker damage

Insecticides

There are preventative insecticides that can protect high-value trees but they are expensive and difficult to apply. Insecticides should be applied before beetle flights in March/April. Verbenone pheromones *may* have some efficacy.

When using pesticides, always read and follow the label

Other references:

USFS Forest Health Protection
www.fs.usda.gov/goto/fhp/fidls

OSU Forestry Extension
<http://extensionweb.forestry.oregonstate.edu/>