



Mountain Pine Beetle

Forest Health Fact Sheet

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MPB adult caught in a sap flow (pitch tubes are signs of beetle attacks)

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Mountain pine beetle (*Dendroctonus ponderosae*) is the most destructive forest pest in the west and has contributed to more tree mortality than any other bark beetle in Oregon. Between 2007 and 2016 the average number of acres containing pine mortality from mountain pine beetle was estimated at 380,000 acres per year. Older, unmanaged (over-grown) stands of pine are most susceptible to this pest. These dense, “dog-hair” stands of lodgepole pine that have long been unmanaged and untouched by fire are often ground zero for mountain pine beetle outbreaks. At endemic levels, beetles will selectively attack stressed or weakened trees but during outbreaks, healthy trees and less preferred pine hosts may also be attacked.

Hosts

- Major: lodgepole, ponderosa, western white, sugar and white bark pine

The range of Mountain pine beetle (MPB) extends across all 11 western states and western Canada. In Oregon, it is distributed in pure and mixed pine stands mostly east of the Cascades.

Biology

In Oregon, there is typically one generation of MPB per year. Larvae or adults may overwinter. Adults are 4-7mm. Adults attack around July and excavate 12-36” long galleries that are distinguished by a hook at the bottom of the main channel. Pitch tubes are 13-25mm in diameter.

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

Damage

The presence of pitch tubes does not always indicate impending tree mortality, particularly if the MPB attacks



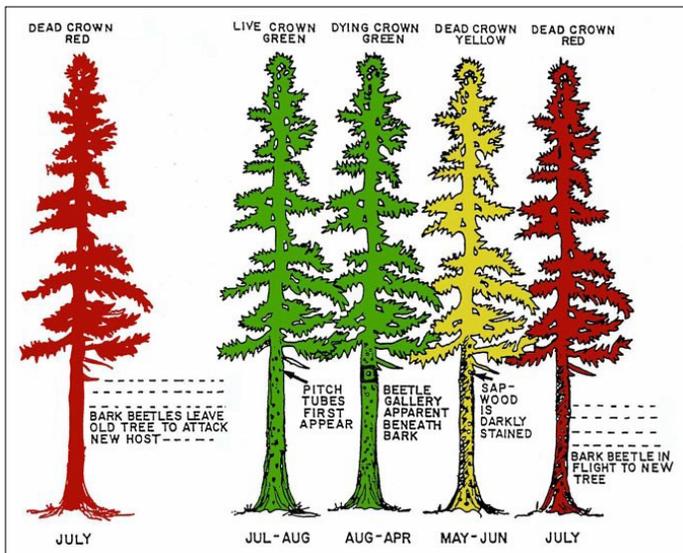
MPB pitch tubes (left) and gallery (right, arrow shows hook at bottom of gallery)

Buhl, ODF; Leslie Chong, Simon Fraser Univ., Bugwood.org

are on ponderosa pine. Additionally, trees may not produce pitch tubes during drought periods when internal moisture levels are low (“blind attacks”), although orange-tan boring dust (frass) will still be present. Tree death can be confirmed when the crown changes color between May and July of the year following the attack.

It is estimated that each larva destroys 6-10 fascicles (bundles) of pine needles during its development. MPB also vectors fungi that hasten tree death by disrupting water transport. These fungi also stain (but do not decay) sapwood.

Trees are often attacked in small clumps and across larger areas. The most spectacular MPB outbreaks occur in unmanaged lodgepole pine stands where tree mortality can extend across the landscape.



Timeline of tree mortality following MPB attack

In general, MPB infestations develop in overstocked pine stands. Among host trees, lodgepole, sugar, and western white pine are more susceptible to attack than ponderosa. However, if preferred hosts are not available MPB can overcome remaining, less-preferred pine hosts. Aerial survey data indicates that sugar pine are particularly vulnerable to attack during drought periods.

Overstocked pine stands greater than 60 years old with 6-26" dbh for lodgepole pine and 6-40" dbh for ponderosa pine are susceptible to MPB attack. When populations are at endemic levels MPB selects weak trees. During an outbreak all trees are susceptible to attack, although stands growing in lower site index classes (a measure of productivity) are often most at risk. Ponderosa growing on better sites have low susceptibility but overstocked stands on poor sites may suffer extensive mortality that is concentrated in the largest trees. For lodgepole pine, stocking levels and tree size have more influence than site index on susceptibility to outbreaks. The probability of MPB infestation in lodgepole stands increases with basal area and tree size. Stands with basal area greater than 100' per acre with dbh of 6" have a high probability

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)
- Manage slash to simultaneously prevent *Ips* outbreaks

of MPB attack. Trees need at least one year to benefit from increased resources and improved conditions created by thinning. Stands should be thinned ideally before outbreaks are allowed to reach adjacent areas.



MPB outbreak near Lakeview, Oregon

Christine Buhl, ODF

Management

Thinning pine stands to prevent overstocking is essential to improve resiliency against MPB attacks and may sometimes reduce tree mortality if conducted in the midst of an outbreak. Pines growing in overstock mixed conifer stands are also susceptible to MPB attack and stand densities should be reduced similar to what is recommended for a pure pine stand - particularly on poorer quality sites. It is important during thinning to also manage slash properly to prevent outbreaks from slash-infesting *Ips* beetles.

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 July. 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/>