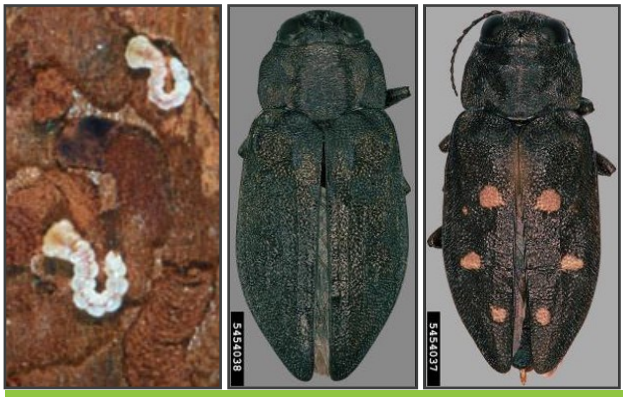
Flatheaded Fir Borer

Forest Health Fact Sheet

December 2016



Larvae and two color morphs of adult flatheaded fir borer. Adults are 7-11mm long.

Dave Powell USFS & Steve Valley ODA, Bugwood.org

Flatheaded fir borer (*Phaenops drummondi* prev. *Melanophila*) is a type of Buprestid wood boring beetle that behaves like a bark beetle. It feeds entirely underneath the bark instead of excavating galleries in the wood. Wood boring beetles found in western conifers aid in wood decomposition and tend to be secondary, in that they don't kill trees on their own but instead infest dead or dying trees. Flatheaded fir borer, however, can act like a primary insect pest by killing healthy looking trees. This beetle is particularly aggressive in southwest Oregon where it attacks Douglas-fir growing at ≤3,500' in elevation and/or on harsh, dry sites - particularly during droughts. In eastern Oregon, flatheaded fir borer is also one of the few insects that attacks and kills western larch.

Hosts

- Major: Douglas-fir, true firs, western larch
- Minor: spruce, western hemlock (and rarely found in pine)

Distribution for this insect is transcontinental across North America, and it has also been reported in Europe.

Biology

The life cycle of the flatheaded fir borer normally lasts for one year but can be longer, depending on the quality of host as a food source. Adults emerge in the spring (March - April) and feed on conifer needles before flying to a suitable host tree. The adult beetles can sometimes be seen resting on sun-exposed tree bark. Eggs are laid in bark crevices and upon hatching, larvae immediately bore into the inner bark. Larvae feed mostly on cambium and some phloem without entering the sapwood. Late in the summer or early fall (August - September), larvae move to the outer bark where they construct pupal cells and overwinter. Adult beetles emerge the following spring.

Damage

Flatheaded fir borers commonly breed in felled trees or those weakened by drought, fire, defoliation, mistletoe, or other types of stress. Trees infested are usually pole size or larger. Beetles can infest the entire tree, including exposed roots. Attacks may also be confined to the upper crown or large branches, resulting in top-kill and branch flagging. Flatheaded fir borer commonly kills healthy looking Douglas-fir growing at lower elevations on warm, dry sites around interior valleys or in locations where available moisture may be limiting. It is particularly aggressive during and after periods of drought. Patterns of mortality are often clumped on the landscape and concentrated along outer edges of stands, along ridges or drainages. Trees can defend themselves from infestation by 'drowning' insects in resin, but if unsuccessful the tree will die. Often lack of moisture, e.g. drought, reduces resin production. A pitch pocket often forms over arrested larval mines that causes serious wood defect in merchantable timber.

Detection of flatheaded fir borer attacks prior to the yellowing of the tree's crown is difficult. Unlike bark beetles, there are no external indicators of attack such as

Management highlights

- Replant with oak or pine as appropriate
- Avoid damage to roots from construction, roads, etc.
- Remove trees with >50% crown scorch or >25% cambium damage from fire

Bill Schaupp, USFS

Woodpecker damage

boring dust or pitch streams on the bark. For this reason, infestations are rarely diagnosed before the damage has already occurred. However, it is sometimes possible to identify infested green trees during the fall and winter months from the patches of bark removed by woodpeckers searching for beetle larvae. Multi-year infestations may progress from one or more red, flagged branches to involve the entire tree. By the time all of an infested tree's foliage turns red, usually late spring or early summer in the year after attack, almost all of the flatheaded fir borers have already left the tree. Exit holes indicating emergence are oval and about 1/8 - 1/4" wide.

Bill Schaupp, USFS

Flatheaded fir borer galleries

Flatheaded fir borer galleries are confined to the underside of bark, sometimes isolated at the upper crown. Similar to other Buprestids, larvae construct wide, winding galleries that increase in width as larvae grow. Galleries are filled with a brown dust tightly packed in concentric lines.

Management

Natural

Most likely, flatheaded fir borer populations are naturally regulated by parasitic wasps and predators or by drowning in sap flows. When larvae move toward the outer bark nearer to the surface to pupate, they are more exposed to parasitic wasps that fly in late summer or early spring and are also more accessible for woodpeckers.

Silvicultural

Lack of disturbance, especially fire suppression, has resulted in the continued ingrowth of Douglas-fir on harsh sites that are better suited for other species such as oaks and pines. This is particularly true in southwest Oregon as well as areas in the Columbia Gorge, the eastern edges of the Willamette Valley and the rain shadows of Mt. Hood. Regenerating or favoring appropriate species during thinning will reduce future mortality. Practices to maintain tree vigor will reduce susceptibility but may not be helpful on harsh sites. Heavy thinning of stagnant, dense, relatively pure Douglas-fir stands on low quality sites during and right after drought may even increase stress and residual mortality from flatheaded fir borer. Avoid practices detrimental to trees including backfilling over roots, soil compaction in the root zone, and road cuts through well-established stands. Douglas-fir with more than 50% of the crown or 25% of the cambium damaged by fire have a high probability of attack and should be removed to prevent a build-up of borer populations.

Bill Schaupp, USFS

Flatheaded fir borer-caused mortality. Note the green Douglas-fir in less exposed, moist spots are not attacked.

Insecticides

There are no insecticides demonstrated to be effective or labeled for use against flatheaded fir borer.

More information:

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

Other references:

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

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