



Mountain Pine Beetle

February 2018

Dendroctonus ponderosae

Field Notes



Adult mountain pine beetle. NPS/Sean Smith

General Description

“It was raining beetles” is a slight exaggeration, but that’s about how Sean Smith, botanist with the Klamath Network, described Lost Creek Campground during the 2009 mountain pine beetle outbreak in Crater Lake National Park. Beetle populations can explode during epidemics. Outbreaks have killed large blocks of pine-dominated forest in western North America, fueled by warm winters, drought, and crowded forest conditions.

Dendroctonus ponderosae, considered a major forest pest, is a bark beetle native to pine forests in western North America. Bark beetles represent the subfamily Scolytinae (family Curculionidae, order Coleoptera).

Adults are black and the size of a rice grain (5 mm) (< ¼ in). Except when they take flight in late summer (when Smith saw them), they live hidden under tree bark.

Habitat and Distribution

Mountain pine beetles typically infest lodgepole pine, ponderosa pine, western white pine, and sugar pine. When conditions allow, they also attack spruce, fir, and other conifers. From sea level to 11,000 ft, they occur from the Pacific Coast east to South Dakota, and from SW Canada to northern Baja California, Mexico.

Behavior and Feeding

The entire life cycle of a beetle depends on successfully infesting a live tree large

enough (15+ cm diameter (6+ in)) to house the beetle’s activities in its inner bark layer.

The beetles take a strength-in-numbers approach to overcome a tree’s defense. An individual adult female beetle boring into bark releases “aggregating” pheromones that attract other beetles. Each new recruit releases more pheromone, drawing hundreds more. Eventually, beetles release an “anti-aggregation” pheromone to prevent overcrowding. In defense, the tree floods the hole with resin to repel beetles. These “pitch tubes” are visible outside the bark as popcorn-like blobs of resin mixed with boring dust and phloem material. Trees already stressed by drought or disease produce less pitch and are easily overwhelmed, especially during outbreaks.



Pitch tube with beetle stuck in it. NPS/Hooke

The mountain pine beetle enlists a microscopic ally in its efforts. “Blue stain” fungi carried in a specialized mouth pocket infect the tree as the beetle chews. Leaving a telltale bluish stain on the sapwood as they grow, these fungi disrupt the tree’s flow of water and nutrients, contributing to its death. The fungi also release spores in the chambers housing newly pupated adult beetles, providing a ready snack.

Life Cycle and Reproduction

Bark beetles in lower elevation forests typically have a one-year life cycle. At higher elevations, where summers are

shorter and cooler, beetles sometimes take two years to complete their life cycle.

In late summer, adults who have overcome a tree’s defense construct vertical, tunnel-like egg galleries (averaging 25 cm (10 in) long) in the phloem layer. They lay 60–80 eggs that hatch after 10–14 days into white, legless larvae with brown heads. From August to the next June, they move through four stages of growth, snacking on the tree’s nutritious phloem (sugars and other photosynthetic products). As larvae, they are choice woodpecker food. After pupating, they spend another month feeding on a mix of tree tissue and fungal spores. Mature adults fly off for a few days in the sun to find new trees to infest and begin the cycle again. After laying eggs, most adults die.

Conservation

Mountain pine beetles are not a conservation concern, but their effect on host trees, like high elevation whitebark pine, is a concern. In Crater Lake National Park, scientists apply a synthetic version of the beetle’s own anti-aggregation pheromone (verbenone) to high value whitebark pine trees to stave off beetle attack.

Where to See

Crater Lake and Lassen Volcanic National Parks have had large beetle outbreaks. The beetles also occur in Lava Beds NM, Whiskeytown NRA, and probably at low levels in Redwood NSP and Oregon Caves NMP.

More Information

<http://www.oregon.gov/ODF/Documents/ForestBenefits/Mountain%20Pine%20Beetle%202017.pdf>

<https://extension.colostate.edu/docs/pubs/insect/05528.pdf>