Rocky Mountain National Park

Colorado

Mountain Pine Beetle

Background

The Mountain Pine Beetle (*Dendroctonus ponderosa*) is one of several common, native insects that challenge western pine forests. When trees are weakened by overcrowding, lack of diversity of plant life and mistletoe infestation, the pine beetle population can rapidly spread, approaching epidemic levels. Even healthy trees can be affected when there is a widespread infestation of the beetle. Thousands of acres of forest can be affected. In 1990 the U.S. Forest Service reported that the beetles killed 289,800 trees in Washington state. Over 155,422 acres were affected. As many as 15,000 adult beetles may infest one tree during an epidemic. Outbreaks can last for more than ten years.

Outbreaks

Outbreaks of Mountain Pine Beetle infestations ebb and flow with the changing health of a forest. Adult beetles attack large-diameter trees, usually 6 to 8 inches or more in diameter. Bigger trees provide higher quality food and larval habitat and the thicker bark provides greater protection from predators and climatic extremes. As beetles bore through the bark of a healthy tree the tree will produce copious amounts of resin or pitch. This may literally "pitch" the beetles out.

The Mountain Pine Beetle can overcome the "pitch" and excavate galleries in which they live and lay eggs. While in the tree, the beetles disperse spores of a bluestain fungus (*Ceratocystis).* The fungus colonizes the sapwood and effectively circumvents the defenses of the tree. Fungus and beetle have a symbiotic relationship. The fungus blocks resin production by the trees, thus aiding the beetles growth.

<u>Outbreaks of beetle infestations are usually severe when</u>:

- Sustained favorable climate conditions for beetle survival, such as a series of mild winters and good weather during the dispersal and attack periods.
- There is an abundance of trees of susceptible age, size and proximity in a general area close enough for long range dispersal of the beetles.
- Dwarf mistletoe has infested trees, thus stressing and weakening them.

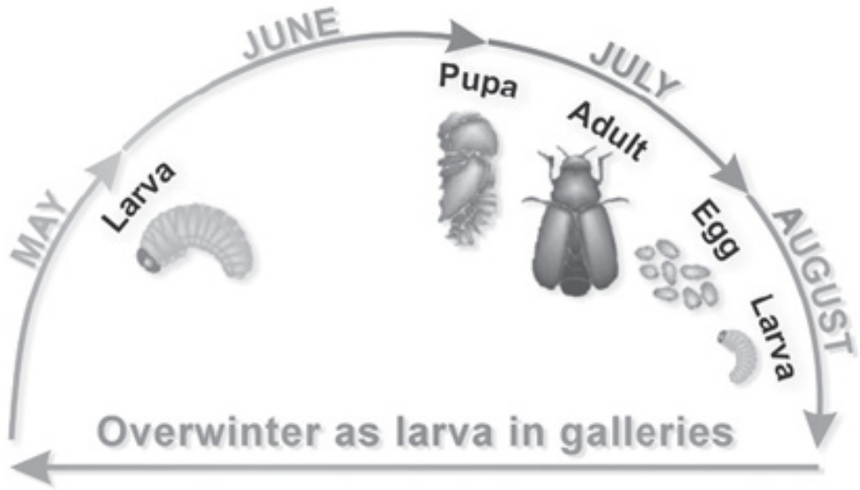
<u>Outbreaks decline and collapse when</u>:

- There is a depletion of susceptible host trees.
- Climatic conditions are no longer conducive to beetle population growth and expansion.

Life Stages

The beetle develops through four stages: egg, larva, pupa, and adult. Mountain Pine Beetles overwinter mostly as larvae, living within the inner bark of trees. Some pupae and adults may also overwinter beneath the bark. Adults emerge between late spring and late summer, depending on climatic and environmental conditions, and fly to new trees. Except for this flight period, all stages are spent under the bark of infested trees. Females build vertical galleries and lay eggs along each side of the galleries. The egg galleries are tightly packed with partially digested woody particles, or frass. In a couple of weeks eggs hatch and 1/4" white larvae begin feeding, excavating 1" to 2" long galleries at right angles to the main galleries. The feeding ends with freezing temperatures that cause dormancy. The life cycle is normally one year long, except for trees affected by very cold temperatures, such as at high elevations, when the cycle can be two years.

Egg Gallery



Effects

A beetle infested tree will have pitch tubes showing at the surface of the bark. The pitch can range in color from white to reddish brown. Tubes are usually widely scattered over the bark. When a tree has not successfully ejected the beetles, the tubes will be one-fourth to one-half inch in diameter.

Infested trees will have dry boring dust, like a fine sawdust, in bark crevices and around the base of the tree. Sometimes, however, infested trees can have boring dust, but no pitch tubes evident. These trees, called blind attacks, are common during drought years when trees produce little pitch.

Tree with visible pitch tubes.

Controls

Rocky Mountain National Park recognizes the Mountain Pine Beetle as a native species which functions as part of a natural ecosystem. However, Mountain Pine Beetles do have the ability to kill high value trees, such as those in the vicinity of campgrounds, picnic grounds and other developed areas in the park. To alleviate the beetle threat, the park may treat selected trees with insect repellents, utilize biological controls, or remove trees that pose a safety hazard.

Thinning and prescribed burning may be used as part of the park's Fire Management Plan. These activities can help reduce Mountain Pine Beetle populations.

Any actions that are taken to reduce Mountain Pine Beetle populations will comply with the National Environmental Policy Act, the park's Resource management Plan, and the National Park Service Management Policies of 2001.

Park information is available by phone at 970-586-1206 or on-line at www.nps.gov/romo

06/07