

Mountain Pine Beetle

Aggressive bark beetle of western pines



Figure 1. Adult mountain pine beetle. Photo: Erich G. Vallery, USDA Forest Service, Bugwood.org.

Name and Description—*Dendroctonus ponderosae* Hopkins [Coleoptera: Curculionidae: Scolytinae]

The mountain pine beetle is the most aggressive, persistent, and destructive bark beetle in the western United States and Canada. Adult beetles are dark brown to black, cylindrically-shaped, and 1/4 inch (4-7.5 mm) long (fig. 1). Larvae are small, white grubs with tan head capsules.

Hosts—Most native and introduced species of pines are hosts for mountain pine beetle. In the Rocky Mountain Region, ponderosa, lodgepole, whitebark, limber, and bristlecone pines are all attacked. During large outbreaks, Engelmann and blue spruce have been attacked and successfully colonized.

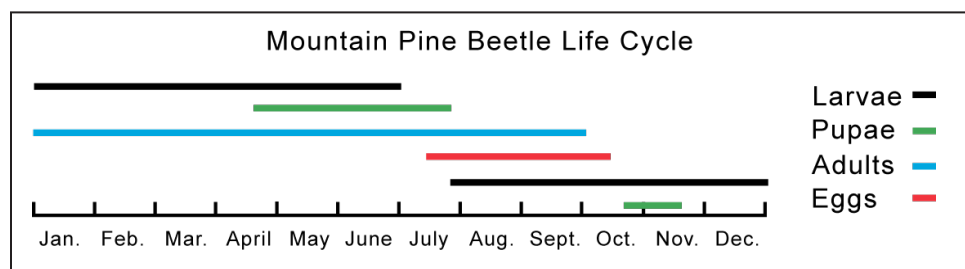


Figure 2. Mountain pine beetle life cycle (from Johnson 1982).

Life Cycle—Mountain pine beetles overwinter mostly as larvae beneath (or within) the inner bark of host trees. Occasionally, pupae and callow adults may also overwinter. In most lodgepole and ponderosa pine stands, larvae pupate at the ends of their feeding galleries in late spring. Adults emerge and attack from about early July through August,

depending on elevation and temperature (fig. 2). Egg galleries are more or less straight and vertical and may be up to 30 inches (76 cm) long. Eggs are laid along each side of the gallery in individual niches. Both niches and egg galleries are tightly packed with frass. Eggs hatch and larvae feed until freezing temperatures cause dormancy. Extremely cold temperatures (prolonged periods below -30 °F) can cause significant mortality and can lead to an outbreak reduction or end.

Damage—This is one of the few bark beetles that usually make obvious pitch tubes on bark surface at the attack site (fig. 3). Pitch tubes are masses of red, amorphous resin mixed with bark and wood borings. Boring dust is evident in bark crevices and around the base of infested trees. Under bark, look for straight, vertical egg galleries with a crook or J shape at the beginning, which can extend upward 30 inches (76 cm) or more (fig. 4). Galleries are packed tightly with boring dust. Larvae (grubs) are present during fall and winter. Most pupate in late spring, and adults emerge from the bark in midsummer to attack new trees. Infested trees fade within a year from yellow-green to red-brown. Hosts may have their bark removed by woodpeckers searching for larvae.

Management—Outbreaks usually develop in mature to over-mature forests. Large reserves of these forests pose a constant hazard in areas climatically favorable for the mountain pine beetle. In addition, management plans for reserved areas such as parks and wildernesses should consider the need for protection against destructive outbreaks. Management should focus on forests and not on the beetle by altering stand conditions that favor buildup of beetle populations. There are two basic approaches to reducing losses from mountain pine beetle in pine forests: (1) long-term (preventive) forest management, and (2) direct control.



Figure 3. Pitch tubes and boring dust at site of mountain pine beetle attack. Photo: Kenneth E. Gibson, USDA Forest Service, Bugwood.org.

Mountain Pine Beetle - page 2

The strategy of preventive management is to keep beetle populations below injurious levels by limiting the beetles' food supply through forestry practices designed to maintain or increase tree/stand resistance. Preventive management addresses the basic cause of epidemics—stand susceptibility—and is considered the most satisfactory long-term solution. It includes a combination of hazard rating, priority setting, and silvicultural manipulations. In contrast, suppression of beetle populations, (that is, killing them by various methods of direct control) treats only the problem of too many beetles.

Methods of direct control include felling and burning, debarking, or solarizing infested trees. Effects of direct control are only temporary, so the treatment must be implemented yearly as long as beetle infestations exist. When properly used, direct control might be effective both in reducing the rate of the spread and the intensification of infestations; but it should be considered only a holding action until susceptible stands can be altered silviculturally. Individual trees can also be protected from fatal attacks through the use of chemicals applied prior to tree infestation (preventive sprays). This treatment must be repeated as long as beetle infestations exist in the area. Preventive sprays have been used in combination with treatments such as sanitation (removing beetle-infested trees) and thinning to increase overall stand health while protecting individual high-value trees. Use of preventive spray treatments in Rocky Mountain Region recreation areas should be supported by a site-specific vegetation management plan.



Figure 4. Mountain pine beetle gallery has a crook at the end. Larvae are in feeding galleries. Photo: Ladd Livingston, Idaho Department of Lands, Bugwood.org.

-
1. Amman, G.D.; McGregor, M.D.; Dolph, Jr., R.E. 1985. Mountain pine beetle. Forest Insect and Disease Leaflet 2. Washington, DC: U.S. Department of Agriculture, Forest Service. 11 p.
 2. Furniss, R.L.; Carolin, V.M. 1977. Western forest insects. Misc. Publ. 1339. Washington, DC: U.S. Department of Agriculture, Forest Service. 654 p.
 3. Johnson, D.W. 1982. Forest pest management training manual. Lakewood, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region. 138 p.