



Adult mountain pine beetle,
Dendroctonus ponderosae
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Mountain Pine Beetle

The mountain pine beetle (MPB) is a naturally occurring insect of the Rocky Mountain ecosystem. These small cylindrical insects colonize and kill mature trees by boring through the bark and mining the phloem – the layer between the bark and wood of the tree. When conditions are favourable, populations of MPB can increase and large numbers of trees can be affected, killing large areas of mature lodgepole pine. Large outbreaks in the southern part of Kootenay National Park have helped shape the forests we see today. These forests are now productive habitats supporting a diversity of plant and animal species. Kootenay is still experiencing beetle outbreaks in some areas.

Life Cycle of Mountain Pine Beetle

Mountain pine beetles normally have a one-year life cycle. In late summer, adults, who are approximately 5 mm (1/4”) long, leave the colonized trees in which they have developed. They then seek out living, green trees and tunnel under the bark and search for mates.

Eggs are laid in vertical galleries (tunnels) under the bark. After the eggs hatch, the grub-like larvae spend the winter feeding under the bark. Larvae pupate in the spring and emerge as adults from July to September.

A key part of this cycle is the transmission of blue-stain fungi from the beetle to the tree. Spores of these fungi are introduced by adults into the tree during attacks.



Tree stump showing blue-stain fungi
© Canadian Forest Service

Fungi grow within the tree and, together with the action of bark beetle feeding and gallery digging, disrupt the movement of water within the tree, rapidly killing it. The fungi give a blue-gray appearance to the sapwood.



Red Trees killed by Mountain Pine Beetle
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What to Look For:

- Red needles on the crowns of trees, although a lot of other things can cause needles to turn red, such as drought stress and disease.
- Eggs, larva, or their J-shaped galleries under the bark.
- “Pitch tubes” – bubbles of resin on the trunk where beetles tunnel into the bark, generally found at mid tree level.
- “Sawdust” at the base of a tree or in bark crevices.
- Woodpecker activity, such as holes in trunk and bark chips on the ground (woodpeckers are looking for a variety of insects).

Mountain Park Outbreaks

Mountain pine beetle outbreaks in the mountain national parks are not new:

- Two major outbreaks have occurred in Kootenay (1930-45 and 1981- present).
- In Yoho, there was a smaller infestation in the 1930s, and current populations are increasing.
- Waterton had an extensive outbreak that occurred in the 1970s.



- Banff had a minor outbreak between 1923-43, a smaller outbreak in the 1970s and early 1980s, and currently has a growing population.
- In 1999, mountain pine beetle was recorded for the first time in Jasper.

MPB has existed in Kootenay at low or “endemic” levels for as long as its pine tree hosts have grown on the landscape. The beetles were first detected in 1930 on the eastern side of Kootenay Valley between Cross River and Pitts Creek. This outbreak lasted until 1945 and progressed north to Vermilion Crossing, covering over 100 square kilometres and killing 80% of the pine. This outbreak decreased to natural levels after 1945.

The second outbreak began in 1981 and is still going strong. The beetles are concentrated on Spar Mountain, the south end of the Mitchell Ridge adjacent to the B.C. boundary, and scattered through the Kootenay Valley. In 2003, beetle activity increased significantly.



Lodgepole pine forest with red trees killed by MPB
© Parks Canada

An Old Tree Problem

Decades of fire suppression and a warming climate have ensured the current success of MPB in Kootenay. The park has large continuous stands of old lodgepole pine that are often weakened from disease and drought. As a result, they are less able to fend off beetle colonization.

Historically, when fires burned they would create a mosaic of forest patches of various ages, sizes and species. This made the landscape as a whole healthy and less susceptible to widespread insect outbreaks

and large wildfires. Prescribed fire programs are helping restore a healthy mosaic to the landscape.

Mountain Pine Beetle: A Natural Process In Our Forests

Mountain pine beetles are part the natural forest cycle and help to ensure that forests are healthy. When mountain pine beetles kill a lodgepole pine, they don't just leave behind a dead and wasted tree. Other tree species and plants growing alongside or underneath the pine now have more light in which to grow. These species give diversity to the forest and in turn, support other wildlife by providing shelter and food.

Mountain pine beetle normally affect mature or weakened lodgepole pine trees, helping to kick-start the invaluable process of decomposition by recycling old or damaged trees. Decaying wood returns nutrients to the system while providing shelter and food for many plants and animals.

What We Are Doing About MPB

Parks Canada directs that native insects and diseases are natural ecological processes that should be allowed to proceed without interference if possible. However, where insects or disease pose a serious threat to provincial lands, intervention may occur.

In some mountain parks, thinning and burning are used to manage beetle populations. These tools are consistent with the mandate of national parks. Parks Canada's preferred option is prescribed burning since fire is a natural process across this landscape.

In Kootenay National Park, landscape level prescribed fires are being planned for various areas of the park. This will diversify the age and species composition of the forest, making it less susceptible to mountain pine beetle outbreaks in the future.

