

Forest Health

by Sunil Ranasinghe

Mountain Pine Beetle in Alberta

The mountain pine beetle (MPB) is the most serious pest of pines in western Canada. Mass attacks by these small insects (4.0 – 7.5 mm long), aided by blue stain fungi associated with them, can kill mature pine trees within a few weeks.

The last MPB outbreak in the province occurred from 1977 – 1985 in southwestern Alberta and killed over one million cubic metres of mature pines.

The natural range of MPB extends from Pacific Coast east to South Dakota and from northern British Columbia and western Alberta south to northwestern Mexico. The fringe area of its distribution covers eastern slopes of the Rockies in Alberta thus leaving most of the province outside its natural range. However, during the current outbreak MPB attacks in Alberta have been detected further north than ever before thus indicating a possible expansion of its range.

Although all pine species are susceptible to MPB attacks, the lodgepole pine is the preferred host in Alberta; white bark and

limber pines are also attacked. Natural attacks have not been reported on jack pine, which is a potential host.



Mountain Pine Beetle damage near Waterton Lakes

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Current MPB Infestations in Alberta

The detection of about a dozen MPB-killed trees in Banff National Park in 1998 was the first indication of the current infestation in Alberta. Since then the number of MPB-killed trees in this park increased exponentially until Parks Canada's habitat management projects curtailed MPB activity. In 2001, MPB-killed trees were detected in Willmore Wilderness Park. In 2002, MPB infestation in Banff National Park spilled over to the adjoining provincial Crown land near Canmore. Over 1000 MPB-attacked trees were detected during the ground surveys carried out in and around the Town of Canmore in 2002. Subsequently MPB-killed trees were detected in Jasper National Park as well. Following aggressive control action taken by Alberta Sustainable Resource Development in collaboration with Parks Canada, Alberta Community Development (provincial parks) and other stakeholders, the number of new MPB attacks on the provincial land has been significantly reduced.

The mature/overmature component of Alberta's pine forests has increased substantially in the recent past partly in response to more effective wildfire management. With over 230 million cubic metres of mature and overmature pines with an estimated commercial value of 23 billion dollars along the eastern slopes alone, the stakes of a devastating MPB infestation are very high in Alberta.

MPB Management in Alberta

MPB infestations need three components—beetle, suitable hosts and favourable weather conditions—to succeed. Out of these, beetle and suitable host availability are the two components that can be manipulated to manage MPB infestations.

The MPB management program in Alberta is composed of prevention, avoidance and control of beetle populations.

Ministerial orders are used to prevent infested pinewood being transported between June 1 and September 30 into Alberta from areas with current MPB infestations. This makes sense in view of the majority of pines in the province having evolved without exposure to the beetle.

Silvicultural means can play a key role to avoid MPB infestations in mature pine stands. On a short-term basis, thinning to a 5 m X 5 m density will enable mature stands to avoid MPB infestations. Harvest sequencing can be used to prioritize removal of stands with high MPB hazard identified by prediction models. On a long-term basis, creating mixed-species or mixed-age pine stands help to mitigate MPB concerns.

If infestations occur in spite of the preventative measures an aggressive, integrated MPB control program is used. This program includes surveys for detection and monitoring followed by assessment of risk of spread, hazard of infestations and potential impact on timber supply. Once the assessment is complete control strategies either directed toward reducing beetle populations or minimizing potential losses are identified. The main objective of this control program is to tackle the MPB populations at an incipient stage, i.e., transition period before the increasing MPB populations reach the epidemic phase. To achieve this, a goal has been set to detect and control 100% of the new infestations in the first year of occurrence.

Aerial surveys over the landscape are used to detect MPB-attacked trees with ominous signs of red crowns. These red trees although already dead and not harbouring the beetles any more indicate the areas with suspected MPB infestations. Areas with suspected attacks are ground surveyed to detect green attack trees that have not yet change crown colour but harbour life stages of beetles. These green attack trees are removed before beetle emergence to manage the MPB populations. Models have been developed to predict the MPB dispersal and spread over the landscape.

To date this aggressive approach of detecting and removing beetle-infested trees during the incipient stage of the populations has kept the MPB at bay in Alberta. However, with the potential for a continuous influx of beetles from infested stands in adjoining areas vigilance and prompt action are of the essence to prevent another MPB epidemic in Alberta.

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