

Mountain Pine Beetle Ecology Program

Research Theme No. 1

MPB Biology and Management

Importance of Research Theme

Understanding the various aspects of MPB biology, population growth and spread is a necessary requirement for managing the infestations effectively. Most of what we know about MPB biology stems from studies conducted in BC. Since beetles migrated to Alberta several anecdotal observations suggest that they exhibit different behavior, infestation dynamics, and survival and growth patterns than in their native range. Alberta's forests are different to BC's in stand structure and they do not share a co-evolutionary history with MPB as the pine trees in BC do. In addition, Alberta's climate differs from the interior BC or USA where outbreaks have mostly been studied. All management tools employed in Alberta are based on understanding of beetle biology as it was observed in the historic range. It is yet unclear how these need to be adapted to improve their relevance, accuracy and predictive power in Alberta's landscapes.

The efficacy of current management aimed at slowing the rate of spread of Mountain Pine Beetle infestation needs to be continually evaluated in order to manage prescriptions to suit changing conditions. Early detection is crucial for timely control of MPB populations. When populations are still small the chances of eradicating spot infestation are highest. Accurate detection methods are necessary for any management action.

Implications if information needs are not addressed

MPB biology, population dynamics and spread potential can have major implications for forest managers and the communities that depend on the forest industry. Harvest plans need to be adjusted to prevent beetles from spreading, new containment measures need to be taken to transport and store infested wood adding to processing costs. Where, when and how much harvesting is necessary for slowing the spread can be improved with more accurate spread models.

If the effect of current control actions cannot be measured it is difficult to be accountable to tax payers, to request more funding and to evaluate the merits of different strategies. When low populations are missed it is more difficult to control them once they have grown into large epidemics. Forest industry may lose its immediate to mid-term timber supply. Communities may lose their main source of income and natural heritage. Drinking water supply may be jeopardized and wildlife may lose critical habitat.

Economic, social and ecological benefits derived from addressing information needs

Government and industry will be able to make well informed decisions about managing the infestation. Detection of low MPB populations would enable early management action before populations grow, reducing the overall cost of control. Knowing when, where and how much to harvest will enable forest companies to stay in business and secure the future of the communities that depend on them. Understanding the growth and spread potential of MPB populations enables identifying risk to key forest values. Vulnerable watersheds can be prioritized for protection so drinking water quality is sustained. The people of Alberta will be able to enjoy the beauty of the forest. Wildlife will persist if its habitat is maintained and created for the future. Spread through the Boreal forest to other provinces of Canada might be prevented. Other provinces in Canada will be in a better position to manage MPB infestations if more knowledge is available.

Urgency of addressing information needs

Finding answers to priority questions is urgent as the window of opportunity for managing the infestations is narrowing with populations growing across Alberta. Since large-scale management is conducted every year it is urgent to be able to evaluate its effectiveness at slowing MPB spread.

Early, rapid and accurate detection of beetle infestations are essential if containment and control of the beetle is to occur. Accurate detection of low level populations is most critical on the eastern and northern edge where MPBs are crossing the borders to SK and NWT. Knowledge on MPB survival and population growth in northern latitudes is increasingly critical.

**Priority Research Questions
April 29, 2013**

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1.	What is the efficacy of current control measures applied to MPB in Alberta?
2.	What drives local and long distance beetle dispersal, establishment and population dynamics of MPB in novel host environments?
3.	What critical establishment thresholds can be defined to guide operational management of MPB infestations in novel habitats?