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Release Response of Black Spruce and White Spruce Following Overstory Lodgepole Pine Mortality Due to Mountain Pine Beetle Attack

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Abstract : Advance regeneration is present in many lodgepole pine stands in Alberta. When the overstory pine canopy is killed by Mountain Pine Beetle (MPB) the growth of this advance is likely to increase. Understanding the growth response of these understory tree species is needed to improve mid-term timber supply projections and management decisions. To quantify the growth (diameter, height, height/diameter ratio) responses of black spruce and white spruce to lodgepole pine mortality, sample trees of black and white spruce advance regeneration were selected from 7 lodgepole pine dominated stands (5 attacked; 2 control) in the Foothills Region of western Alberta. Measurements were collected 7-8 years after MPB attack across a wide range of spruce height and stand densities. Analysis was done using mixed model linear regression. Result indicates that there was an increase in both diameter and height growth after MPB attack; however, this increase in growth was delayed for about four years. Both spruce species had similar height response and their height/diameter ratio decreased after release, partly as a result of increased understory light associated with loss of needles in the pine canopy. In addition, the diameter and height growth responses of both spruce species were strongly related to density, prerelease growth and initial size.

Keywords : mountain pine beetle, forest regeneration, lodgepole pine, growth response
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