

March 2012

Regenerated Lodgepole Pine Trial 10-year Results: Tree Mortality and Health

The Regenerated Lodgepole Pine Trial consists 102 one-hectare permanent sample plot clusters (“installations”) installed about 10 years ago throughout the Alberta foothills to monitor stand

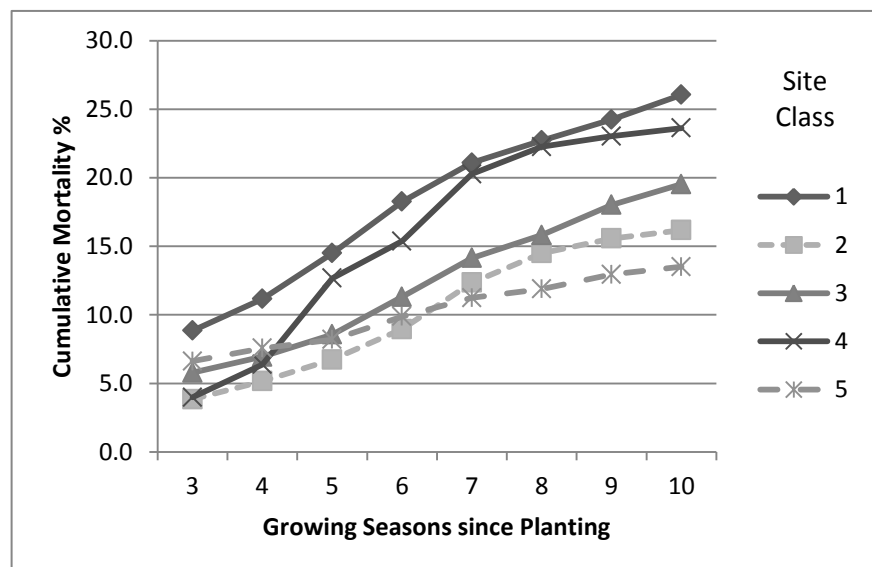


development of lodgepole pine, planted and naturally regenerated after harvesting, in relation to site and treatment factors. This note is one of 3 summarizing results after 10 years. A more detailed report is also available.¹

During the last decade, Alberta foresters have become increasingly aware of health risks to lodgepole pine, including to post-harvest regeneration such as that shown in the image at left.

The figure below shows trends by site class² in cumulative mortality of planted stock to the end of the trial’s 10th growing season since

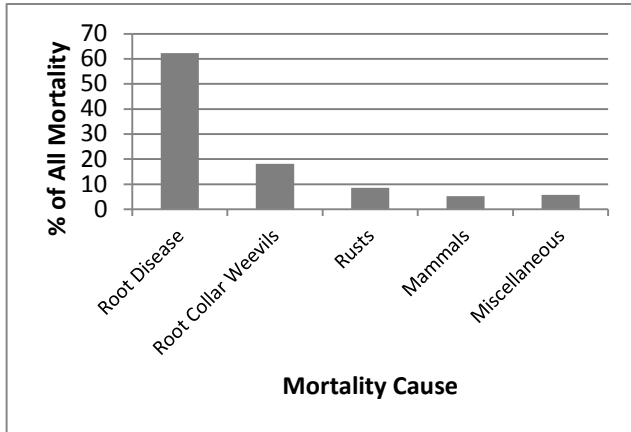
planting. The highest mortality occurs on dry (class 1) and rich (class 4) sites. Weeding has not yet shown any statistically significant effect. Because of ingress delay, it is too early to accurately assess mortality in natural regeneration and to reliably compare it with mortality in planted stock. Mortality of planted stock is positively correlated (i.e. increases) with deciduous tree stocking and density, but is negatively correlated with the presence of willow, alder, other tall shrubs, forbs and mosses.



¹ Regenerated lodgepole pine trial 10-year crop performance report. Foothills Growth and Yield Association, February 2012. <http://foothillsresearchinstitute.ca/pages/Publications/>

² 1 = bearberry / lichen / hairy wild rye (submesic-subxeric, medium-poor); 2 = Labrador tea - mesic (mesic, poor); 3 = billberry / cranberry / sarsaparilla / rhododendron (mesic, medium); 4 = honeysuckle / fern (subhygric, rich); 5 = Labrador tea - hygric (hygric, poor).

A strong relationship was found between mortality and mean annual temperature. Responses of mortality to climate variables differ between ecological site classes, but overall mortality increases with temperature. (These responses are described and discussed in detail elsewhere.)



The figure at left shows apparent causes of mortality measured over the last 2 years. The primary direct causes during this period have been root disease (mostly *Armillaria* spp., pictured below left), followed by root collar weevils (mostly *Hylobius warreni*, larval stage pictured below right) and rusts (mostly *Endocronartium harknessi*).



Occurrence of the 3 leading lethal pathogens has increased in the last few years: the figure below left compares the percentage of installations with the pathogens detected as present in the 7th and 9th growing seasons (GS). The figure below right makes a similar comparison for the percentage of trees (including both live and dead) showing symptoms of infection.

