

**March 2008**

## Regenerated Lodgepole Pine Project – Fifth Year Results

Between the summer of 2000 and the spring of 2002, 9 member companies of the Foothills Growth and Yield Association (FGYA) installed and planted 102 one-hectare research plot clusters throughout the Eastern Slopes, in a large replicated experiment designed to monitor stand development of harvest-origin lodgepole pine in relation to:

- site;
- initial spacing of planted stock;
- vegetation control (weeding);
- density regulation (pre-commercial thinning).

Results following the first 5 growing seasons were analyzed during 2007, and included the following observations.

- Height growth was mainly influenced by site, particularly soil nutrient regime.
- Diameter and basal area development too were influenced by site, but also by vegetation control, particularly on the most productive sites.
- Mortality was variable, and the main causes appeared to be climate (summer drought and winter desiccation) and insects (primarily root collar weevil).
- High levels of mortality in planted stock were most prevalent on poor-dry and rich-moist sites.
- Natural regeneration of pine and other coniferous species has resulted in high levels of stocking on mesic and dry sites, and poor stocking on hygric and sub-hygric sites. It appears to have been influenced primarily by soil moisture, site preparation, and competing vegetation.



Rand McPherson (left) coordinated field installation and initial measurements of the trial.

- The ingress of natural regeneration had not peaked by the end of the fifth year since trial establishment.
- The delay in natural regeneration has resulted in naturals that are on average currently smaller than planted stock. The naturals, once and where established, have so far demonstrated less mortality and health problems than the planted trees.



## **Foothills Growth & Yield Association Quicknote #9**

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The data and analyses are being used to provide an improved basis for forecasting achievement of reforestation establishment and performance targets. A preliminary regeneration establishment model has been formulated, predicting density, height and diameter distributions of planted stock as functions of age, initial spacing, site, and treatment. This will be expanded to include the dynamics of natural regeneration.

Results to date highlight some key questions that need to be answered in order to support management of reforestation risks, such as:

- At what rate will mortality continue in planted stock?
- Will mortality increase in natural regeneration, and if so, by how much?
- Can we better predict tree mortality and health in relation to climate, insect and other risk factors?
- How long will ingress of natural regeneration continue, at what rate, and how will its growth compare with that of planted stock?

Improved answers to these questions will be available after analysis of data to be collected during 2008 for crop performance at 7 years. The large variation in climate, and in regeneration responses to climate and insects, observed across the study area provides an exciting opportunity to explore how future climate change will influence forest regeneration.

The mission and mandate of the FGYA are to continually improve the assessment of lodgepole pine growth and yield in managed stands by:

- Forecasting and monitoring responses to silvicultural treatments;
- Facilitating the scientific development and validation of yield forecasts used by members in managing their tenures;
- Promoting knowledge, shared responsibility and cost-effective cooperation.

If you have comments or questions regarding this project, or would like more information, please contact:

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