

Quicksheet #24



Jan. 2008

Basal Forking in Nursery-induced Mature Foliage Lodgepole Pine Seedlings vs. Regular Planting Stock After 7 Growing Seasons

Research Project 01-09

Introduction

Forking of tree stems has negative implications to volume growth and value. Newly planted seedlings with forks may suffer a competitive disadvantage and increased damage by vegetation press. Observations made at the Alex Fraser Research Forest (AFRF) suggested that lodgepole pine (*Pinus contorta* var. *latifolia*) seedlings with juvenile foliage at time of planting were expressing severe basal forking. This trial was established in 2001 to compare stem form of trees planted with and without nursery-induced mature foliage. The rationale was that seedlings with more foliage might be better able to suppress competition by lateral branches. Pine seedlings can be induced to develop mature foliage if grown for at least part of their early development under a specific set of light conditions.

Study Sites and Methods

Plots were established in the Gavin Lake Block of the AFRF in 3 recently harvested cutblocks within mesic sites of the SBSdw1 biogeoclimatic variant. Three rectangular plots with 6 rows of 10 trees each (30 trees/ treatment) were planted by the same planter on May 9, 2001. The treatments included 1-year old pine seedlings with nursery-induced mature foliage and those with regular juvenile foliage typical of most planting stock (Figure 1). The same seedlots and stock types were used in all plots. The planting order for each row was randomized by flipping a coin. A mixture of trees from different seedling bundles was planted for each treatment. The prescribed inter-tree spacing ranged from 2.87 m – 3.10 m. Plot corners were staked with pvc stakes and trees were individually identified with numbered pig-tail duff pins.

Key Words:

lodgepole pine seedlings

nursery-induced mature foliage

basal forking



Figure 1: 1-year old lodgepole pine seedling with **A** nursery-induced mature foliage, and **B** juvenile foliage during first growing season, both with basal forking with dominance at time of planting (pointers).

Tree form was assessed at time of planting (Y0), and after the first (Y1), second (Y2), third (Y3) and seventh (Y7) growing seasons. Form categories were as follows:

1. leader dominant (no forking)
2. basal fork where one stem is more dominant (taller) than the other
3. basal fork without dominance (stems are of equal height)

UBC Research Forests

4. fork above base where one stem is more dominant (taller) than the other
5. fork above base without dominance (stems are of equal height).

Data where stem form was a function of unrelated mechanical damage were culled in the analysis, as were dead or missing trees.

Results and Discussion

Basal forking occurred with or without dominance in 33% of seedlings with juvenile foliage (untreated) and 15% of those with mature foliage in Y0, and increased to 36% and 17% respectively after one growing season. In years 2, 3 and 7, basal forking among the mature foliage specimens declined to 1%. Basal forking declined more slowly among the untreated trees with 14% in Y2, 5% in Y3 to 1% at Y7 (Figure 2). None of the treated trees and only a single untreated specimen that exhibited basal forking (both with and without dominance) in Y0 and Y1 continued to exhibit that form at Y7. For the most part, all had grown out of that form to have a dominant, single stem or one that endured subsequent leader damage (causes unknown) that caused forking above the base in the interim.

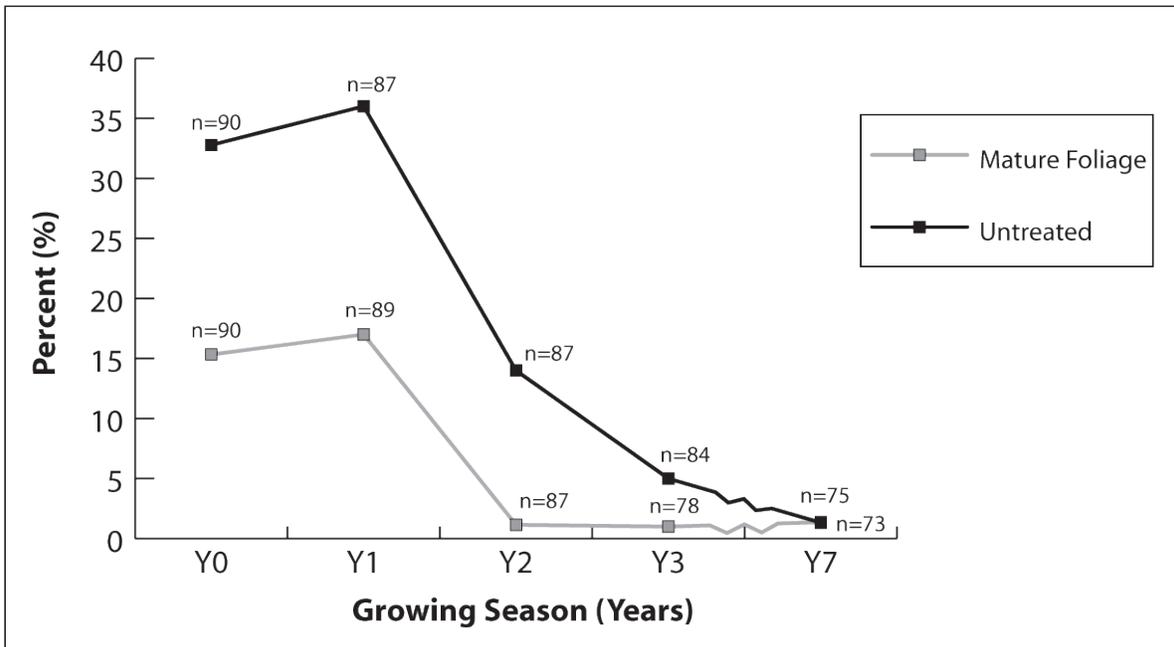


Figure 2: Percent basal forking in lodgepole pine seedlings with nursery-induced mature foliage at time of planting as compared to regular (untreated) seedlings after seven growing seasons

The one treated specimen that had basal forking (without dominance) at Y7 had previously exhibited forking above the base only. Both *Armillaria ostoyae* and western gall rust (*Endocronartium harknessii*) now occur in its plot and present additional variables that may also be contributing to tree form. The one untreated specimen with basal forking (without dominance) at Y7 was previously assessed as having basal forking with dominance since Y1. The western gall rust gall at the fork junction observed in Y7 may account for the more vigorous growth of this competing stem.

Conclusions

Lodgepole pine with mature foliage at time of planting from the seedlot and stock type used in this trial exhibited about half as much basal forking as normal planting stock did within the first year. After the second growing season, the treated specimens had largely outgrown this form problem and attained single, dominant stems. While the untreated specimens exhibited greater basal forking, by Y7 they too had grown out of this stem form, aside from one individual. None of the sample trees that had basal forking at time of planting continued to exhibit that form after seven years (trees were not assessed in years four, five and six). While it appears that pine seedlings planted with nursery-induced mature foliage do not exhibit as much basal forking as regularly grown nursery stock, eventually there is no difference in the incidence of basal forking between the two treatments.