

Incorporating Wood Density in Black Spruce and Jack Pine Breeding Programs in Ontario for Maximum Fiber Yield Production

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Abstract

An operational-level evaluation of growth traits and wood density, including a new selection trait, dry fiber weight, was conducted in a black spruce and a jack pine tree improvement program in northwestern Ontario. Estimates of genetic variation, heritability and age-age correlation of wood density, growth traits (e.g., height, dbh, and volume) and dry fiber weight at different ages in black spruce and jack pine were completed. In addition, the impact of different selection scenarios on genetic gain was estimated. For black spruce a negative but weak genetic correlation between wood density and growth traits was found, resulting in no loss of genetic gain in dry fiber weight production due to selection based on growth traits, such as height and DBH. For jack pine, estimates of genetic correlation between wood density and growth traits were negative and moderately strong, especially between DBH and wood density, indicating that faster growing trees are genetically associated with lower wood density. If the primary objective of a jack pine tree improvement program is to increase wood production for solid wood products then, based on these results, it is recommended that wood density be considered.