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Realized genetic gains observed in a first generation seedling seed orchard for jack pine in New Brunswick, Canada

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Abstract Jack pine seedlots collected from a seedling seed orchard owned by J.D. Irving Limited (JDISSO) were compared in a block-plot genetic gain test on four sites in New Brunswick, Canada. Three seedlots representing different genetic quality of the orchard were included: before rogueing (UNR), following the first rogueing (1STR), and following the second rogueing (2NDR). Two stand seedlots were included to represent an average unimproved commercial seedlot (UC) for comparison. Individual tree growth and stem straightness were recorded up to age 15 (one-third rotation age). For individual tree growth, there was no strong evidence of better performance of the UNR over the UC, but the 1STR and 2NDR grew much faster. For volume per hectare, all the JDISSO seedlots outperformed the UC. The realized gains per hectare were higher than those on individual tree basis, but both increased with rogueing time and decreased with age. Improvement in stem straightness was also significant for all the orchard seedlots. The realized genetic gains were generally comparable to the respective predicted ones from the family tests. Analyses of individual sites indicated that the realized gain varied greatly with site, especially for growth traits. Deploying good seedlots to better sites would result in more volume gains. Overall, results of this study indicate the efficiency of the seed orchard procedure for jack pine.

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