

SURVIVAL AND HEIGHT GROWTH OF RED SPRUCE PROVENANCES  
IN THREE EXPERIMENTS IN ONTARIO

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Twelve provenances of *Picea rubens* Sarg., representing areas from North Carolina to Quebec and the Maritime Provinces, were measured at the age of 13 years in two experiments at Chalk River and one in the University of Toronto Forest at Dorset. Variance and correlation analyses were made. There was a large genotype-environment interaction for survival, and differences among provenances were significant ( $P \leq 0.05$ ) only on a seasonally dry, grassy site subject to spring frost. Survival was highest in northern provenances from Pennsylvania, Quebec, New Brunswick, and Nova Scotia, and lowest in southern provenances from West Virginia and North Carolina. In contrast, the genotype-environment interaction for total height was small, and height differences among provenances were significant ( $P \leq 0.01$ ) at each of the three sites. Northern provenances grew better than southern and some of them were twice as tall as southern provenances at two of the three sites. Correlation analyses demonstrated that survival and height growth were related to latitude and elevation, and particularly to the hybrid index which previously had been determined for all provenances. Therefore, introgressive hybridization between red spruce and black spruce, *Picea mariana* BSP., is one of the most important factors determining the observed variation pattern.

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