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INFLUENCE OF CULTURAL PRACTICES ON THE RELATIONSHIP BETWEEN FROST TOLERANCE AND WATER CONTENT OF CONTAINERIZED BLACK SPRUCE, WHITE SPRUCE AND JACK PINE SEEDLINGS.

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Two experiments were performed to study how cultural practices influenced the relation between water content and frost tolerance of black spruce, white spruce, and jack pine seedlings. In the first experiment, first-year black spruce seedlings were submitted to 14 d mid-august treatments of short days of 8 h (SD) or to natural daylength (ND), during which seedlings were irrigated (IRR) or not (NIRR). In the second experiment, first-year white spruce, black spruce, and jack pine seedlings were fertilized at two levels, normal (NF) or double (DF) during the growing season. In the fall, we followed the evolution of frost tolerance (LT), water content (dry weight/fresh weight ratio), height and diameter growth, bud formation, and mineral concentrations of shoots and roots. In the first experiment, SD treatment alone accelerated the frost acclimation, the drop in water content, and the bud formation. SD+NIRR triggered the decrease and the cessation of height growth. In the second experiment, NF treatment slightly improved frost tolerance in white spruce. Diameter growth (except for white spruce), and bud formation were enhanced by high nitrogen concentration, whereas no significant effect of fertilization could be found on height growth and water content. In both experiments, the relationship between water content and frost tolerance was independant of treatments, and indicated that non tolerant seedlings (LT_{50}>-10°C) had dry weight/fresh weight ratios less than 30% for the three species. Thus, this rapid method of evaluating frost tolerance could be useful to seedling producers in eastern Canada.