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INFLUENCE OF HEAT SUM AND FERTILIZATION ON PICEA MARIANA (MILL.) B.S.P. SEEDLINGS. PART I. GROWTH AND NUTRIENT CONCENTRATIONS.

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The objectives of the experiment was to verify and quantify the influence of heat sum and mineral nutrition on growth and nutrient concentrations in foliage and roots. One year old containerized black spruce seedlings were treated for 94 d in growth chambers under the following conditions on a 12 h:12 h basis: (1) 21:16°C (1551 Growing Degree Days with a 2°C temperature basis, GDD); (2) 19:14°C (1363 GDD) and (3) 17:12°C (1175 GDD). The photoperiod was maintained at 16 h with a photon flux of 250 $\mu\text{mol m}^{-2} \text{s}^{-1}$. Three nutritional regimes (12, 24, 48 mg N/cell) were applied using a 20-20-20 commercial fertilizer. Morphological variables and mineral concentrations were measured every 30 d.

Shoot length increased with time and was particularly sensitive to fertilization. The increase in root biomass was significantly affected by heat sum and fertilization while foliar biomass increase was mostly attributed to fertilization. Nitrogen concentration in foliage decreased with fertilization level and time as a result of a dilution effect by an increasing foliar biomass. Foliar P and K also decreased with time, but their decrease followed different patterns, depending on fertilization and heat sum.