

Evaluating trembling aspen (*Populus tremuloides* Michx.) seedling stock characteristics in response to drought and out-planting on a reclamation site

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Abstract

Trembling aspen (*Populus tremuloides* Michx.) seedlings often display reduced growth, or transplant shock, following out-planting largely due to moisture constraints. This thesis explores the influence of seedling size (root volume), root to stem ratio (RSR) and non-structural carbohydrate (NSC) reserves on the growth performance and physiological status of aspen seedlings under varying levels of drought stress in a controlled growth chamber and following out-planting on a reclamation site. These characteristics have been found to improve out-planting success in aspen and may also increase drought tolerance. In the growth chamber study, stem growth and foliar development was reduced under drought, but the degree growth decreased was greatly influenced by initial seedling characteristics. Small seedlings with high RSR displayed the greatest stem growth and leaf area under drought stress, while large seedlings with low RSR had the poorest shoot growth. Similarly, high initial RSR resulted in the greatest above-ground growth performance in seedlings after out-planting. Root growth was sensitive to environmental factors in the growth chamber and on the reclamation site, but was not influenced by initial characteristics.