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Propagating trembling aspen from root cuttings: impact of storage length and phenological period of root donor plants

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Abstract Two experiments were conducted to examine the effects of growing conditions, duration of cold storage, and distinct phenological periods of root donor plants on the propagation success of aspen rootlings. Root donor plants were produced either under greenhouse or open grown conditions. Root cuttings were periodically collected from donor plants that had been stored for various lengths of time in cold storage (up to 180 days), or that were stored dormant in cold storage (up to 150 days) and then grown for another full growing season. Longer storage of donor plants produced only slightly smaller rootlings and resulted in slightly lower establishment success. Rootling establishment success was severely depressed (down to 18% establishment success) when cuttings were collected during the active growth period of donor plants. Carbohydrate reserves did not influence rootling establishment success but did affect root and shoot growth performance. It appears that other factors, such as hormone levels, may be more important in rootling establishment success.

Keywords *Populus tremuloides* · Clonal propagation · Cold storage · Phenological period · Root cutting · Carbohydrate reserves · Vegetative regeneration

Introduction

Aspen (*Populus tremuloides* Michx.) is an early successional, fast growing clonal species that has a broad distribution in North America, and as such is adapted to a wide range of environmental and biotic stresses (DeByle and Winokur 1985). Forest managers have become interested in the short-rotation plantation culture of aspen due to its high fiber quality and productivity. In addition, native aspen is more likely to be accepted as a plantation species by local environmental groups and regulators of forestry activities than exotic species

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