CENTRE FOR ENHANCED FOREST MANAGEMENT

ADVANCES IN FORESTRY RESEARCH

DEPARTMENT OF RENEWABLE RESOURCES

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Rootling propagation of aspen: impact of storage and donor plant condition

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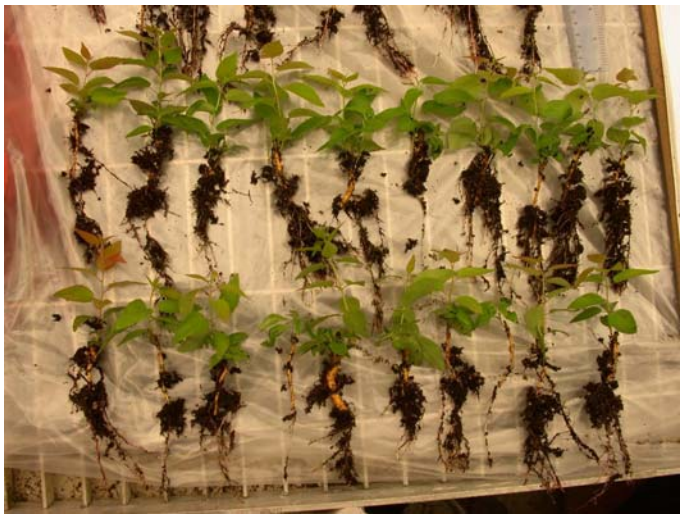
Because of aspen's high fiber quality and productivity, forest managers have become interested in it as a species for short-rotation plantation culture. Although production from seeds is more economical, it is particularly desirable to propagate aspen from selected superior-performing clones.. Deployment of superior genetic material, however, has been slow because of difficulties in the propagation of these selected clones. Small segments of roots (rootlings) offer promise as a means to vegetatively reproduce these clones but propagation success using rootlings has been inconsistent. There is limited information on how the rearing conditions of root donor plants affect the establishment success of rootlings. In several studies we examined the influence of different rearing protocols for root donor plants on the successful establishment of rootlings for clonal propagation; in particular the effects of different lengths of cold storage, and of the phenological stage of donor plants were studied.

Methods: Root donor plants were produced using two rearing protocols either under greenhouse or open grown conditions. Donor plants were periodically harvested from stock that had been in cold storage for 0 to 180 days, or that was stored dormant in cold storage and then grown outside for another full growing season. Root cuttings were collected from these harvested donor plants and tested for their establishment success and growth.

Results: Longer storage of donor plants did not affect establishment success of rootlings but produced slightly smaller rootlings. Rootling establishment success was severely depressed (82% reduction) when cuttings were collected during the active growth period of the donor plants. Higher root carbohydrate reserves of donors and larger diameters of roots from donors did not influence establishment success of rootlings but did increase the root and shoot growth of the establishing rootlings.



Implications: Donor plants that were produced under outside conditions had better-performing rootlings.

Donor root systems can be stored frozen (-3°C) for up to 180 days with only a small negative effect on the establishment success of rootlings.

High levels of root carbohydrates are beneficial to the growth of rootlings.

Other unknown factors such as hormone levels at the time of collection appear to contribute to the establishment success of rootlings.

Rough handling of donor root systems during harvest of roots might significantly influence rootling performance but this was not tested in this study

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Further Information:

Snedden, J., Landhäusser, S.M. and Lieffers, V.J. 2009. Propagating trembling aspen from root cuttings: impact of storage length and phenological period of root donor plants. New For. (in press).

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