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Production of Even-Sized Hybrid Aspen Plants from Root Cuttings: Transplanting, Height Grading and Planting Dates

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Abstract

At present in Finnish nurseries, hybrid aspens are reproduced from root cuttings by transplanting the sprouted cuttings to the large plugs (trays with 380–400 cm³ cell volume). Sprouting time of cuttings varies within and between clones a lot. This causes problems in the production of aspen plants: the large height variation within a plant batch in nurseries and the high proportion of short plants (with minimum height of 40 cm). To produce more even-sized batches, plants were graded into height categories twice: first when transplanted them into small plugs and then into larger plugs. This procedure reduced the variation in the final height of graded batches in comparison with the batches transplanted directly into the large-volume containers. The variation in the height of hybrid aspens did not exceed the variation in a reference silver birch batch, however. The use of short plants for plug-to-plug transplanting changed the growth rhythm of the plants, resulting in later cessation of the height growth. One solution to the problems is to plant hybrid aspens in summer at the time of plug-to-plug transplanting. The height growth of these plants increased and the shoot tip dieback inhibited in comparison with plants that were grown for a longer period in the nursery, frozen-stored and then planted in the spring or early summer of the following year.

Keywords: grading, height, hybrid aspen, planting, *Populus*, root cutting

Introduction

In the course of the last decade, the paper industry has shown an interest in using hybrid aspens (*Populus tremula* L. × *Populus tremuloides* Michx.) for paper manufacturing. Hybrid aspens are produced both from seeds and vegetatively, but vegetative reproduction is preferred since e.g. clonal plants remain unchanged from generation to generation. Hybrid aspens are produced vegetatively by micropropagation and shoot cuttings, but the most efficient method is to raise the new generation from root cuttings.

In Finland, silver birch (*Betula pendula* Roth) has been produced in containers for the last 30 years. Nursery growing practices for silver birch have improved greatly over the years and it is now possible to raise seedlings that are quite uniform in height. The situation is less advanced for hybrid aspen. It is important that similar improvements to those made with birch should be achieved with aspen.

To reproduce hybrid aspens by means of root cuttings, Stenvall *et al.* (2004) described the operational practice used in Finnish nurseries at present. First, 2–10 mm thick roots of 2-year-old stock plants

are cut into pieces 3–4 cm in length. The cuttings are then planted horizontally into flats or plastic containers (e.g. trays with 110–115 cm³ cell volume) filled with a peat-sand mixture. The root-cutting flats or containers are kept in a heated greenhouse with regular irrigation until the cuttings have sprouted. When sprouted cuttings are about 1–10 cm in height, they are transplanted into larger-volume plastic containers (e.g. trays with 380–400 cm³ cell volume), in which the plants are raised until the end of the growing-season (about 4 months). Both between and within the clones there is a large variation in the sprouting time, *i.e.* the time needed to develop shoots from cuttings (Stenvall *et al.* 2004). If all of the sprouted cuttings are transplanted at the same time into the final growing containers, the transplants will have varying sizes, a factor which frequently causes problems for the growing of plants in nurseries. The varying sizes of the plant material within a tray and between trays make proper irrigation and fertilization difficult. Plants have to be irrigated and fertilized based on the needs of the tallest plants, with the result that shorter ones receive an excessive amount of water or nutrients, which can disturb their develop-