

MICROPOPAGATED SILVER BIRCH (*BETULA PENDULA* ROTH) IN THE FIELD – PERFORMANCE AND CLONAL DIFFERENCES

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In Finland, methods for micropropagation of birch were developed in the 1980's. As a result, both juvenile and mature trees can be used as starting material. The practical application of micropropagation in forestry started in 1987 when a joint project to propagate birch on a large scale was set up by three companies. The first clonal propagated silver birch plantlets were sold to forest owners in the spring of 1989. At the beginning of the 1990's nearly one million clonal propagated birches were produced for forest cultivation. However, production has since finished as it was considered unprofitable. Nevertheless, micropropagation of birch remains a valuable tool in research and tree breeding. Different types of experiments in controlled environments have provided much information concerning individual birch clones and variation among clones in, for example, palatability to herbivores, susceptibility to fungal diseases and sensitivity to air pollution. There are, however, very few results published on the performance of micropropagated birch in field conditions as well as about the importance of clonal variation in practical forest cultivations on highly variable forest sites. **The aim of this study** was to compare micropropagated plants and seedlings of silver birch and to study the clonal differences in field conditions in forest cultivation areas.

The material of the study consists of altogether 10 field trials, which were established in 1989 and 1992 in co-operation with Enso Gutzeit Company, and are situated in Eastern Finland. A randomized block design was used in all trials. A total of 11 clones and 10 differ-

ent lots of seedlings were included in the study. Both the clones and seedlots were of southern Finnish origin. The clones had been selected for large-scale propagation programme within progenies from open pollination or controlled crossings of plus trees, within progenies from seed orchards and among phenotypically selected plus trees. The seedling lots were families related to the clones or corresponding geographical origins. The trials were measured in 1993 and 1996 at the age of six or seven years. The survival and height of the plants were measured and damages caused by different biotic agents (moose, hare, vole, stem lesions) were observed. An analysis of variance was used in order to test for the differences. Bonferroni corrected pairwise comparisons were made in order to detect significant differences between single clones and seedlots.

Differences in survival and height between the micropropagated and seed-born plants were, in most cases, statistically non-significant. In some cases, however, there were large and significant differences in both survival and height between single clones, some clones performing clearly worse than the others. The genetic gain from clonal selection in general was low.

The selection of clones for micropropagation should be done very carefully and with tight selection criteria. Despite careful selection there is still a possibility of occurrence of clones with unexpectedly poor performance. It is concluded that birch clones should be tested in field conditions before wide scale commercial micropropagation and practical forest cultivation takes place.