

Working Papers of the Finnish Forest Research Institute 114: 53–54

Using buds from mature trees of *Pinus sylvestris* for budding young seedlings

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A budding method study for multiplying selected mature Scots pine trees

Young Scots pine (*Pinus sylvestris*) seedlings were budded by using buds from mature trees of the same species or from Arolla pine (*Pinus cembra*). The first pilot experiments were carried out in 1990 at the Michigan State University (USA) and later similar plant material was produced for environmental studies at the University of Oulu (Finland) and for forestry related studies for Metla (Finnish Forest Research Institute) and the Department of Applied biology of the University of Helsinki (Finland).

Material

Young seedlings (4 - 6 months) were used as rootstock. They were treated and grown equally to seedlings for forestry purposes. Different seed sources were used according to the availability of seedlings from forest tree nurseries or availability of seedlings from other Scots pine studies in Haapastensyrjä breeding station. Buds were collected from different Scots pine trees of more than 60 years of age in the spring or early summer before they started to sprout. All buds of Arolla pine were collected from one, more than 20 years old tree. All of the stock trees were healthy and their form was good, however, living in open places they had also branches growing close to the ground. All buds were collected from the lowest branches.

Methods

Two different methods were used: top budding (fig. 1) and side budding (fig. 2) (similar to top grafting and side grafting). Rootstock seedlings were approximately 10 cm high. In top budding method needles were removed from top of the seedlings and in side budding tops were saved but needles were removed below it to allow side cut and binding. Buds were collected with five centimeters of branch. The collected buds were used either directly or stored in cold room in plastic bags. Buds were prepared by using scalpels. All the attached wood was removed and the buds were cut to V-shape to fit in split cut of the rootstock seedlings.

The buds were bound and covered with Para-film. The budded seedlings were either grown outside protected from direct sunlight or in a growth chamber.



Fig. 1. A bud from a mature Scots pine tree has been budded into a young seedling of Scots pine using top budding method. (Photo: Tapani Haapala)



Fig. 2. Side budding method is used to combine Scots pine seedling with a bud from a mature Scots pine. It is time to remove original top of the seedling to allow the new shoot to develop into a new top of the plant. (Photo: Tapani Haapala)

Discussion

Altogether more than two hundred budded pine seedlings have been produced, most of which are Scots pine and about 30 Arolla pine. Budding is a very efficient and fast method which requires very little space. When using potted seedlings, more than 500 seedlings can be grown in a space of 1 m². In some experiments almost all of the buds started to grow. In one experiment, when bud material was not stored properly, none of the buds grew well.

No significant differences were found between the methods. However, top budding is a much easier and a slightly faster method than side budding. Most of the seedlings were used for environmental studies. However, some of the oldest trees are growing on research fields of the University of Oulu and are now over ten years old. The youngest ones are less than one year old and they are to be used for further studies of the method. The Scots pine seedlings when budded with Arolla pine buds grew as well as when budded with Scots pine buds.