

## From planting to 26 years of age — actual growth and estimated volume scenarios for spruces and pines

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**Abstract.** The objective of this study was to compare the survival and volume of conifer stands at 26 years of age with their status at planting. Survival, growth and damage were studied in eight clear felled stands regenerated in 1972. Five of the areas were planted with Norway spruce (*Picea abies*(L.) Karst.) and three with Scots pine (*Pinus sylvestris* L.). The plantings were examined in 1972 and 1974. In 1974, the number of living undamaged planted seedlings was low (10-15%). However, the number of undamaged seedlings was supplemented by naturally regenerated conifer and birch seedlings. The total number of undamaged seedling in 1974 was equivalent to 20-30% of the number of seedlings planted. In 1998, the main species in three stands had changed from Norway spruce to Scots pine, and in one stand from Norway spruce to birches. Actual volume in 1998 for the stands was compared to stand volume generate according to live scenarios based on recommended and actual seedling number in 1972 and 1974. The actual volume was 64% of that expected if the recommended number of trees had been planted. Naturally regenerated Scots pine and Norway spruce increased stand density in 1998. The actual volume was 37% higher than the average volume in the surrounding county. On average, 36% of the trees were damaged. More than 50% of the total damage was caused by moose (*Alces alces* L.). For Scots pine, moose or other browsing animals damaged 30% of the trees. The results of this study indicate that the 1998 volume was higher than expected, considering the low number of undamaged seedlings in 1974. This was mainly due to the large amount of naturally regenerated plants. In addition, the results indicate that the volume could have been higher if the initial conditions had been better. Despite the low number of undamaged seedlings in 1974, seven of the eight studied stands produced a higher volume than the average stand for the region. In practise, high numbers of seedlings should be planted on scarified areas. In most cases there will be a supply of naturally regenerated seedlings.

### Introduction

During the period 1950-1980, there was intense debate in Sweden concerning regeneration methods. Changes in soil preparation methods, from manual scarification to mechanised methods started in the 1950s. In the beginning of the 1970s, approximately 50% of the regenerated area was mechanically scarified (Anonymous 2001). The former Swedish forest law dated 1948 and the common forest practice in 1970s was focused on Scots pine (*Pinus sylvestris* L.) and Norway spruce (*Picea abies* (L.) Karst.) as the main crop species. Birches were used as a supplement, when a conifer seedling was missing (Anonymous 1988).

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