

Report of the master thesis "Seedling quality and field establishment of two-year-old Norway spruce (*Picea abies*) seedlings"

Summary of the project and results

Regeneration is the first and most important step towards sustainable use of the forest resources. Norway spruce (*Picea abies*) covers about half of the standing timber in the Norwegian forest. The most common regeneration method after clearcutting of Norway spruce is planting. In 2016, 34.9 million seedlings were planted in Norway. High quality seedlings are important for successful regeneration after clear cutting.

The aim of the present study was to identify the relationship between seedling quality and establishment of Norway spruce seedlings. In the experiment, two-year-old Norway spruce seedlings from the same genetic origin, cultivated in six different Norwegian nurseries, were planted the summer of 2016. All seedlings groups were quality tested before planting, by measuring root growth capacity and nutrient status.

At the study site in Lardal municipality 505 seedlings were planted, while 475 seedlings were planted at the study site in Larvik municipality. The height, root collar diameter and vitality was registered in May, July and September 2016. Root growth capacity had a significant effect on relative growth, and seedlings with a high nitrogen content (2.0 – 2.2 %) showed in general better growth than those with low nitrogen content (1.3 – 1.6 %). Two seedling groups were infected by pathogens, which adversely affected growth.

Evaluation of the project

The project showed that control and testing of sufficient root growth and nutrient level, as well as good nursery hygiene, are important for maintaining an optimal seedling quality of Norway spruce. This is an important finding for future production of Norway spruce seedlings and additional research in this field is important. For further research it would be interesting to compare the seedlings later in the forest rotation, not just the first growing season. It may also be wise to compare other seedlings from the nurseries in the study, to see if the seedling quality always is the same.

I have learned a lot from this process and are very grateful for the financial support from NordGen.

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Pictures from the test of root growth capacity

