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## Effect of planting stocktype and cultivation treatment on the establishment of Norway spruce on cutaway peatlands

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**Abstract** In order to determine the effect of stocktype and cultivation treatment on the field performance (survival and growth) and physiological status of *Picea abies* in cutaway peatlands, small bare-root, large bare-root and containerised seedlings were planted in a deep ploughed and a control site. Survival after 2 years was good across all treatment (>90%) except for the large bare-root seedlings growing in the control site (84%). For all the morphological characteristics assessed in this study, there was no significant interaction between stocktype and cultivation treatment indicating that the growth response to site cultivation was not stocktype dependent. After two growing seasons, all Norway spruce seedlings performed better in the deep ploughed site and displayed also better nutritional and physiological status. Regardless of cultivation treatment, mean height, diameter and volume increment were significantly smaller for the large bare-root seedlings while the small bare-root seedlings displayed the greatest growth rates. In order to promote early height growth in container and small bare-root stock, large diameter is important. Other initial characteristics such as foliar nitrogen content may also have a strong influence on first year field performance. The physiological status of the seedlings during the first year after outplanting was assessed using chlorophyll fluorescence (CF) measurements. CF measurements detected a higher level of stress for the large-bare root stock (low Fv/Fm). On the other hand, small bare-root stock displayed highest maximum potential photochemical activity which corresponded to greatest growth rates. Container seedlings demonstrated higher capacity for photosynthetic electron transport during the first five months after planting suggesting that they recovered from planting stress quicker and optimised better light interception and utilization than bare-root stock. It can be concluded that intensive management systems including deployment of best-adapted stocktype and site cultivation can be used to enhance early height growth of Norway spruce on cutaway peatlands.

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