From Forest Nursery Notes, Winter 2009

114. © A comparison of mounding and inverting to establish Norway spruce on podzolic soils in Sweden. Hallsby, G. and Orlander, G. Forestry 77(2). 2004.

A comparison of mounding and inverting to establish Norway spruce on podzolic soils in Sweden

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Summary

The study comprised 12 semi-practical field trials on 1–2-year-old clearcuts distributed from 57 to 65° N on podzolic soils. The objective of the study was to evaluate if inverting site preparation should be recommended as an alternative to mounding when both regeneration results and environmental effects were considered. Five growing seasons after planting with Norway spruce (*Picea abies* L Karst.) stock, improved seedling survival was found following inverting (78 per cent) compared with mounding (65 per cent) and unscarified controls (57 per cent). Height increment following inverting (46 cm) and mounding (42 cm) was significantly higher than for unscarified controls (32 cm). When the target number of site preparation spots was 2500 per hectare, the rate of altered ground contour on mounding plots was 40 per cent, whereas a lower rate of altered ground contour was found after inverting (15 per cent). However, comparing total surface disturbance, the difference between mounding and inverting was negligible. Improved plantation establishment following inverting can be expected on a majority of the normal plantation sites in Sweden and elsewhere in boreal forests where conditions are similar. Inverting needs to be improved technically before the potential benefits of reduced soil disturbance will be attained.

Introduction

Mechanical site preparation is known to facilitate the establishment of seedlings planted on boreal clearcut sites (Kinnunen, 1989; Hämäläinen, 1990; Sutton, 1993, Strömberg *et al.*, 2001). Over the last 40 years ~70 per cent of the regeneration area in Sweden has been treated with mechanical site preparation (Anon., 2001) and the dominant methods have been disc trenching and patch scarification/mounding (Strömberg *et al.*, 2001).

On the mesic or moist soils that are found on ~75 per cent of Swedish forest sites (cf. Anon., 2002) high planting positions in a mineral soil covered humus berm or mound are often recommended (Anon., 1987). This prescription is motivated by improved nutrient supply, favourable soil temperature during the growing period, and better soil structure in the root zone compared with planting in mineral soil patches, pits and furrows (Örlander *et al.*, 1990).

On the other hand, elevated planting positions can cause post-planting water deficiency during