

We are unable to supply this entire article because the publisher requires payment of a copyright fee. You may be able to obtain a copy from your local library, or from various commercial document delivery services.

From Forest Nursery Notes, Summer 2011

87. © Establishment of planted Norway spruce and Scots pine seedlings: effects of light environment, fertilisation, and orientation and distance with respect to shelter trees. Erefur, C., Bergsten, U., Lundmark, T., and de Chantal, M. *New Forests* 41:263-276. 2011.

Establishment of planted Norway spruce and Scots pine seedlings: effects of light environment, fertilisation, and orientation and distance with respect to shelter trees

Charlotta Erefur · Urban Bergsten · Tomas Lundmark ·
Michelle de Chantal

Received: 3 February 2010 / Accepted: 4 October 2010 / Published online: 17 October 2010
© Springer Science+Business Media B.V. 2010

Abstract The effects of stand stem density (SSD), orientation and distance with respect to shelter trees, and fertilisation on planted *Pinus sylvestris* and *Picea abies* seedlings were examined at two sites, one with a southerly aspect (64°14'N, 19°46'E, 225 m a.s.l.) and one with a northerly aspect (64°09'N, 19°36'E, 274 m a.s.l.) in boreal forests in Sweden. The damage and growth were compared at these sites in stands with three SSD's and different light regimes: uncut forest (SSD 500, ~500 stems/ha), shelterwood (SSD 150, ~150 stems/ha), and clear-cut (SSD, 0 stems). Half of the seedlings were irrigated with fertiliser (10 mM N). Fertilisation and SSD affected the height growth of *P. abies*, since fertilised seedlings in SSD 0 grew the most (22.2 cm). Fertilised seedlings in SSD 0 also generally had the greatest biomass (twigs, leading shoot and needles), even *P. sylvestris* seedlings on the North slope, where fertilised and unfertilised pine seedlings in SSD 0 had 62.6 and 39.7 g biomass, respectively. *P. sylvestris* increased about 150% in dry mass of leading shoot of the increase of *P. abies* with equal height growth, when comparing SSD 150 and SSD 0. The results indicate that the general conditions of the stand have stronger effects on the growth of planted seedlings than their orientation and distance with respect to the nearest tree and that light requirements cannot be moderated by fertilisation. We postulate that a system in which forest gaps are formed under a shelterwood could provide a way to regenerate forests that exploits the beneficial features of both shelter trees and clear-cuts.

Keywords Biomass · Fertilisation · Height growth · Light · Manual planting · Shelterwood

C. Erefur (✉) · U. Bergsten · T. Lundmark
SLU Forest Ecology and Management & Vindeln Experimental Forests, 92291 Vindeln, Sweden
e-mail: Charlotta.Erefur@esf.slu.se

M. de Chantal
Department of Forest Ecology, University of Helsinki, P.O. Box 27, Helsinki 00014, Finland