

## **ESTIMATION OF SITE INDEX IN OLD, SEMI-NATURAL STANDS OF NORWAY SPRUCE AT HIGH ALTITUDE**

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Site-index in Norway is given by the dominant height of an even aged stand at reference age 40 years at breast height (1.3 m above ground). The site-index curves which are standard for Norway spruce (*Picea abies* L. Karst.) [2], are suspected to underestimate the site-index in old, semi-natural spruce forests at high altitude characterized by naturally regenerated, uneven-aged stands with low density. The aim of this study was to estimate the accuracy of site-index estimates in such forests and suggest some age corrections by comparing to measures in adjacent cultivated spruce stands.

Along stand boundaries caused by either property boundaries or strip harvestings, we established 17 pairs of field plots in the municipalities of Sør Fron, Ringebu and Øyer. Each pair consisted of one plot in the old, semi-natural stand and one in the adjacent cultivated stand, aiming at least possible difference regarding to altitude, vegetation, topography and soil.

Mean age at breast height of dominant trees varied from 106 to 182 years at semi-natural plots and from 23 to 42 years at the cultivated plots.

The site-index curves of Tveite [2] underestimated the site-index by 4.2 m on average. Site-index estimated by site properties resulted in underestimations of 4.5 m and 3.9 m on average for the equations G10 and G4 respectively [1]. The presented models for age corrections showed that the underestimation increased by age and that dominant height only increased slightly by age. The results also suggest that the deviation of the height-age relation at the semi-natural plots from the site-index curves relates to wind exposure and soil depth. We argue that the underestimation of site index in semi-natural stands is due to a slower and less persevering height growth compared to cultivated stands at similar sites due to differences in density and genetic origin. We suggest applying the presented model 3-alder, which is a linear function of age, for age correction in old, semi-natural spruce stands 50 to 300 m below forest line in Eastern Norway.

### References

- 1 Nilsen, P. og Larsson, J. Y. 1992. Site Index estimation from vegetation type and site properties. *Research paper of Skogforsk* 92 (22): 1-43.
- 2 Tveite, B. 1977. Site-index curves for Norway spruce (in Norwegian with English summary). *Reports of The Norwegian Forest Research Institute* 33 (1): 1-84.