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Biomass of understorey vegetation according to stand age in boreal coniferous forests

Muukkonen, P. & Mäkipää, R.

e-mail: petteri.muukkonen@metla.fi, raisa.makipaa@metla.fi

Finnish Forest Research Institute, P.O. Box 18, FI-01301 Vantaa, Finland

INTRODUCTION

In the early phases of succession the proportion of the total biomass made up of understorey vegetation may be considerable. The understorey vegetation froms a notable proportion of the annual litter production and plays a significant role in nutrient cycling.

METHODS

The relationship between above-ground biomass and percentage cover of plant species was modelled with data from ten subjectively selected experimental sites (Fig. 1). Developed biomass equations were applied to vegetation data collected from a systematic network of the permanent sample plots established by the National Forest Inventory in 1985–86. The variation of the above-ground biomass of understorey vegetation by age and the by basal area of the stand was modelled using simple regression equations.

RESULTS & DISCUSSION

In the spruce stands, herbs and grasses had the largest amount of biomass in the early stages of succession (Fig. 2). For the bryophyte and dwarf shrub populations several years are needed to grow to full size. During stand development, the biomass of dwarf shrubs was seen to decrease after the pioneer stage of succession and then to increase. After this, the biomass saturated during the process of maturing.

In the pine-dominated stands, the above-ground biomass of bryophytes and dwarf shrubs was found to increase continuously during stand development and to saturate at in older ages (Fig. 3). Herbs and grasses were found to produce the largest amount of biomass during early succession, after which it decreased. The above-ground biomass of lichens was almost at the same level during stand development, being the lowest at stand ages from 30 to 90 years.

Our equations for predicting understorey biomass are applicable to boreal coniferous forests of up to 160 years old. An upper limit is given since the number of older stands in our data was small.

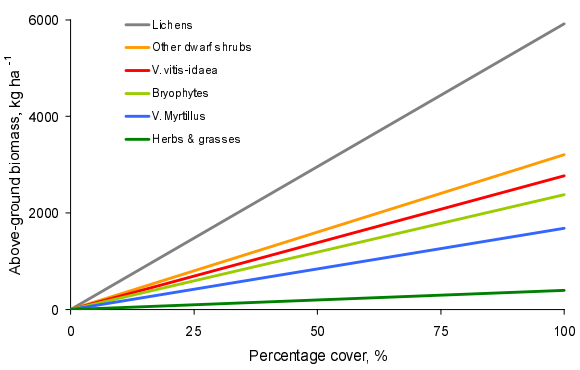

Figure 1. Above-ground biomass of plant species and group of species in boreal coniferous forests predicted as a function of the percentage cover of species.

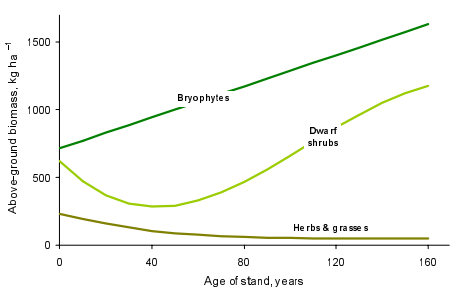

Figure 2. Group-wise above-ground biomass of understorey vegetation in the Norway spruce stands .

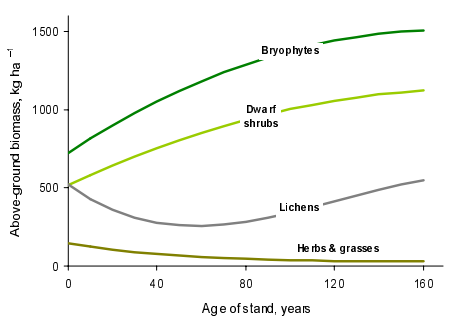

Figure 3. Group-wise above-ground biomass of understorey vegetation in the Scots pine stands .

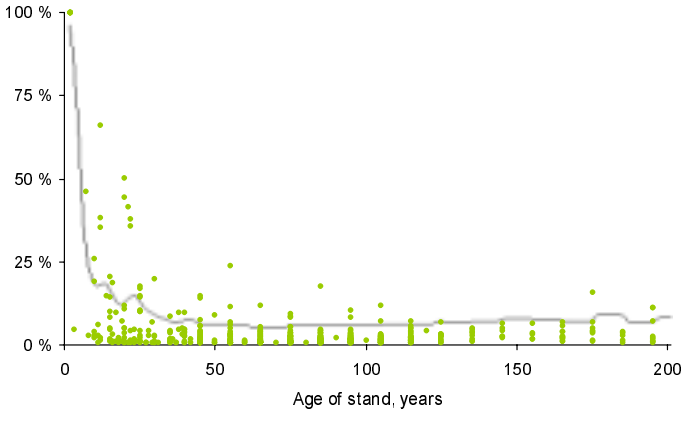

Figure 4. The proportion of the understorey vegetation of all vegetation during stand development in the Norway spruce forests. The biomass of all vegetation includes above-ground parts of trees and understorey vegetation.

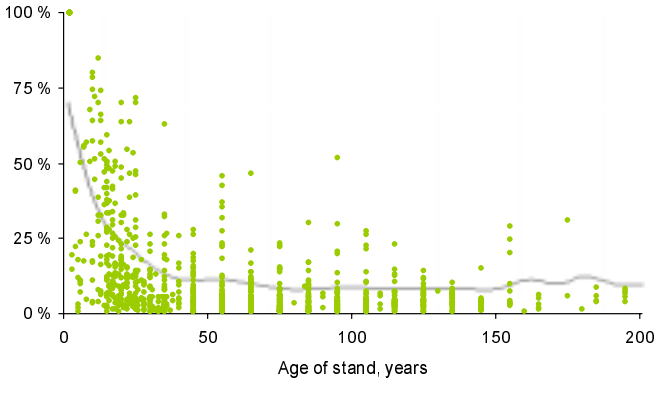

Figure 5.The proportion of the understorey vegetation of all vegetation during stand development in the Scots pine forests. The biomass of all vegetation includes above-ground parts of trees and understorey vegetation.

Muukkonen, P. & R. Mäkipää. Biomass models of understorey vegetation according to stand age in boreal coniferous forests. Submitted manuscript.