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Eva Ritter[1], Lars Vesterdal[2] and Per Gundersen[3]

[1]Agricultural University of Iceland, Hvanneyri, 311 Borgarnes, Iceland; eva@lbhi.is.
[2]Forest & Landscape, Hørsholm Kongevej 11, 2970 Hørsholm, Denmark; lv@kvl.dk. [3] Forest & Landscape, Hørsholm Kongevej 11, 2970 Hørsholm, Danmark; pgu@kvl.dk.

Abstract

In Western Europe, more and more arable soils are set aside for afforestation. The effect on soil properties can be expected to differ compared to afforestation of marginal soils. However, most studies have been carried out on nutrient-poor soils. The objectives of this study were to investigate changes in soil properties of formerly intensively managed soils. The study was carried out as a chronosequence approach (time for space substitution) to investigate changes during the first 3 decades after afforestation. Seven oak (*Quercus robur* L.) and seven Norway spruce (*Picea abies* (Karst.) L.) stands were selected in the afforestation area Vestskoven, 15 km west of Copenhagen, Denmark. Stand ages ranged from 1 to 30 years. Additionally, a permanent pasture (21 years) located in the study area was included in the study. Soil had developed from calcareous till material and the texture was sandy loam.

This study is also described in the abstract "Changes in soil carbon and nitrogen after afforestation of arable soils with oak (*Quercus robur*) and Norway spruce (*Picea abies*)" in the proceedings of this conference.

The first poster presented results from the mineral soil. It was concluded that during the first three decades covered by the chronosequence study, afforestation changed soil properties derived from intensive cultivation. However, changes in soil properties were generally slow, and at the end of the study period most of the parameters investigated were still closer to conditions found in arable soils than in old-growth forest soils. Furthermore, site conditions inherited from parent material and the former land use seemed to determine the direction and range of changes more than tree species. There was no effect of tree species on C and N storage in the mineral soil. Soil C/N ratios tended to be greater under spruce than under oak, but the difference was not significant.

The second poster presented results from the forest floor. Coherent forest floors had accumulated after ca. 8 years. Obviously, the amount and quality of litter fall had an effect on forest floor properties. There was a higher N storage under spruce than under oak in spite of lower N concentrations in the litter material. This could be explained by the higher accumulation rates of litter material under spruce. Thus, in contrast to results of the mineral soil, the choice of tree species was important, mostly in terms of accumulation rates, N storage, and C/N ratios of the forest floor.

Reference

Ritter E, Vesterdal L, and Gundersen P 2003. Changes in soil properties after afforestation of former intensively managed soils with oak and Norway spruce. *Plant Soil* 249, 319–330

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