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Table of Contents

IN PRESS
SWR 2015
SWR 2014
SWR 2013
SWR 2012
SWR 2011
SWR 2010
SWR 2009
SWR 2008
SWR 2007
SWR 2006
SWR Home

Editorial Board

For Authors

- Authors Declaration
- Instruction to Authors
- Guide for Authors
- Copyright Statement
- Fees
- Submission

For Reviewers

- Guide for Reviewers
- Reviewers Login

Subscription

Soil and Water Research

Study of podzolization process under different vegetation cover in the Jizerské hory Mts. region.

Nikodem A., Pavlů L., Kodešová R., Borůvka L, Drábek O.:

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[fulltext]

The development of Podzols is conditioned by many factors. One of them is vegetation cover. The aim of this study was to examine in detail special chemical properties, micromorphological features and water retention ability of Podzols under two different vegetation covers (spruce forest and grass). The study was performed in the Jizerské hory Mts., which were strongly influenced by atmospheric acidificant depositions in the past. The study was focused on the assessment of a 30-year grass amelioration impact on soils on the former forest land. It was shown that larger differences in the studied chemical properties (pH_{KCl}, pH_{H2O}, eCEC, content of Ca, Mg, Al_{KCl}, Al_{H2O}, Al(X)1+, Al(Y)2+ and Al3+ species) were in the surface organic horizons and decreased with depth. Podzolization intensity was higher under the spruce forest than under the grass cover. Higher amounts of potentially dangerous Al forms were detected in the soils under the spruce forest than under the grass. Grass expansion on clear-cut areas (former

forest) as a natural amelioration step results in the particular restoration of soil conditions. The micromorphological features studied on the soil thin sections using the optical microscope and soil water retention curves measured on the undisturbed 100 cm3 soil samples showed a significant influence of the organic matter presence on the soil structure and retention ability of H and Bhs horizons. Soil under the grass cover had denser structure (e.g. greater fraction of small capillary pores) and higher retention ability than soil under the spruce forest. Very similar retention curves were measured in the Ep and Bs horizons under both vegetation covers. Micromorphological features studied on the thin soil sections clearly documented a podzolization mechanism (e.g. organic material transport and its accumulation, weathering process and Fe oxidation and mobilization).

Keywords:

grass; micromorphological features; podzolization process; soil water retention; spruce forest

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