

The effect of the felling forest management method on contents of micronutrients (Zn, Mn, Cu) in sandy soils of fresh coniferous forest in the Puszcza Notecka Forest

Wpływ zrębowego sposobu zagospodarowania lasu na zawartość mikroelementów (Zn, Mn, Cu) w piaszczystych glebach boru świeżego Puszczy Noteckiej

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The felling forest management method and the resulting need for mechanical tillage operations in preparation for regeneration in felling sites always cause considerable changes in the contents and soil profile distribution both in the case of soil organic matter and many micronutrients essential for growth and development of forest plants.

Assessment of the current resources of zinc, manganese and copper in sandy forest soils of 40-year old pine stands may be an important diagnostic tool used when selecting appropriate silvicultural measures applied in low-producing or degraded coniferous forest sites.

The aim of this study was to determine the effect of mechanical tillage operations using a crosswise disc harrow or in furrows ploughed with a forest lister plough on the contents and profile variation in zinc, manganese and copper levels in forest ectohumus, as well as mineral horizons of rusty podzol soils and podzols formed from slightly loamy sands, lying in shallow layers on loose, deep sands.

In situ soil analyses were performed in 2010 on permanent experimental plots established in 1971 in three forest divisions of the Puszcza Notecka Forest: Międzychód, Oborniki and Wronki. Presented results are a fragment of interdisciplinary, long-term studies conducted within the framework of a research task entitled "The effect of elimination of felling residue and tillage method on the status of organic matter, health and silvicultural quality of plantations and carbon fixing in soil" (no. OR-2717/9/08), financed by the Directorate General of the State Forests in Warszawa.

Soil contents of micronutrients soluble in 1M HCl were assayed by atomic absorption spectrometry (ASA) in accordance with methods applied in agrochemical and forestry experimentation.

Analysis of dependencies between individual tillage methods, soil resources of organic matter and thickness in 40-year pine stands and the occurrence of investigated micronutrients showed that their contents and profile distribution in sandy soils of fresh coniferous forests were to the greatest extent modified by mechanical tillage in preparation for regeneration of felling sites using Scots pine.