



Diversity of the microbial activity in the varied soils of different forest habitat type of the Pieniny National Park

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Research on natural or slightly transformed soils provides valuable information on the functioning of the environment and the relationship between soil, edaphon and vegetation. Soil microbiological activity is used as an indicator of the state of soil environment and for monitoring changes occurring in the soil. The aim of research was to investigate the relation between habitat, soil type and soil microbial activity.

The study area was located in the Pieniny National Park (southern Poland) in varied forest habitat type (Association or SubAll.: D-F (*Dentario glandulosae-Fagetum*), P-A (*Phyllitido-Aceretum*), C-F (*Cephalanthero-Fagenion*)) and different soil types C-L (Calcaric Leptosols); P (Rendzic Phaeozems); C-C (Calcaric Cambisols); E-C (Eutric Cambisols); EnE-C (Endocalcaric Cambisols)). From the park area, seventy points were selected to investigate soil microbial properties such as content of microbial biomass carbon (MBC) and dehydrogenases activity (DHA) in 0-10 cm layers. Additionally, dissolved organic carbon (DOC) was measured. Basic soil properties such as texture, organic carbon content (TOC), total nitrogen (TN), pH, cation exchange capacity (CEC), hydrolytic acidity (Hh) and available P, K and Mg were included in previous research.

Investigated soils were characterized by different soil microbial activity depending on soil type and forest habitat. The content of MBC ranged from 1009 $\mu\text{g g}^{-1}$ in P-A_E-C to 5422 $\mu\text{g g}^{-1}$ in P-A_P. The content of MBC in P soil type differed from that of E-C and EnE-C, and the C-L soil type was different from E-C and EnE-C. The content of MBC was positively correlated with pH, TOC, CEC and negatively with Hh and available food (e.g., DOC to TOC ratio). Whereas the DHA was varied from 2.5 $\mu\text{g TPF g}^{-1}\text{soil 1 h}^{-1}$ in D-F_EnE_C to 15.6 $\mu\text{g TPF g}^{-1}\text{soil 1 h}^{-1}$ in C-F_P, DHA in D-F habitat was significantly different than in C-F; the differences between those habitats (D-F and C-F) and P-A were not relevant. DHA was positively correlated with pH, TN and CEC and negatively with Hh.

The soil microbial properties were more closely related to soil type than forest habitat type. The soils were characterized by varied soil microbial activity, which was correlated mainly with soil sorption properties.

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