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Soil diversity under semi-natural grassland within the forest-steppe zone – examples from Transylvania (Romania)

Abstract

In the Transylvanian Basin, extensively managed hay meadows with a particular biodiversity could survive until today. Under a temperate-continental climate of the forest steppe and within the colline zone, they are situated on north-facing slopes with an erratic undulated relief, dominated by small slumpings. A mosaic of different site conditions is illustrated by a patchy distribution of wet meadow, dry- and semi-dry grassland sites. However, little is still known about the edaphic properties of these ecosystems. Precise pedological studies, even less entire soil sequences, are nonexistent. Therefore, the presented findings are a first approach to outline the distribution of different soil types under such semi-natural grasslands. As preliminary results, they are embedded into a pedological-morphodynamic study about the regional grassland-dependent landscape development.

Two northern exposed hay meadows were investigated through the application of catenas. Soil description was done according to 'Bodenkundliche Kartieranleitung' (KA 5), based on data gathered from cores, test pits, and laboratory analysis. Several different soil types were detected: On the upper slope and on exposed positions, driest conditions and lowest clay contents led to the formation of subtypes of 'Pararendzina', 'Tschernosem', and 'Kalktschernosem'. Along more inclined parts of the slope, 'Tschernosem' and 'Pelosol' occur with accented processes of soil creep. Within colluvial infillings of punctually distributed small depressions, highest clay- and SOM-amounts were recorded. Especially in 'Pelosol'-subtypes occurring there, intense seasonal waterlogging and desiccation dominates soil formation.

Along the investigated slopes, the generally deep, clay- and organic matter-rich soil cover reveals a small-scale mosaic of different soil types, reflecting the variety of site conditions. The specific soil features further let assume a long lasting constancy of semi-natural grassland on these potentially forested sites within the forest steppe.