



Soil of the Year 2007: Podzol (“Podsol”)



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Curatorship Soil of the Year



Podzol with *Calluna vulgaris* in North Germany
Foto: Pietrzok



Podzol in mountain region of South Germany
Foto Ehrmann

Characteristics

International classification (WRB): Podzol

German classification: Podsol

What do Podzols look like and how did they get their name?

The name Podzol originates from Russia and can be translated as „ash coloured soil”. Under a raw humus layer and a thin humic horizon, a bleached, violet to grey coloured horizon follows as the typical and eponymous horizon. In this layer, humus and iron are leached out. They accumulate in the underlying horizon and form a dark brown or red brown horizon. This horizon is often very concrete, called “hardpan”. Iron concentrations can be observed along root pods, often accompanied by black-brown or red-brown bands in the deeper soil layers.

How are Podzols formed?

Podzols are developed at sites with poor substrates (sandstone, granite, drifting sands, etc.), with sufficient precipitation, high humidity and a relatively low average temperature.

The podzolization process is linked to strong acidification. The litter of heath and coniferous forests are very resistant to microbial decay processes, which leads to a thick organic litter layers. Organic acids are leached out from this litter layer, which make iron and aluminium from weathering minerals water soluble and transportable to deeper layers. In the deeper layers, they leach out again under different chemical conditions. This creates the typical horizon sequence of the podzol.

The historical reforestation of ancient natural oak-birch forests to pine forests, and the expansion of heath areas as a result of the sod cultivation by humans, promoted the formation of podzols.

What is the functional relevance of these soils for humans and the environment?

Podzols fulfil common soil functions for humans, plants, and animals. They are natural habitats for undemanding plant species. Podzols often show a low water holding capacity with high drainage rates and high groundwater recharge. Therefore, they are important for the water balance of the landscape. Many drinking water catchments are Podzol areas.

Podzols are also important as archives for natural and cultural history, because they provide relevant information on the development of landscapes, settlement structure, and cultivation technique.

Using special cultivation techniques like breaking the “hardpan” layer and expanding irrigation, allow farmers to achieve relative good yields despite the poor soil properties. However, this is coupled with an immense risk of damage to groundwater resources through leaching of nutrients and agro-chemicals.

In mountainous regions, Podzols are mainly used by forestry. The suitability depends on the degree of acidification and the depth and density of the “hardpan” layer.

What are the risks for these soils?

Podzols are mainly sandy soils. Under arable land use with incomplete vegetation cover during the year, they are often endangered by wind erosion. Unfortunately, Podzols are widely cultivated by deep ploughing for arable land use in North-West Germany, which basically disturbs their natural properties and functions.

Where can these soils can be found?

Podzols are widely distributed in Germany, ranging from the coast to the humid hilly regions, and to the Alps, even above the tree line at 2200 m.

On the dunes and drifting sand covers of the Northern German lowlands (Emsland, Oldenburger Geest, Lüneburger Heath land, Western Schleswig-Holstein, Brandenburg, Mecklenburg-Vorpommern), iron-humus Podzols can be found under coniferous forests and scotch heather vegetation. On silicate rich glacio-fluviatile sands, iron Podzols are formed under coniferous forests. On wet sites with a shallow groundwater level under bog-heather humus, Podzols are developed. In the mountainous regions, Podzols are formed on granite and gneiss (Harz Mountains, Fichtel Mountains, Ore Mountains, Southern Black Forest, Bavarian Forest), on bunter (Northern Black Forest, Solling), on chalk-sandstone (Teutoburg Forest), on keuper sandstone (South-Germany), or on quartzite (Rheinish Slate Mountains). Outside Germany, Podzols are widespread in Scandinavia and the sub-polar regions, where they are the dominant soils.

Where you get information ?

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