Soil of the Year 2012:
Histosols

Proposal and material preparation:
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Fotos: D. Devecioglu, J. Zeitz, M. Zauft,






International classification (WRB): Histosols
German classification: Niedermoor

Characteristics

What are Histosols and what do they look like?

Histosols contain more than 30% organic material, exhibiting a typical dark-brown to black color. Depending on their status, the peat-forming plant residues, making up Histosols, are more or less visible to the naked eye. The subsoil in Histosols can consist of sand, silt, loam, clay, or in lakes they can consist of deposited materials such as mud. Depending on their parent material, mud can look white (lime mud), olive green (liver mud from algae), or dark brown (clay mud).

How do Histosols develop and where are they found?

Histosols mainly develop in groundwater-influenced lowlands, or along rivers and lakes. Globally, they are primarily found in the cool and humid climates of the northern hemisphere where excessive water is more often precipitated than evaporated.
In Germany, Histosols cover a surface of about one million hectares. Most of the Histosols and their biggest connected areas (up to 30,000 hectares) are situated in Schleswig-Holstein, Lower Saxonia, Mecklenburg-Western Pomerania, Brandenburg, Bavaria and Baden-Württemberg. The different Histosol areas (211,000 hectares) in Brandenburg are mainly used as pastureland.
Usually, the development of lowland Histosols is initiated with a paludification process by high groundwater levels, or an increasing sedimentation into lakes. In paludification, marshes' dead plant material accumulates under water saturation and is deprived of air above the mineral subsoil.
In terrestrialized marshes, the peat lies on the bottom of a water body above organic or mineral sediments, called muds. The peats of Histosol areas are formed of dead roots, branches, leaves and sprouts of sedges, reeds, mosses, elders, willows or other swamp plants. As a consequence of a lack of oxygen, the decomposition processes of the permanently delivered organic materials are only slow and incomplete. Additionally, special microorganisms are necessary for the decomposition process. The peat within Histosols only increases by a few mm each year into the direction of the water surface or the sea centre. The peat increase occurs from the bottom to the top. With a peat layer thickness of more than 30 cm we have a Histosol.

Functions and use of Histosols:

Histosols are ecologically very valuable. Only conformists, mostly rarities, exceptional animal and plant specialists like the Large Copper, Cotton Grass and sedges are adapted to the high water contents and special nutrient conditions.
Thick Histosols contain up to 2,000 tons of carbon per hectare. Worldwide they are the greatest carbon storages per areal unit.
Former vegetation and climate conditions can be learned from the peat composition. Often traces of settlements and a former use can be found. Therefore Histosols are important archives of nature and civilization.
For using peats for agriculture, forestry, or human settlements, they had to be drained by ditches or drainage systems which seriously and often irreversibly changed the peat properties. With different intensity most German Histosols are actually used as pasture land.
For more than 1,000 years, the peat from Histosols has been used as solid fuel, medicine, and fertilizer. Until the 1950's, peat digging was carried out industrially. Also bog iron, a formation in peats with iron-rich groundwater infiltration, and lime mud were excavated until the beginning of the 20th century. Today organic material from peat is obtained for medical use on very few sites in Germany.
Because of their rare occurrence, intact Histosols in Germany close to nature have been put under nature conservation.

Possible dangers for Histosols:

Drainage is the main danger for Histosols close to nature, as the peat within Histosols shrinks with drainage, and the soil surface collapses. Oxygen penetrates into the Histosol, which until then has been water-saturated. With this process begins the mineralization of the peat. Nutrients and gases like carbon dioxide (CO_2) are released and a carbon sink changes into a carbon source. As well, a climate change

can lead to desiccation and destruction of the Histosols. Intensively used Histosols can release climate-affecting gases, e. g. up to 40 tons of carbon dioxide per hectare each year.
For conservation and permanent protection of intact Histosols, carefully elaborated development strategies are needed.

Who gives out information about Histosols?

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* Ad-hoc AG Boden der Bundesanstalt für Geowissenschaften und Rohstoffe sowie der Staatlichen Geologischen Dienste der Länder: www.bgr.bund.de

* Deutsche Bodenkundliche Gesellschaft, AG Bodensystematik:, www.dbges.de;
* Bundesverband Boden: www.bvboden.de, www.bodenwelten.de

* Bodenkundlich orientierte Institute an Hoch- und Fachschulen sowie Geologische Landesämter der Bundesländer

Where you get all information about the Action Soil of the Year and CD's and material about the different soils (2005 – 2011)

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