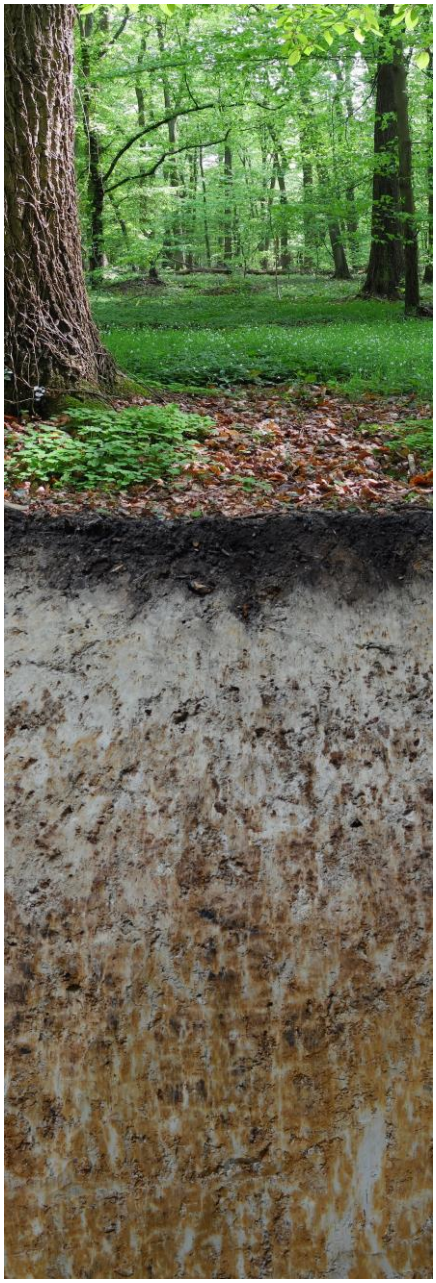
Soil of the Year 2015: Pseudogley

Proposal for 2015: M. Dworschak, G. Milbert (State Geological Survey North Rhine-Westphalia) and Curatorship Soil of the Year
Pictures: A. Dickhof, M. Dworschak, G. Hornig, G. Milbert, S. Schulte-Kellinghaus (State Geological Survey North Rhine-Westphalia);



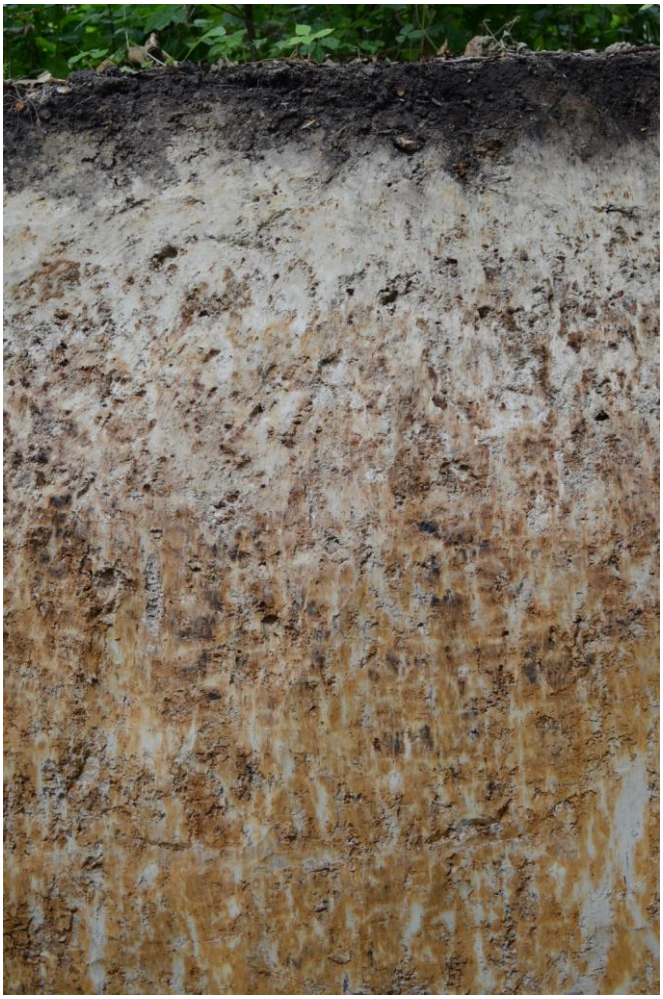
Imprint
Common action of the Deutsche Bodenkundliche Gesellschaft (DBG), Bundesverband Boden (BVB),
Ingenieurtechnischer Verband für Altlastenmanagement und Flächenrecycling (ITVA) and Umweltbundesamt (UBA)

Soil Profile Kottenforst Forest near Bonn

International classification (WRB): Planosols or Stagnosols
German classification: Pseudogley

Characteristics

Pseudogley soils form where precipitation water drains away significantly slowly into the ground. Beneath a well permeable layer that is waterlogged after rainfall, there is a dense layer with low permeability. In the German soil classification, most soils affected by stagnating water belong to the Pseudogleys, those with an extended wet phase to the Stagnogleys. The international classification (WRB) allocates these soils primarily to the Planosols and Stagnosols.



topsoil
contains humus

light grey, bleached under wet conditions

temporarily waterlogged layer

iron mottles, hard iron-manganese segregations

layer with low permeability
higher clay content,
denser, veined

Wet-Dry Soils

As a function of the water permeability of the soil, the weather conditions, and the water intake of the plants, pseudogley soils change between wet, moist, and dry phases. These phases may vary in length and may occur several times during the course of a year. This results in temporary excess and temporary lack of soil water. During the wet phases, lack of oxygen adversely affects plant roots and soil organisms. On pseudogley soils only those plant species thrive that can tolerate wet soil conditions. Little by little, a mottled to veined soil, with depletions, bleach by water, and concentration of hard iron and manganese concretions.

Important for Natural Balance

Pseudogley soils are unique natural bodies that often host forest and plant communities that prefer changing moisture conditions, e.g. Common Oak-European Hornbeam forests.

Prominently wet pseudogley soils are, due to their extreme site conditions, well-suited for rare animal and plant communities.
Pseudogley soils store precipitation water that evaporates in delayed time, or is consumed by plants. In this way, they buffer precipitation peaks. The perched water drains slowly into the groundwater, possibly to close-by groundwater soils, and into water paths or water bodies.

Forest and Adapted Silviculture

Forests adapted to changing moisture conditions can be stable and productive ecosystems that simultaneously, are ecologically valuable. Tree species tolerating perched soil water are: the Common Oak, European Hornbeam, Ash, Black Alder and Downy Birch. Adversely affected are: Norway Spruce, Larch, and Beech. The latter few develop only shallow roots in perched water, while in dry years drought causes damage.
After several wet years in a row, roots suffer from a lack of oxygen. During storm events, shallow root trees tend to be uprooted.
Timber harvesting does not harm the soil during dry phases only.

Sites Sensitive to Climate

Pseudogley soils are sensitive to weather conditions and the climate. Increasing numbers of heavy rains result in more frequent wet phases. If climate warming extends the vegetation period, plant-water consumption increases, and longer dry periods could occur.
Wet-dry Common Oak-European Hornbeam forests could develop into Beech forests in the long run. During the last 50 years, the vegetation period has already lengthened more than two weeks, and the number of heavy rains has risen.

Further Information

Web page Soil of the Year: www.boden-des-jahres.de
German Soil Science Society: www.dbges.de;
Bundesverband Boden: www.bvboden.de
State Geological Surveys of Germany/ad-hoc-AG Boden:
www.infogeo.de/ueberuns/boden/mitglieder
Geological Survey North Rhine-Westphalia:
phone.: +49 2151 897 586 or 897 437, E-mail: boden@gd.nrw.de
Soil science institutes at universities and universities of applied sciences

Information Material (Flyer 2015, Poster 2015, CD's of all Soils of the Years)

Flyer and Poster: Federal Environment Agency (Umweltbundesamt)
www.umweltbundesamt.de/publikationen/poster-boden-des-jahres-2015-stauwasserboden

CDs about all Soils of the year 2005 – 2015: E-mail: frielinghaus@zalf.de