

# Adapting humus form classification to WRB principles

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## Introduction

The recently published European Humus Forms Reference Base (Zanella et al. 2011) aims to harmonize the classification of humus forms specifically required for trans-national inventories and monitoring of soil conditions at the European scale (Fig. 1). Here we propose to enhance the classification by adopting basic principles and rules of the WRB soil classification system (IUSS working group WRB 2006).

## The object classified as humus form

Objects of classification are the assemblages of organic and mineral topsoil horizons differing in their consistence, arrangement and thickness. These horizons are significantly formed through the activity of soil organisms and serve as main habitat for them. Humus forms are variable in space and time and are strongly influenced by environmental factors, such as climate, vegetation and land use. As a humus form type develops at considerably shorter time scale than a soil type, there is no strict coincidence between both. Therefore, humus form types (topsoil types) and soil types need to be classified independently.

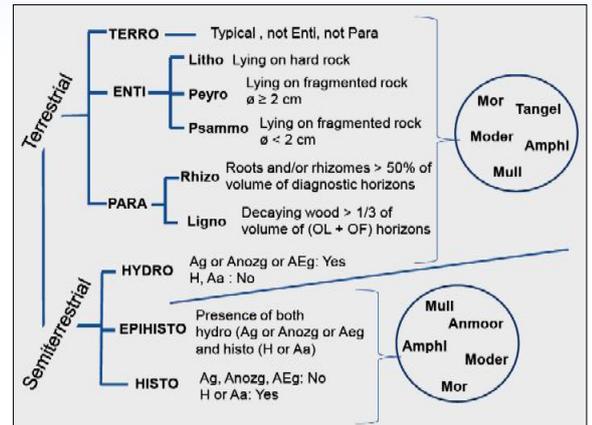


Fig. 1 The hierarchy of the European humus form classification (according to Zanella et al. 2011).



Mull



Moder



Amphi



Anmoor



Fibric Moor

## Outline of the classification

The proposed classification uses two hierarchical levels with the main humus form types (currently Mull, Moder, Amphi, Anmoor, Moor) at the first level, and a set of prefix and suffix qualifiers that are added to the name of the main type at the second level. The main humus form types are differentiated according to the primary humus forming processes that have produced the characteristic humus profile (e.g. litter fragmentation, humification, mixing of organic matter with mineral soil). At the second level in combination with qualifiers, the units are differentiated according to specific properties and factors that have influenced the primary humus forming processes.

## Second level: The combination with qualifiers

A detailed characterisation of humus forms requires a large number of indicators. Green et al. (1993) already used "phase adjectives" (qualifiers) to differentiate properties of humus forms. The "Topsoil Characterization" of the FAO (1998) and the WRB (2006) define many qualifiers that are applicable also to humus forms. Using a multiplicity of qualifiers for one unit allows to better detail the description.

Qualifiers related to

- > parent materials: Arenic, Siltic, Clayic, Histic
- > plant materials: Rhizic, Follic, Lignic, Xylic
- > physical characteristics: Epilithic, Peyric, Crustic, Compact, Cryic
- > chemical characteristics: Calcic, Eutric, Dystric, Eu-, Meso-, Oligotrophic
- > biological characteristics: Vermic, Termitic, Mycic
- > hydrological characteristics: Ombric, Rheic, Hydric, Xeric
- > fabric of horizons: Fibric, Hemic, Sapr
- > thickness of horizons: Pachic, Tenuic
- > disturbance of horizons: Turbic, Ustic

## First level: The main humus form types

- > **Mull** is an aeromorphic humus form characterised by the intense mixing of organic matter with mineral matter. An OH-horizon is lacking.
- > **Moder** is an aeromorphic humus form with an OH-horizon resulting from zoogenic litter transformation. No mixing activity of earthworms is occurring in the A-horizon.
- > **Amphi** is an aeromorphic humus form with an OH-horizon above an A-horizon structured by soil-dwelling earthworms.
- > **Anmoor** is a hydromorphic humus form with an A-horizon enriched in organic matter under poorly aerated conditions.
- > **Moor** is a hydromorphic humus form characterised by the accumulation of poorly decomposed organic matter under saturated conditions.



Sapr

## Example: Humus forms on Histosols

Drained Histosols can have aeromorphic humus forms that are referred to as *Histic Mull* or *Histic Moder*. Examples for the designation of hydromorphic humus forms in natural or semi-natural bogs and fens are *Fibric Moor* (*Ombric*, *Oligotrophic*) or *Sapr Moor* (*Rheic*, *Mesotrophic*).

## Outlook

Conformity to WRB principles will easily allow to broaden the classification of humus forms to a general topsoil classification system including cultivated soils.

## References

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