

CAMBISOLS



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ISRIC – World Soil
Information

Wageningen
The Netherlands

Definition of Cambisols

Soils that show soil formation by either:

- Colour change compared to parent material
- Soil structure development
- Leaching of carbonates
- Formation of silicate clays and sesqui(hydr)oxides as result of weathering of primary minerals

But lack sufficient soil development to classify for other RSGs

Diagnostics of Cambisols

Cambisols have:

- A ***cambic*** horizon; or
- A ***mollic*** horizon overlying a subsoil with low base saturation within 100cm depth; or one of the following:
- An ***andic***, ***vertic*** or ***vitric*** horizon starting between 25 and 100cm below the surface; or
- A ***plinthic***, ***petroplinthic***, ***salic*** or ***sulfuric*** horizon starting between 50 and 100cm below the soil surface, in the absence of loamy sand or coarser material above these horizons

Cambic horizon (1)

Results from incipient soil formation:

- Texture sandy loam or finer
- At least moderately developed soil structure, and lacking original rock structure in at least half of the volume of the horizon
- Evidence of alteration (stronger chroma, redder hue, more clay than underlying horizon, removal of carbonates)

Cambic horizon (2)

- Lacking the brittle consistence of the *fragic* horizon
- CEC > 16 cmol(+) kg⁻¹; or
ECEC > 12 cmol(+) kg⁻¹; or
≥ 10 percent weatherable minerals; or
≥10 percent water-dispersible clay; and
- Thickness of 15cm or more

Genesis of Cambisols

Main soil-forming factor is:

Time

Main soil-forming processes are:

- Dissolution and removal of carbonates
- Alteration of especially easy-weatherable primary minerals such as mica and feldspar
- Formation of silicate clay and precipitation of iron(hydr)oxides
- Aggregation to form soil structure

Classification of Cambisols (1)

- **Strong expression qualifier:** *thionic*
- **Intergrade qualifiers:** *andic, endosalic, ferralic, fluvic, gelic, gleyic, leptic, plinthic, vertic, and vitric*

Classification of Cambisols (2)

- **Secondary characteristics qualifiers,** related to defined diagnostic horizons, properties or materials: *aridic, calcareic, gelistagnic, gypsiric, humic, hyperochric, stagnic, takyric, and yermic*
- **Secondary characteristics qualifiers,** not related to defined diagnostic horizons, properties or materials: *chromic, dystric, eutric, rhodic, skeletal, and sodic*

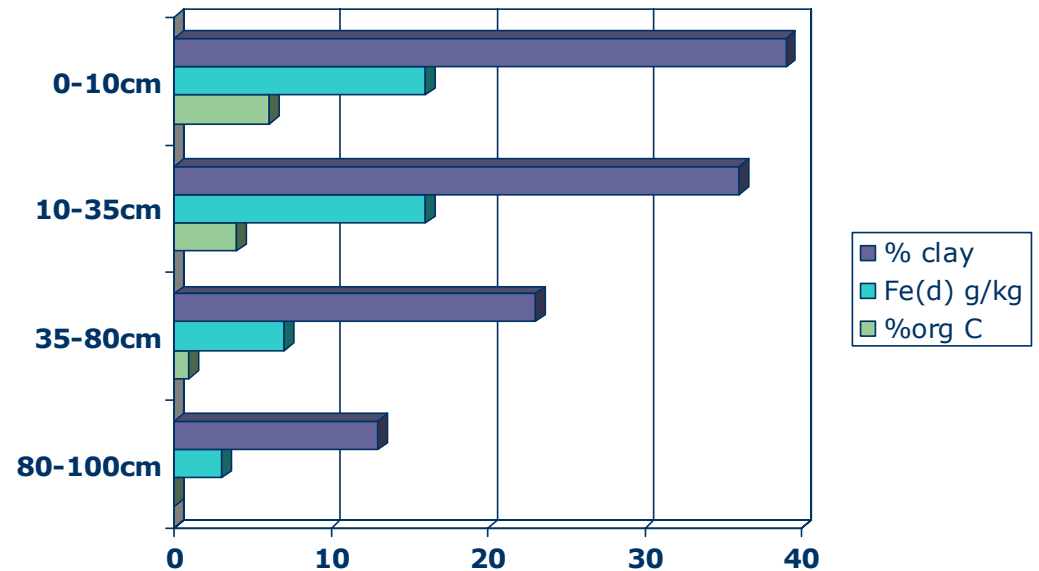
Classification of Cambisols (3)

- **Haplic qualifier**, where none of the above applies: *haplic*

Examples of Cambisols (1)



Humi-Endoleptic Cambisol
(Dystric), China

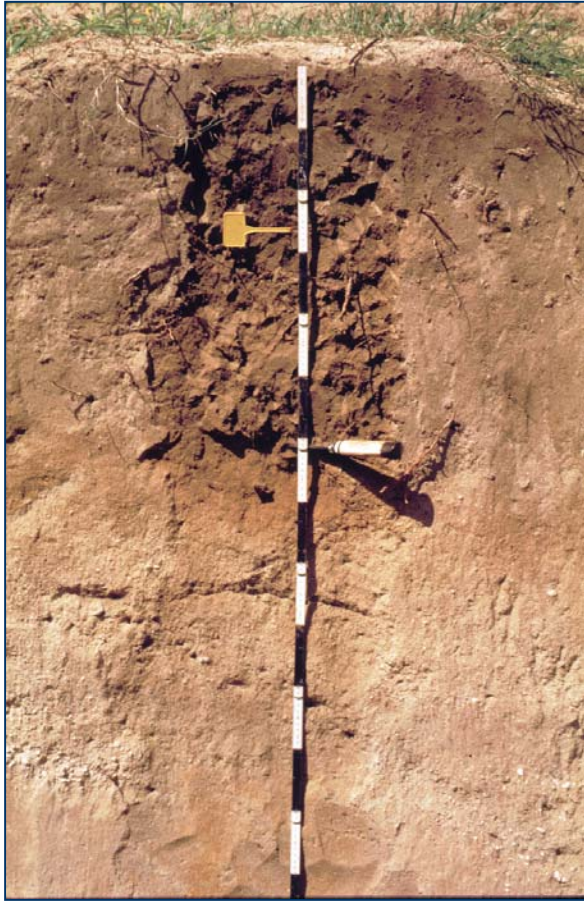


Examples of Cambisols (2)

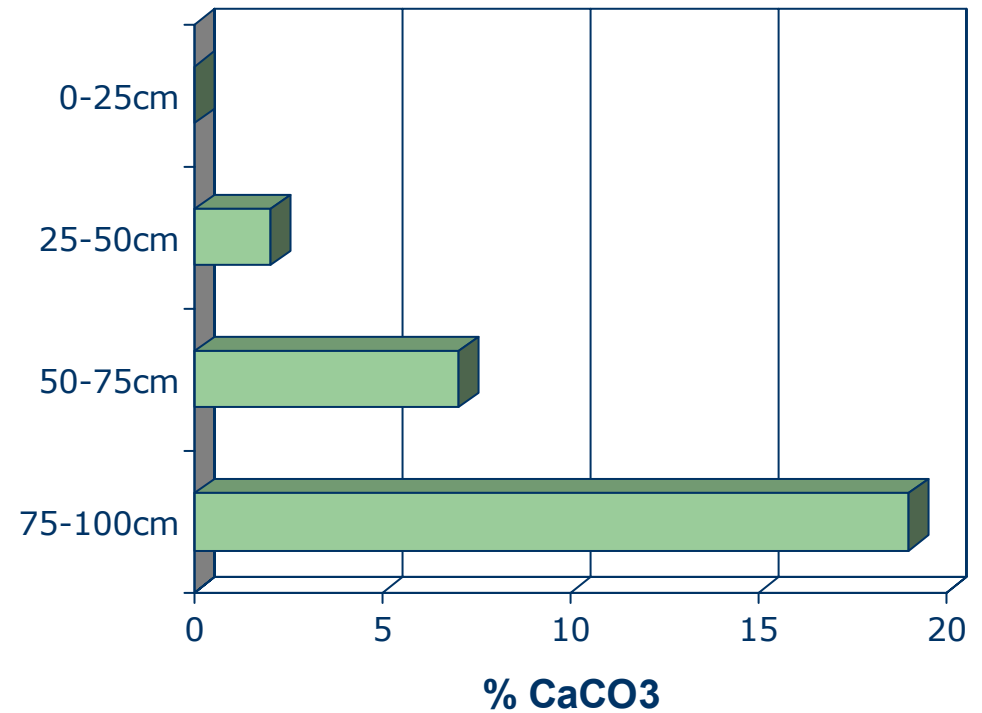


Endoskeleti-Vertic Cambisol
(Eutric and Chromic) \\
Eutri-Vertic Cambisol
(Chromic), Italy

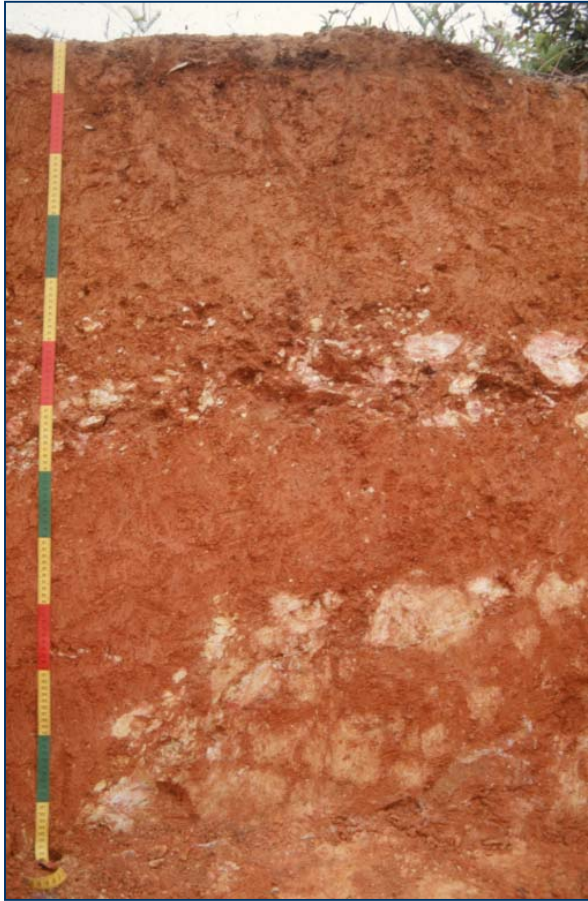
Examples of Cambisols (3)



Calcaric Cambisol, Mexico



Examples of Cambisols (4)

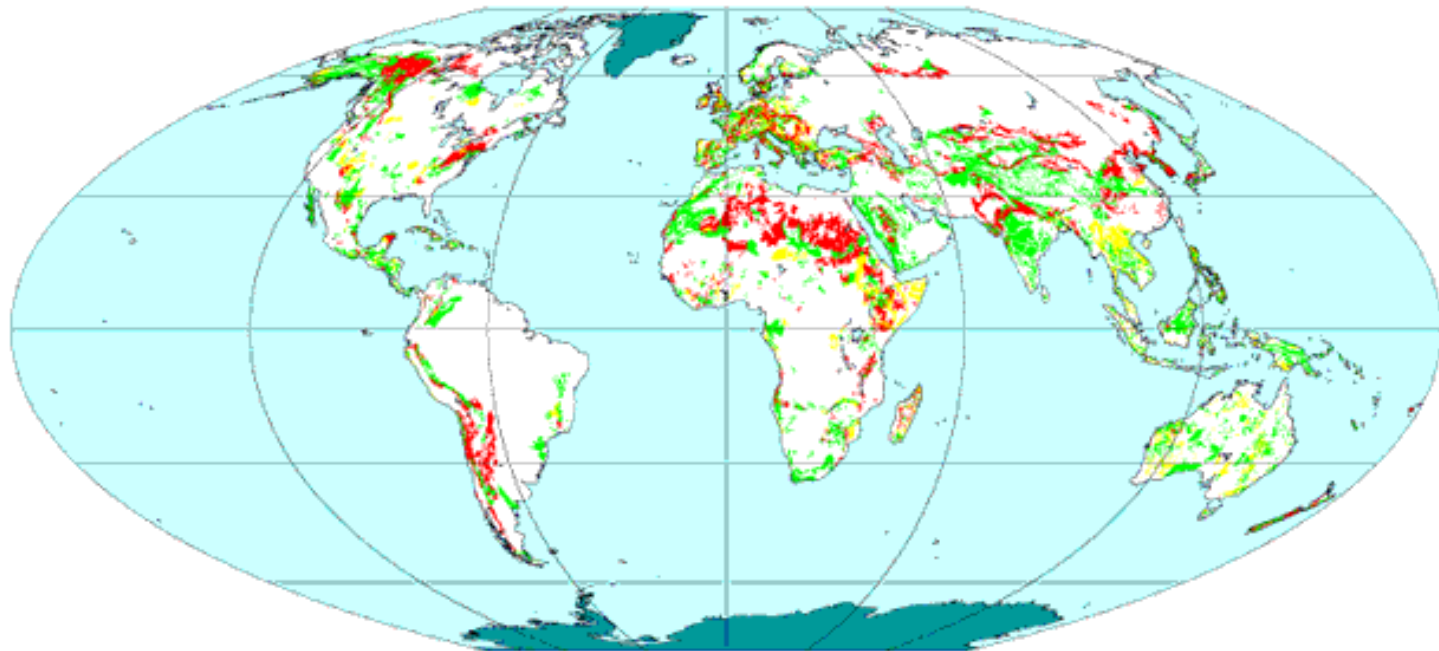


Hyperdystric Ferralic Cambisol
(Chromic), China

Depth (cm)	CEC soil cmol(+)	CEC clay cmol(+)	% base saturation
0-15	15.3	11	6
15-40	6.5	11	3
40-70	8.8	20	2
70-90	3.7	17	5
90-120	2.5	18	8

Distribution of Cambisols (1)

Distribution of CAMBISOLS
Based on WRB and the FAO/Unesco Soil Map of the World



Red Dominant **Green** Associated **Yellow** Inclusions **Teal** Miscellaneous lands
(Inland waterbodies, Glaciers, No data)

Flat Polar Quartic Projection

FAO-GIS, February 1998

Distribution of Cambisols (2)

One of the most widespread soils, covering some 1.57 billion ha or 12.5 % of the Earth's land surface, mainly in temperate and boreal regions, in desert regions, and in mountainous areas.

Associated soils

Temperate and boreal regions: Fluvisols and Gleysols in low-lying positions; Regosols, Podzols, Luvisols and Umbrisols in upland areas

Deserts: Regosols, Calcisols, Gypsisols, Arenosols and Leptosols

Mountains: Leptosols, Regosols and Umbrisols

Tropical regions: Ferralsols, Acrisols and Lixisols