

Lecture outline

- What is soil?
- Soil science terminology
- Soil components

2



Definition by horticulturists

– Soil is the medium in which plant roots grow or can grow

4

Definition by engineers

– The unconsolidated mineral and organic material on the earth's surface, down to bedrock

5

Definition by soil scientists

- **Soil** is a dynamic natural body, composed of mineral and organic solids, gases, liquids and living organisms, which can serve as a medium for plant growth

Yet another definition by soil scientists

- **Soil** is dynamic natural body having properties derived from the combined effect of **climate** (*c*) and **biotic activities** (*b*), as modified by **topography** (*r*), acting on **parent materials** (*p*) over periods of **time** (*t*)

$$\text{Soil} = f(c, b, r, p, t)$$

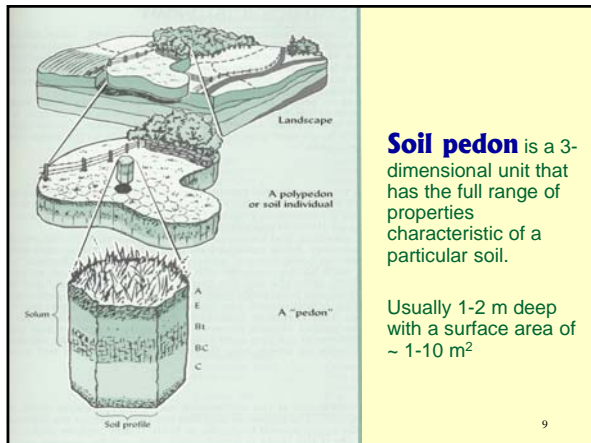
Factors of soil formation 

7

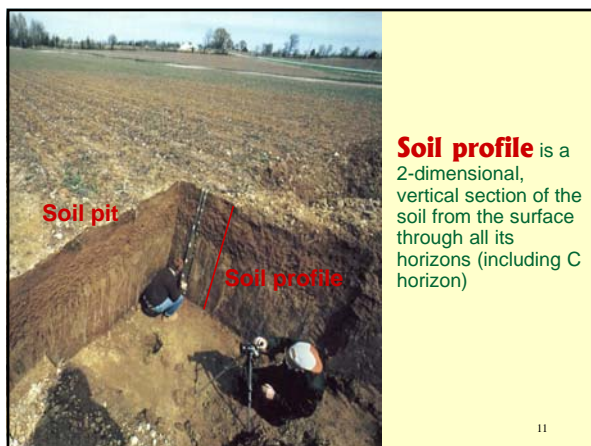
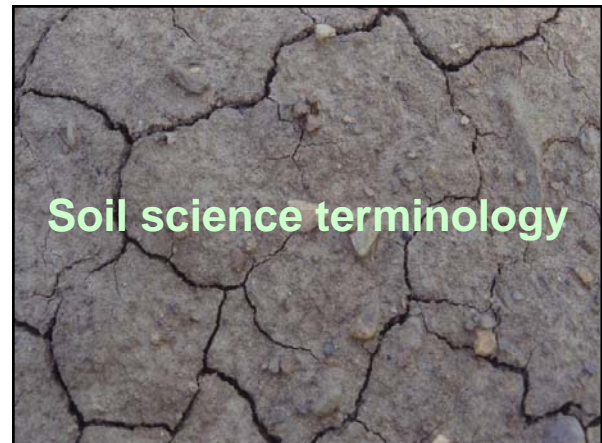


Soil individual?

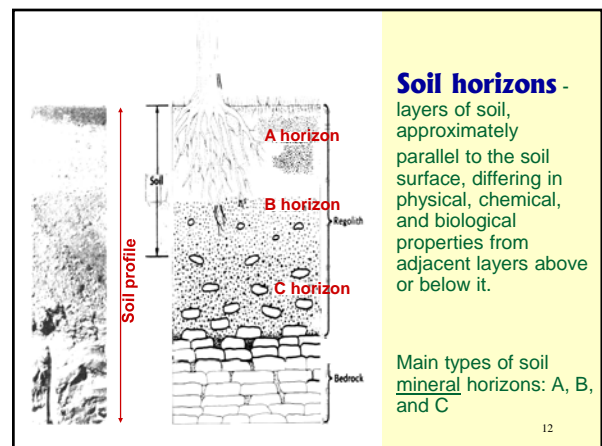
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11



12

What is difference between mineral and organic soils?

Mineral soils contain about 1-6% of organic matter (by weight)

Organic soils contain >30% of organic matter by weight (or >50% by volume)

13

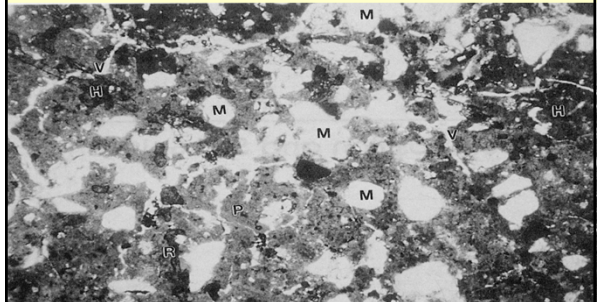


Soil components

- Mineral (inorganic) materials
 - Organic matter
 - Water
 - Air
- } Soil matrix
- } In soil pores

15

Spatial arrangement of soil components



M=primary minerals H=humus (organic matter) P=plasma (clay)
V=voids (pores) R=root fragments (organic matter)

16

Volume composition of a loam surface soil

17

Mineral constituents in soils

- **Sand, silt, and clay** particles have diameter smaller than 2 mm
- Relative proportions of sand, silt, and clay in a soil is **soil texture**



Soil organic matter



19

Soil water



This soil is formed under conditions of water saturation. Water stands in the pit.

20



Soil respiration measurement

Soil air

21