Lecture 2

2nd Stage of Horticulture Department

TOPICS

- **TRADITIONAL AND MODERN DIVISIONS OF SOIL SCIENCE.**
- **SOIL PROFILE DESCRIPTION**

A- Traditional Division of Soil Science

1- **Pedology is** a Greek word (pedon, means soil or earth), and it is a branch of soil science which is dealing with the laws of origin formation and geographic distribution of the soil as a body, it has three dimensions (length, width, and depth) in the nature. **Pedology consists of:**

a) **Soil Genesis**
b) **Soil Morphology**
c) **Soil Survey and Classification**
d) **Soil Mineralogy**

2- **Edaphology** is a Greek word (edaphos, means soil or ground) and it is another branch of soil science which is dealing with the influence of soils on living things, particularly (chiefly) plant, including human use of land for plant growth or deals with the study of soil in relations to growth of plants, nutrition &yield of crops. **Edaphology comprises soil sciences below:**

a) **Soil Chemistry.**
b) **Soil Physics.**
c) **Soil Fertility & Plant nutrition.**
d) **Soil Microbiology.**
e) **Soil Conservation.**

1- Modern Division of Soil Science

D1. 1. Soil In Space and Time	C1. 1. Soil Morphology
	C1. 2. Soil Geography
	C1. 3. Soil Genesis
	C1. 4. Soil Classification
D2. 2. Soil Properties and Process	C2.1. Soil Physics
	C2.2. Soil Chemistry
	C2.3. Soil Biology
	C2.4. Soil Mineralogy
D3. 3. Soil Use and Management	C3.1. Soil Evaluation and Land use
	C3.2. Soil and Water Conservation
	C3.3. Soil Fertility and Plant nutrition
	C3.4. Soil Engineering and Technology
	C3.5. Soil Degradation Control, Remediation and Reclamation
D4. 4. The Role of Soils in Sustaining Society and the Environment	C4.1. Soils and the Environment
	C4.2. Soils, Food Security, and Human Health
	C4.3. Soils and Land Use Change
	C4.4. Soils Education and Public Awareness
	C4.5. History, Philosophy, and Sociology of Soil Science

SOIL PROFILE DESCRIPTION

- ***Soils profile* is** a vertical section of the soil extending through all its horizons and into the parent material.
- ***Soil horizon:*** Is a layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil forming processes.

The Simplest soil horizon* comprises *of A = topsoil, B = subsoil C = parent material

But most have O, A, E, B, C, and R

Horizon vs Layer

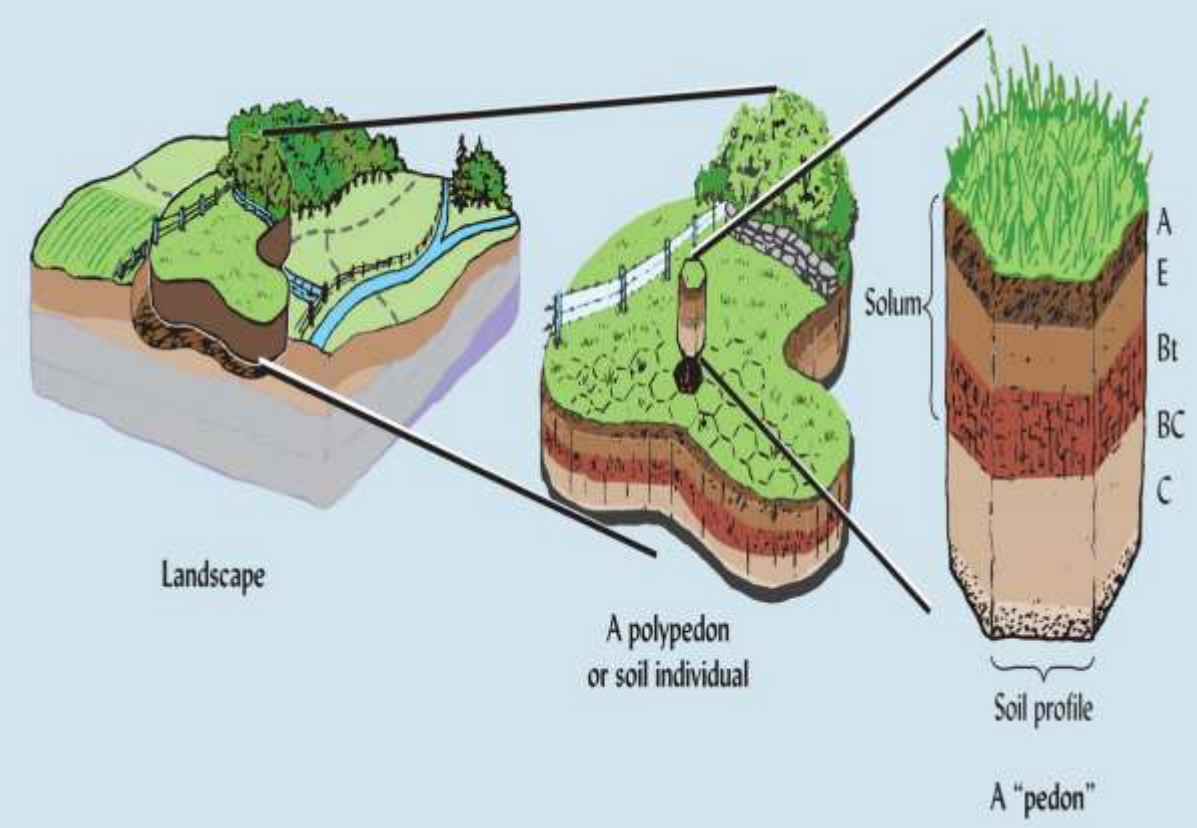
***Horizon*:** soil materials that having distinct characteristics (properties) formed largely by soil forming processes, **but a layer** in the soil deposited by a geologic force (wind, water, glaciers, oceans, etc.) and not relating to soil forming process.

Pedon

- ***Pedon*** is the smallest volume of soil that shows characteristics of all horizons of a particular soil and extends from the ground surface down to bedrock.
- Typically represents 1-10 m^2 of surface area. A group of pedons is called *polypedons.*

Soil Horizon Nomenclature

- Soil horizons designated by a combination of: CAPITAL LETTERS-lower case letters- NUMERALS.
- Master horizons are major layers designated by capital letter such as 0, A, E, B, C and R.
- Subordinate Distinctions: Lower case letters used as suffixes to designate specific master horizons. i.e. Ap, Bw, Cg
- Vertical Subdivisions: A horizon designated by a single combination of letters which needs to be subdivided. i.e. Bw1, Bw2, Cg1, Cg2.



Soil Pedon and Soil Profile

- **In a simple way, we can consider a "Pedon" as a 3-D structure (minimum 1 m^2 surface up to 10 m^2) that contain all the properties of the studied soil.**
- **The soil profile is defined as a vertical section of the soil from the ground surface downwards to where the soil meets the underlying rock (USDA Soil Taxonomy). In this way, a soil profile could be one of the vertical face of a pedon**

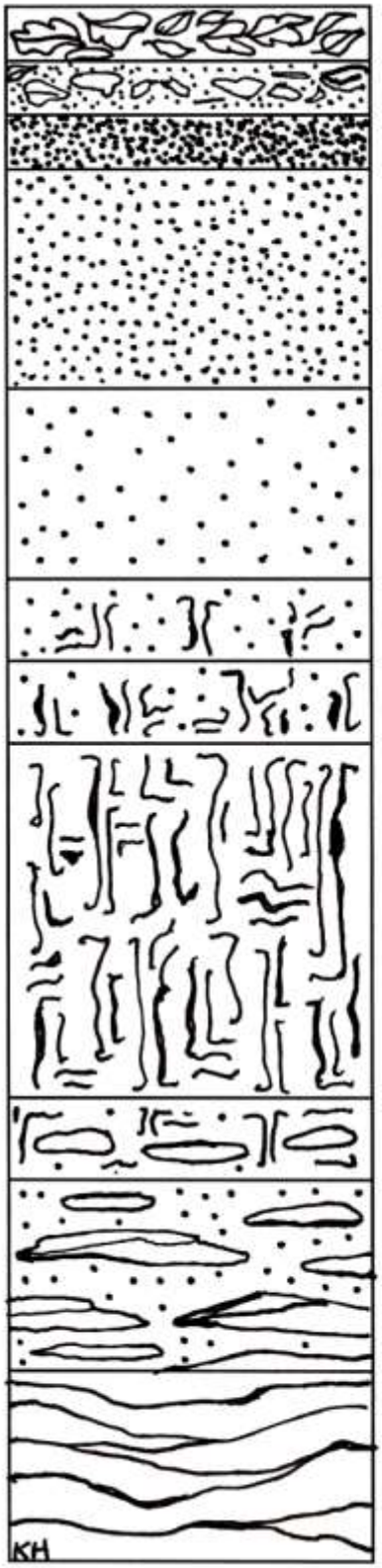
A vs. E horizon

- A horizons have a high OM content
- E horizons have low OM content
- E horizons often feel sandier (coarser) than the A horizon
- E horizons have a higher value

E vs. B horizon

- E horizons are sandier (coarser) than B horizons
- E horizons are higher in value
- B horizons have more clay
- B horizons have more Fe

Idealized soil profile



Oi Loose, easily recognizable, organic debris
Oe Partially decomposed organic materials
Oa Fully decomposed organic materials

A Surface mineral horizon; darker and higher in organic matter. If plowed, will be designated Ap

E Eluviated horizon; light colored zone of maximum leaching of clay, iron, aluminum, and soluble organic matter. Often mixed into Ap

EB Transition from E to B; more like E than B

BE Transition from E to B; more like B than E

B Subsurface zone of maximum accumulation of clay, iron, etc. Common features include development of blocky and/or prismatic structure, clay coatings on larger particles, red and yellow colors from accumulation of iron oxides

BC Transition from B to C; more like B than C

C Weathered parent material such as saprolite, oxidized sediments, unconsolidated bedrock, etc.

R Hard bedrock; not always seen