

CASE

*Curriculum for Agricultural
Science Education*

Principles of Agricultural Science – Plant

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Structure and Depth Perception

Unit 2 – Mineral Soils

Lesson 2.1 Understanding Soil Properties

Soil Structure



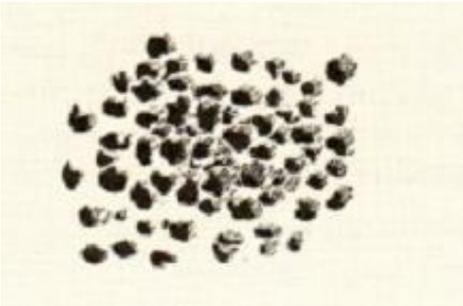
When soil particles cling together in an arrangement known as a ped, it is called structure.

Organic matter is important in soil structure formation.

Two considerations must be made for soil structure:

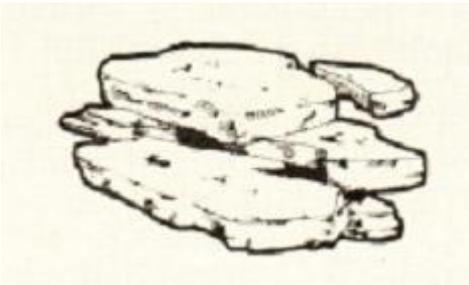
- Structure type – the shape of the ped
- Structure grade – the strength of the ped

Structure Type



Granular

- Roughly spherical, like grape nuts.
- Plant roots, microorganisms, and sticky products of organic matter decomposition bind soil grains into granular aggregates.

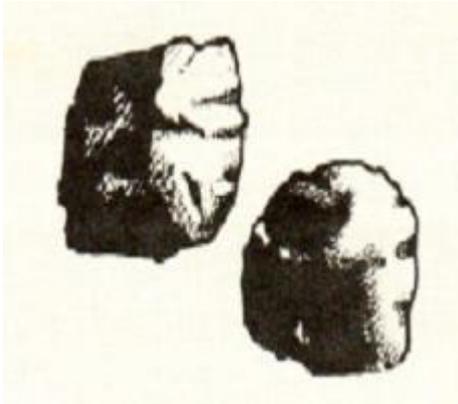


Platy

- Flat peds that lie horizontally in the soil.

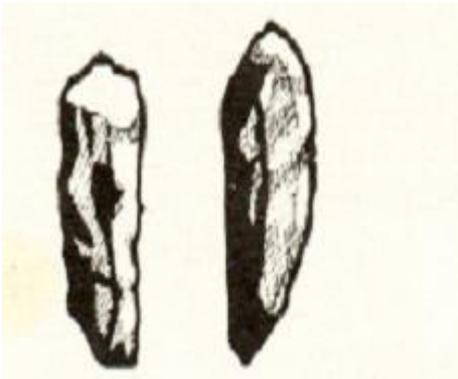
(Huddleston & Kling, 1996)

More Defined Structure Types



Blocky

- Roughly cube-shaped, with more or less flat surfaces.
- Blocky structures are typical of B horizons.



Prismatic

- Larger, vertically elongated blocks, often with five sides.

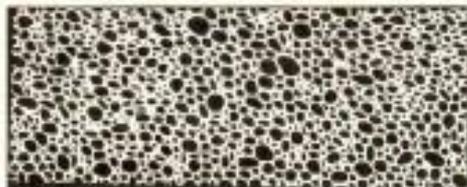
(Huddleston & Kling, 1996)

Structureless Types



Massive

- Compact, coherent soil not separated into peds.
- Small pores, slow permeability, and poor aeration.



Single grain

- Every grain acts independently.
- No binding agent holding grains together.
- Permeability is rapid.

The above structure types are the two extremes in terms of effects on permeability.

(Huddleston & Kling, 1996)

Structure Grade



Four grades define soils:

- Strong – good aeration by ample pore space
- Moderate
- Weak
- Structureless – poor conditions for crop use

Effective Depth



Effective depth is the zone, which plant roots can easily grow.

Barriers for root growth are caused by:

- Massive soils
- Dense soil structure
- Poor internal drainage
- Abrupt texture changes between horizons
- Gravelly and large sands

Signs of Promise for Roots



Good conditions for effective depth include:

- Moderate and strong structure grades
- Brown or red soils, which indicate good aeration

References



Huddleston, J. H., & Kling, G. F. (1996). *Manual for judging Oregon soils*. Corvallis, OR: Oregon State University.

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Plaster, E. J. (2003). *Soil science & management* (4th ed.). Clifton Park, NY: Delmar.