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Fundamentals of Soil Science

### 3.2. Soil Structure

... The term **texture** is used in reference to the size of soil particles but, when the arrangement of the particles is being considered, the term **structure** is used. Structure refers to the aggregation of primary soil particles (sand, silt, clay) into compounds particles.

Structure **modifies** the influence of texture in regards to moisture and air relationships, action of microorganisms, and root growth. A good example of this occurs in the blacklands of Alabama and Texas, where the content of highly plastic clay is as high as 60 percent. These soils would be of limited value for crop production if they did not have a well-developed granular structure, which facilitates aeration and water movement.

### 3.3.1. Types of Soil Structure

Soil aggregates or peds are classified on the basis of shape as spheroidal, platelike, blocklike, or prismatic. ... The types of structure in Miami loam soil are shown in Figure 1. ... Structure is also described in terms of size and grade (distinctness) of peds. Those in the Bt horizon of the Miami loam shown in Figure 1 are distinct and the grade is strong. In the A2 horizon the structure is indistinct, and the grade is called weak.

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*Bt*

*A2*

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### 3.3.2. Formation of Soil Aggregates

... To produce aggregates there must be some mechanisms that groups particles together into clusters and also some means by which they are firmly bound so that the structural forms persist. For example, aggregations can be induced by the pressure exerted by freezing or developing roots.

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### 3.3.3. Colloids and Aggregate Formation

... The colloidal fraction is the active constituent since, without its

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presence, single-grained structure prevail. ... The three groups of colloidal matter, that are important as cementing material in aggregate formation, are: (1) clay, (2) iron and aluminum oxides, and (3) organic matter. ... There are several theories concerning the process by which aggregation is brought about, but this process, which I explain in the blackboard, is probably as widely accepted as any.

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**References**

Foth, H. D. 1978. Fundamentals of Soil Science. John Wiley & Sons, New York, USA

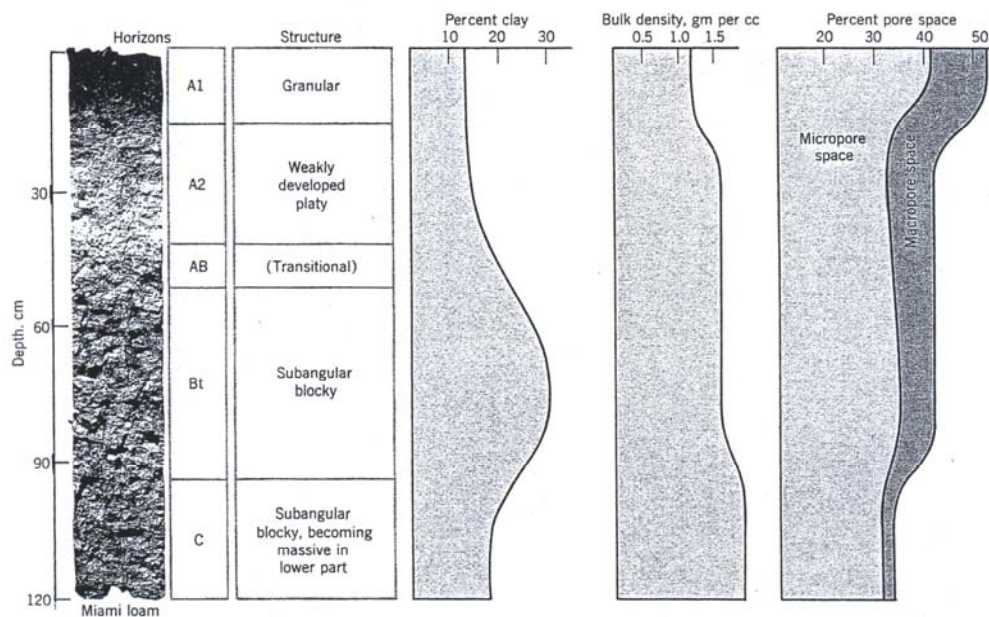


Figure 1 Horizon designations, structure, clay content, bulk density, and percentage pore space of horizons of Miami loam (Alfisol) (Source: Foth, 1978).

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