

Water Movement in the
Soil-Saprolite Transition Zone of
Kaolinitic Soils of the Southern
Piedmont Region

Southwest Piedmont Team - MO 14

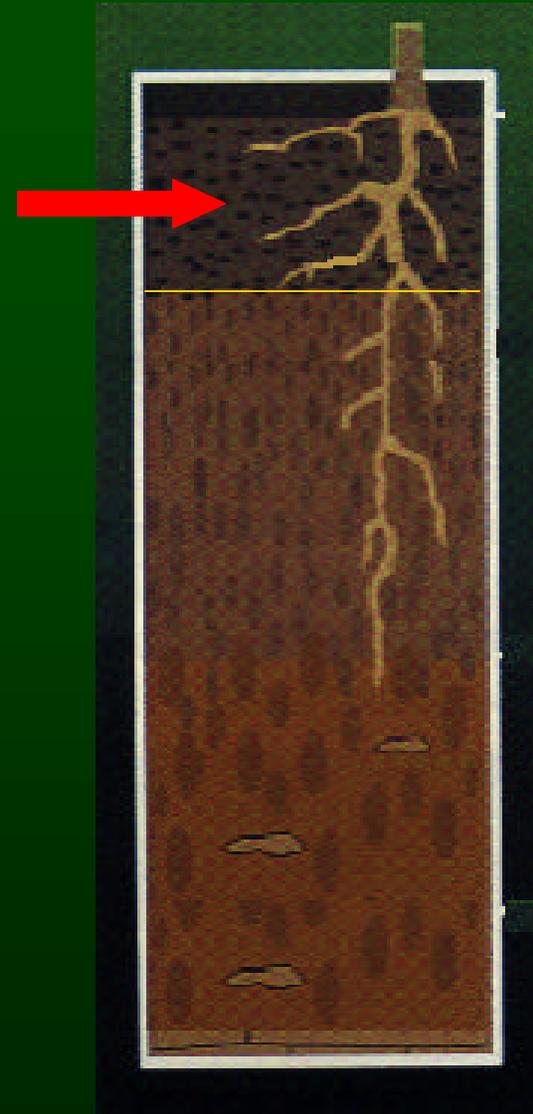
Permeability

(saturated hydraulic conductivity)

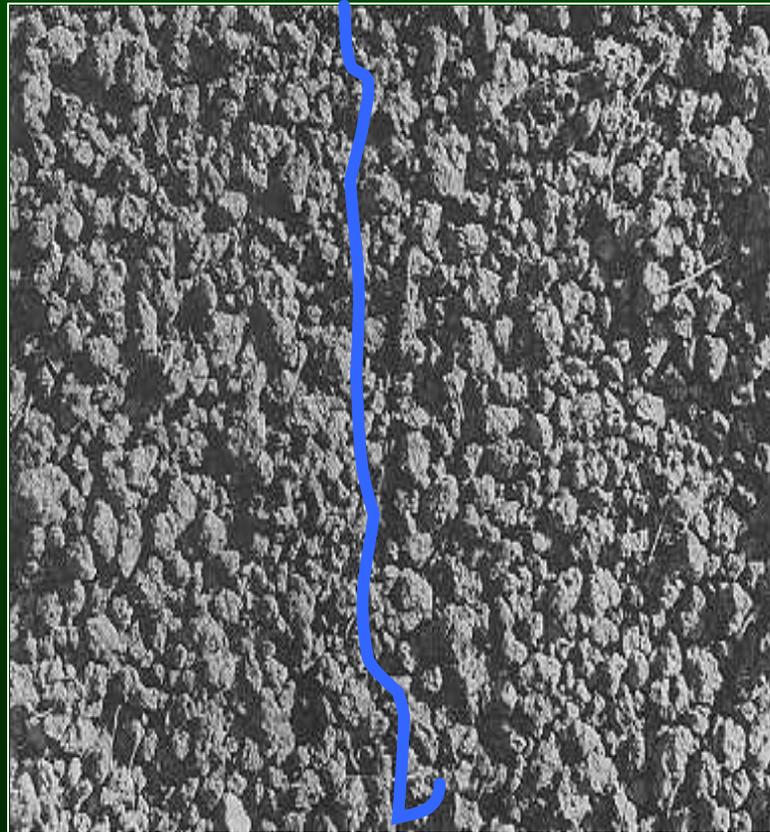
- the downward movement of water through the soil
- porosity (size and distribution of pore spaces) determines the permeability of the soil.
- texture, structure, mineralogy, density, biologic activity affect porosity

A horizon

Mineral horizons that form at the surface or below an O horizon

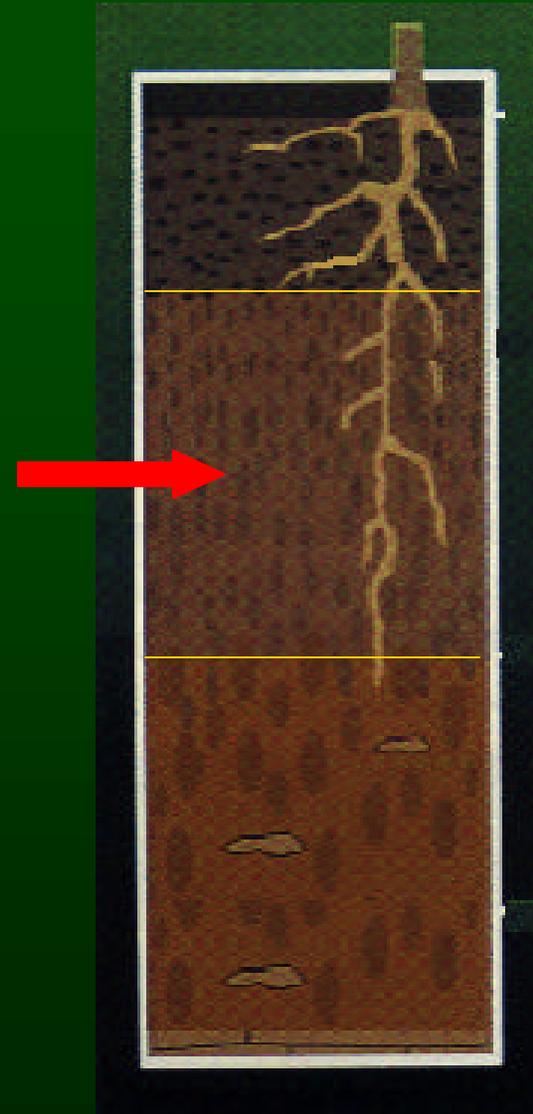


Granular Structure

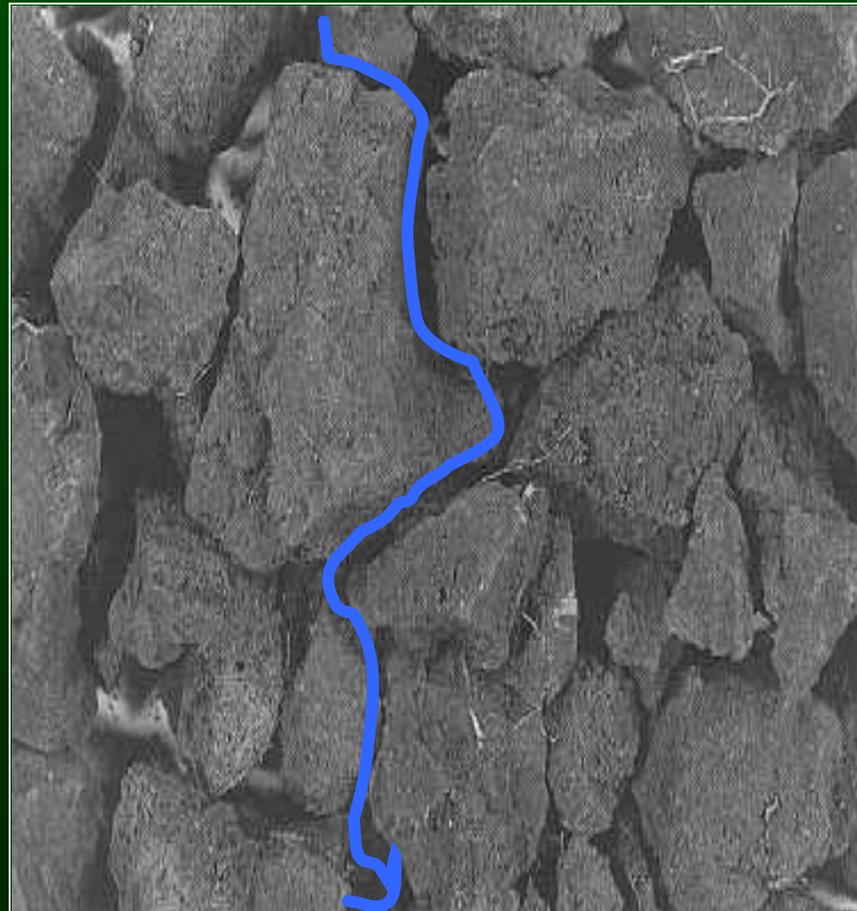


B horizons

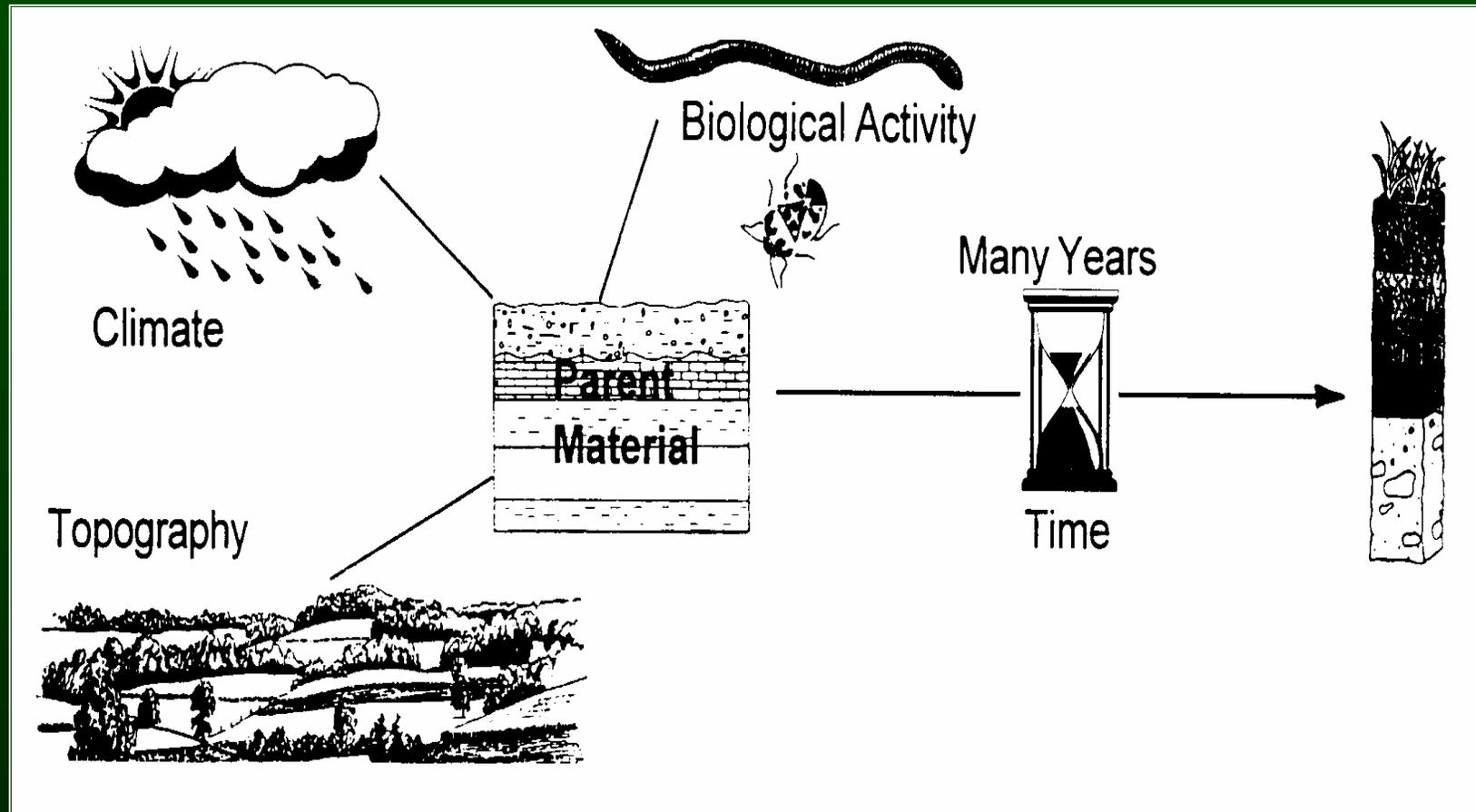
Mineral horizons that form below O, A, and E horizons



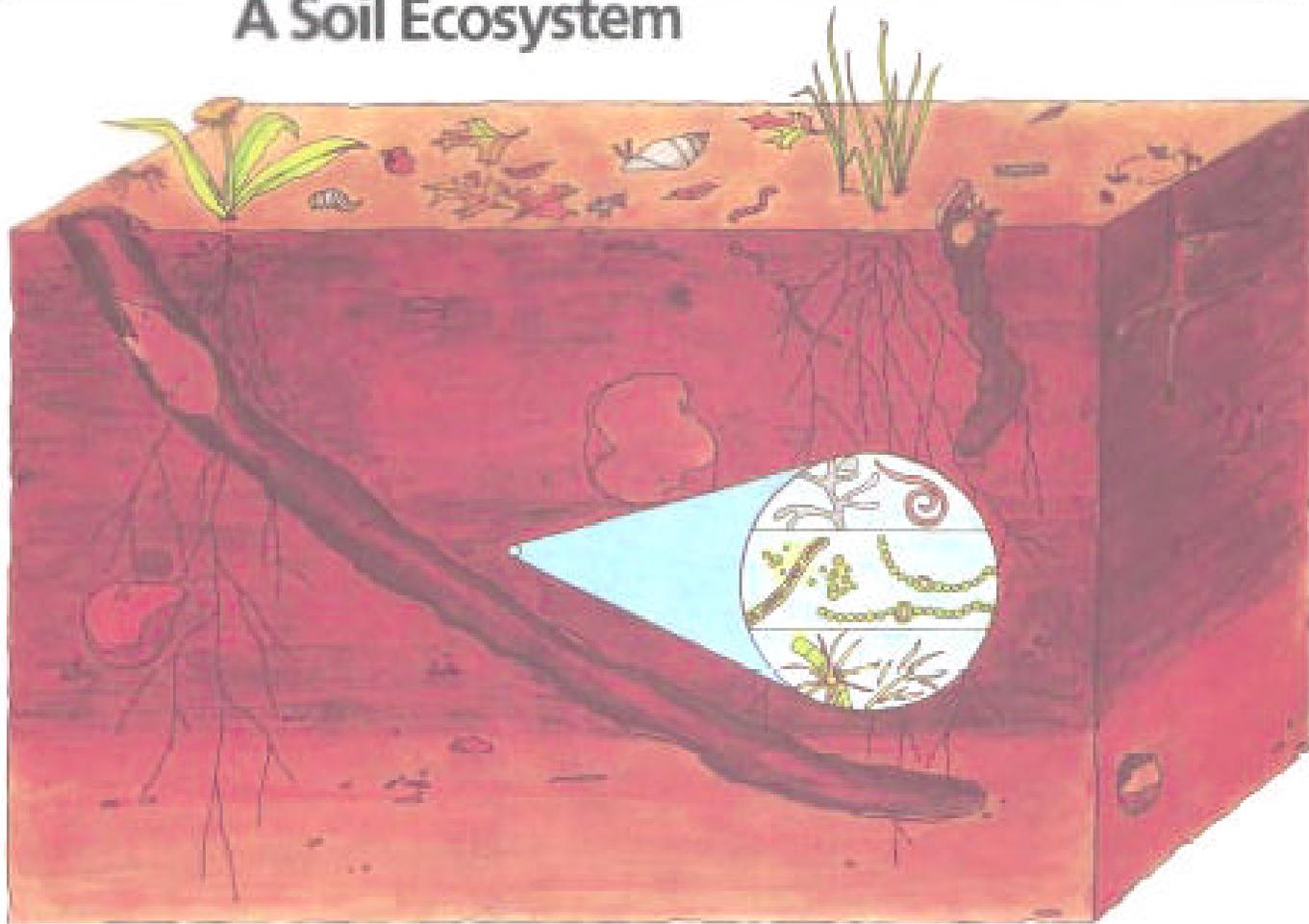
Blocky Structure



Soil Formation

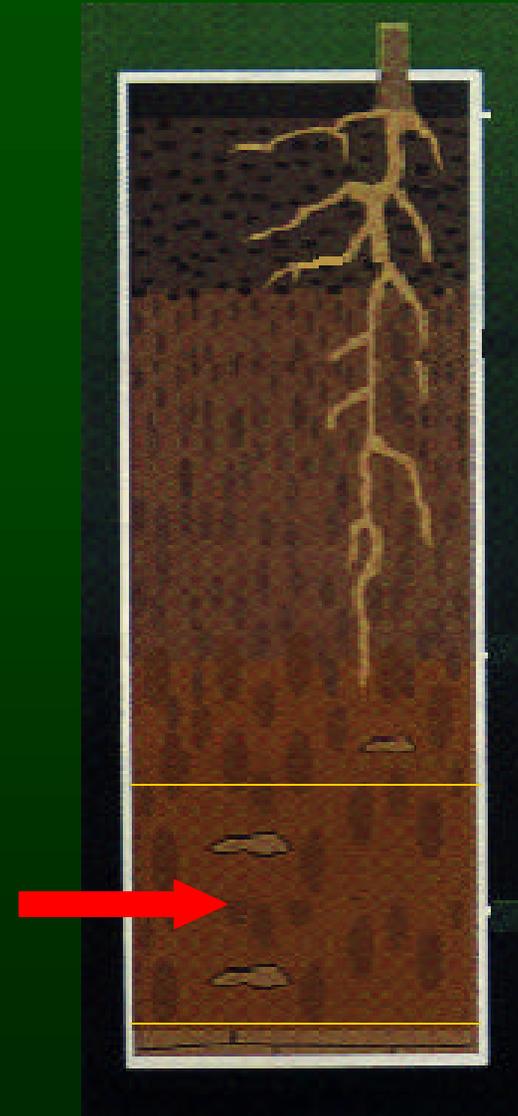


A Soil Ecosystem



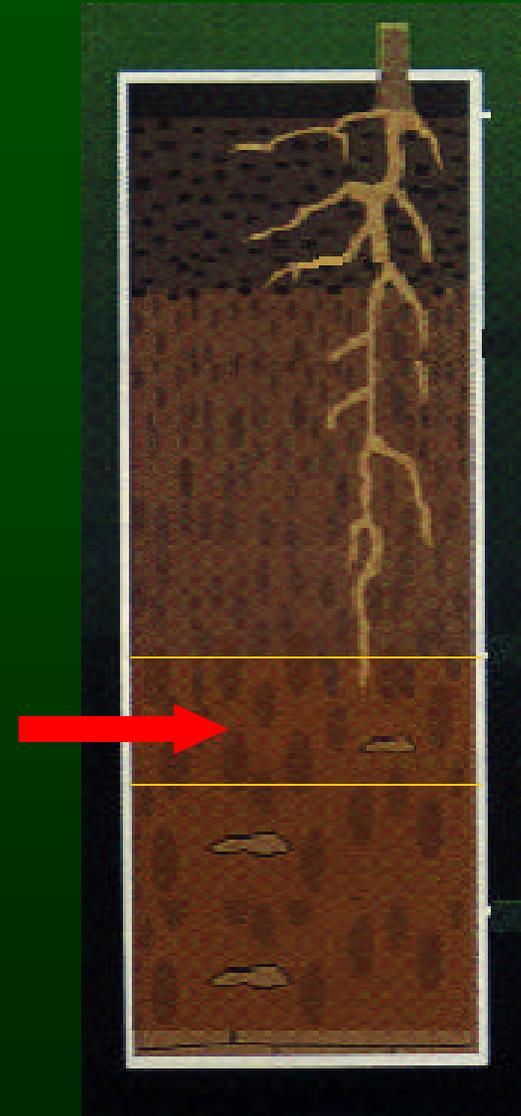
C horizons

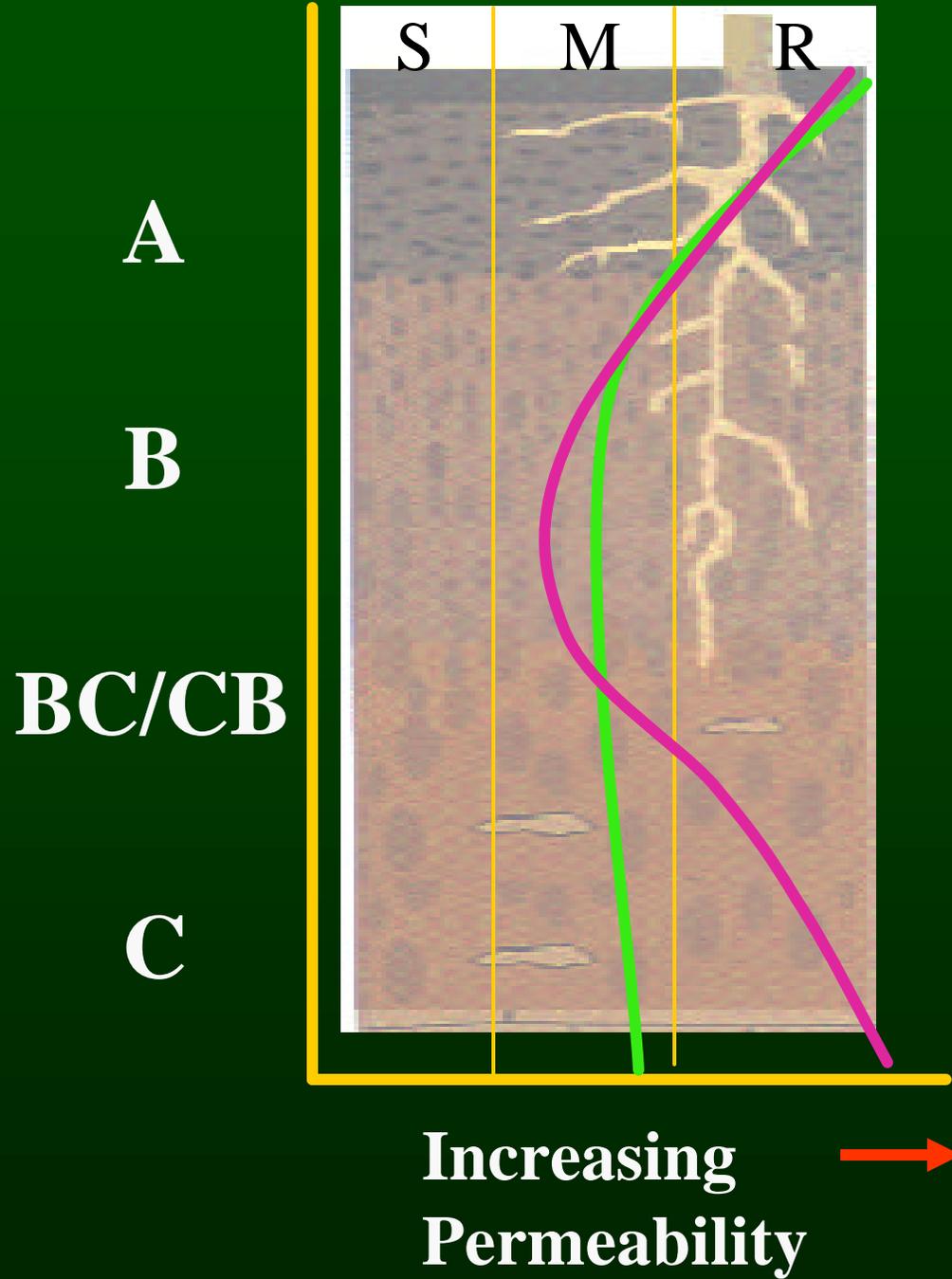
Horizons (*excluding hard bedrock*) that are little affected by soil forming processes and lack the pedogenic development observed in above horizons



BC or CB horizons

Transitional mineral horizons that show evidence of both pedogenic development and rock inherited structure

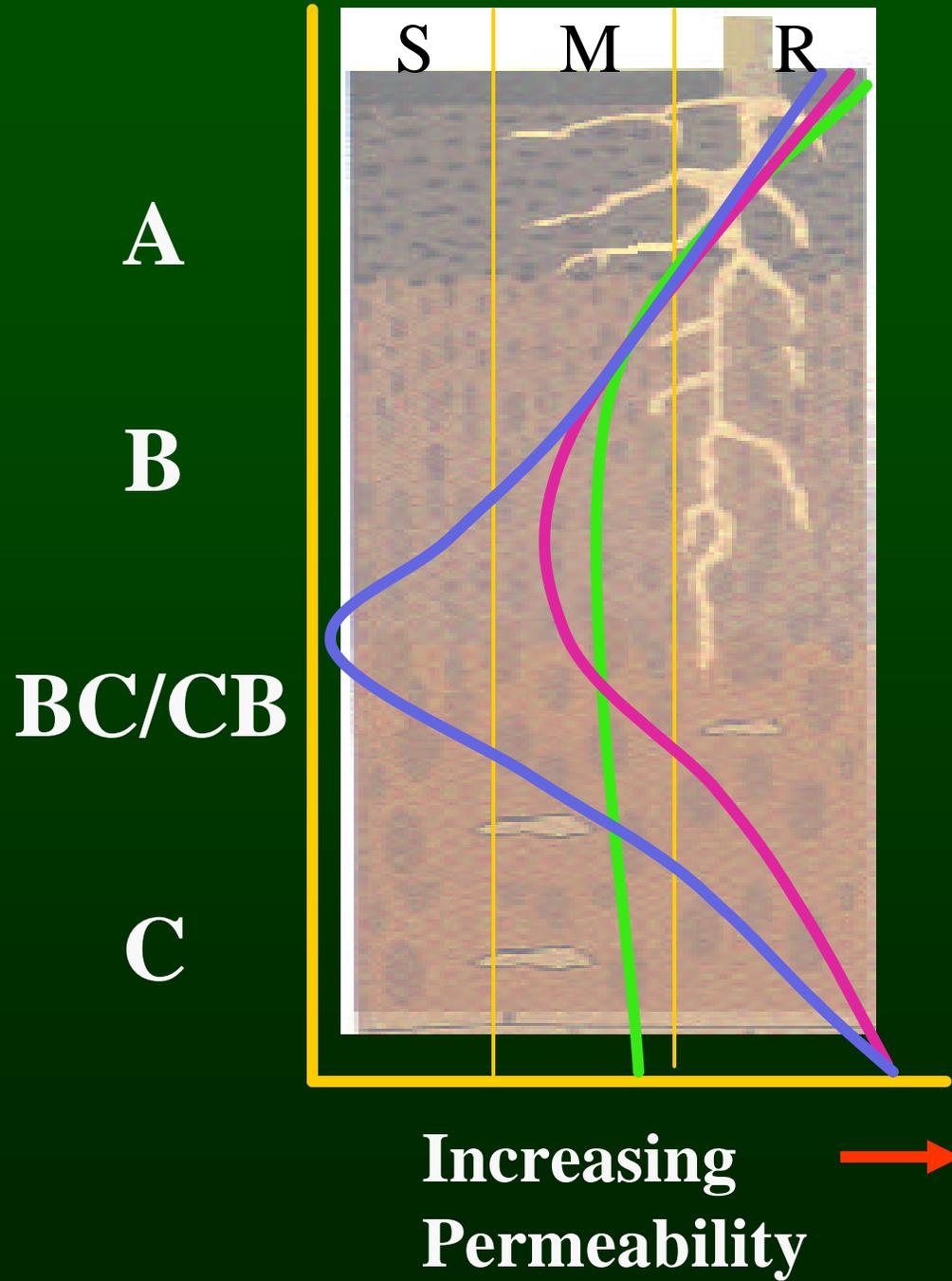




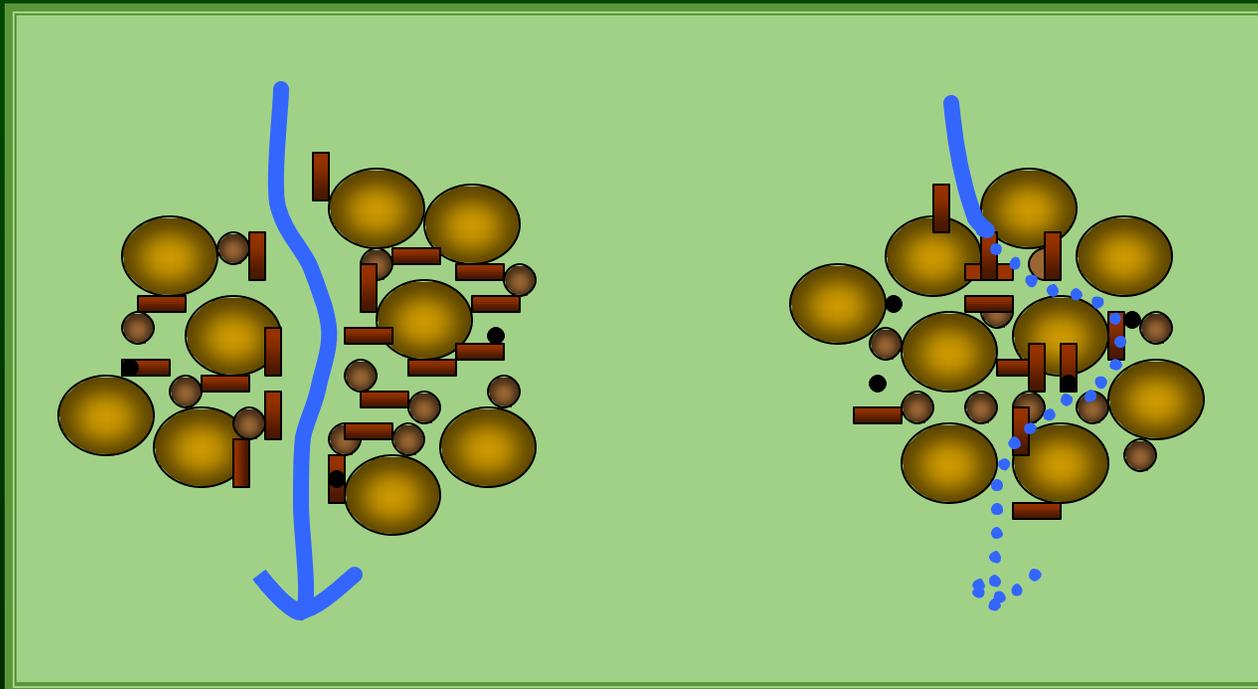
SELECTED RESEARCH

Vepraskas M.J., Guertal W.R., Kleiss H.J., Amoozegar A. 1996. Porosity Factors That Control the Hydraulic Conductivity of Soil-Saprolite Transition Zones. Soil Sci. Soc. Am. J. 60: 192-199.

Amoozegar A., Hoover M.T., Guertal W.R., Kleiss H.J., Surbrugg, 1993. Evaluation of Saprolite for On-Site Wastewater Disposal. Water Resource Research Institute Report 279



Porosity

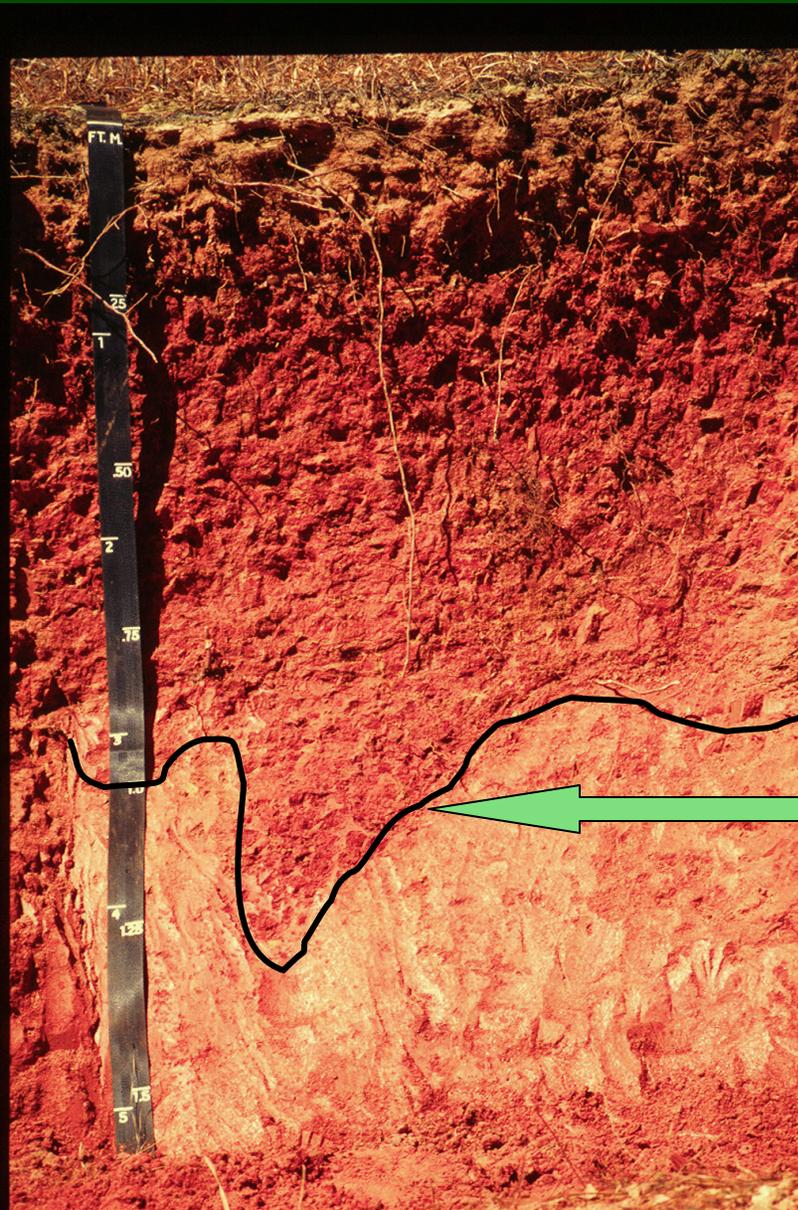


- Cecil, Madison, Lloyd, Pacolet are among the most commonly used soils for on-site waste disposal in the Piedmont Region
- Soil interpretations for septic tank drain fields are “moderate” (percs slowly) in older published surveys / “limited” (restricted permeability) in NASIS reports
- Interpretations are based on the most limiting layer of the soil



Cecil soil

Bt / BC interface



Madison soil

Bt / CB interface

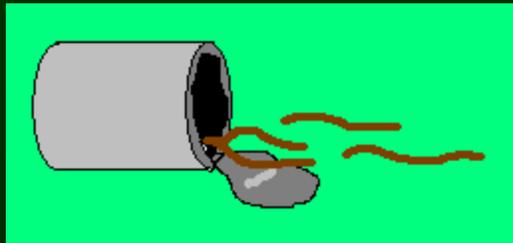


Madison

Bt / C interface
at 24''

?? To Ponder ??

- Is more research needed?
- How significant is the zone of slower permeability to our interpretations?
- How do we present this to our users?



Soil Observation - Soil Auger



Most commonly used (+)

Quick sample (+)

Portable (+)



May destroy structure (-)

**Difficult to evaluate
transition (-)**

Soil Observation - Power Sampling

Quick sample (+)

**Relatively undisturbed
(structure intact) (+)**

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Expensive (-)

**Limited by terrain or
vegetation (-)**

Moisture dependent (-)



Soil Observation - Bank Cut



No cost (+)

Minimal labor (+)

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**Not always easy to
find (-)**

May be disturbed (-)

Soil Observation - Soil Pit

**Best for viewing
soil features and
transitions (+)**



Expensive (-)

Labor intensive (-)

Time consuming (-)

**Not always
practical (-)**

