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

Factors influencing soil formation:
- Climate
- Topography
- Parent Material
- Biological Activity
- Time (Many Years)
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
Increasing Permeability
SELECTED RESEARCH


Increasing Permeability
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"

[Image of a soil profile with a label indicating the Madison Bt/C interface at 24 inches]
?? 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 (+)

Note:

- 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 (-)