Environmental Pedology (SOS 4715C)

Gain hands-on, practical knowledge about soils on the landscape:
— Relating soil - landscape - vegetation - parent material.
— Describing and classifying soils.
— Determining seasonal high water tables.
— Estimating erosion, infiltration, permeability, etc.
— Interpreting suitability for waste disposal, etc.

Spring Semester, M & W, period 4
W, periods 6-9 (field lab)
Questions? Contact Willie Harris
Phone: 392-1951, Ext 251
Email: opettre@ufl.edu

Classification of Soils

Soil Taxonomy Hierarchy

Kingdom
Phylum
Class
Order
Family
Genus
Species

Order 12
Suborder 63
Great group 250
Sub group 1400
Family 8000
Series 19,000
**Mollic Epipedon**

- Thickness: > 18-25 cm
- Color value: < 3.5 moist
- Chroma: < 3.5 moist
- Organic Carbon: > 0.6 %
- Base Saturation: > 50 %
- Structure: strongly developed

Organic carbon = organic matter x 0.58

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**Umbric Epipedon**

Meets all criteria of the Mollic epipedon, except base saturation < 50%

Chemically different than Mollic
**Ochric Epipedon**

Too: thin
light
low in O.M

Mollic
Umbric

Ochric = pale
Extremely common

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**Histic Epipedon**

Organic horizon
Formed in wet areas
Black to dark brown
Low bulk density
20-30 cm thick

Organic = > 20% - 35% O.M.
(water saturation, clay content)

Anaerobic

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**Melanic Epipedon**

Similar in properties to Mollic
Formed in volcanic ash
Lightweight, Fluffy

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Anthropic Epipedon

- Resembles mollic (color, o.m.)
- Use by humans
- Shells and bones
- Water from humans

Plaggen Epipedon

Produced by long-term (100s yrs.) manuring
Old, human-made surface horizon
Absent in U.S.
> 50 cm thick

Diagnostic Surface Horizons

Epipedons

<table>
<thead>
<tr>
<th>Mollic</th>
<th>Very common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umbric</td>
<td></td>
</tr>
<tr>
<td>Ochric</td>
<td></td>
</tr>
<tr>
<td>Histic</td>
<td></td>
</tr>
<tr>
<td>Melanic</td>
<td>&quot;specialized&quot;</td>
</tr>
<tr>
<td>Plaggen</td>
<td></td>
</tr>
<tr>
<td>Anthropic</td>
<td>Human-derived</td>
</tr>
</tbody>
</table>
Organic Matter Accumulation

$\text{Organic Matter Accumulation}$

$t_{\text{max}} = 3000 \text{ yrs}$

Diagnostic Sub-surface Horizons

Diagnostic Subsurface Horizons

- Formation
- Translocation
- Transformation

- Clays
- Organic Matter
- Oxides
Organic Matter

Clays

Kaolinite

Oxides

Iron

Aluminum

Also: salts, carbonates, sulfides

Subsurface Horizons

Formation

Translocation

Transformation

Diagnostic Subsurface Horizons

Albic

Argillic

Spodic

Oxic

Cambic

Kandic

Sombric

sulfuric

Aeric

Calcic

Gypsic

Salic

Duripan

Fragipan

Placic

Sub-Horizon Designations

Diagnostic Subsurface Horizons

Albic (white) Horizon

Light-colored (Value > 6 moist)

Elluvial (E master horizon*)

Low in clay, Fe and Al oxides

Generally sandy textured

Low chemical reactivity (low CEC)

Typically overlies Bh or Bt horizons

*not all E horizons are albic horizons
**Diagnostic Subsurface Horizons**

**Argillic Horizon**
- Illuvial accumulation of silicate clays
- Illuvial based on overlying horizon
- Clay bridges
- Clay coatings

**Diagnostic Subsurface Horizons**

<table>
<thead>
<tr>
<th>Argillic Horizon</th>
<th>Kandic Horizon</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Activity</td>
<td>Low Activity</td>
</tr>
<tr>
<td>Necessary</td>
<td>Not Necessary</td>
</tr>
</tbody>
</table>

**Spodic Horizon**
- Illuvial accumulation of organic matter and aluminum (+/- iron)
- Dark colored (value, chroma < 3)
- Low base saturation (acidic)
- Formed under humid acid conditions
Elluviation and Illuviation

Elluviation (E horizon)

- Organic matter
- Clays
- Bh horizon
- Bt horizon
- Spodic horizon
- Argillic horizon

Diagnostic Subsurface Horizons

Oxic horizon
- Highly weathered (high temperatures, high rainfall)
  - High in Fe, Al oxides
  - High in low-activity clays (kaolinite < smectite < vermiculite)

Diagnostic Horizons

<table>
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<th>Subsurface</th>
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Soil Taxonomy

Diagnostic Epipedons
Diagnostic Subsurface horizons
Moisture Regimes
Temperature Regimes

Check Your E-mail