**Class Update**

- **Homework**
  - HW1 is graded
  - Range of 9.3 to 10 with mean of 9.54
  - Best HW: Erin and Stephanie
  - Send to questions to Ling

- **Two lectures on Wednesday**
  - Finish a week ahead

**Review of Basic Soils**

1. Soil and its functions
2. Soil formation and classification
3. Soil physical properties
4. Soil water
5. Soil colloids
6. Soil acidity and alkalinity
7. Soil organisms
8. Soil organic matter

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**Buffering & buffering capacity**

- **Buffer capacity (BC)**
  - CEC
  - Colloids
    - Humus
    - Layer silicates: 2:1, 1:1
    - Oxides
  - High BC
    - Soils with high BC required more lime for a given change in soil pH

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**CEC & pH of 9 soil orders**

<table>
<thead>
<tr>
<th>Soil order</th>
<th>CEC (cmol+/kg)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entisols</td>
<td></td>
<td></td>
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<tr>
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<td>Spodosols</td>
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<tr>
<td>Ultisols</td>
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Review of Basic Soils

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Soil organisms & organic matter

- Earthworm
- Plant Roots
- C/N ratios
- Decomposition
- Humus
- Factors affecting SOM

Soil Organism

- 100,000-1,000,000,000 /g soil
- 10,000 species/g soil
- Organic C to inorganic C

Earthworm

- Eat soil: 2-30 times of their own wt.
- Casts: earthworm’s wastes
- Vermiculture
Plant Roots

- Soil organisms
  - Food & energy supply
- Root mass
  - 1/4 of aboveground crop
- Rhizosphere:
  - Zone around the root (1-2 mm)
  - High in nutrient

Total As in rhizosphere and bulk soils

<table>
<thead>
<tr>
<th></th>
<th>Rhizosphere</th>
<th>Bulk</th>
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</thead>
<tbody>
<tr>
<td>Archer Feed Store</td>
<td>4.42±0.23</td>
<td>2.28±0.73</td>
</tr>
<tr>
<td>Archer Ministorage</td>
<td>26.5±1.72</td>
<td>4.07±0.05</td>
</tr>
<tr>
<td>Crystal River Quarry</td>
<td>46.3±1.58</td>
<td>0.99±0.03</td>
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<tr>
<td>Rainbow Springs</td>
<td>235±25.6</td>
<td>0.07±0.02</td>
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</tbody>
</table>


C/N ratios of organic matter

- Importance of C/N ratios
  - Plant residues: C= 45-58%, N=1-6%
  - Competition for N at a high C/N ratio

- Various C/N ratios
  - Soils 8/1 to 15/1 (10/1 to 12/1)
  - Microbes 5/1 to 10/1
  - Legume 10/1 to 30/1
  - Sawdust 400/1 to 600/1

Factors affecting SOM

- Temperature
  - ↑↓
- Rainfall
  - ↑↑
- Vegetation
  - Grassland > forest
- Soil texture
  - ↑↑
- Drainage
  - ↑↓
- Tillage
  - ↑↓