AGRY 515

Nutrient Bioavailability – see PowerPoint file**:**
SoilNutrientBioavailability_Slide_2012

Where are the nutrients in the plant-soil system?

- Minerals (weathering)
- Non-exchangeable Sites (fixation and release) – **Fig.1**
- Cation Adsorption Sites (exchange)
- Anion Adsorption Sites (non-specific and specific adsorption)
  - Ligand exchange
  - Precipitation and dissolution
- Organic Matter
  - Litter (decomposition / mineralization)
  - Microbes (immobilization and mineralization)
- Soil Solution (assimilation and leaching)
- Standing Biomass (assimilation, plant demand)

Compare / Contrast an agroecosystem with a forest ecosystem...

What is nutrient bioavailability? – **Fig. 2**
- Compare / Contrast factors and / or processes controlling N and K availability – **Fig. 3**

What controls bioavailability? – **Fig. 4**

How do you quantify bioavailability?
- **Ask the plant** - field plant plot trials

  Advantages / Disadvantages???

  Ask the soil - determine the amount of nutrient in various nutrient pool(s)

  What is soil buffer power? – **Fig. 5, Fig. 6**
  - intensity: concentration in the soil solution

quantity: amount of nutrient ion in the soil solution and in other pools that replenish the soil solution.

Nutrient Movement in Soils

How do nutrients move in soils? – **Fig. 7**

How do nutrients arrive at the root surface?

Mass Flow – Table 1

Root Interception

Diffusion – Table 2

- Diffusion coefficient
- Effective diffusion coefficient
- Volumetric water content
- Tortuosity
- Buffer power

Nutrient Concentration in the Rhizosphere – Fig. 8 – 11