

AGRY 515

Nutrient Bioavailability – see PowerPoint file: **SoilNutrientBioavailability_Slides_2008**

Where are the nutrients in the plant-soil system?

- Minerals (weathering)
- Non-exchangeable Sites (fixation and release)
- 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. 1**

Compare / Contrast factors and / or processes controlling N and K availability – **Fig. 2**

What controls bioavailability? – **Fig. 3**

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. 4, Fig. 5**

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?

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. 6, Fig. 7