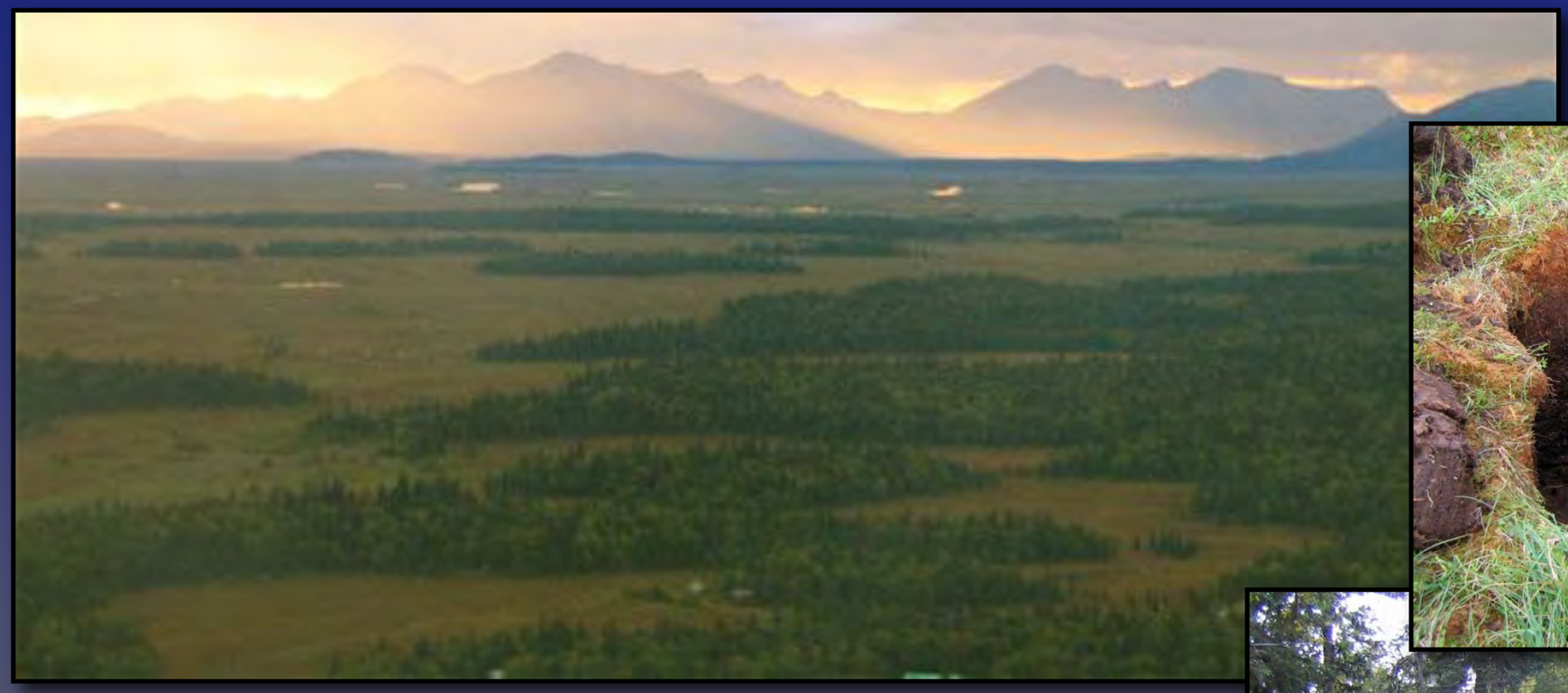
Qualities of Good Garden Soil



Alaska's horticultural soil characteristics

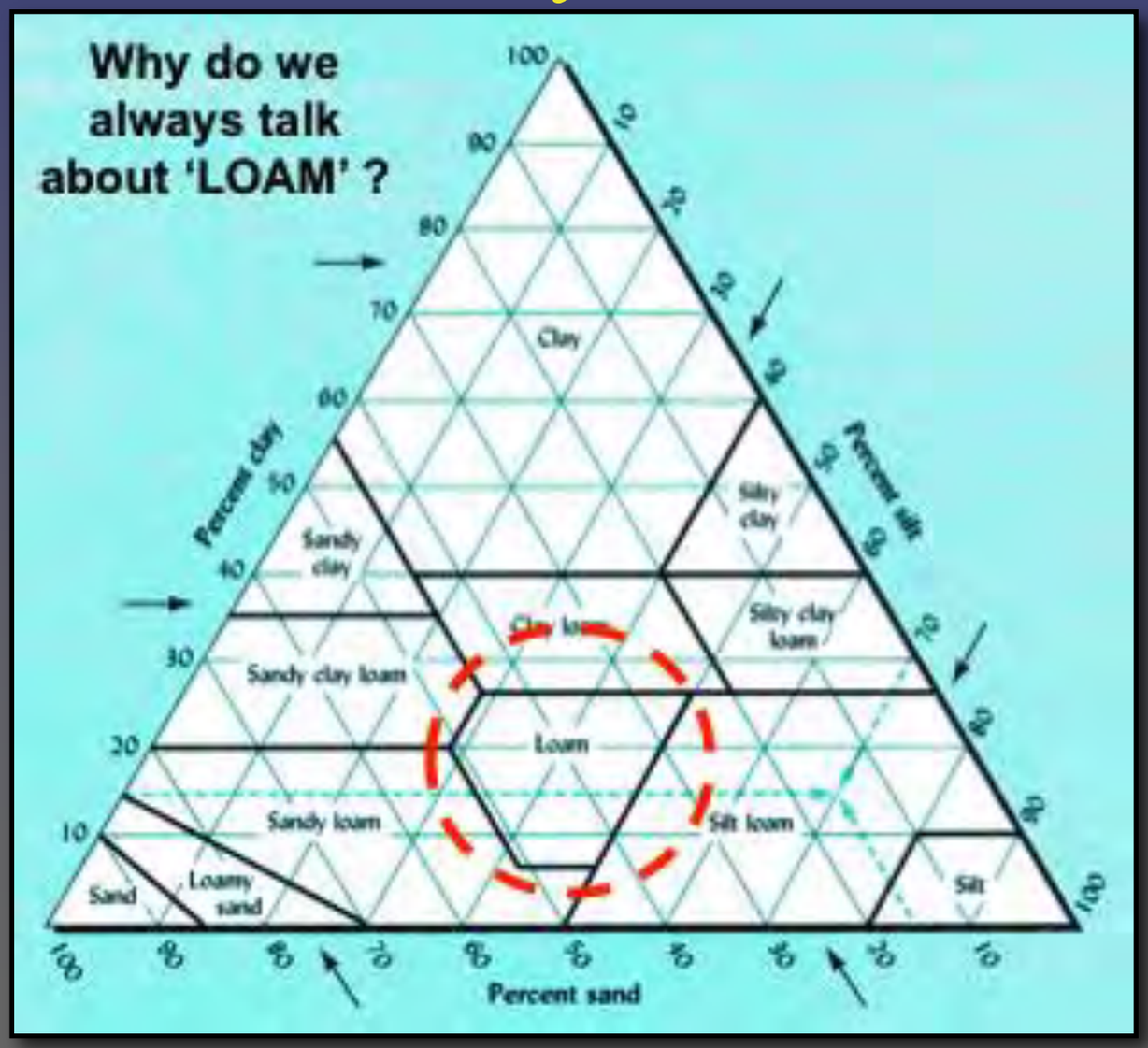
Jodie Anderson – Alaska Farm to School Conference
13 January 2015

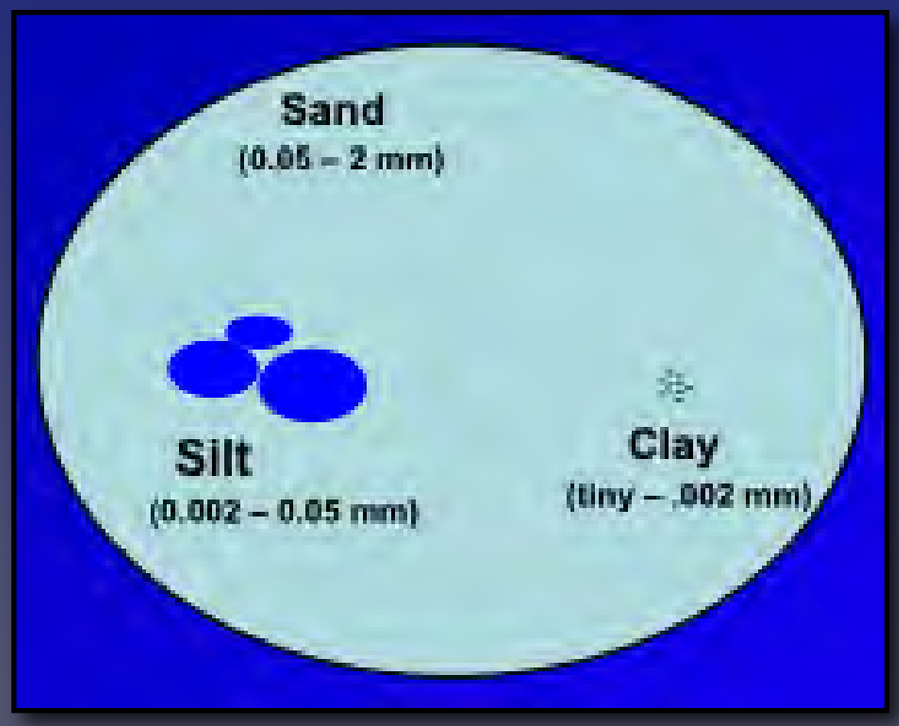
Major Roles of Soil:

- Physical
- Chemical
- Biological

Physical Characteristics of Soil

- Texture: a property that is difficult to change naturally

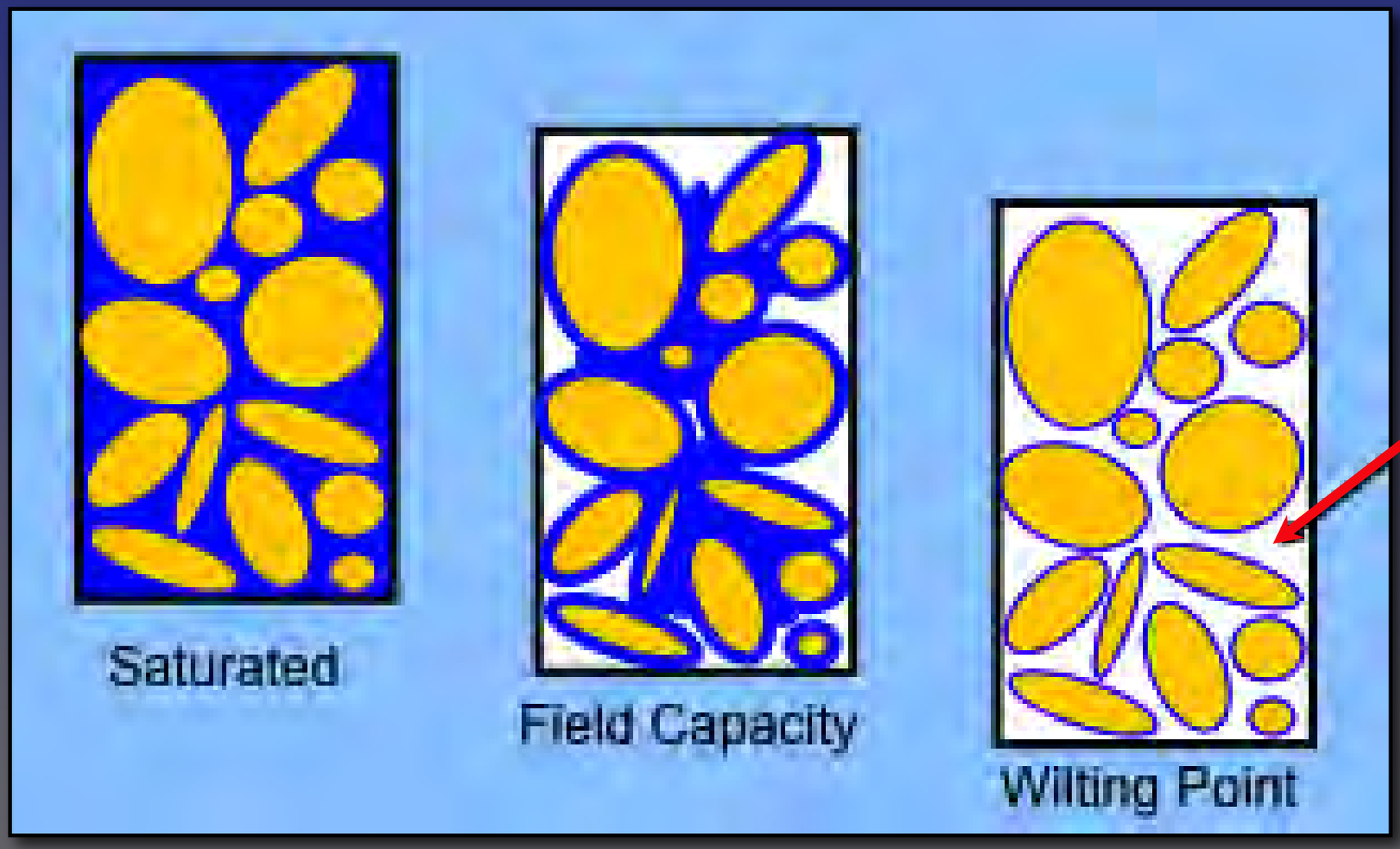




Sand is 1,000 - 10,000 times larger than clay

Silt is 10 - 100 times larger than clay

Water holding capacity: the ability of a soil to hold water



Large pores = good drainage

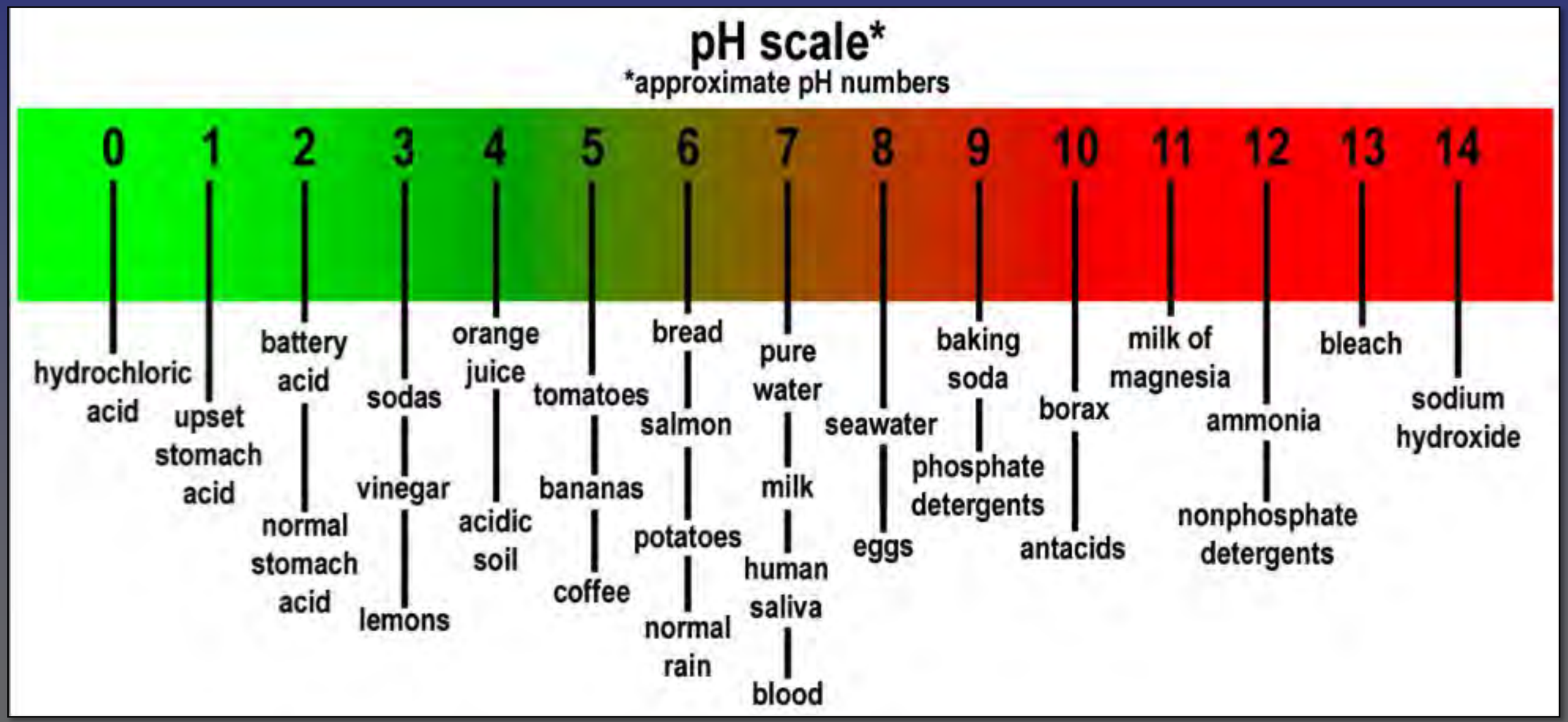
Sand drains faster than silt or clay

Chemical Characteristics of Soil

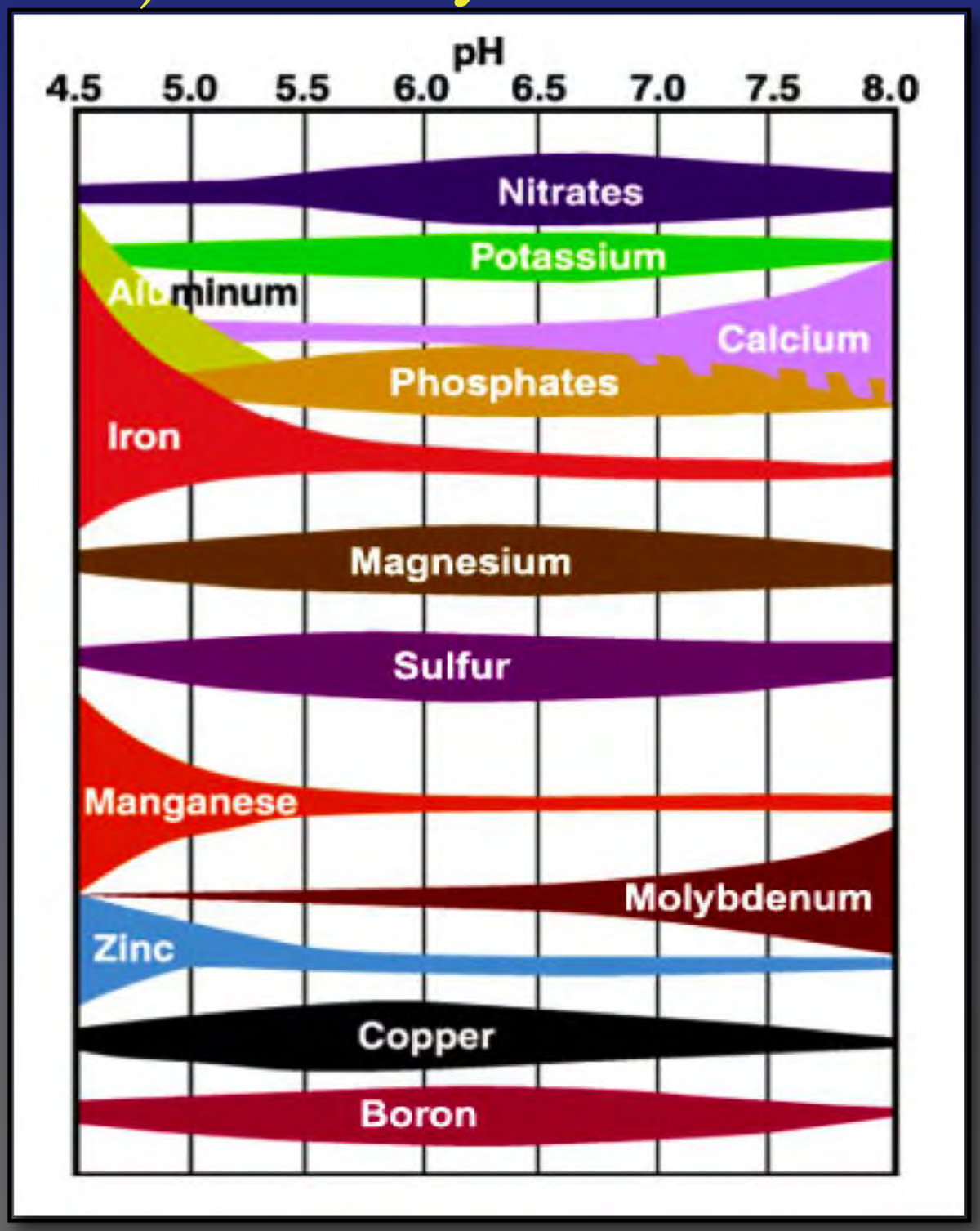
Soil testing: what you need BEFORE you add anything to your soil

- Take a soil sample
- Send it off to a lab
- Interpretation of results for recommendations

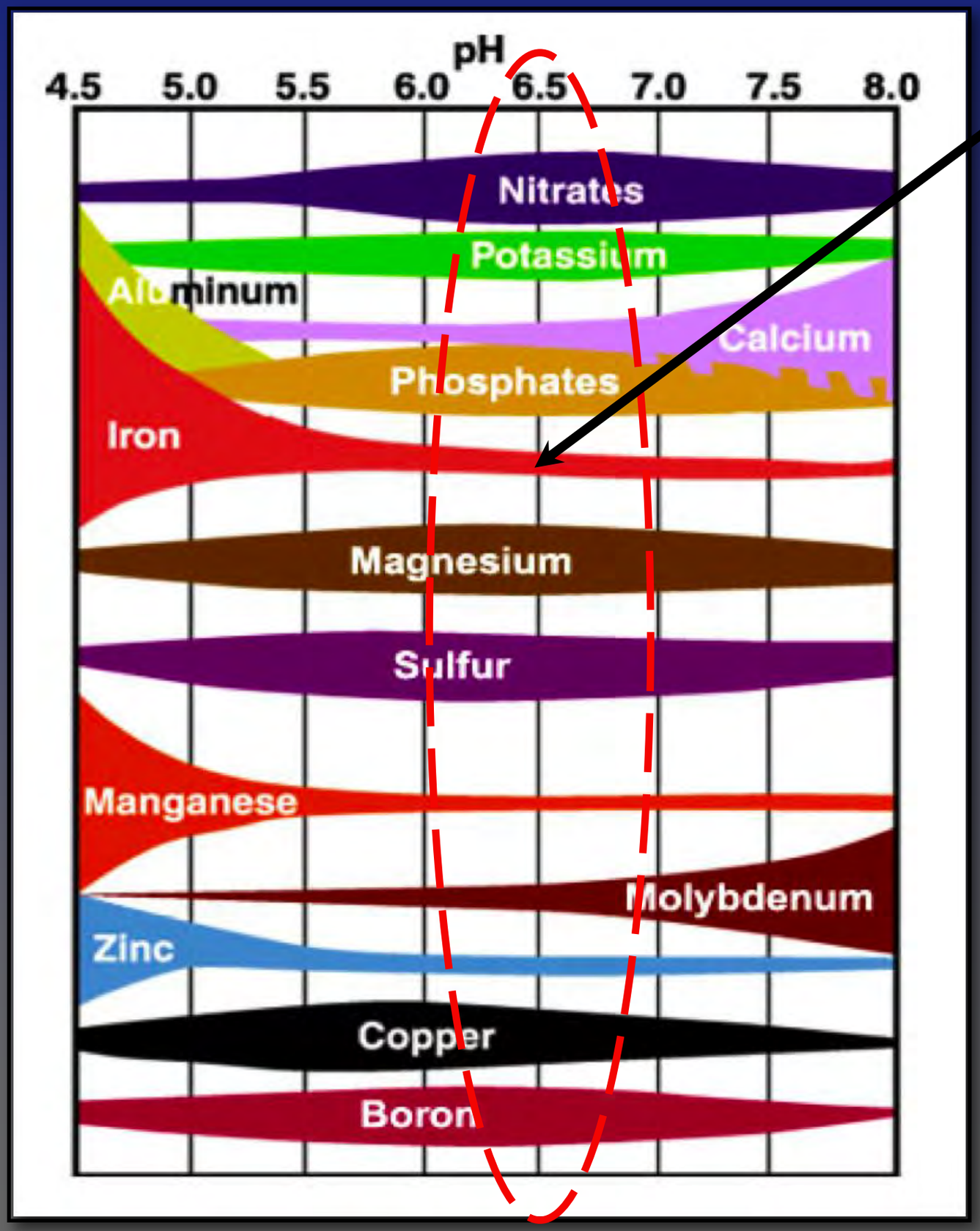
Soil pH: the amount of acid or base in your soil - peat is VERY acidic



Soil pH influences plant growth in three major ways:



- affects the availability of plant nutrients
- affects the activity of soil microbes
- affects the availability of soil metals that can be toxic to plants in high concentrations



Aluminum and Iron are much less available - not so toxic to plants

Macronutrients N, P, K are readily available for plants

Adjusting soil pH

- Raising soil pH - make it less acidic (most common for peat and tundra soils)
  - Add ground limestone - least expensive
  - Add dolomitic limestone when magnesium is needed
  - Add wood ash - could cause salt issues

- Lowering soil pH - make it more acidic
  - Add elemental sulfur
  - Add ammonium sulfate fertilizer
  - Add urea fertilizer (N fertilizer)

This can take several seasons for large changes

Soil Nutrients

- Macronutrients - Primary (need by the semi-load)
  - Nitrogen (N)
  - Phosphorus (P)
  - Potassium (K)
- Macronutrients - Secondary (need by the pickup)
  - Calcium (Ca)
  - Magnesium (Mg)
  - Sulfur (S)
- Micronutrients (need by the teaspoon)
  - Zinc (Zn)
  - Iron (Fe)
  - Boron (B)
  - Copper (Cu)
  - Manganese (Mn)
  - Molybdenum (Mo)
  - Chlorine (Cl)
  - Nickel (Ni)

Soil Fertilizers (supplements)

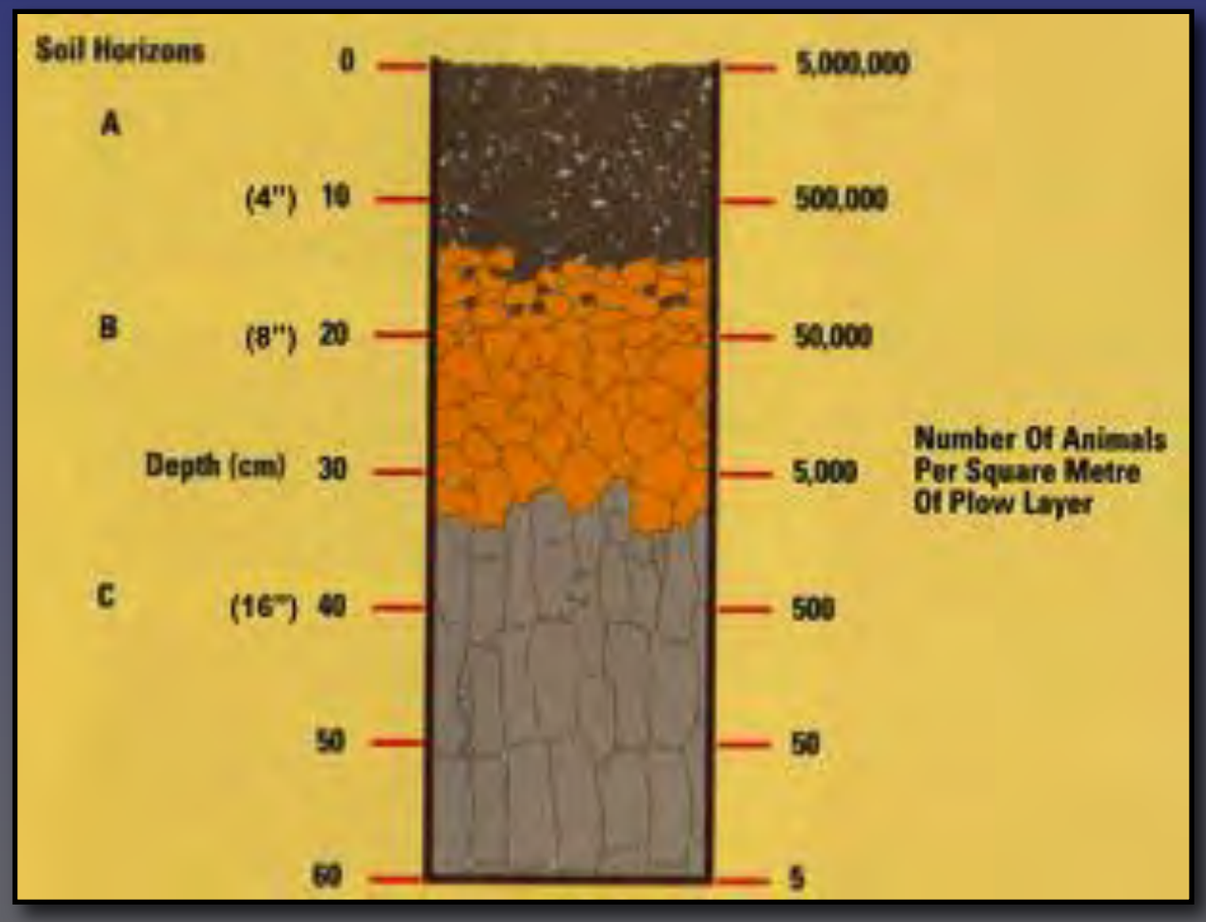
- Organic (natural materials with little processing)
  - Manure (2-2-1)
  - Fish Meal (10-4-0)
  - Legumes
  - Limestone
- Synthetic/conventional (manufactured or mined)
  - Triple phosphate (0-46-0)
  - Potassium chloride (0-0-60)
  - 10-10-10
  - Urea (46-0-0)
- Certified organic (natural material, can be processed)
  - Alfalfa pellets
  - Blood meal (15-1-1)
  - Green sand (0-0-5)

N-P-K pattern remains the same regardless of the material - it has to, it is the law!!

Biological Characteristics of Soil

- Soil biology: most topsoil has passed through the gut of a soil animal!!

- Influences soil structure
- Influences nutrient cycling
- Indicates soil health (healthy soil = many "bugs")



A power of 10 loss of organisms every 4 inches

Soil Biology Recommendations

- Add organic material that will break down quickly to build up the biological environment for "bugs"
- Organic material you can add:
  - Compost
  - Manure
  - Chicken house stuff
- Increasing soil biology will improve your soil and THAT will improve your plants!!!

Building Your Own Soils from What You Find Around Home

Western Sustainable Agricultural Research and Education (WSARE) Grant – Online Video:

Building Soils in Alaska Communities

- River bank perspective (Bethel)
- Ocean shore perspective (Angoon)