

Plain Talk About Soil Chemistry

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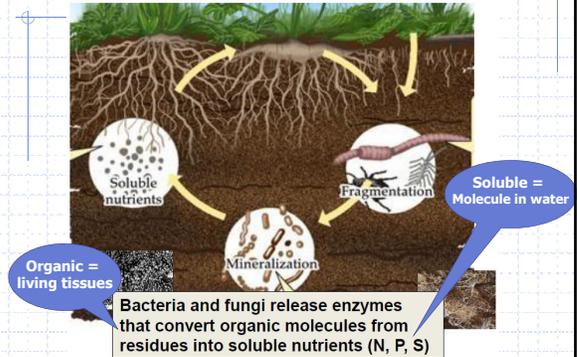
Plant nutrients must be dissolved in water.

Dissolve-ability impacts availability.

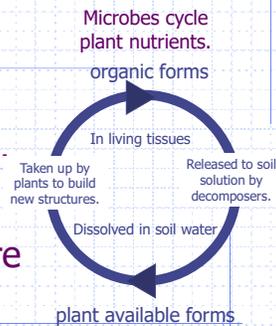
- ◆ Some nutrients easily dissolve in water.
- ◆ Some nutrients take years to dissolve.
- ◆ Application timing can be your ally – or your enemy.

Soil Biology and Plant Nutrients

Stott, Moebius-Clune, Moore-Kucera: NRCS

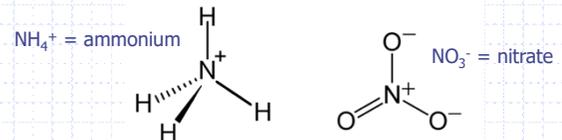


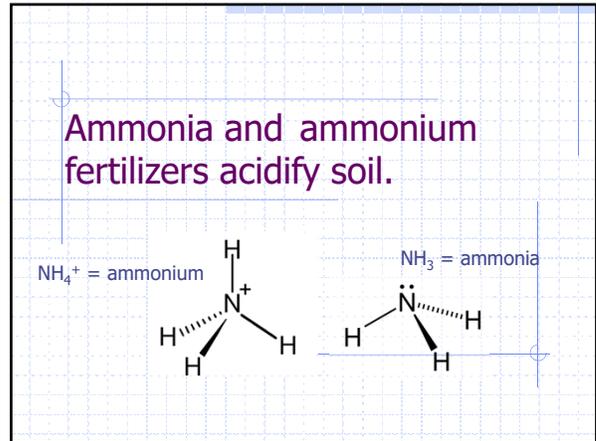
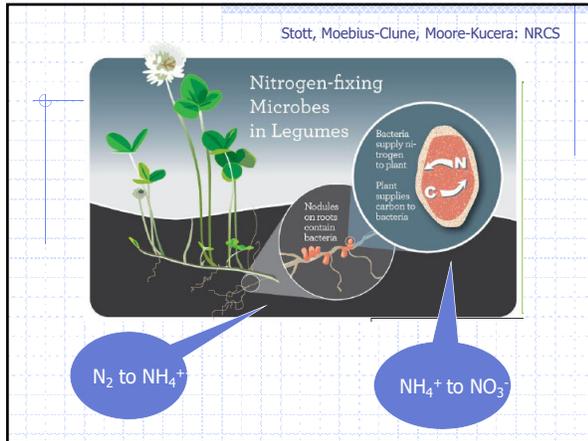
Whatever its initial form, some fertilizer is cycled by microbes before being used by plants.



Plants recognize 2 forms of nitrogen

- ◆ NH_4^+ - plants adapted to acidic soils
- ◆ NO_3^- - plants adapted to neutral or alkaline soils



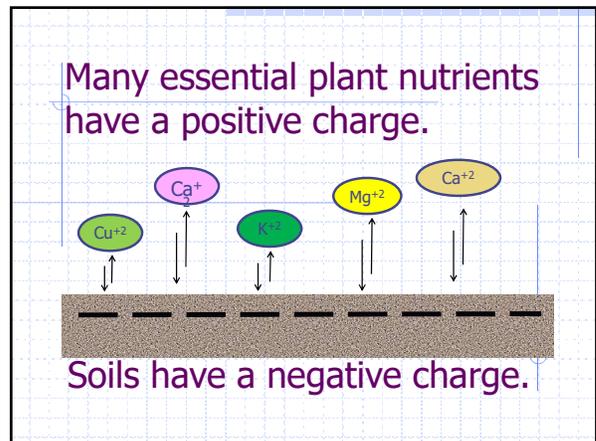


Like diamonds, clay soils are forever.

Pop Quiz:

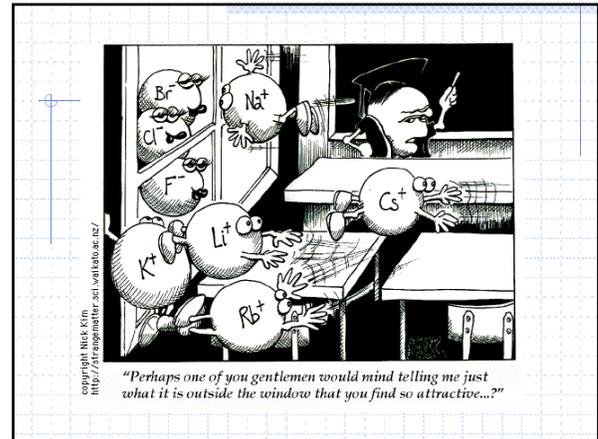
What is the charge on soils?

Soils have a negative charge.

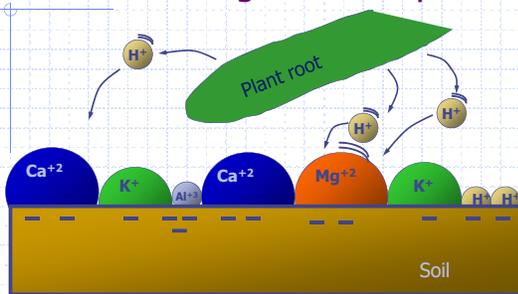


Attraction is everything in fertility management.

- ◆ Nutrient management is like teenagers in love.
- ◆ Timing determines nutrient use.
- ◆ Cations = + charge
- ◆ Anions = - charge
- ◆ Cation Exchange Capacity

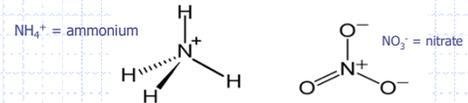


Cation Exchange is a Swap Meet.



Roots are fussy shoppers.

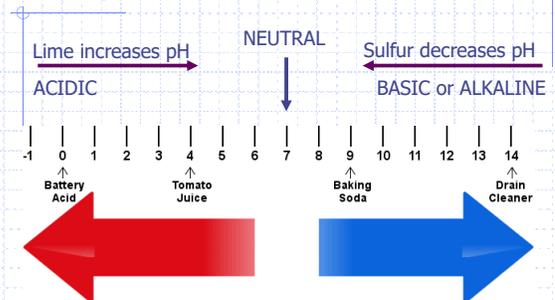
- ◆ Roots recognize only specific nutrient forms.
- ◆ Nitrogen is the only nutrient plants can recognize in each of two forms.



Right soil pH unlocks nutrient availability.

- ◆ pH controls nutrient form and dissolvability.
- ◆ Growers can impact soil pH.

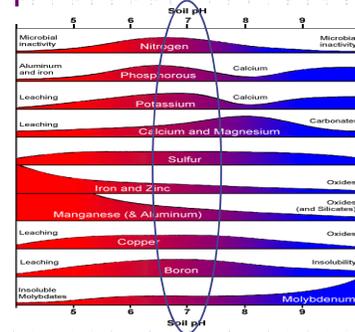
The pH Scale



Lime – 2 chemical forms

- ◆ Agricultural lime – Calcium carbonate
- ◆ Dolomitic lime – Calcium magnesium carbonate
- ◆ *It's the carbonate that changes pH, not the calcium or the magnesium!*
- ◆ Gypsum – CaSO_4 – provides calcium but does not change pH.
- ◆ Repeated compost applications tend to sustain soil pH.

Soil pH & Nutrient Availability



Home soil test kits are OK . . . maybe

- ◆ The results ain't necessarily so
- ◆ You don't need to be a rocket scientist to recognize a problem

Summing it all up:

- ◆ Nutrients must be dissolved in water.
- ◆ Soil pH impacts availability.
- ◆ Roots are fussy shoppers.
- ◆ Soil has a negative charge.
- ◆ NH_3 and NH_4^+ acidify soil.
- ◆ Home soil test kits.

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