


Organic Food Production

*Soil Science
Fertilizers*
by
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Primary Nutrients


- A primary nutrient is one needed in large quantities by plants and usually needs to be added:
 - Nitrogen (N)
 - Phosphorus (P)
 - Potassium (K) also called “potash”



N-P-K

Nitrogen (N)

- Essential to nearly all aspects of growth
- Highly water soluble...particularly in sandy soils
- There are various forms of N
 - Elemental (air)
 - Ammonium (NH₄)
 - Nitrite (NO₂)
 - Nitrate (NO₃)

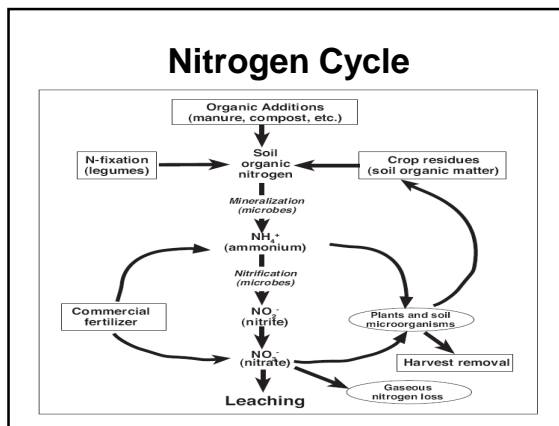


7

N


14.01

Yellowing of leaves



Phosphorus (P)

- Allows plants to harvest energy derived from photosynthesis
- Important for root and leaf development
- Cold soils greatly impair P uptake



15


P

30.97

Purpling of leaves

Potassium (K)

- Potassium allows plants to utilize nitrogen and water
- Rivals nitrogen for amount used



19

K

39.10

Marginal scorching

Secondary Nutrients

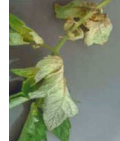
- Secondary nutrients are macronutrients that are usually not limited in the soil
 - Calcium (Ca)
 - Magnesium (Mg)
 - Sulfur (S)

Usually deposited by weathering of parent material

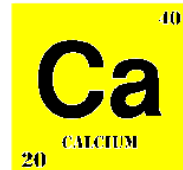


Calcium (Ca)

- Essential for the functioning of cell walls and membranes
- Especially important for fruits
- Rarely deficient if correct pH



Calcium deficiency in tomatoes

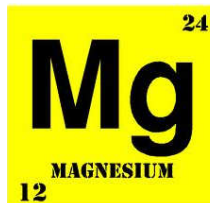


Magnesium (Mg)

- Mg is a component of chlorophyll
- Works with Phosphorus to drive plant metabolism

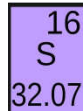


Yellowing due to little magnesium



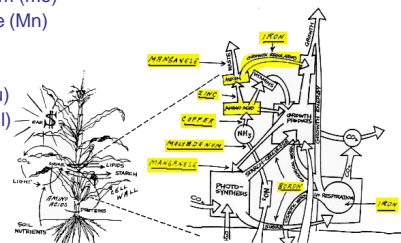
Sulfur (S)

- Component of 3 of the 21 essential amino acids
- Important for protein production
- S deficiency causes light green/stunted plants
- Alaska forage crops respond well to additional Sulfur



Micronutrients

- Availability of most micronutrients is largely pH dependent; availability decreases as pH increases or decreases
 - Molybdenum (Mo)
 - Manganese (Mn)
 - Boron (B)
 - Zinc (Zn)
 - Copper (Cu)
 - Chloride (Cl)
 - Nickel (Ni)
 - Iron (Fe)



Mycorrhizae fungus



Some Organic Fertilizers

	N	P	K
• Fishmeal w/crab	7	5	1
• Mission Beach kelp	2	0	.5
• Whitefish meal	11	3	.5
• Pollock fishmeal	11	2.5	1
• Salmon meal	11	2	1
• Wood ash	0	1	3
• Chicken manure (dry)	2	2	2
• Cow manure (dry)	1	2	2

Commonly Available Conventional Fertilizers

- 16-16-16 all purpose fertilizer
- 10-20-20 excellent flower and veggie fert.
- 8-32-16 good flower and veggie fertilizer
- 22-11-11 lawn fertilizer
- 22-4-4 lawn fertilizer
- 22-4-4 w/weed & feed

