

Veteran & New Farmer Program

Principles of Plant Nutrition for Soil Mixes

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Support from:



Basic Soil Components

- 25% Air
- 25% Water
- 40-45% Minerals
- 5-10% Organic Matter (OM)
 - Includes all the living things in the soil
 - Can be much higher in soil mixes

Today we want to do a basic overview of plant nutrients and components of soil mixes.

13 Essential Soil Based Plant Nutrients

- Primary Macronutrients:
 - Nitrogen (N)
 - Phosphorus (P)
 - Potassium (K)



13 Essential Soil Based Plant Nutrients (cont.)

- Secondary Macronutrients: support for appropriate plant development
 - Calcium
 - Magnesium
 - Sulfur



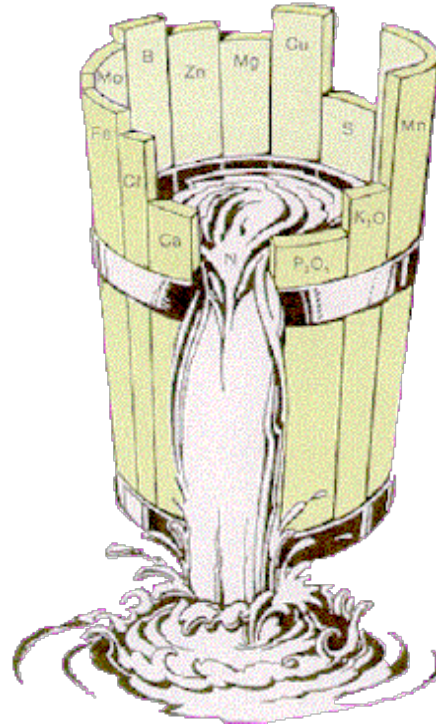
13 Essential Soil Based Plant Nutrients (cont.)

Micronutrients:

- Copper
- Boron
- Iron
- Chloride
- Manganese
- Molybdenum
- Zinc



Liebig's Law of the Minimum Nutrient Balance



"The availability of the most abundant nutrient in the soil is only as good as the availability of the least abundant nutrient in the soil."

**Do not feed your
plant!**

**Feed the soil, and the
soil will take care of
your plants!**

“Old School” Nutrient Management

- Fertilize heavily with commercial fertilizer infrequently to save on labor
- Heavy Commercial Fertilizer:
 - Prone to leaching, Run-off
 - Burn plants (many are salt based)

It is better to apply smaller amounts of fertilizer frequently.

“New School” Nutrient Management

- Fertilizer:
 - Smaller amounts more frequently
 - Fertigation (fertilizer in irrigation water)
- Mulch and other Organic Matter Sources:
 - Increases water and nutrient holding capacity
 - Increases soil tilth/quality
 - Increases soil organism activity
 - Releases nutrients slowly as it breaks down

Sources of Plant Nutrients

Inorganic Sources

- 16-16-16, or 10-20-20, or Miracle Grow etc.

Organic Sources

- Organic Mulch: Nutrient rich, slow release
- Compost: Nutrient rich, microbial activity
- Manure: Cow: 10-3-9

Poultry: 30-20-10

- Earthworm castings: 1-0-0, high bioactivity
- Coffee Grounds: 2-.3-1

Sources of Organic Plant Nutrients

- Fish meal: 9-5-4
- Fish emulsion: 4-1-5
- Bone meal: 4-12-0
- Blood meal: 13-1-1
- Wood ash: 0-1-10 *High with micronutrients, **raises soil pH**
- Seaweed: @ 12% Potassium, trace elements

Locally Available Ingredients & “Home Grown” Potting Soils

Available Ingredients: Washed sand, coconut coir, mulch, compost, composted manures, peat moss, vermiculite/perlite, local clay or soil (will give weight to soil mixes).

Some possible mixes include

- Coconut coir (husk) 80%, perlite, compost
- 1:1:1 Soil, peat moss (or sifted mulch), sand
- Compost, peat moss (or sifted mulch), vermiculite or
- Try your own blend of local materials