SOIL NUTRIENTS AND ADMENDMENTS

MATTHEW PETERSCHMIDT

RESTON GARDENERS MEETING, 2013

PLANT NUTRIENTS

CHOPKNS CaFe Mg B Mn ClZn Mo

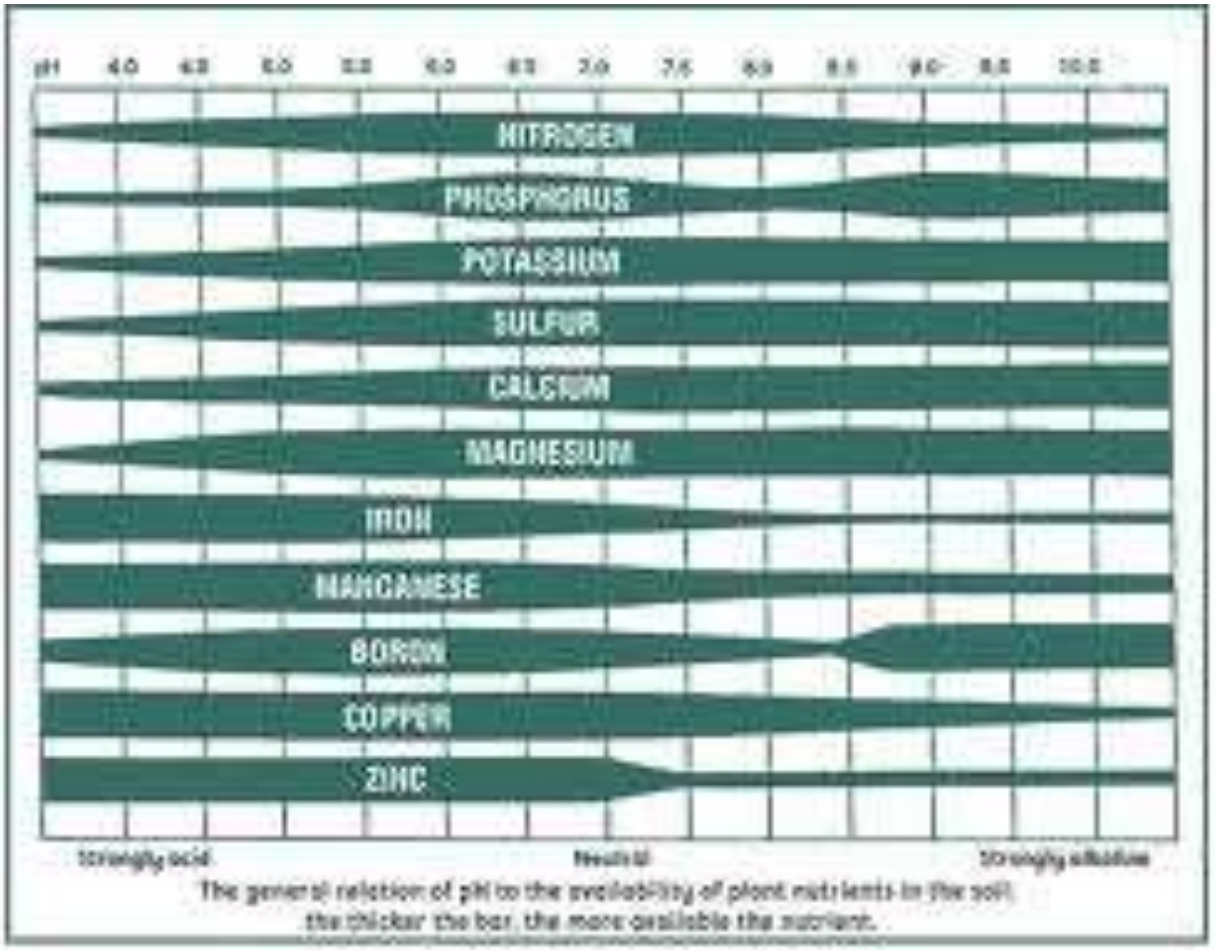
Macro and Micro nutrients

Fertilizer is NOT plant food.

Compost as a soil amendment, not as much as a fertilizer. Helps make micro nutrients more available for plant to uptake.

Soil test, soil test, soil test.

PLANT NUTRIENTS



SOIL pH LEVELS

PLANT DISORDERS: MACRONUTRIENTS

Nitrogen (N)

- Vital for formation of new plant protoplasm such as chlorophyll.
- Low amounts of nitrogen plant growth is stunted and plant will turn pale green or yellow
- Nitrogen is easy leached from the soil.
- Besides compost and fertilizers, nitrogen is fixed from the air to forms that the plants can use.
- Too much nitrogen will cause excessive growth that is usually not desired.

PLANT DISORDERS: MACRONUTRIENTS

Nitrogen (N)

PLANT DISORDERS: MACRONUTRIENTS

Phosphorus (P)

- Phosphorus is necessary to photosynthesis, energy transfers and for good flower and fruit growth.
- Bacteria break down phosphoric acid for plant uptake.
- Leaves may be reddish on the underside in the early spring and seeds may have abnormalities with a deficiency of phosphorus.
- Bone meal or high phosphorous rock powder to correct levels.

PLANT DISORDERS: MACRONUTRIENTS

Phosphorous (P)

PLANT DISORDERS: MACRONUTRIENTS

Potassium (K)

- Needed for manufacture and movement of sugar, cell division, root development and retain water.
- Deficiency of potassium appear in older leaves first with yellowing at the edges. Later the leaves turn brown and may crinkle or curl. On Legumes yellow spots turn brown spread inwards from the leaf edge.
- Can add potash rock, granite dust or wood ashes.

PLANT DISORDERS: MACRONUTRIENTS

Potassium (K)

PLANT DISORDERS: MICRONUTRIENTS

Calcium (Ca)

- A lack of calcium appears to affect growing plants on stems and roots.
- Lower leaves may roll in at the edges and brown spots appear on them. Some plants show green veins with yellow tissue between them.
- Calcium uptake is influenced by the quantity of magnesium, manganese, and potassium present in the soil.
- Use natural limestone to increase calcium.

PLANT DISORDERS: MICRONUTRIENTS

Calcium (Ca)

PLANT DISORDERS: MICRONUTRIENTS

Iron (Fe)

- Iron deficient, iron chlorosis, soils usually have an over supply of magnesium or lime.
- pH of soil will affect the availability of iron to become available for the plant to uptake.
- Composting with manure, dried blood or seaweed.
- Leaves will be yellow with the veins retaining their green color.

PLANT DISORDERS: MICRONUTRIENTS

Iron (Fe)

PLANT DISORDERS: TRACE ELEMENTS

Magnesium (Mg)

- Deficiency is manifested by discoloration in the tissues between the veins (interveinal) causing leaves to look streaked.
- A reddish or purplish coloration appears on the leaf.
- Magnesium functions as a carrier for phosphorus and the two deficiencies often go together.

PLANT DISORDERS: TRACE ELEMENTS

Magnesium (Mg)

PLANT DISORDERS: TRACE ELEMENTS

Manganese (Mn)

- Manganese is believed to be involved with the ability of oxidizing enzymes in plants.
- It also affects the iron intake of plants.
- Manganese deficiency is shown by mottling of the tissue between veins.
- Most common in acid soils.

PLANT DISORDERS: TRACE ELEMENTS

Manganese (Mn)

PLANT DISORDERS: TRACE ELEMENTS

COPPER (CU)

- Copper is found in greatest abundance in the growing parts of the plants.
- Copper deficiency is most evident in the tips and end leaves in plants. Plants may be more susceptible to airborne fungal diseases.

Copper deficiency in watermelon: the vine is stunted, leaves are crinkled.

Copper deficiency in strawberries causes yellowing of leaves and susceptibility to fungal diseases.

PLANT DISORDERS: TRACE ELEMENTS

Zinc (Zn)

- Zinc aids in moisture absorption and the production of chlorophyll and enzymes.
- Older leaves are more apt to display a problem.
- Plants may be stunted.

A zinc deficiency can cause stunting, with white spotting between veins, in tomatoes.

PLANT DISORDERS: TRACE ELEMENTS

Boron (B)

- 1-15 ppm is all this needed and in some cases could be too much.
- In the soil it is held within the organic material and only slowly broken down for uptake. It can also be leached below the root zone in areas of heavy rainfall.
- Boron is used in the growth areas, meristems, and is used for cell differentiation.
- Leaves can be distorted, yellow and smaller than normal.

PLANT DISORDERS: TRACE ELEMENTS

Boron (B)

PLANT DISORDERS: GUESSING GAME

SOIL AMENDMENTS AND FERTILIZERS

Compost:

- **Helps condition the soil for better uptake of existing micro nutrients and trace elements.**
- **Can be found locally such as the garden plot or your house.**
- **Composted manures are great for adding micro nutrients as long as it is already composted. Fresh manures need time to mellow over winter.**

SOIL AMENDMENTS AND FERTILIZERS

Fertilizers: Labels

NET WEIGHT 4 LBS. (1.81kg)

Plant-tone

All Purpose Plant Food

5-3-3

GUARANTEED ANALYSIS

Total Nitrogen (N)	5.0%
0.4% ..... Ammoniacal Nitrogen	
1.6% ..... Other Water Soluble Nitrogen	
3.0% ..... Water Insoluble Nitrogen*	
Available Phosphate (P_2O_5)	3.0%
Soluble Potash (K_2O)	3.0%
Calcium (Ca)	3.0%
Magnesium (Mg)	1.0%
0.6% ..... Water Soluble Magnesium (Mg)	
Sulfur (S)	1.0%

Derived from: Hydrolyzed Feather Meal, Pasteurized Poultry Manure, Cocoa Meal, Bone Meal, Alfalfa Meal, Greensand, Humates, Sulfate of Potash, and Sulfate of Potash Magnesia.

*Contains 3.0% Slow Release Nitrogen from Hydrolyzed Feather Meal, Pasteurized Poultry Manure, Cocoa Meal, Bone Meal, and Alfalfa Meal. F1381

ALSO CONTAINS NON PLANT FOOD INGREDIENTS

Contains a total of 895 Colony Forming Units (CFU) per gram of the following species:

Acidovorax facilis	21 CFU per gram
Bacillus licheniformis	208 CFU per gram
Bacillus megaterium	208 CFU per gram
Bacillus pumilus	208 CFU per gram
Bacillus subtilis	208 CFU per gram
Cellulomonas flavigena	21 CFU per gram
Paenibacillus polymyxa	21 CFU per gram

SOIL AMENDMENTS AND FERTILIZERS

- **Dried Blood 12-0-0, Should also deter squirrels but not dogs.**
- **Cotton Seed Meal 6-2-1, good general fertilizer, source of zinc and copper.**
- **Greensand 0-0-0.1, rich in trace elements, comes from a mineral called glauconite.**
- **Gypsum, source of calcium but won't alter pH as Lime will.**
- **Kelp meal 1-0-2, an excellent soil conditioner and a rich source of minerals and plant hormones.**

END RESULTS