My plantation is called "Ta Triantafila Tou Theou" (Greek for "the roses of God")

175 bushes of all types of rose cultivars

Favorite type of bushes are David Austin shrubs

Absolute favorite rose: Kelsey Rose Tidwell

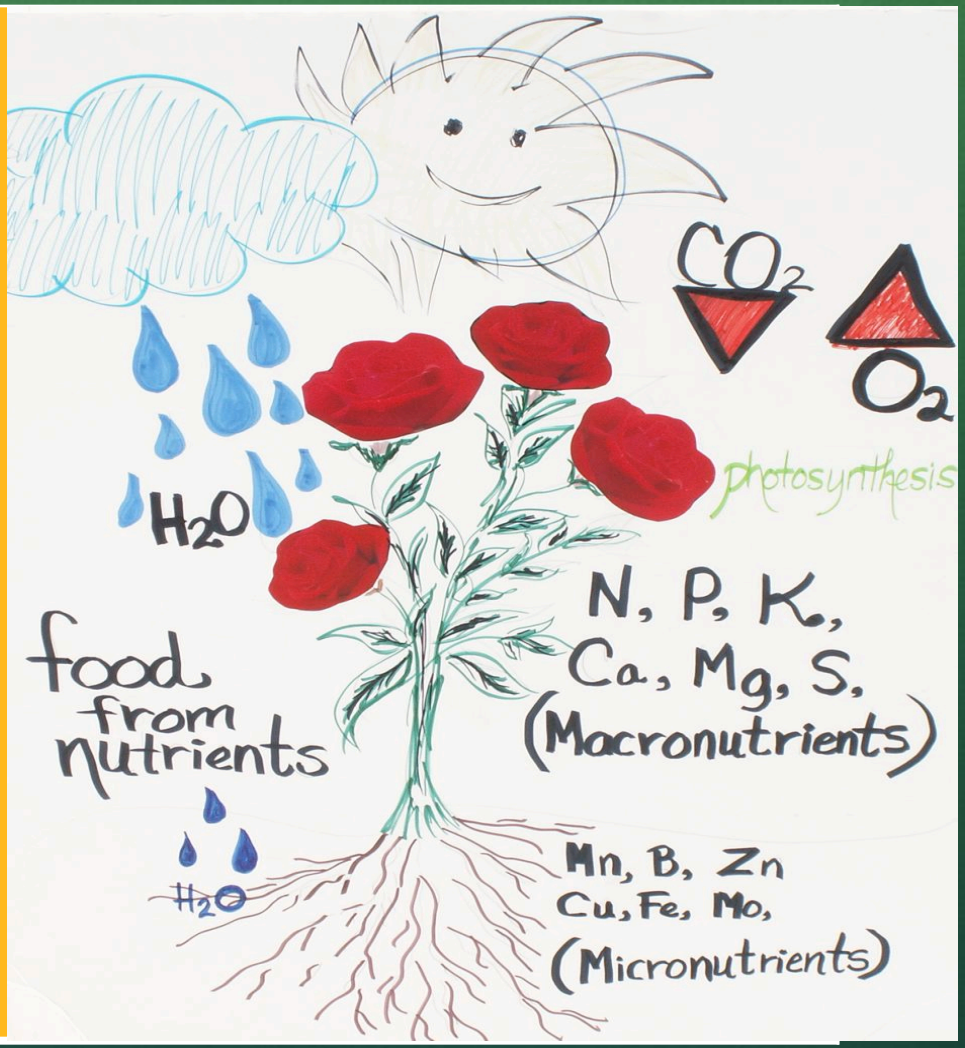
What does fertilization mean to roses?

Aka, what can I use to grow a healthy garden of roses and maybe even a “Queen” of show?

How your rose bush makes food

Your rose bush takes in carbon dioxide from the air, water and nutrients from the ground and makes sugars and starches (the source of energy to do that is sunlight and the reaction is known as photosynthesis). These building blocks in rose bushes are technically known as carbohydrates (carbon and water). The plant uses these to grow and make beautiful roses. The plant does not need the oxygen left over from the carbon dioxide and so the plant releases oxygen back into the atmosphere.

Carbon dioxide + water + energy = sugar + oxygen



Fertilize means to make productive

- A bag of fertilizer has three main numbers.

Ex: **12–4 8–8** ...numbers represents % of NPK elements in the overall bag. The rest of the ingredients in the bag may be Dolomite, Gypsum or Limestone etc.

Rose bushes need:

- 3 Primary Elements (Macronutrients)
- 3 Secondary Elements (Macronutrients)
- 6 Trace Elements (very small amounts of element needed…Micronutrients) to grow healthy.

Primary Elements

- Nitrogen (N)
- Phosphorous (P)
- Potassium (K)

Nitrogen (N)

Nitrogen deficiency shows in older foliage, light green to yellow color of leaf, yellow veins;
Nitrogen leaches ***EASILY*** from soil with too much rain; mostly available below 5.5 pH and above 7.5 pH .
Lack of oxygen in soil after heavy rains can mimic Nitrogen deficiency.

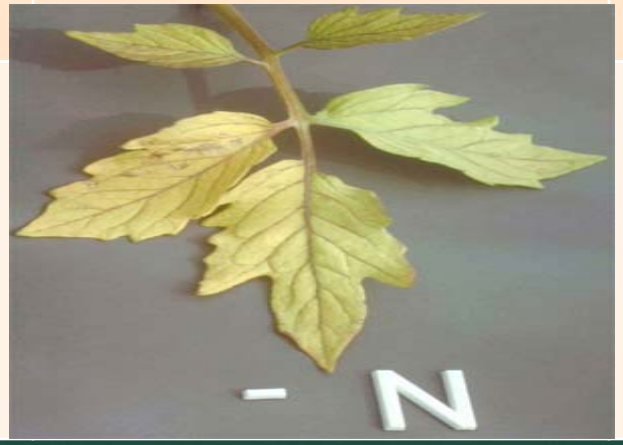
Tall, strong canes, good blooms and green leaves.

Be careful not to apply excessive nitrogen to plants because it creates vegetative centers in roses…OGR and English roses esp. (looks like the Green rose is growing in the middle of your bloom).

Inorganic Forms: water soluble nitrate (nitrate of soda, ammonium nitrate).

Ammoniacal nitrogen- available after conversion in soil; Urea nitrogen slowly available after conversion in soil.

4 forms of nitrogen:
1) Nitrate (WSN=water soluble nitrogen) ***
2) Ammoniacal
3) Urea
4) Nitrite (WIN=water insoluble nitrogen)



Organic Forms: Alfalfa Meal, Fish Emulsion, Sewage Sludge, Bloodmeal.

Nitrogen and Iron Deficiencies

Clear yellow leaves with yellow veins as well = nitrogen deficiency

Clear yellow leaves and veins that are still green in color = iron deficiency (chlorosis)

Phosphorous (P)

Phosphorus deficiency appears in older foliage developing dark red and purple colors. It becomes less available when pH drops below 6 or above 7.5

pH measures acidity of soil….get a soil test each year in January if possible!!

Stimulates root growth; big bloom production; hastens plant maturity adding to winter hardiness.

Phosphorus moves **slowly** through soil. Recommend adding superphosphate when planting new roses in a one "egg" size near feeder roots

Inorganic Forms: Superphosphate (and Triple superphosphate)

Organic forms: Bonemeal, Fish Meal, Sewage Sludge

Potassium (K)

Potassium deficiency usually is seen in older foliage. Leaf margins are brown, weak stems and
many blind shoots.

Potassium leaches ***EASILY*** from soil and becomes unavailable to plant below 6.0

Vigor in root and cane production; high turgidity in blooms and foliage; need this element for starch formation; works to balance surplus of other two primary elements

Inorganic forms:
SulPoMag (SPM)
Nitrate of potash (avoid using muriate of potash)

Organic forms: kelp, seaweed, composted manures

Secondary Elements

- Calcium (C)
- Magnesium (Mg)
- Sulfur (S)

Calcium (C)

Calcium deficiencies appear at growing tips- brown edges appear.

Highest availability in pH range of 6.5-7.5

Cell wall growth; reduces dieback; improves vigor and strength of plant; neutralizes harmful acids; improves soil and leaches salts

Inorganic forms: Dolomite, gypsum, rock phosphate

Organic forms: Bone meal, manures

Be aware of fresh manures applied to plants, may burn. Also, **bacteria level is high.** *** Rosarians MUST get a tetanus shot every ten years.

Magnesium (Mg)

Magnesium deficiency will be shown in older leaves, yellowing around edges of leaf with signs of dying tissue overlaying the affected parts;

With a high rainfall, magnesium leaches from soil; highest availability in pH range of 6.5-7.5

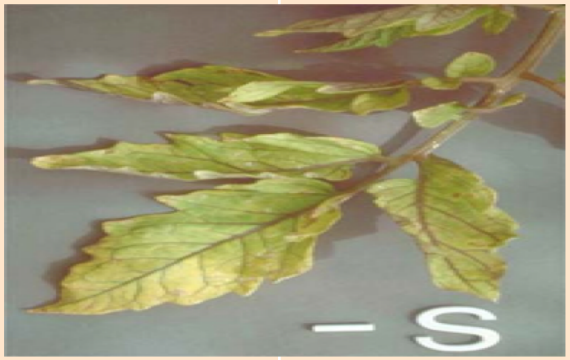
**Promotes chlorophyll production which makes foliage green and healthy, disease resistant plants; increases basal break development. *

Inorganic forms: Epsom Salts, SulPoMag, Dolomite lime

Organic Forms: manures, composts

Sulfur (S)

Sulfur deficiency shows when veins of leaves become pale; available in pH range of 6.5-7.5	Essential to root growth; key element of several important amino acids, lowers pH	Inorganic Forms: Epsom salts, gypsum, SulPoMag Organic Forms: manures, composts



Trace Elements

Iron
(Fe)

Zinc
(Zn)

Manganese
(Mn)

Copper
(Cu)

Boron
(Bu)

Molybdenum
(Mo)

Trace Elements

Iron (Fe) Deficiency shows in new young leaves at top of bush (chlorosis). Readily available at less than less than 6.5 pH	Essential in production of chlorophyll for green foliage. Regulates respiration of oxygen and sugar burning enzymes	Inorganic forms: Chelated Iron (Sequestrene) Organic forms: manures and meals that covert to usable form in acidic soil
Manganese (Mn) Deficiency in young leaves, brown, black spots next to veins. Available at less than a 6.5 pH	Enzyme activity for photosynthesis, used in respiration and nitrogen metabolism 	Inorganic forms: Essential minor elements, Manganese sulfate Organic forms: Sewage sludge, manures and meals

Trace Elements

Boron (B) Available at less than 6.5 pH. Deficiency shows in terminal bud dying and leaves curling	Controls starch formation, stimulates cell division and flower formation 	Inorganic Forms: Essential minor elements and in "20 mule team borax" Organic forms: trace amounts in manures, meals
Zinc (Zn) Deficiency shows mottled leaves, irregular yellow areas available at less than 7.0 pH	Stimulates stem growth and flower bud formation 	Inorganic forms: Essential minor elements, Zinc sulfate

Trace Elements

Copper (Cu) Deficiency is seen when terminal leaves get brown spots. Available below 7.0 pH	Stimulates stem development and pigment, enzyme activator 	Inorganic forms: Essential minor elements, Copper Sulfate Organic forms: trace amounts in soil, manures and meals
Molybdenum (Mo) Deficiency shows in pale leaves with rolled margins. Available when pH is greater than 6.5	Needed to make amino acids to stimulate plant growth and for nitrogen fixation 	Inorganic forms: Essential minor elements Organic forms: trace amounts in soil, sewage sludge

Element	Leaves to first show deficiency	Symptom
Nitrogen	Old	Pale green leaves and yellow veins
Phosphorus	Old	Premature leaf fall-off Purplish tints on underside of leaf
Potassium	Old	Yellow areas, then browning of leaf edges and tips
Magnesium	Old	Yellow spots with dead centers
Sulfur	New	Similar to nitrogen deficiency
Calcium	New	Damage and die off of growing points; yellowish leaf edges
Manganese	New	Dead yellowish tissue between leaf nerves
Copper	New	Dead leaf tips and withered edges
Zinc	Old	Yellowish areas between nerves, Starting at leaf tip and edges
Boron	New	Dead shoot tips, new side shoots also die
Molybdenum	Old	Yellow spots between leaf nerves, then brownish areas along edges. Inhibited flowering
Iron	New	Yellow leaves, dark veins

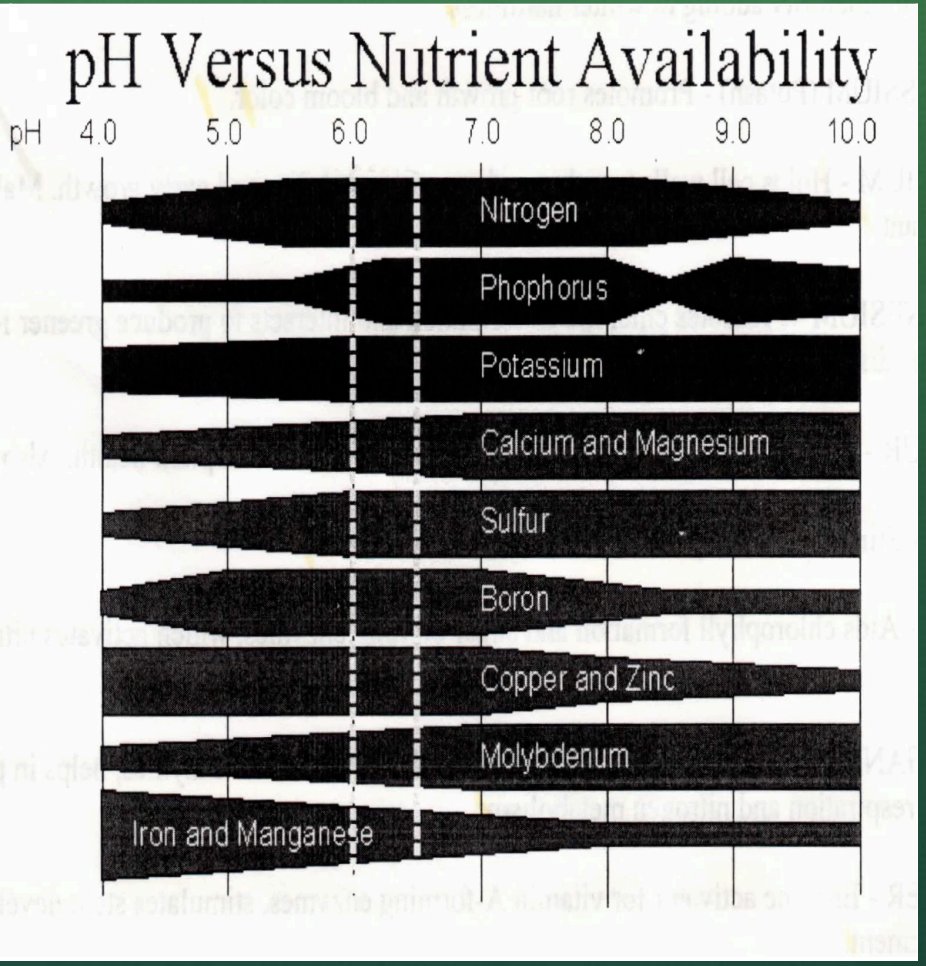
Availability of Nutrients

Your rosebush will absorb most nutrients within the pH range of 6.0 and 6.5 so it is important that you know the pH of your soil and how to adjust it.

Dolomite lime raises the pH.

Sulfur lowers the pH.

Amounts and frequency of product applied depends on your soil analysis (which should be done every year).



Types of Fertilizers

- Chemical Fertilizers = synthetically produced. All chemical fertilizers are salts. All salts interfere with the ability of the plant to obtain water. Heavy applications of chemical fertilizers will cause burn on the leaves similar to not watering plant during hot weather. NEVER APPLY FERTILIZER TO DRY SOIL. Roses should always be watered before and after an application of chemical fertilizer. The existing salt level in the soil can also contribute to the burning effects of adding chemical fertilizers.

- Organic Fertilizers = come from once living organisms, low in nutrient content and are slow release requiring biological action from the soil organisms to release the nutrients. This feeds the soil life keeping the soil healthy (able to hold air, nutrients and water)…ex: manures, fish emulsion, alfalfa meal, cottonseed meal.

Common Natural Fertilizers and their nutritive value

Materials	N	P	K	Available	Comments
Dried Blood	12	0	0	high	
Bone Meal (steamed)	0	9	0	medium	
Rock Phosphate	0	13	0	low	must be ground to 200 mesh powder
Fish Emulsion	4	0.1	0	high	may attract pests
Fish Meal	10	4	0	high	may attract pests
Leaf Mold	1	0.4	1	medium	
Seaweed	1.5	0.7	5	medium	
Cottonseed Meal	7	2.5	2	high	may contain pesticide residues
Wood Ashes	0	2	5	high	hardwood preferred, liming effect.
Garden Compost	1	0.3	1	medium	varies with ingredients
Cow Manure	0.5	0.2	0.5	medium	rotted not dehydrated
Horse Manure	0.7	0.5	0.6	medium	rotted not dehydrated
Rabbit Manure	4	3	1	medium	rotted not dehydrated
Hen Manure	1.8	1	0.5	medium	rotted not dehydrated
Hog Manure	0.3	0.3	0.4	medium	rotted not dehydrated
Sheep Manure	1	0.35	0.5	medium	rotted not dehydrated
Sludge	4	2.5	0	medium	may contain toxic metals
Granite Dust	0	0	6		virtually insoluble
Limestone	-	-	-		used to raise pH
Dolomite Limestone	-	-	-		corrects magnesium deficiency and raises pH
Peat Moss	-	-	-		improves soil structure

***Human, cat and dog feces should not be used due to the danger of disease.**

From website: http://www.farminfo.org/garden/fertilizer.htm

Forms of Fertilizers

- Water Soluble Fertilizers = fertilizers in a form that will dissolve in solution. Mixed with water, the solution can be sprayed on the foliage (foliar feeding) or used as a soil drench.
- Slow Release Fertilizers = (organic or chemical) that are slowly converted for use in soil to feed plants.
- Osmocote, a chemical, slow release fertilizer, looks like a bee bee or when sliced in half looks like a bull's-eye…explanation……..
- Plants use nutrients in their ionic forms so it does not matter what source the nutrient originated (chemical or organic)…however, it is wise to feed the soil with organics several times a year to enhance healthy and abundant microorganisms. Almost all fertilizers tend to make the soil more acidic.

Pawlikowski Drench
A quick picker-upper!!

Recipe for 32 gallons of water- a normal trash can

- 2 cups of fish emulsion
- 1 tablespoon of 20 Mule Team Borax
- ¼ cup of manganese sulfate
- 4 cups of Epsom Salts
- 4 cups powdered milk
- 1/3 cup of Maxi Crop Seaweed (or Response)

Mix well in a sturdy trash can and apply one gallon per bush, half that amount for smaller bushes. This can be done three times a year, preferably in the spring, summer and fall

Final Word to all CR'S: KISS

(Keep it simple sweetie)

- **Feed your rose plants small quantities of fertilizer on a consistent basis (example: one half cup of granular fertilizer per mature bush, a quarter cup for minis, minifloras, every two weeks) from February to November. Make sure the fertilizer has the macro and minor elements included. Supplement with other fertilizers such as SulPoMag, Epsom Salts, Milorganite, Gypsum, Fish Emulsion or Essential minor elements if the fertilizer does not contain them. Add organics in the spring and fall to enhance the soil organisms. Give bushes an extra dose of iron (Sequestrene several times a year if needed). Watch for those beautiful Queens in your garden. Enjoy God's greatest flower gift to us…The Magnificent Rose.**

Since all gardens vary, see a

Consulting Rosarian for help with

your own personalized

feeding program!!

Happy Rose growing!!

The Rosequeen