



# **What does fertilization mean to roses?**

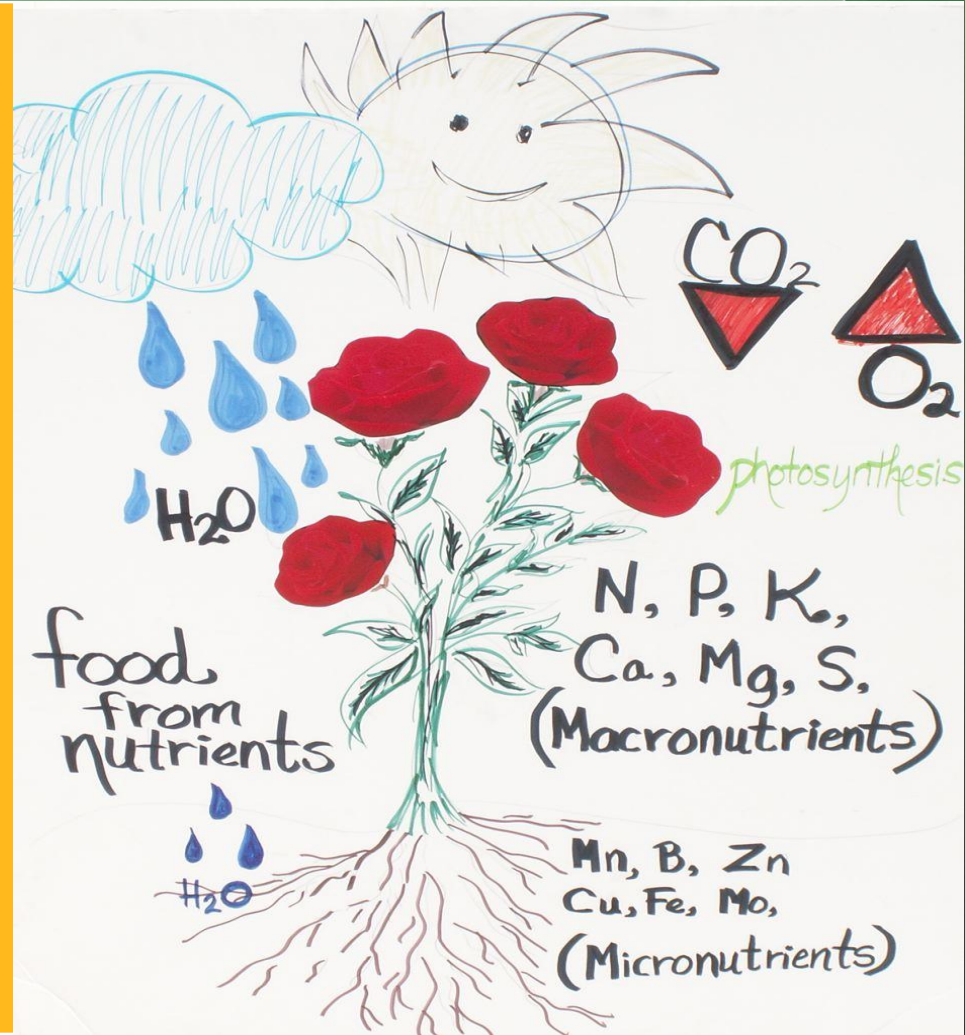
**Aka, what can I use to grow a healthy garden of roses and maybe even a “Queen” of show?**



# 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.

**S A SOUTHERN 50AG®**

# 12-48-8

## PLANT STARTER

### SOLUBLE FERTILIZER PLUS MINORS

**FOR USE IN TRANSPLANT SOLUTIONS, SOIL DRENCH, AND FOLIAR SPRAYS.**

#### DIRECTIONS

**TRANSPLANT SOLUTION:** For use when transplanting tobacco, tomatoes, lettuce, collards, cauliflower, eggplant, cucumber, grass, etc. and annual plants. Mix 3 pounds in 50 gallons of transport water (2 tablespoons per gallon). For annuals and vegetable sets use 1/2 to 1 cup of transport solution per plant. When transplanting through plastic mulch, and when transplanting where high soluble salt concentrations in the soil are anticipated, use 1 pound per 100 gallons of water (1 1/2 tap per gallon).

**SOIL DRENCH:** For newly seeded row crops, use 3 pounds in 60 gallons of water (2 tablespoons per gallon). Apply as a drench using 1 pint to 4 linear feet of row. For new transplants through plastic mulch, use 3 to 4 lbs. in 100 gallons of water (3 to 4 tap per gallon). Apply as a drench using 1 pint per sq. ft. of drench area.

**FOLIAR SPRAY:** Use at the rate of 3 pounds in 60 gallons of water (1 1/2 tablespoons per gallon).

**CONSTANT FEED:** Where injector systems are used, the following table may be used to determine the amount of fertilizer to use in concentrate tank. When constant feeding, it is often desirable to leach potbed and benchbed gangs about once a week in order to avoid excessive fertilizer build up, particularly on the soil surface.

**NOTE:** Indicated rates are intended as a guide for initial applications. Experience with the particular crop and frequent soil testing are best guides to proper fertilization.

OUNCES BY WEIGHT PER GALLON OF CONCENTRATE				
FRUIT CONC.	INJECTOR RATIOS			
Nitrogen	1.50	1.10	1.128	1.156
50 ppm	2.52	2.07	2.21	2.25
100 ppm	5.03	4.12	4.42	4.50
150 ppm	7.54	6.18	6.63	6.75
200 ppm	10.05	8.24	8.84	9.00

**GUARANTEED ANALYSIS:**

TOTAL NITROGEN (%)	12.0%
2.30% Nitrate Nitrogen (N)	
9.70% Ammoniacal Nitrogen (N)	
0.60% Urea Nitrogen (N)	
AVAILABLE PHOSPHATE (P <sub>2</sub> O <sub>5</sub> )	48.0%
SOLUBLE POTASSIUM (K <sub>2</sub> O)	8.0%
Boron (B)	0.02%
Copper (Cu)	0.05%
Iron (Fe)	0.09%
0.5% Chelated Iron (Fe)	0.10%
Manganese (Mn)	0.05%
0.25% Chelated Manganese (Mn)	0.05%
Molybdenum (Mo)	0.0005%
Zinc (Zn)	0.05%
0.55% Chelated Zinc (Zn)	0.05%
Chlorine not more than 1.0%	

**PLANT NUTRIENTS DERIVED FROM:** Ammonium Phosphates, Potassium Nitrate, Urea, Fats, Sodium EDTA, Manganese Oxidum EDTA, Zinc Oxidum EDTA, Cobalt Oxidum EDTA, Sodium Borate, Sodium Molybdate, EDTA, Ethylenediamineacetate, Antibiotic Colloid, Potassium Acidate, Calcium Carbonate Equivalent per Ton.

**CAUTION: KEEP OUT OF REACH OF CHILDREN.**  
CONTAINS POTASSIUM NITRATE, AN OXIDIZER—POSSIBLE FIRE HAZARD  
May be harmful, if swallowed. Avoid breathing dust, and contact with skin, eyes and clothing.  
If spilled, give two glasses of water, induce vomiting and call a physician. If to eyes, do not rub with water. If on clothes, launder before reuse. Wash thoroughly after handling.  
For questions concerning this product, please contact us at [aginfo@southernag.com](mailto:aginfo@southernag.com).

**Southern Agricultural Insecticides, Inc.**  
Palmetto, FL 34229      Hendersonville, NC 28793      Boons, NC 28607

**Net Weight: 25 lb (11.34 kg)**

# 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.**

## 4 forms of nitrogen:

- 1) Nitrate (WSN=water soluble nitrogen) \*\*\*
- 2) Ammoniacal
- 3) Urea
- 4) Nitrite (WIN=water insoluble nitrogen)

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.

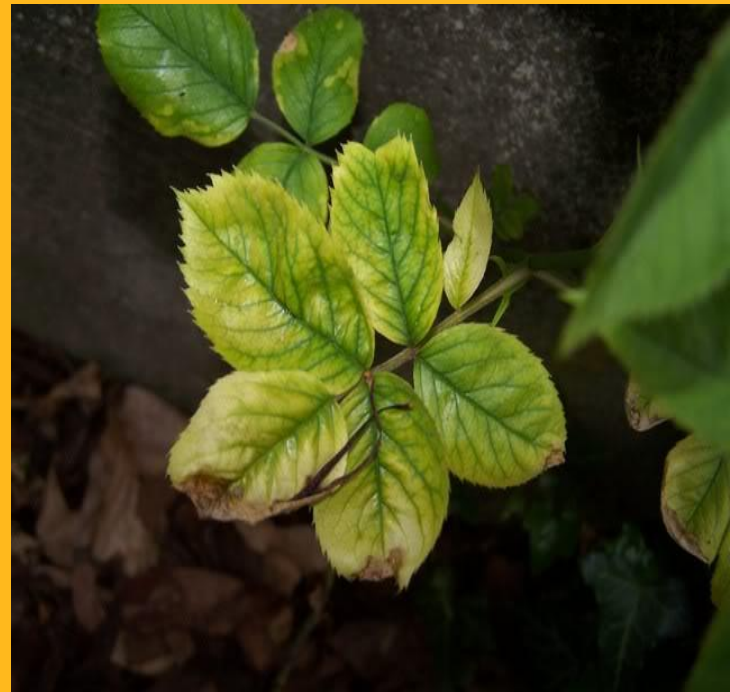
Organic Forms: Alfalfa Meal, Fish Emulsion, Sewage Sludge, Bloodmeal.

# 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.\***

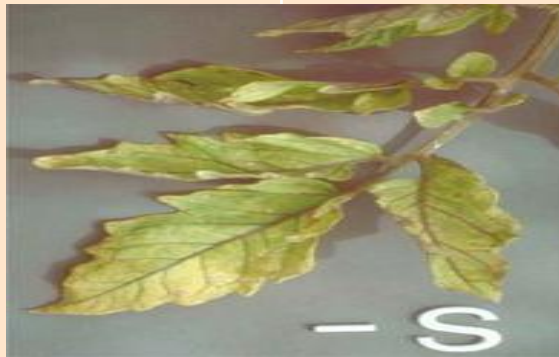
Inorganic forms:  
Epsom Salts, SulPoMag, Dolomite lime

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

(B)

Molybdenum

(Mo)

# Trace Elements

## Iron (Fe)

Deficiency shows in new young leaves at top of bush (chlorosis).

Readily available at 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 convert to usable form in acidic soil

## Manganese (Mn)

Deficiency in young leaves, brown, black spots next to veins.

Available at less than 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

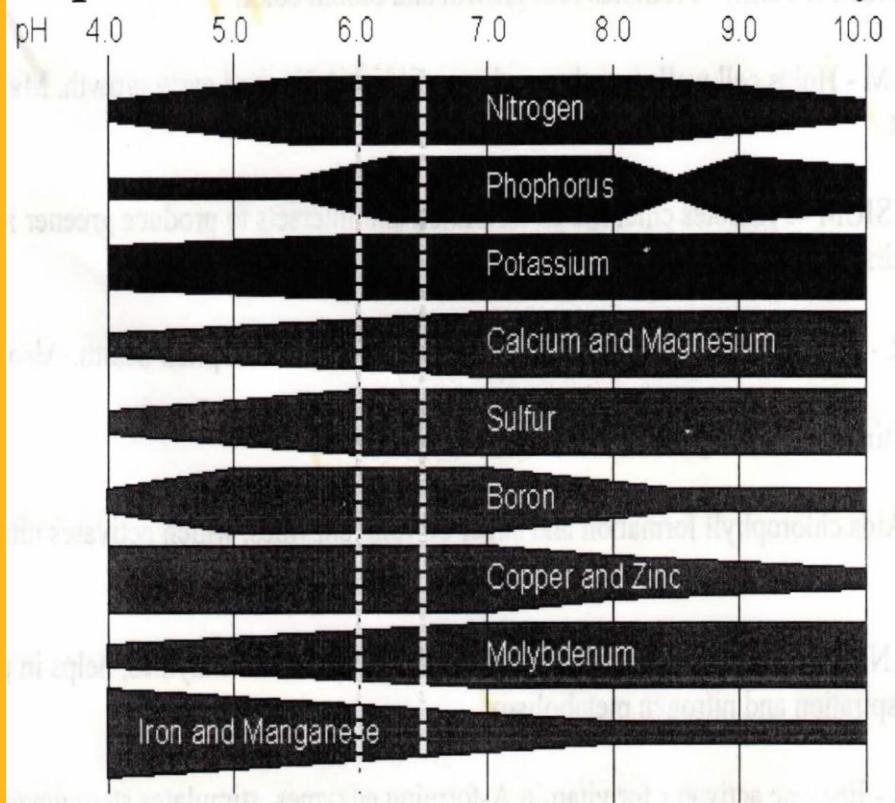
Your rosebush will absorb most nutrients **within the pH range of 6.0 and 6.5** so it is important that you know the pH of your soil and how to adjust it.

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).

pH Versus Nutrient Availability





# 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
- $\frac{1}{4}$  cup of manganese sulfate
- 4 cups of Epsom Salts
- 4 cups powdered milk
- $\frac{1}{3}$  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

