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- Vibrant life in the soil is the central objective. Because supporting and empowering soil life is the key to healthy plants.
- Things that you do or let be done that harm soil life harm your plants.
- Addressing limiting factors is the general process
- Life will do the best with what she has, therefore, identify limiting factors and endeavor to address them.
- The key areas to address are minerals, biology, carbon, water, air.
- Quality correlates with Nutrient Level, Flavor, and Shelf Life
- There are correlations between, Soil Health, Plant Health, Human Health, and Cultural / Environmental Health
- Step 1) is Soil Testing and Mineral Balancing
- On the Base Plus or "Agri-Dyn II" Test, which is a Strong Acid test my basic recommendations are Sulfer - 75 ppm, Phosphorus - 75 ppm, Calcium - 65-70%, Magnesium - 10-15%, Potassium - 3-5%, Boron - 3 ppm, Manganese 80-90 ppm, Copper - 4 ppm, Zinc - 8 ppm, Cobalt - 2 ppm, Molybdenum - 1 ppm, Selenium - .5 ppm, Silicon 50 ppm
- Maximum yearly applications of minerals
- Sulfur - with Calcium needed, 500 pounds per acre (ppa) gypsum
- Sulfur - with Magnesium and Potassium needed 300-500 ppa Sul-Po-Mag or K-mag
- Sulfur - with Potassium needed 200-300 ppa potassium sulfate.
- Sulfur - with Magnesium needed 200 ppa magnesium sulfate (epsom salt)
- Sulfate forms of the trace elements
- Phosphorus - with calcium needed, 500-2000 ppa colloidal soft rock phosphate, Tennessee brown rock phosphate, Black hard rock phosphate
- Phosphorus - with potassium needed, animal manure, or animal manure based compost.
- Calcium - 500-2000 lbs Calcium Carbonate (Calcite or Hi-cal Lime) Also Aragonite, Coral Calcium, Egg Shells,
- Calcium - with Magnesium needed 500-2000 ppa Calcium Magnesium Carbonate, (Dolomite, or Dolomitic Lime)
- Calcium - with Sulfur needed, 500 ppa gypsum
- Calcium - with Phosphorus needed, 500-2000 ppa Soft Rock Phosphate.
- Calcium - Phosphorus and Traces and Paramagnetic needed 500-2000 ppa Carbonatite
- Magnesium - with Calcium needed 500-2000 ppa Dolomite
- Magnesium with Sulfur and Potassium needed 300-500 ppa Sul-Po-Mag or K-mag
- Magnesium - with Sulfur needed, 200 ppa magnesium sulfate (epsom salts)
- Potassium - Spread well, clean wood ash
- Potassium - with Magnesium and Sulfur needed, 300-500 ppa Sul-Po-Mag or K-mag

- Potassium - with Sulfur needed, 200-300 ppa potassium sulfate
- Potassium - with Phosphorus needed, animal manure or animal manure based compost
  Boron - 30ppa per year borax, or15 ppa per year solubor
- Manganese - 5-20ppa manganese sulfate
- Copper - 5 ppa Copper Sulfate. If very low (below 2ppm) up to 10 ppa
- Zinc - 5-10 ppa Zinc Sulfate.
- Sodium Molybdate .5 lb actual molybdenum per acre/per year
- Sodium Selenate .25 lb actual selenium per acre/per year
- Cobalt Sulfate - 4 ppa per year
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- Inoculants
- Collostrum, Critical symbiotes for plants. Foundational life in the food chain
- Bacterial and Fungal species, Ideally present at germination
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- Seed, Seed size, Seed history, Seedling vigor – culling, Yield potential – spacing
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- Potting soil
- Besides Compost, peat, vermiculite and perlite, Consider, Kelp, Alfalfa, Zeolite, Humate, Montmorillonite, Lime, Rock Phosphate, Gypsum, Trace Elements, and critical role of biological inoculants and enzyme stimulants.
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- Tillage, Effect of tillage on soil life
- Strategy for minimal tillage, Permanent raised beds - green or brown mulch
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- Complexing Compounds
- Simple sugars, Complete carbohydrates, Complete proteins, Lipids / essential oils
- Phytonutrients, phytoalexins, antioxidants, plant secondary metabolytes
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- Evolution of pest and diesease resistance
- Complete carbs - soil borne pathogens Fusarium, verticilium, alternaria
- Complete proteins - larval forms of insects aphids, cabbage looper, tomato hornworm, corn earworm, colorado potato beetle larvae
- Complete lipids - air borne pathogens mildews and blights
- Complete Phytoalexins - Cucumber beetle, potato beetle, flea beetle, japanese beetle
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- Fertigation / Irrigation
- Drip tape, sprinkler, hose
- Maintain water at good level in soil at all times. Critical.
- “Good Level” able to pick up soil, clench it into ball and have it stay as a ball.
- Plan to have this system in place
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- Foliar Spray
- Plant feeding through the leaf surface.

- Backpack sprayer, squirt bottle, etc. Best response when an immediate turn around is desired. Very powerful if all other pieces are working.
- Plan to be able to do this now.
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- Assessing plant status
- Start with overview of patch. General glance across field.
- Questioning attitude. Ask. Listen. Throughout the day, when working in the crop. What comes to you?
- Sentience, Intuition, Spirit, Devas, Kinesthetic, Gut feeling.
- Questions
- Are new growth tips standing erect? Do honeybees work the flowers vigorously? Is the plant growing rapidly? Are stems solid or hollow? What weed families are dominant? How many flowers are setting per bunch? How thick are the stems? How thick are the calix's? How thick are the leaves? What color are the leaves? What color is the sap? What is the spacing between nodes?
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- General Parameters
- Stem size - Bigger is better, Stem Strength - Should be able to bend between the fingers. See how much a stem will bend before breaking. Greater flexibility is a sign of improved quality. Stem hairs - More and longer is better. Solid stems in grains and brassicas especially. Hollow connotes functional Ca deficiency. Stem shape - round is preferred. Oblong connotes Ca deficiency. Internode Points - Shorter internodes build stockier plants which can build higher yields. In tomatoes and vine crops 4-6 inches between nodes should be the max. Try for shorter. Leaf Thickness - Thicker is better. Facilitates greater photosynthesis and nutrient transport. Fe, Mg and K associated with this. Leaf shape. Shorter wider leaves correlate with higher production potential and stockier plants. Ex tomato plant. 1X5.5 inches or 2.5X4 inches Leaf Density - plants highly loaded with leaves have higher productive capacity. Leaf sap color - darker color more chlorophyll. Mg and B+K associated with this. More photosynthetic potential. N will make plant look greener, but not sap darker. Number of flowers per cluster - greater number of flowers greater number of fruit. Mn often limiting factor in flower number and fruit set. 4-6 flowers to 12-15. Size and strength of flowers critical. Size of calix.
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- Biochemical process of plant nutrition
- Boron activates Silicon which carries all other nutrients starting with Calcium which binds Nitrogen to form amino acids, DNA and cell division. Amino acids form proteins and tag trace minerals especially Magnesium to form chlorophyll which transfers energy via Phosphorus to Carbon to form sugars which go where Potassium carries them
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- Calcium
- Often Ca shortages show up in tandem with other shortages. Most common, B and Si. Stem and leaf strength and ability to flex and bend back are correlated to

Ca. Strong cell walls which correlate to fungal resistance. Roundness of stems sign of good Ca presence.

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- Calcium Deficiencies -
- Dark green vein in mid rib of leaf, yellowish in between. Leaves have wrinkled appearance, may defoliate. Poorly developed root hairs. Young leaves die back at tips
- Adequate Ca correlates to same leaf size across the plant. Consistency. Adequate Ca will help plant vibrate at a higher frequency increasing the plants ability to pull nutrients to it. Leaves will curl upward in Ca shortage in cucurbits and will also become brittle. This will correlate with B also.
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- Silicon
- Vine crops will become resistant to powdery mildew with sufficient Si. Synergist with Ca. Sufficient Si will make very strong cell walls. Grasses and cucurbits especially need Si. Si supplementation will cause leaf hairs to increase in size and vibrancy. Micro transmitters.
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- Boron
- Boron facilitates Carbohydrate transport down to roots and nutrients up to leaves. Insufficient B will correlate with stagnant brix readings in crops, not fluctuating the day. Adequate levels of Ca in the soil and bottom of the plant but not in the top of the plant will correlate with B deficiency. B pushes nutrients upward and outward in the plant. Catalytic effect in moving nutrients. Close attention to inside and outside brix and pH in a leaf. If inside of leaf is in better shape than outside probably a B deficiency. Death of terminal bud/deformed flowers – deficiency
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- Sulfur Deficiency -
- Reduced growth, Delayed maturity, Young leaves light green, Old leaves turn yellow and don’t drop
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- Phosphorus Deficiency -
- Dull blue green, Poor root growth, Poor flowering and fruit set, Low Brix
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- Nitrogen Deficiency
- Yellowing or orange or purple bottom to top, Low Conductivity, Stunted growth
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- Potassium
- Potassium is a transport element, and catalyst in plant sizing. K deficiency will show up in leaf, fruit, and stem if size is not there. Lack of K is obvious in size and shape of fruit. Delicious apple shape shows insufficent K. Should not be oblong, should be as round on flower end as stem end. K shortage will be obvious in thin stems, calix’s and leaves. Small fruit. K shortage in vine crops will show as a light or yellow band on the outside rim of the leaf. Yellow spots on lower leaves/dull blue green