2010 Course 6

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Course Review

- Review principles
- Review practices
- Integrate what we have learned
- Leave with a cogent understanding of relationships between principles, practice and where you want to go next year.
- Ask all of the questions that are still lurking in the back of your mind

And then

Time for each participant to share their experiences, conclusions, desires, and plans.

Bring all data collected from the research project to share.

Fill out profile page as grower if you want to stay connected and put yourself out as an active participant in the process of increasing nutrition in crops.

Biological inoculation

- Digestive tract of plants
- Like collostrum
- Bacterial and fungal communities
- Experiences/Results

Seed Selection

- Sizing, sort for larger seeds
- When ordering seeds, ask for 9’s and 10’s
- Before planting put seeds in Orgone Generator
- Fewer larger seeds given more space will increase overall vitality and yield

Potting Soil

- Besides Compost, peat, vermiculite and perlite, Consider, Kelp, Alfalfa, Zeolite, Humate, Montmorillonite, Lime, Rock Phosphate, Gypsum, and critical role of biological innoculants and enzyme stimulants.

Soil Testing

- Strong acid test in Fall preferably, or spring.
- Weak acid in growing season at 4-6 weeks after transplant stage for high value crops

Mineral Levels

- For Strong acid test, from Logan Labs
- Sulfer - 75 ppm
- Phosphorus - 75 ppm
- Calcium - 70-75%
- Magnesium - 15-18%
- Potassium - 3-5%

Trace Mineral Levels

- Boron - 3 ppm
- Manganese 80-90 ppm
- Copper - 4 ppm
- Zinc - 8 ppm
- Cobalt - 2 ppm
- Molybdenum - 1 ppm
- Selenium - .5 ppm

General recommendations for specific mineral deficiencies

- Sulfer - with Calcium needed, 500 pounds per acre (ppa) gypsum
- Sulfer - with Magnesium and Potassium needed 300-500 ppa Sul-Po-Mag or K-mag
- Sulfer - with Potassium needed 200-300 ppa potassium sulfate.
- Sulfate forms of the trace elements

Phosphorus

- Phosphorus - with calcium needed, 500-2000 ppa colloidal soft rock phosphate, Tennessee brown rock phosphate, Black hard rock phosphate
- Phosphorus - with potassium needed, Compost.

Calcium

- 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 Dolomitice Lime)
- Calcium - with Sulfer 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

- Magnesium - with Calcium needed 500-2000 ppa Dolomite
- Magnesium with Sulfer and Potassium needed 300-500 ppa Sul-Po-Mag or K-mag
- Magnesium - with Sulfer needed, 200 ppa magnesium sulfate (epsom salts)

Potassium

- Potassium - Spread well, clean wood ash
- Potassium - with Magnesium and Sulfer needed, 300-500 ppa Sul-Po-Mag or K-mag
- Potassium - with Sulfer needed, 200-300 ppa potassium sulfate
- Potassium - with Phosphorus needed, Compost

Boron

- Boron - Depending on level needed, up to 30ppa per year Borax. Apply in split applications. Ideally at least three

Manganese

- Manganese - 5-20ppa manganese sulfate

Copper

- Copper - 5 ppa Copper Sulfate. If very low up to 10 ppa

Zinc

- Zinc - 5-10 ppa Zinc Sulfate.

Mineral Application Rules of Thumb

- To address deficiencies, fall applications are best. That gives time for minerals to be digested and made bio-available for next year's crop.
- Rock minerals should whenever possible be applied with some form of an organic compound. Some common ones are compost, Humates, Biochar.

Best Practices for Mineral application

- Into cover crops in the fall
- Into compost piles at first turn

Other materials very valuable for soil building

- Granite dust
- Basalt dust
- Volcanic dust
- Trace element rich clays

Bacterial/Fungal Ratios

- Remember that most crop plants (except brassica family) have critical symbiotic relationship with mycorrhyzhall fungi.
- Tillage and composting practices especially along with seed and transplant inoculation are very important in setting up the fungally dominant soil.

Protein Synthesis/Proteolysis

- The formation of complete proteins in a plant is a primary means of insuring pest resistance. Basic mineral balancing and inoculation are key for setting up this level of functionality in our plants.
- Insects do not have the enzymes in their digestive tracts necessary for breaking down proteins, and have the antenna necessary to see if their preferred food crops are high in nitrates and amino acids or proteins.

Paramagnetism/Diamagnetism

- Paramagnetism - technically is the capacity of the charges in a material to align in the presence of an applied field.
- Practically - Plants are diamagnetic by nature, and so the stronger the paramagnetic charge of the soil, the stronger the effective opposite charge between soil and plant which facilitates plant growth.

ERGS

- Energy Released per Gram Second
- Effectively this is the electrical energy flowing in the soil system that facilitates the mobility of crop nutrients and building of plants.
- One of the simplest real time and least expensive ways to see overall functionality of soil system.
- With proper mineralization and biological system support, this is the way to see if the “battery” is still being charged, or running out of juice.
- Minimum 200 at plant/transplant and up to 600-800 at fruit fill being the desired levels.

Plant Feeding in Season

- Basic Infrastructures that support plant maintenance and vitality - Drip or other irrigation, and Foliar Spraying Capacity.

Plant Compound Creation

- Complete Carbohydrate Production
- Complete protein Production
- Fat and Oil (essential) Production
- Enzyme, Vitamin, Hormone Production. Secondary Plant Metabolites.

Brix Monitoring

- Ideally, brix readings in plant leaf sap should not drop below 12. Early morning testing is best to show minimum levels. If 12 is not attained in mid afternoon of a sunny day, the plant is definitely stressed.
- Regular weekly monitoring is ideal for discerning movement in brix levels.
- Same point in plant is necessary for significant readings. I.e. fourth newest leaf.
- Same time in day as well.
- Brix below 12 shows the need for other monitoring activities if the desire is to address the problem.

Plant Sap pH monitoring

- In organic systems, if brix is deficient, the best mode to determine cause of deficiency is plant sap pH.
- 6.4 pH in plant sap is ideal.
- Below 6.4 predicts a plant available deficiency probably of Calcium, Potassium, Magnesium or Sodium.
- Above 6.4 predicts a plant available deficiency of nitrogen, sulfates or phosphates.
- Most often low plant sap pH is due to Calcium or Potassium deficiency.

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
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Questions

- 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?
- How many petals are on each flower?

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.
- 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.

General Parameters

- Leaf Thickness - Thicker is better. Facilitates greater photosynthesis and nutrient transport. Fe, Mg and K associated with this.
- 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.

General Parameters

- 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.
- Check pH and Brix of crops and weeds next to them. As the soil becomes strengthened, the brix rises and balances in the crops, and drops and imbalances in the weeds.
- What weed families are present? Not individual weeds, but general trends.

In General

- Once a plant shows deficiency symptoms, you have limited the genetic potential of that crop in that year. Epigenetics.
- A plant will generally start seriously building its frame 4-6 weeks after it has been transplanted.
- Saturated paste test 3-4 weeks after transplant = 1-2 weeks before framing and fruiting = time to adjust for deficiencies. Proactive monitoring.
- 3-4 weeks after bulking point it becomes difficult to significantly impact yield potential.
- Getting past bulking point with healthy form, healthy root system, and sufficient mineral availability Significantly Increases Potential For Yield.

Saturated Paste Test

- Soluble Salt - 300-750 ppm
- Chlorides - 25-50
- Bicarbonate - 50-100
- Phosphorus - .5 ppm
- Calcium as % should be greater than Mg and K. As a % the Ca:Mg ratio 3:1 or a ppm ratio of 5:1. Ideal range 30-50 ppm, 60%

Saturated Paste Test

- Magnesium - 6-10 ppm, 18-20%
- Potassium 15-25 ppm, 15%
- Sodium 5 ppm, <5%
- Sulfer 5 ppm
- Boron .1 ppm
- Iron .3 ppm
- Manganese .15 ppm
- Copper .05 ppm
- Zinc .1 ppm
- On traces +- .02 ppm variability from ideal ok

Research Projects

- Who Took Part?
- Share Results

Class Review

- Share experiences
- Results
- Thoughts and plans for the future
- Suggestions for how to run the course better
- Suggestions for material to cover

RFC Profile Form

- Online database of participating growers and allies
- Space to share your farms activities nad objectives in relation to ND crop production
- Networking and marketing opportunity.
- Please spend 15 minutes filling out the form

Thank You