PRINCIPLES, **PROTOCOLS AND PRODUCTS TO PRODUCE NUTRIENT DENSE CROPS** AND THE REAL FOOD CAMPAIGN

COURSE 1

INTRODUCTION OVERVIEW OF PRINCIPLES STRUCTURE OF COURSE SEEDS, INNOCULATION AND POTTING MEDIA.

DAN KITTREDGE

GREW UP ON AND MANAGED MANY HANDS ORGANIC FARM IN BARRE MA. CLOSELY CONNECTED TO NOFA FOR 25+YEARS

WORKED WITH FARMERS IN INDIA, SIBERIA, CENTRAL AMERICA AND ACROSS THE US

E.D. REMINERALIZE THE EARTH DIRECTOR REAL FOOD CAMPAIGN.

REAL FOOD CAMPAIGN

- TO RESTORE HUMAN HEALTH BY RENEWING THE MINERALS AND LIFE IN SOILS TO OPTIMIZE THE NUTRIENT QUALITY OF FOOD.
- TO SUPPORT FARMERS TO APPLY BIOLOGICAL PRINCIPLES OF 21ST CENTURY AGRICULTURE IN EFFECTIVE SOIL STEWARDSHIP.
- TO CREATE STANDARDS AND CERTIFICATION TO DELIVER AUTHENTIC NUTRIENT-DENSE FOODS TO CONSUMERS.

OVERALL CAMPAIGN STEPS

- FARMER EDUCATION AND EMPOWERMENT
- BROAD AND COMPREHENSIVE RESEARCH DOCUMENTATION OF PRINCIPLES AND RESULTS
- SERIOUS ACHIEVABLE STANDARDS WITH DIRECT RAMIFICATIONS FOR SOIL, PLANT, ANIMAL, HUMAN AND ENVIRONMENTAL HEALTH.
- CONSUMER EDUCATION AND RESOURCE DATABASE

REAL FOOD CAMPAIGN

- NUTRIENT DENSITY AS QUALITY STANDARD IS, AS OF YET, NOT TECHNICALLY DEFINED.
- A COLLABORATIVE PROCESS OF SPECIALISTS IN THE PRODUCTION OF NUTRIENT DENSE CROPS IS CURRENTLY UNDERWAY TO DETERMINE A CLEAR, INEXPENSIVE EMPIRICAL TEST FOR ALL AGRICULTURAL CROPS. THIS PROCESS WILL CONCLUDE IN ONE TO TWO YEARS.
- THIS IS A PROJECT OF THE REAL FOOD CAMPAIGN, WHICH WILL BE TOUCHED ON AT THE END OF THIS WORKSHOP.
- THE CURRENT WORKING SUGGESTIONS INCLUDE A FIELD BRIX TEST, CALCIUM, MAGNESIUM, VITAMIN Å, VITAMIN Ć AND SELENIUM LEVEL AND RATIO TESTS AND ANTIOXIDANT LEVELS LAB TESTS.

REAL FOOD CAMPAIGN

- BRIX- GREATER REFRACTION OF LIGHT THROUGH SAP CORRESPONDS WITH COMPLEX CARBOHYDRATES, COMPLETE PROTEINS, AND NON REDUCING SUGARS, WHICH CORRELATE DIRECTLY WITH NUTRITION AND FLAVOR.
- CALCIUM, MAGNESIUM, VITAMIN A, VITAMIN C, SELENIUM, {BORON, POTASSIUM, PHOSPHORUS AND NITROGEN}-THESE MINERALS, IN PREDETERMINED QUANTITIES AND RATIONS CORRELATE DIRECTLY WITH THE PRESENCE AND HEALTHY RELATIONSHIP OF A NUMBER OF OTHER TRACE ELEMENTS AND VITAMINS.
- A LIMITED NUMBER OF TEST FACTORS LIMITS THE COST OF THE TEST.
- ORAC/ANTIOXIDANT LEVELS- A SPECIFIC ELEVATED LEVEL OF ANTIOXIDANTS GENERALLY IMPLIES OVERALL NUTRITIVE VALUE, ENERGETICS AND PHYTONUTRIENTS.

COURSE STRUCTURE

- EVERY TWO MONTHS THROUGH THE YEAR
- LEARN THE TECHNIQUES, PRINCIPLES AND MATERIALS NEEDED FOR THE NEXT TWO MONTHS OF THE GROWING SEASON
- REVIEW AND SHARE EXPERIENCES, ISSUES, SUGGESTIONS
- NETWORK

PROTOCOLS FOR THE YEAR

BIOLOGICAL INNOCULATION
SOIL MINERAL BALANCING
NUTRIENT DRENCHES
FOLIAR SPRAYS

MANAGEMENT PRACTICES FOR THE YEAR

- SOIL TESTING
- TISSUE ANALYSIS
- SAP MONITORING
- VISUAL FIELD ANALYSIS
- TILLAGE AND COVERCROPPING
- ROTATION MANAGEMENT

PRODUCTION PRINCIPLES

REQUISITE ASSUMPTION

 MAXIMUM BIOLOGICAL
 VITALITY IS THE OBJECTIVE OF OUR AGRICULTURAL ENDEAVORS.

 IN SOIL LIFE, CROPS, ANIMALS AND HUMANS

PLANT VITALITY MONITERED

- COMPLETE CARBOHYDRATE
 PRODUCTION
- COMPLETE PROTEIN PRODUCTION
- FAT AND OIL (ESSENTIAL)
 PRODUCTION
- ENZYME, VITAMIN, HORMONE PRODUCTION. SECONDARY PLANT METABOLITES.

BIOLOGICAL VITALITY EXPLORED

- FACILITATION OF THE DNA POTENTIAL.
- CORRELATES WITH VITAL HEALTH
- MAXIMUM POTENTIAL PRODUCTION
- HEALTHY IMMUNE SYSTEM = DISEASE AND INSECT RESISTANCE
- MAXIMUM POTENTIAL NUTRITION

END RESULT CALLED NUTRIENT DENSE

ONE EASY VALIDATION

HIGH BRIX

CURRENT TRADITIONS IN BIOLOGICAL MANAGEMENT

- ORGANIC
- BIODYNAMIC
- PERMACULTURE
- AND OTHERS, EX. SUSTAINABLE
- THESE TRADITIONS DO NOT NECESSARILY EDUCATE THE FARMER IN THE OVERALL PRINCIPLES OF MAXIMIZING BIOLOGICAL VITALITY AND SYSTEMS.

 THEY ARE PROCESS-BASED PROTOCOLS WITHOUT A CLEAR NUTRITIVE OUTCOME AS A STANDARD.

WHAT IS NUTRIENT DENSITY?

- HIGH BRIX
- HEAVY TEST WEIGHT
- WILL DESSICATE
- 100%+ Pre 1940
 USDA AVERAGE
 MINERAL LEVELS
 AND SPECTRUM
- MORE FILLING

- FLAVOR/REFRACTOMETER
- LB'S/BUSHEL,SEED/LB
- SHELF LIFE VS. ROT
- COMPLETE PROTEINS, AMINO ACID RATIOS, ORAC, ENZYMES, PHYTONUTRIENTS
- MINERALS VS. CALORIES

How to Get There?

- INTELLIGENT USE OF SCIENTIFIC PRINCIPLES
- CHEMISTRY
- PHYSICS
- BIOLOGY
- MICROBIOLOGY
- SOUND FARM MANAGEMENT PRACTICES.

WHAT HAPPENS?

- REDUCED WEED PRESSURE/WEEDS GET DISEASE & INFESTATION
- REDUCED TO REMOVED CROP DISEASE & INFESTATION
- SHORTER TIME TO HARVEST
- INCREASED YIELD
- INCREASED FLAVOR AND SHELF LIFE

MORE REQUISITE ASSUMPTIONS

- SCIENTIFIC PRINCIPLES ARE CRITICAL TOOLS
- TECHNOLOGY IS A POTENTIALLY VERY VALUABLE ALLY
- DOGMA IS DANGEROUS
 - EX. MINING IS BAD
 - PRODUCTS OF HUMAN INDUCED CHEMICAL REACTIONS ARE BAD
 - TILLAGE IS BAD

FIGHTING IS OUT OF STYLE

SOLVING THE DIALECTIC

- FIGHTING WEEDS, INSECTS AND DISEASES IS THE OLD MENTALITY. IT HAS NOT SOLVED ANY PROBLEMS.
- SOLUTION TO THE DIALECTIC IS IN CONCEIVING OF THE OBJECTIVE AS BUILDING THE BIOLOGICAL SYSTEM IN WHICH CROP PLANTS OUT COMPETE.
- BUILD THE SOIL PROPERLY AND THE INSECTS AND DISEASE WILL ATTACK THE WEEDS!

SOLUTION TO THE DIALECTIC •UNDERSTANDING AND OPERATING FROM THE ENERGETIC **REALITY** UNDERPINNING PHYSICAL SYSTEMS

FOUNDATIONAL PARAMETERS FOR BIOLOGICAL FUNCTION

SOIL

 BALANCING BIOLOGICALLY AVAILABLE MINERALS

ANION/CATION BALANCING

ERGS/PARAMAGNETISM AND ENERGY FLOW

BACTERIAL/FUNGAL RATIOS

PLANT

PROTEIN SYNTHESIS VS. PROTEOLYSIS

CARBOHYDRATES AND SUGARS



CONDUCTIVITY



SOIL TESTING

- STRONG ACID/WEAK ACID
 SAVINGS ACCT/CHECKING ACCT
 CEC/BIOLOGICALLY AVAILABLE
 - MINERAL BALANCING
- PH FOR MINERAL SOLUBILITY IN SOLUTION/MINERAL RATIOS FOR OPTIMAL SOIL LIFE AND PLANT SYMBIOSIS, AND ENERGY

ENERGY FLOW IN NATURE

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BACTERIAL AND FUNGAL RATIOS

- TRAJECTORY OF SOIL EVOLUTION FROM STONE TO CLIMAX FOREST.
- INITIALLY HIGHLY BACTERIAL DOMINANT 1,000 TO 1 BY WEIGHT AND VOLUME TO FINALLY HIGHLY FUNGAL-DOMINANT 1,000 TO 1 BY WEIGHT AND VOLUME.
- CROP PLANTS HAVE PRIMARY SYMBIOTIC RELATIONSHIPS JUST TO THE FUNGAL SIDE OF THE CENTER OF THE SPECTRUM. AND WEEDS JUST TO THE BACTERIAL SIDE.
- SOIL MINERAL RATIOS AND ENERGY LEVELS DETERMINE IDEAL HABITAT FOR SPECIFIC SPECIES OF SOIL LIFE.

ERGS

 ERGS TESTING IS A RAPID AND INEXPENSIVE WAY TO MONITOR ENERGY FLOW IN THE SOIL.

 REAL TIME MANAGEMENT DECISIONS INCLUDING APPLICATION OF SEAWEED, BIOLOGICAL INOCULANTS, HUMATES, MICRONIZED MINERALS AND MOLASSES ARE PRACTICAL WAYS TO KEEP ERGS READINGS AT IDEAL LEVELS, FACILITATING MAXIMUM BIOLOGICAL GROWTH.

ENERGY

ENERGY BALANCING IS AT THE ROOT OF MINERAL BALANCING. **BALANCING AND INCREASING** POTENTIAL ENERGY IS AT THE ROOT OF SOIL BUILDING +/-BALANCE, SPIN AND QUANTITY **BATTERY IS PLATES WITH AN** ELECTROLYTE. MAXIMUM POTENTIAL DIFFERENCE IS

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BATTERY

A FULLY CHARGED

PROTEIN SYNTHESIS VS. PROTEOLYSIS

- COMPLETE PROTEINS AND NON REDUCING SUGARS ARE THE OBJECTIVE OF PHOTOSYNTHESIS.
- THIS IS WHAT MAMMALS ARE DESIGNED TO DIGEST.
- FREE N, AMINO ACIDS, AND SIMPLE REDUCING SUGARS ARE WHAT INSECTS CAN DIGEST.
- SUFFICIENT CA, P, S ETC CRITICAL.
- REFRACTOMETER IDEAL TOOL FOR MEASURING.

CALCIUM

- PRIMARY BASE AGAINST WHICH OTHER MATERIALS ARE REACTED TO RELEASE ENERGY.
- KEY TO SUCCESSFUL FOLIAR SPRAYS.CALCIUM CHANNELS IN CELL
 PRIMARY CHANNELS FOR MOVEMENT OF COMPOUNDS.
- KEY FOR INTRACELLULAR COMMUNICATION. TELEPHONE LINES.

PHOSPHORUS/PHOSPHATE

- ALL MINERALS WHICH ENTER A PLANT EXCEPT NITROGEN ENTER ATTACHED TO A PHOSPHATE ION. TRAIN ENGINE
- KEY FOR ATP. ENERGY WHICH FIRES THE FACTORY OF THE PLANT.
- SHORTAGE OF PHOSPHATE MEANS A BREAKDOWN OF THE TRANSMISSION OF ENERGY IN PLANTS AND AS SUCH PREVENTS GROWTH.

WORK OF PHIL CALLAHAN

 INSECTS TUNE INTO THE RADIO
 AND INFRARED
 SIGNALS IN THEIR
 ENVIRONMENT TO
 SEEK, IDENTIFY,
 TRACK AND HOME
 IN ON THEIR MATES
 AND FOODS.

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WEEDS

PREFER BACTERIAL DOMINANT SOIL.
SOUR GRASS WEEDS, FUNCTIONAL CALCIUM DEFICIENCY
BROADLEAF WEEDS, PHOSPHORUS / POTASSIUM RATIO IMBALANCE
SUCCULANTS, FUNCTIONAL CARBON DEFICIENCY

BRIX AND REFRACTOMETER

- REFRACTOMETER MEASURES QUANTITY OF DISSOLVED SOLIDS IN A FLUID.
- MEASURED IN DEGREES BRIX
- HIGHER BRIX CORRELATES DIRECTLY WITH HIGHER MINERAL CONTENT, MORE COMPLETE PROTEINS, INCREASES PHYTONUTRIENTS, AND VITAMINS.
- ALSO CORRELATES WITH BETTER FLAVOR, MORE SWEETNESS AND LONGER SHELF LIFE.
- HIGH BRIX CROPS WILL NOT ROT. THEY DESICCATE.

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BRIXCHART

PRELIMINAR

Y

STANDARD FOR NUTRIENT DENSITY GOOD OR EXCELLENT ON THE BRIX CHART

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Electrical Conductivity

- ENERGY AVAILABLE FOR PLANT GROWTH
- MEASURES THE QUANTITY AND MOBILITY OF IONS (CATIONS & ANIONS) AND IS PERFECT FOR SEEING AN OVERVIEW OF THE AMOUNT OF NUTRIENTS AVAILABLE TO THE CROP.
- SOIL EC BELOW 200 ERGS/MICROSIEMEN IMPLIES AN INSUFFICIENCY OF ENERGY AVAILABLE FOR THE ELECTRICAL/CHEMICAL REACTIONS NECESSARY FOR HEALTHY PLANT GROWTH. 1000 TOO HIGH

 IDEALLY 200-600 IN THE SOIL, AND 2000+ IN PLANT SAP QuickTime™ and a decompressor are needed to see this picture.

PH

- IDEAL SAP PH-LEVEL FOR OPTIMAL PLANT GROWTH AND PRODUCTION IS PH 6.4
- IF SAP PH EXCEEDS 6.4, THIS PROBABLY MEANS A SHORTAGE OF THE ANIONS NITROGEN, PHOSPHATE OR SULFUR. AT PH 8 THE ODDS OF INSECT TROUBLE IS 100%.
 - Conversely, if sap pH is lower Than 6.4, then there is a cation Problem, with possible Deficiencies of calcium, Magnesium, potassium and/or Sodium. Low sap pH suggests a Far greater potential for Foliar disease. At pH 4.5 the Probability for fungal Appearance is 100%.

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How?

- SOIL AVAILABLE
 MINERAL BALANCING
- PROPER BIOLOGICAL INOCULATION
- WATER MANAGEMENT
- REAL TIME SOIL AND
 PLANT SAP ANALYSIS
- NUTRIENT DRENCHES
 AND FOLIAR FEEDING

- PROPER AMENDING
- KEY ROLE OF MYCORRHYZAL FUNGI
 - DRIP, SPRINKLERS ETC
- REFRACTOMETER, ELECTRICAL CONDUCTIVITY AND PH METERS

MICRONIZED MINERALS, HUMATES, BIOLOGICAL INNOCULANTS, SEA MINERALS, MOLASSES, ETC.

WARNING

- THIS PROCESS DOES NOT HAPPEN OVERNIGHT
- EXPECT 3-5 YEARS FOR TRANSITION.
- INSUFFICIENT ENERGY IN THE SOIL TO FEED BIOLOGICAL DIGESTION OF MINERAL AMENDMENTS WILL RESULT IN <u>DIMINISHED ENERGY FOR CROP</u> GROWTH.

NUTRIENT DENSITY AS A QUALITY STANDARD

- WHEN THE BIOLOGICAL SYSTEM IS FUNCTIONING AT A HIGH LEVEL THERE ARE DIRECT MINERAL VITAMIN
 TRACE ELEMENT AND NUTRIENT IMPROVEMENTS THAT ARE EASILY VERIFIABLE IN CROPS.
- THIS NUTRIENT IMPROVEMENT REFERRED TO AS NUTRIENT DENSITY IS THE GENERAL STANDARD TO
 VALIDATE THE SUCCESS OF BIOLOGICAL AGRICULTURE.
- FROM THE CONSUMER'S PERSPECTIVE, NUTRIENT
 DENSE CROPS CORRELATE DIRECTLY WITH SUPERIOR
 FLAVOR, SUPERIOR SHELF LIFE AND A BROAD RANGE
 OF HEALTH BENEFITS RELATED TO THE BODY'S
 COMPLETE NUTRITIONAL NEEDS BEING MET.

COROLLARIES FOR HUMAN HEALTH

 DR. RICHARD OLREE SHOWS A CLEAR RELATIONSHIP BETWEEN SPECIFIC MINERAL DEFICIENCIES AND SPECIFIC DNA MALFUNCTION, NOW UNDERSTOOD TO BE CAUSATIVE FACTORS IN MOST CHRONIC ILLNESS.
 MINERALS FOR THE GENETIC CODE

SEED INNOCULATION

- TEST WEIGHT SORTING
 CRITICAL ROLE OF NUMEROUS SPECIES IN SYNERGY WITH THE PLANT ROOTS
- SIMPLE, INEXPENSIVE AND MAJOR
 FACTOR IN SETTING PLANT GROWTH TRAJECTORY

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.