

PRINCIPLES TO
PRODUCE
NUTRIENT DENSE
CROPS

*AND THE REAL FOOD
CAMPAIGN*

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

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

PLANT VITALITY MONITERED

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

INTRODUCTORY OUTLINE

REQUISITE ASSUMPTION

- MAXIMUM **BIOLOGICAL VITALITY** IS THE OBJECTIVE OF OUR AGRICULTURAL ENDEAVORS.
- IN SOIL LIFE, CROPS, ANIMALS AND HUMANS

BIOLOGICAL VITALITY DEFINED

- MAXIMIZATION OF THE DNA POTENTIAL.
- CORRELATES WITH VITAL HEALTH
- MAXIMUM PRODUCTION
- HEALTHY IMMUNE SYSTEM= DISEASE
AND INSECT RESISTANCE
- MAXIMUM NUTRITION IN CROPS
- IF THE PLANT'S REPRODUCTIVE ORGANS
ARE HEALTHY IT IS MAXIMIZING ITS
POTENTIAL TO REPRODUCE CROPS THAT
ARE HEALTHY.

END RESULT CALLED
NUTRIENT DENSE
EASILY VERIFIED BY
HIGH BRIX

CURRENT TRADITIONS IN BIOLOGICAL MANAGEMENT

- ORGANIC
- BIODYNAMIC
- PERMACULTURE
- AND OTHERS, EX. SUSTAINABLE
- THESE TRADITIONS DO NOT 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
- PH
- CONDUCTIVITY
- BRIX

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

OTHER PARAMETERS

- HUMUS 30-40 MIN LUBKE TEST
- SODIUM <35 PPM
- ORP 28
- PH 6.5
- COPPER .8-2.5 PPM
- IRON 10-25 PPM
- ZINC 1-6PPM
- MANGANESE 8-30PPM
- BORON .8-1.2 PPM
- SULPHUR 30 PPM
- ORGANIC MATTER 4%MIN
- FORMAZON 600

ENERGY FLOW IN NATURE

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RBTI

- RBTI SUGGESTS THAT PLANTS LIVE OFF THE ENERGY RELEASED BY ELEMENTS NOT OFF THE ELEMENTS THEMSELVES "PER SE."
- IN OTHER WORDS REAMS WAS CONCERNED WITH INCREASING THE ENERGY, OR MAGNETISM, OF CROPS THROUGH THE USE OF SPECIALIZED FERTILIZERS.

A GENERATION LOST

- RBTI ANION-CATION CONNUNDRUM
- ANIONIC ENERGY DENOTES THE VEGETATIVE STAGE OF PLANT GROWTH
- CATIONIC ENERGY DENOTES THE FRUITING STAGE.
- REAMS USE OF THESE TWO TERMS DIFFERS FROM THEIR COMMON USAGE IN SOIL CHEMISTRY, WHEREIN AN ANION IS A NEGATIVELY CHARGED ION (NO_3^{-1} , PO_4^{-3} , SO_4^{-2}) AND A CATION IS A POSITIVELY CHARGED ION (NH_4^{+} , Ca^{+2} , K^{+} , Mg^{+2}).

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
A FULLY CHARGED
BATTERY

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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

- *PRELIMINARY
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. 1 000 TOO HIGH
- IDEALLY 200-600 IN THE SOIL, AND 2000+ IN PLANT SAP

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PH

- PH IS A MEASURE OF THE RATIO OF H^+ TO OH^- IONS.
- THE PH OF VINEGAR IS 2.5-3. HOW MUCH CALCIUM IS PRESENT?
- THE PH OF AMMONIA IS 12. HOW MUCH CALCIUM IS PRESENT?
- THE PH OF PURE WATER IS 7. HOW MUCH CALCIUM IS PRESENT?

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
- LAMOTTE SOIL TEST AND 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 DIMINISHED ENERGY FOR CROP 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

WORKING STANDARD/DEFINITION OF NUTRIENT DENSITY AND ITS STATUS

- 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 A, VITAMIN C AND SELENIUM LEVEL AND RATIO TESTS AND ANTIOXIDANT LEVELS LAB TESTS.

WHY THESE FACTORS?

- 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.

OVERALL CAMPAIGN STEPS

- CONSUMER AWARENESS/BRIX DATABASE
- BROAD AND COMPREHENSIVE RESEARCH DOCUMENTATION OF PRINCIPLES AND RESULTS
- SERIOUS ACHIEVABLE STANDARDS WITH DIRECT RAMIFICATIONS FOR SOIL, PLANT, ANIMAL, HUMAN AND ENVIRONMENTAL HEALTH.
- THANK YOU, AND BEST OF LUCK.