



**“Living Soil” — Nature’s System
for Nutrition & Health**

HUGE Topic!!!

- www.Libertytracefarm.com
- References “Books and Resources” Tab
- These Slides “Living Soil” Tab
- Links Past Presentations (2024)
 - (Beginner & Advanced)

Objectives

- Importance of Nutrient Density
- Where it Comes From
- Produce Your Own



30 YEARS (1985-2015)



"More than a terrific movie — it's an important movie."

—Owen Gleiberman, *Entertainment Weekly*

YOU'LL NEVER LOOK AT DINNER
THE SAME WAY AGAIN



FOOD, INC.

A ROBERT KENNER FILM

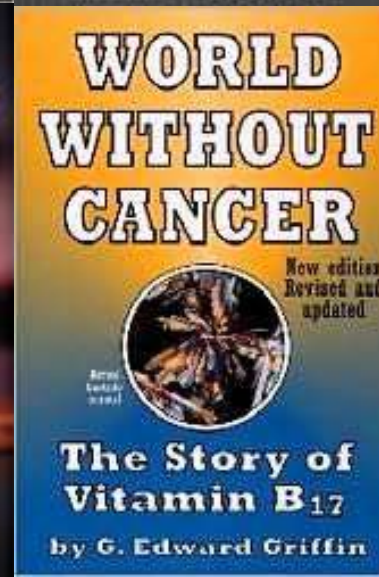
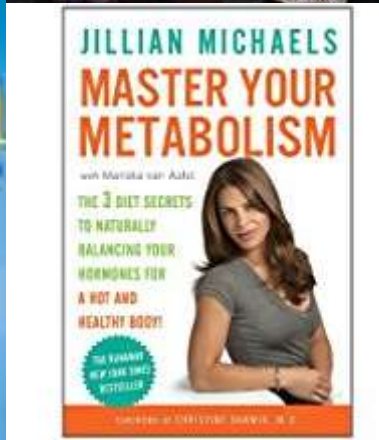
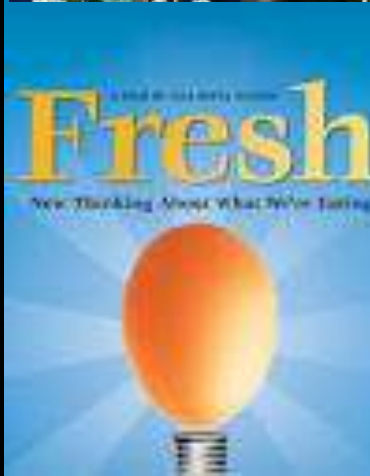
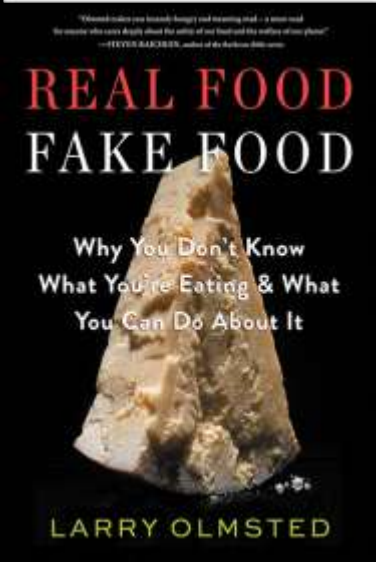
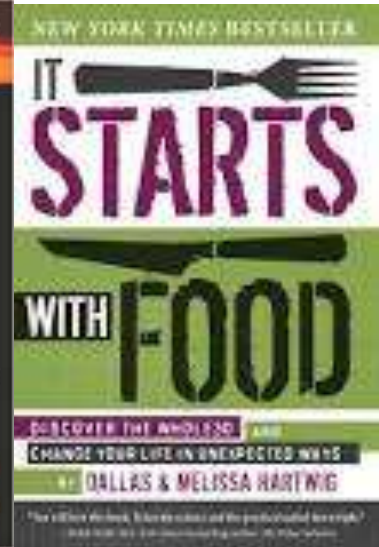
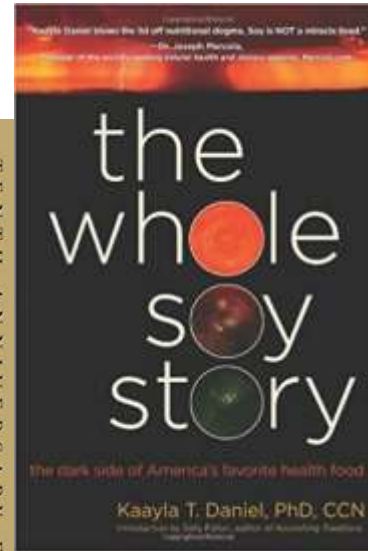
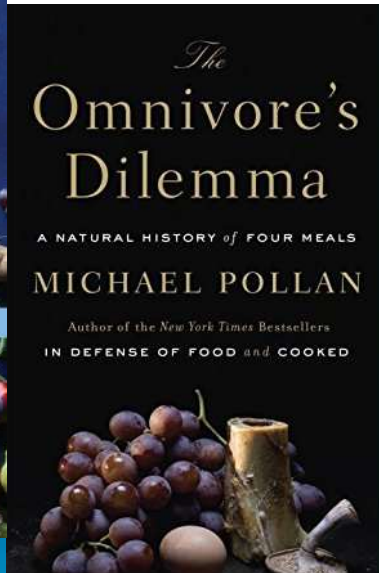
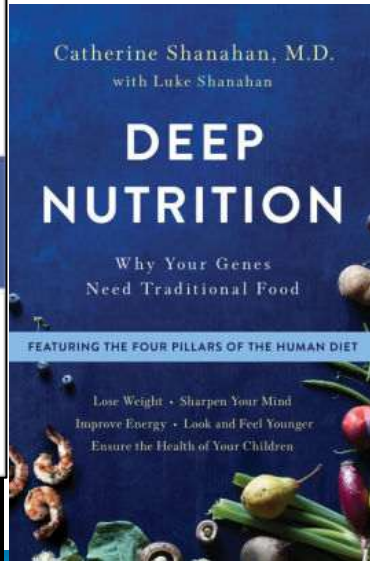
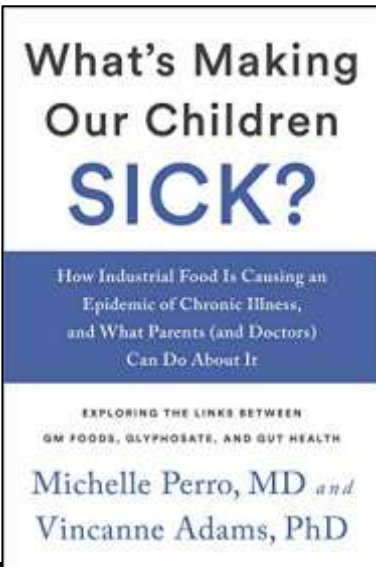
MANUELA VICIOMI, WITNESS MEDIA, AND RIVER ROAD ENTERTAINMENT PRESENT A FILM BY ROBERT KENNER "FOOD, INC." WITH DAVID ABLEN, KEVIN ROBERTS,
AND RICHARD PRANCE. MUSIC BY ERIC SCHLOSSER. VISUALS BY RICHARD PRANCE. EDITOR MELISSA ROBERTO. EXECUTIVE PRODUCERS JUDITH WILLIAM KUNZ AND JUDITH SCHOTER. CAST: JEFF SWILL, DANIE WEVERMANN,
AND OTHERS. www.foodinc.com www.magnolia.com www.fox.com



Joel Salatin—Polyface Farm



2008 and Every Day Since...





Grounded in a Quote

- “When you start to question where your food comes from, you begin to question everything.”

Joel Salatin



#1 Lesson: Be Skeptical

- *How Do You Know That to Be True?*
- “Without data, you’re just another person with an opinion” (W. Edward Deming)
- But, be open minded!!!



Health?

- “If you don’t have your health, you don’t have _____.”

ANYTHING

We Don't Have It!

- “Diseases” never heard of as a kid
 - Obesity, Autism, Alzheimers, Parkinsons, Dementia, Diabetes, Cancer, Leaky Gut Syndrome, Irritable Bowel Syndrome, Celiac, Crohn’s, Autoimmune Illnesses, Restless Leg Syndrome, Chronic Dry Eye, etc, etc.
- 50% Ads Pharmaceutical
- 18% of Economy (GDP)



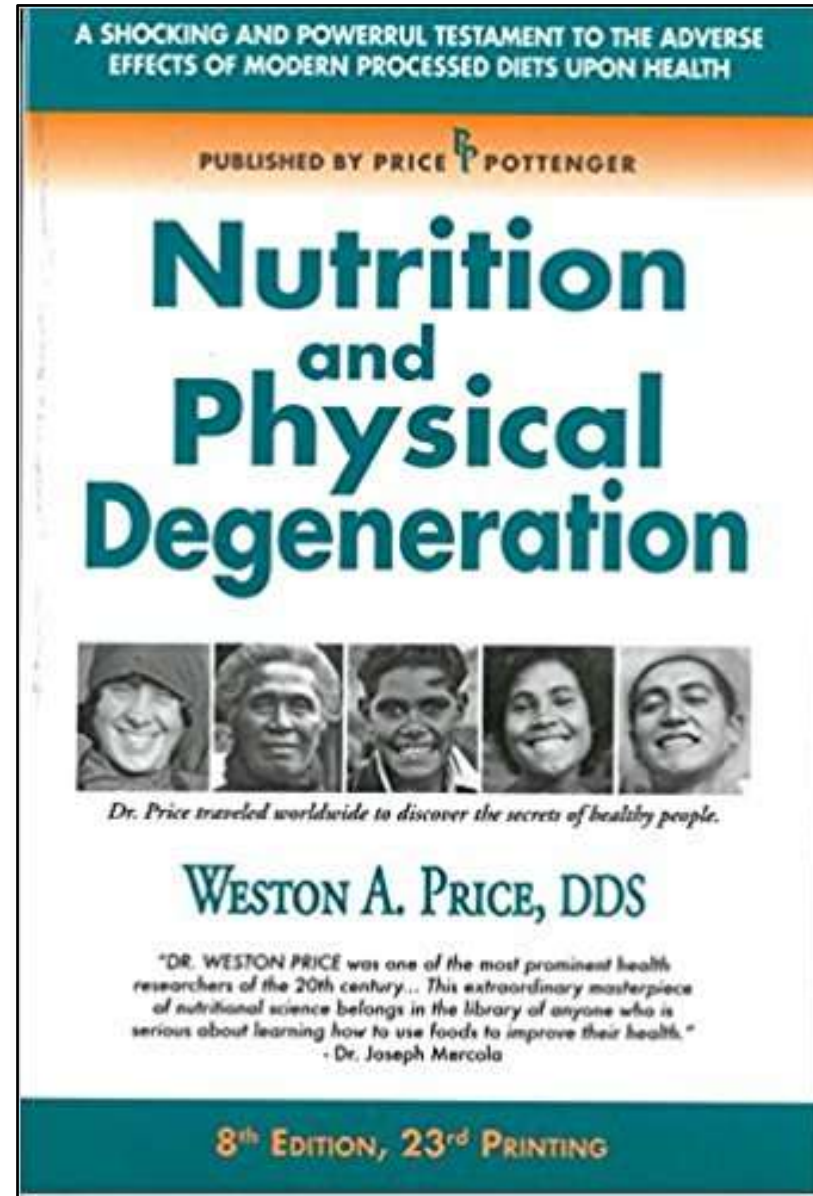
We're Not Healthy

- 2017: 75% of youth 17-24 unqualified to join military
- 1965: 4% of population had a chronic disease
 - Today 46% of children have a chronic disease
- 2006: MS only state above 30% obesity--today 41 states
- 2024: US spent \$5.3 Trillion on healthcare
 - \$6 Trillion on WWII (2024 dollars)
 - Defense 2025 (\$962 Billion)
- What's a Trillion??

1930s--Dr Weston A. Price



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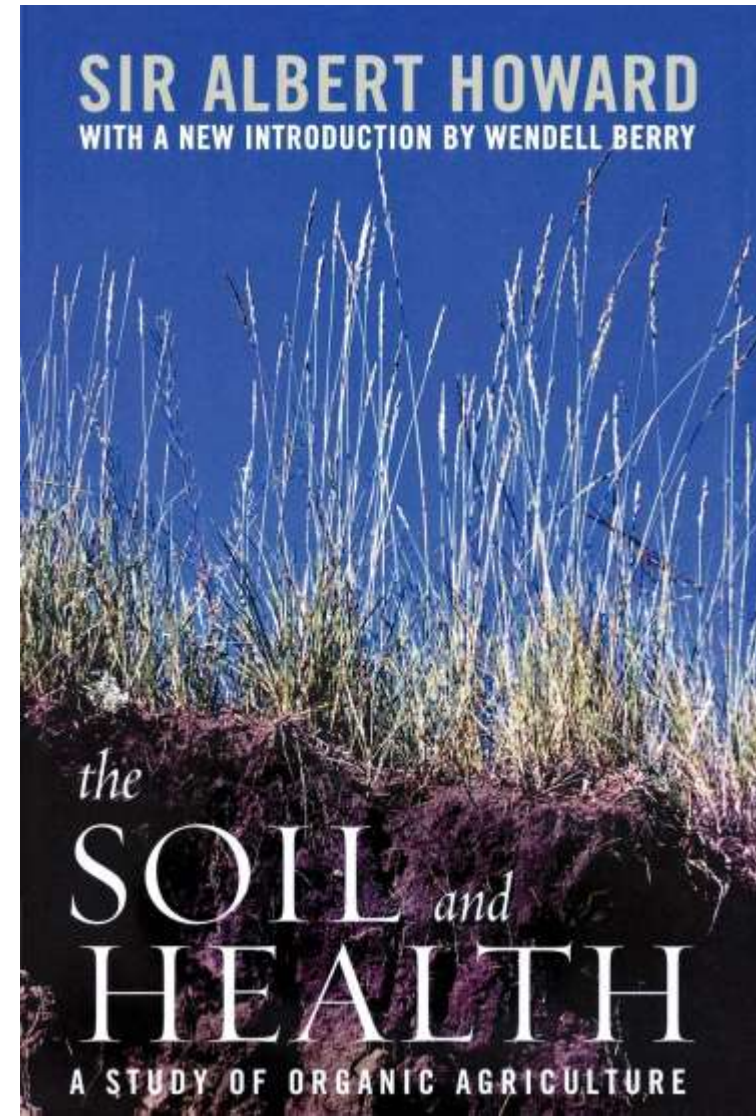
Dr Price's Findings

- NUTRIENT DENSE foods
 - Raw milk, pastured meats, natural produce
- Modern foods--tooth decay & disease
- ABSENCE of nutrients cause disease!



Sir Albert Howard (1947)

- 1910: “Healthy, well-fed animals failed to react to this disease...”
- **Nutrient Density Again!**



Farm Data

- “Curled Toe Disease” — Vitamin B



Gotta Have Some!

✓ **Nutrient Density**

✓ **Vitamins**

✓ **Minerals**

✓ **Enzymes**

✓ **Amino Acids**

✓ **Yet To Be Discovered**

What's "NUTRIENT DENSE" Here?





≠



Is it Nutrient Dense?

- Taste
- \$20 Brix Meter/Refractometer
- Dr Carey Reams (1903-1985)



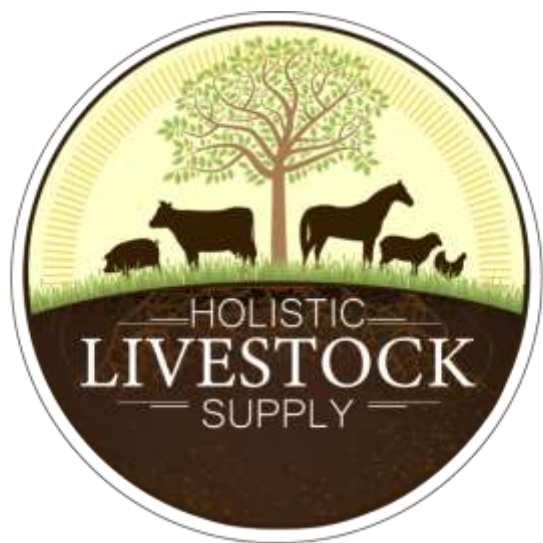
Refractive Index of Crop Juices -- Calibrated In % Sucrose Or °Brix

	Poor	Average	Good	Excellent
FRUITS				
Apples	6	10	14	18
Avocados	4	6	8	10
Bananas	8	10	12	14
Blueberries	8	12	14	18
Cantaloupe	8	12	14	16
Casaba	8	10	12	14
Cherries	6	8	14	16
Coconut	8	10	12	14
Grapes	8	12	16	20
Grapefruit	6	10	14	18
Honeydew	8	10	12	14
Kumquat	4	6	8	10
Lemons	4	6	8	12
Limes	4	6	10	12
Mangos	4	6	10	14
Oranges	6	10	16	20
Papayas	6	10	18	22
Peaches	6	10	14	18
Pears	6	10	12	14
Pineapple	12	14	20	22
Raisins	60	70	75	80
Raspberries	6	8	12	14
Strawberries	6	8	12	14
Tomatoes	4	6	8	12
Watermelons	8	12	14	16
GRASSES				
Alfalfa	4	8	16	22
Grains	6	10	14	18
Sorghum	6	10	22	30

Within a given species of plant, the crop with the higher refractive index will have a higher sugar content, higher mineral content, higher protein content and a greater specific gravity or density. This adds up to a sweeter tasting, more minerally nutritious food with lower nitrate and water content, lower freezing point, and better storage attributes.

	Poor	Average	Good	Excellent
VEGETABLES				
Asparagus	2	4	6	8
Beets	6	8	10	12
Bell Peppers	4	6	8	12
Broccoli	6	8	10	12
Cabbage	6	8	10	12
Carrots	4	6	12	18
Cauliflower	4	6	8	10
Celery	4	6	10	12
Corn Stalks	4	8	14	20
Corn (Young)	6	10	18	24
Cow Peas	4	6	10	12
Cucumbers	2	3	4	5
Endives	4	6	8	10
English Peas	8	10	12	14
Escarole	4	6	8	10
Field Peas	4	6	10	12
Garlic, Cured	28	32	36	40
Green Beans	4	6	8	10
Hot Peppers	4	6	8	10
Kale	8	10	12	16
Kohlrabi	6	8	10	12
Lettuce	4	6	8	10
Onions	4	6	8	10
Parsley	4	6	8	10
Peanuts	4	6	8	10
Potatoes	3	5	7	8
Potatoes, Sweet	6	8	10	14
Romaine	4	6	8	10
Rutabagas	4	6	10	12
Spinach	6	8	10	12
Squash	6	8	12	14
Sweet Corn	6	10	18	24
Turnips	4	6	8	10





BRIX--Grocery Store Produce

DATE	ITEM	SOURCE	BRIX		POOR	AVERAGE	GOOD	EXCELLENT
NA	Distilled Water		0					
2-Apr-23	Organic Spring Mix	Kroger	2		4	6	8	10
2-Apr-23	Organic Living Butter Lettuce	Kroger	2		4	6	8	10
2-Apr-23	Organic Honeycrisp Apple	Kroger	11.5		6	10	14	18
18-Jan-24	Organic Fuji Apple	Kroger	15		6	10	14	18
8-Oct-24	Organic Grape Tomato	Kroger	4.5		4	6	8	12
24-Jan-24	Non Organic Mandarin Orange	Kroger	15.5		6	10	16	20
24-Apr-24	Organic Mandarin Orange	Kroger	8		6	10	16	20
6-Apr-26	Purple Dead Nettle	Yard	10		?	?	?	?

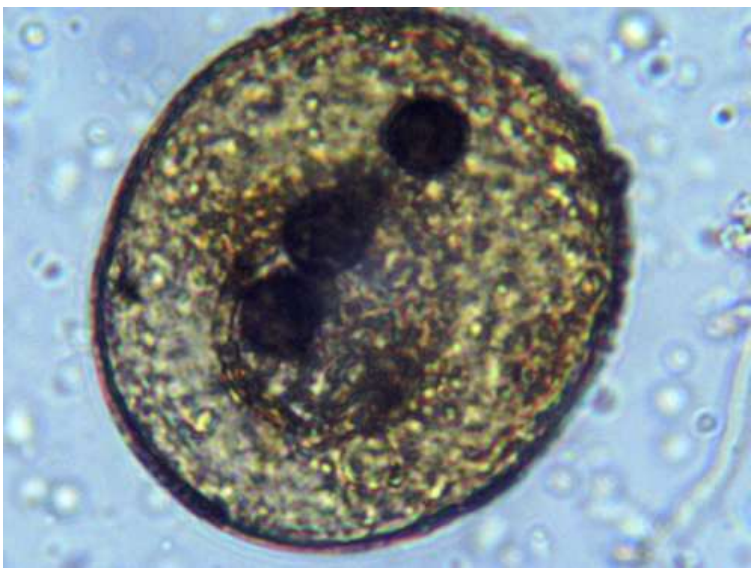
	Kroger
	Conventional vs Organic
	Our Yard





2019 Dr. Elaine Ingham (PhD in 1981)

- Soilfoodweb School
 - Fundamental Courses
 - Certified Lab-Tech
 - Consultant Training Program
 - Microbiome
 - Make biological amendments
 - Microscopy
 - Turn dirt to soil



- Korean Natural Farming—4300 Years!
- **Biology is most important ingredient**
 - Plant “blood” 1:30 dilution of sea water



Periodic Table of the Elements

Atomic Number → **H** ← Symbol
Name → **Hydrogen** ← Atomic Weight

Rows of matter states of gases: **1, 2, 10, 18, 36, 54, 86**

Subcategory in the main standard extended form (color of background):

- Alkali metal
- Alkaline earth metal
- Metals
- Nonmetals
- Transition metals
- Post-transition metals
- Transition elements
- Metalloids
- Phosphorus (metalloid)
- Chalcogens (metalloid)
- Halogens
- Noble gases
- Unknown chemical properties

1 H																	18 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	58 Hf	59 Ta	60 W	61 Re	62 Os	63 Ir	64 Pt	65 Au	66 Hg	67 Tl	68 Pb	69 Bi	70 Po	71 At	72 Rn
87 Fr	88 Ra	89 Ac	90 Rf	91 Db	92 Sg	93 Bh	94 Hs	95 Mt	96 Ds	97 Rg	98 Cn	99 Nh	100 Fl	101 Mc	102 Lv	103 Ts	104 Og

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Korean Natural Farming

SECOND EDITION

JADAM

Organic Farming

The way to *Ultra-Low-Cost* agriculture

Youngsang Cho



INNOVATIVE ORGANIC FARMING TECHNOLOGY
ESTABLISHED IN KOREA.

COMPLETELY OVERCOME THE TECHNICAL AND
PRACTICAL CHALLENGES OF ORGANIC AGRICULTURE.
MAKE YOUR OWN ALL-POWERFUL NATURAL PESTICIDES,
MICROBIAL INPUTS, AND FERTILIZERS.

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JADAM Organic

PEST and DISEASE CONTROL

POWERFUL DIY Solutions to 167
Common Garden Pests and Diseases

Written by Youngsang Cho | Photograph by Donghee Park



THE HARMONICS AND GEOMETRY OF BOUNDARIES



Geoff Lawton's

Permaculture Design Certification



The Food Chain



Sun



Hawk



Grass / Plants



Grasshopper



Mouse



Snake



Dr Charles Northen, MD

- “Sick soils mean sick plants, sick animals, and sick people”
- “It is simpler to cure sick soil than sick people, which shall we choose?”

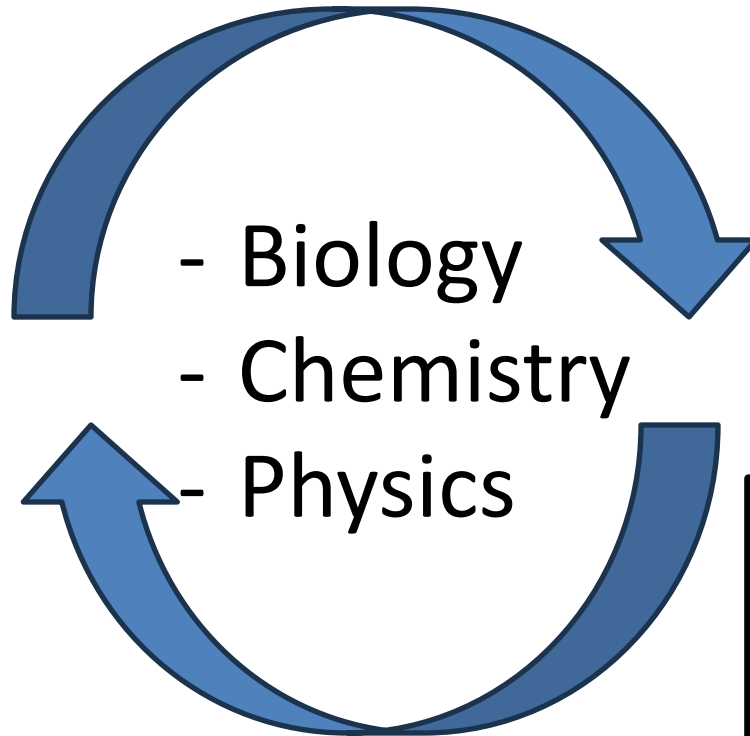


Soil Factory



Raw Materials

- Air
- Water
- Minerals



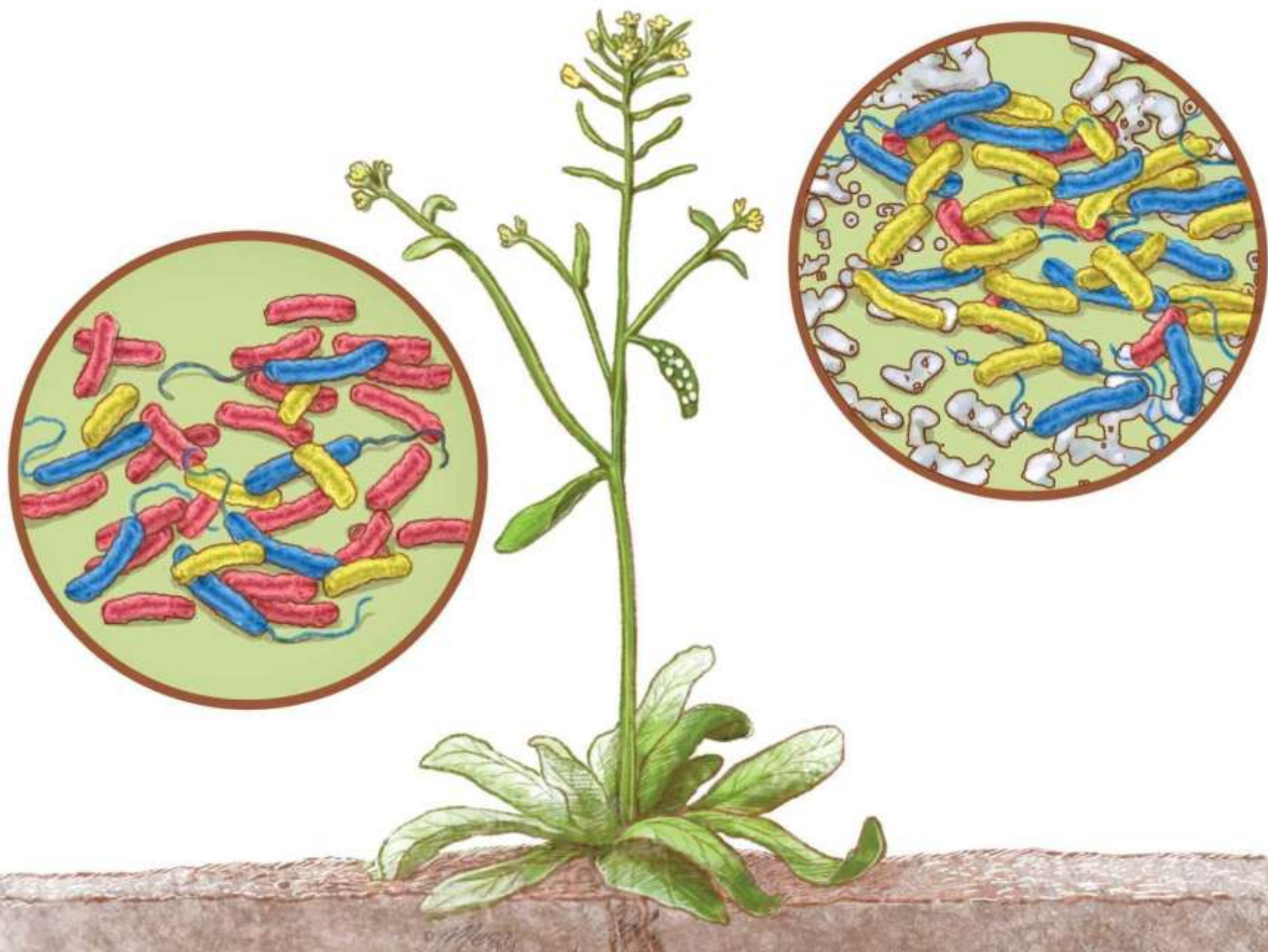
Food



Recycle

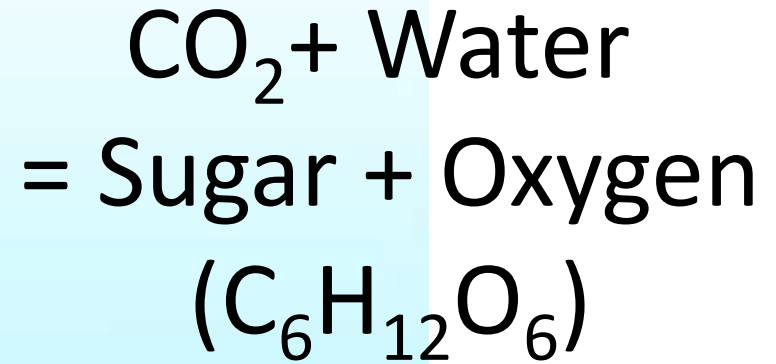
Team Effort!

- Biology—microscopic workers
 - Leverage chemistry & physics to care for the plant
- Chemistry—minerals & chemical reactions
 - Ca, P, K, NO₃, NH₄
- Physics—electrical energy
 - Sun, Moon, Stars, Earth N/S





Photosynthesis



(A) Root System Architecture

Spatially distinct communities

(E) Bacterial associations

(B) Chemical Gradients

(D) Mycorrhizal interactions

(C) Nematodal interactions

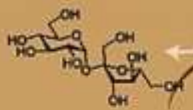




Photo Source: Soil Science Society of America

Periodic Table of the Elements

Key of matter states of gases:
■ ■ ■ ■ ■ ■ ■ ■

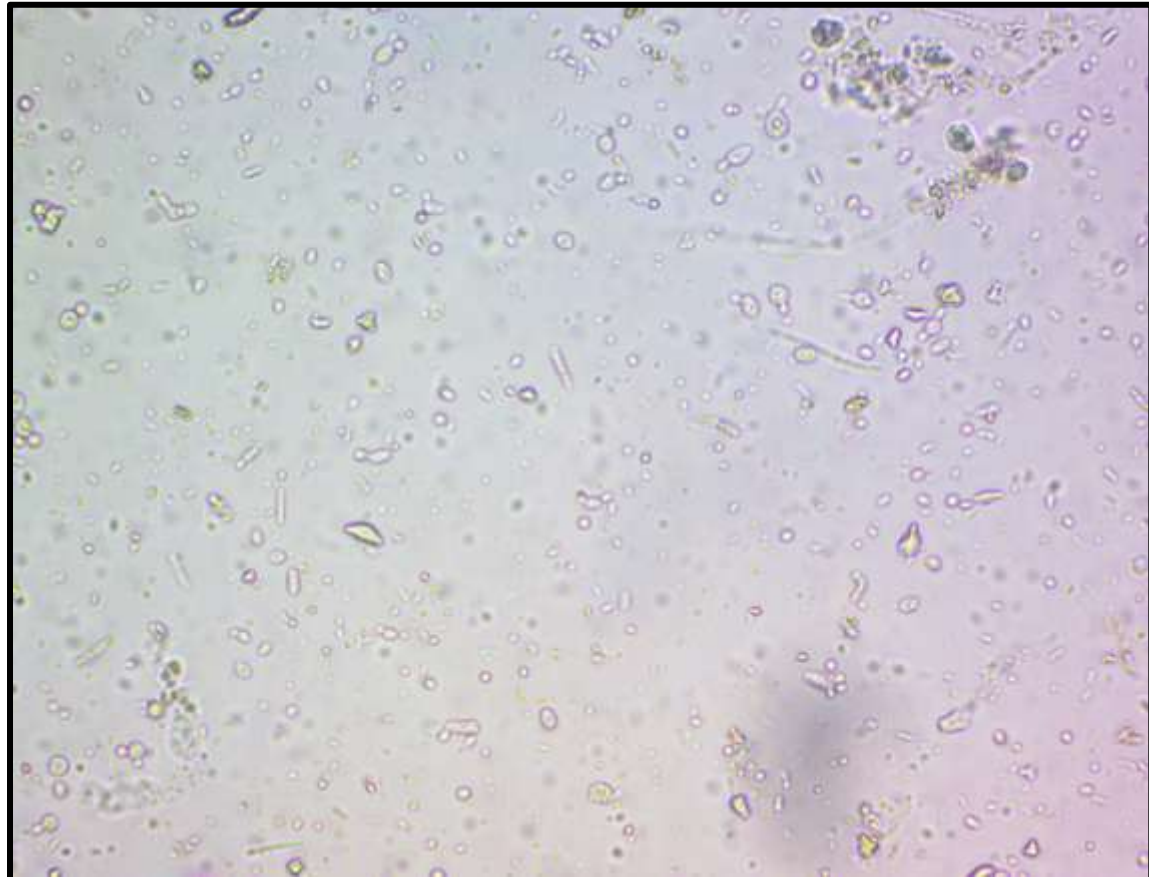
Key of categories in the main standard extended table (color of background):
■ Alkali metal ■ Alkali earth metal ■ Metalloid ■ Noble gas
■ Lanthanide ■ Actinide ■ Pnictogen (semimetal) ■ Unknown/unclassified properties
■ Transition metal ■ Post-transition metal ■ Group 11 element

1 H																	18 He														
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne														
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar														
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr														
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe														
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og

57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Chef Bacteria

- Recycle simple organic matter
 - Manure, alfalfa, green grass (Green, high nitrogen)
 - Fix nitrogen





Chef Fungi

- Recycle more complex organic matter
 - Wood chips, leaves, straw, etc (woody, high Carbon)





**NON-MYCORRHIZAL
ROOTS**



**ROOTS WITH
MYCORRHIZAL FUNGI**

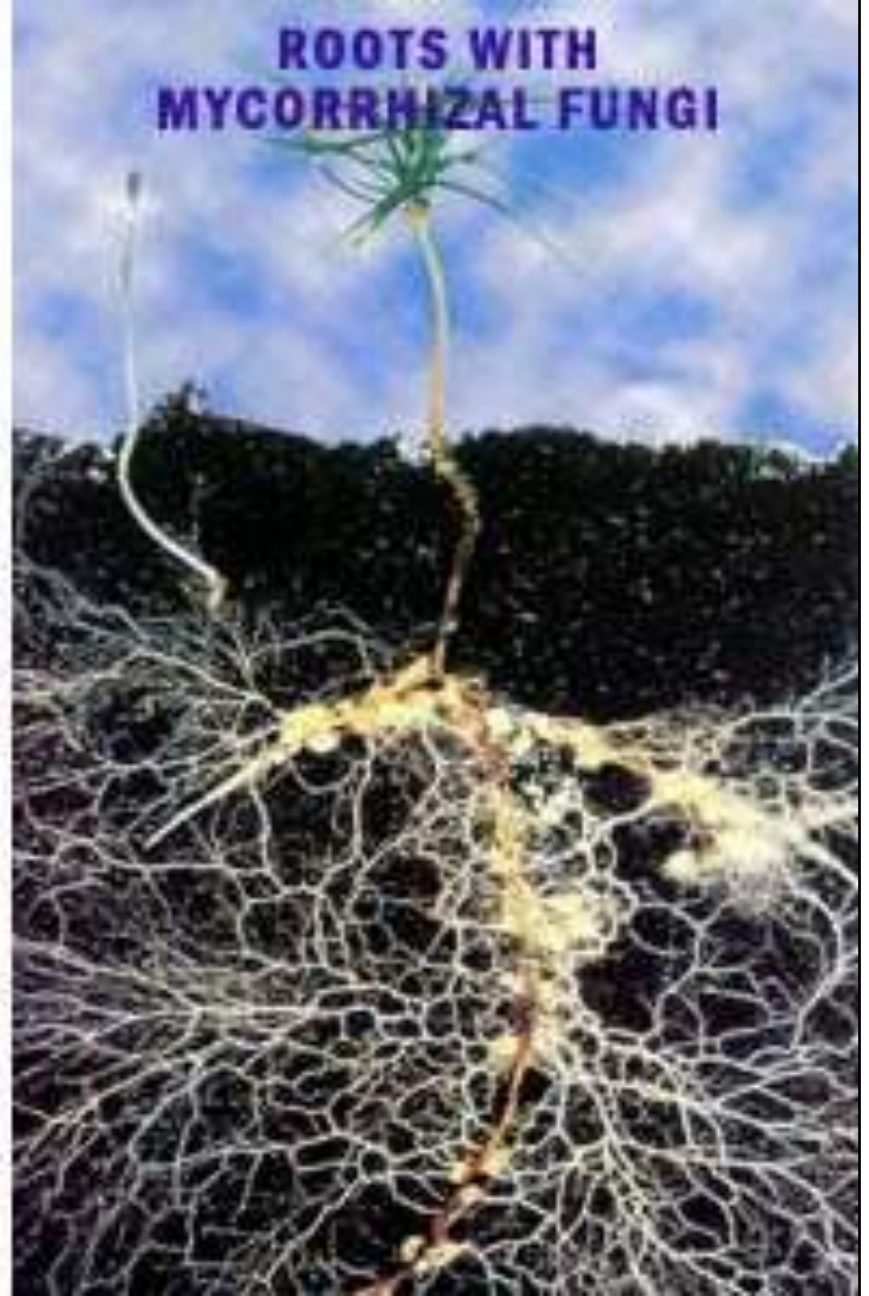


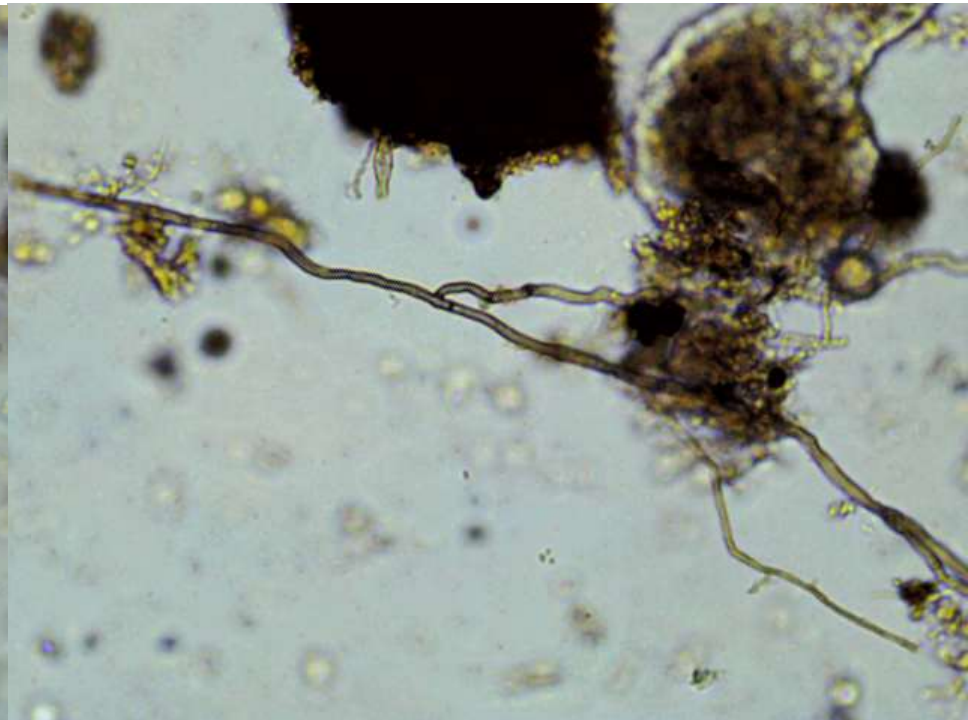
Photo Source: Israel Chemicals Limited Growing Solutions

Chef Protozoa--Predator



Chef Nematodes--Predator





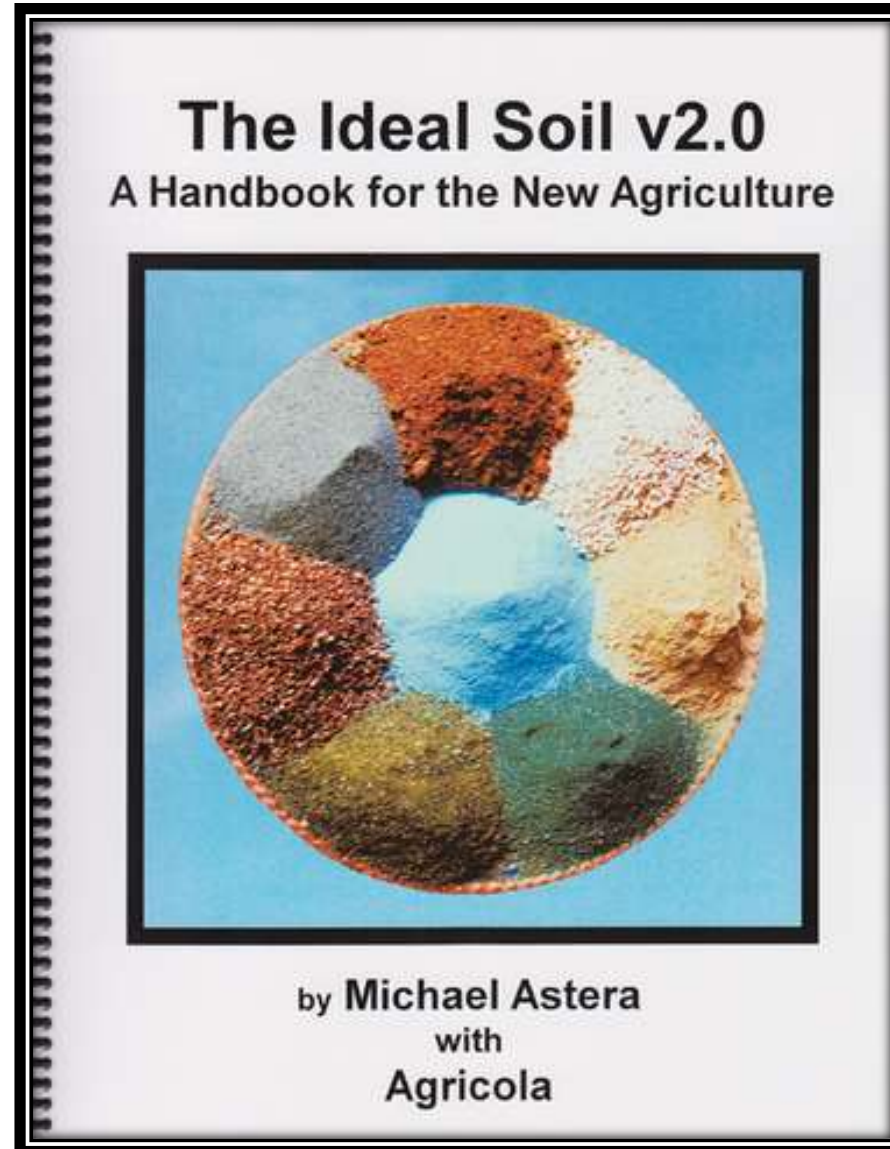
Chemistry--Dr William Albrecht



University of Missouri

1920s-1960s

“...I could help more people through soil science because of the link to health than I could from becoming a medical doctor.”



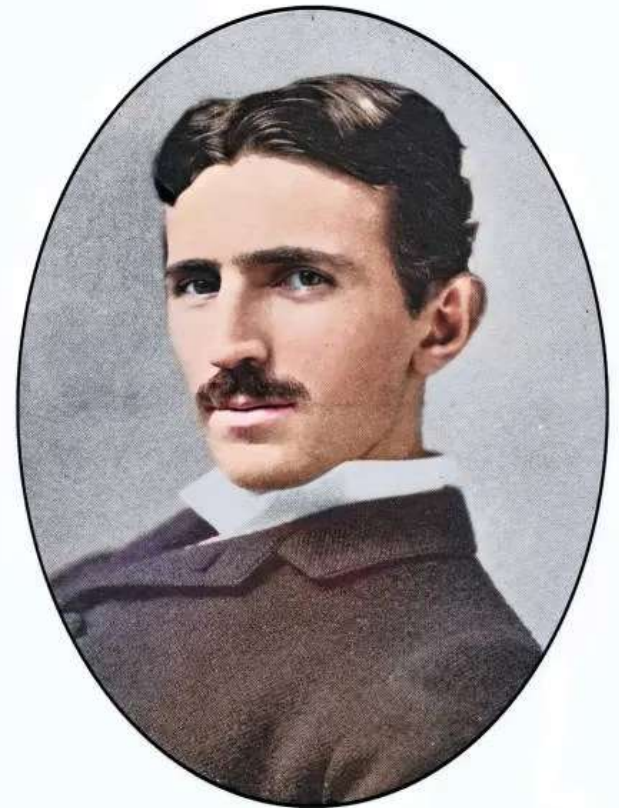
Mineral Balance

- Cation Exchange Capacity—Clay
- Primary—Ca, Mg, K, Na, H, P, S
- Secondary—Fe, Mn, Zn, Cu, B, Cl, Si
- Micro—Cr, Co, I, Mo, Se, Sn, V, Ni, F

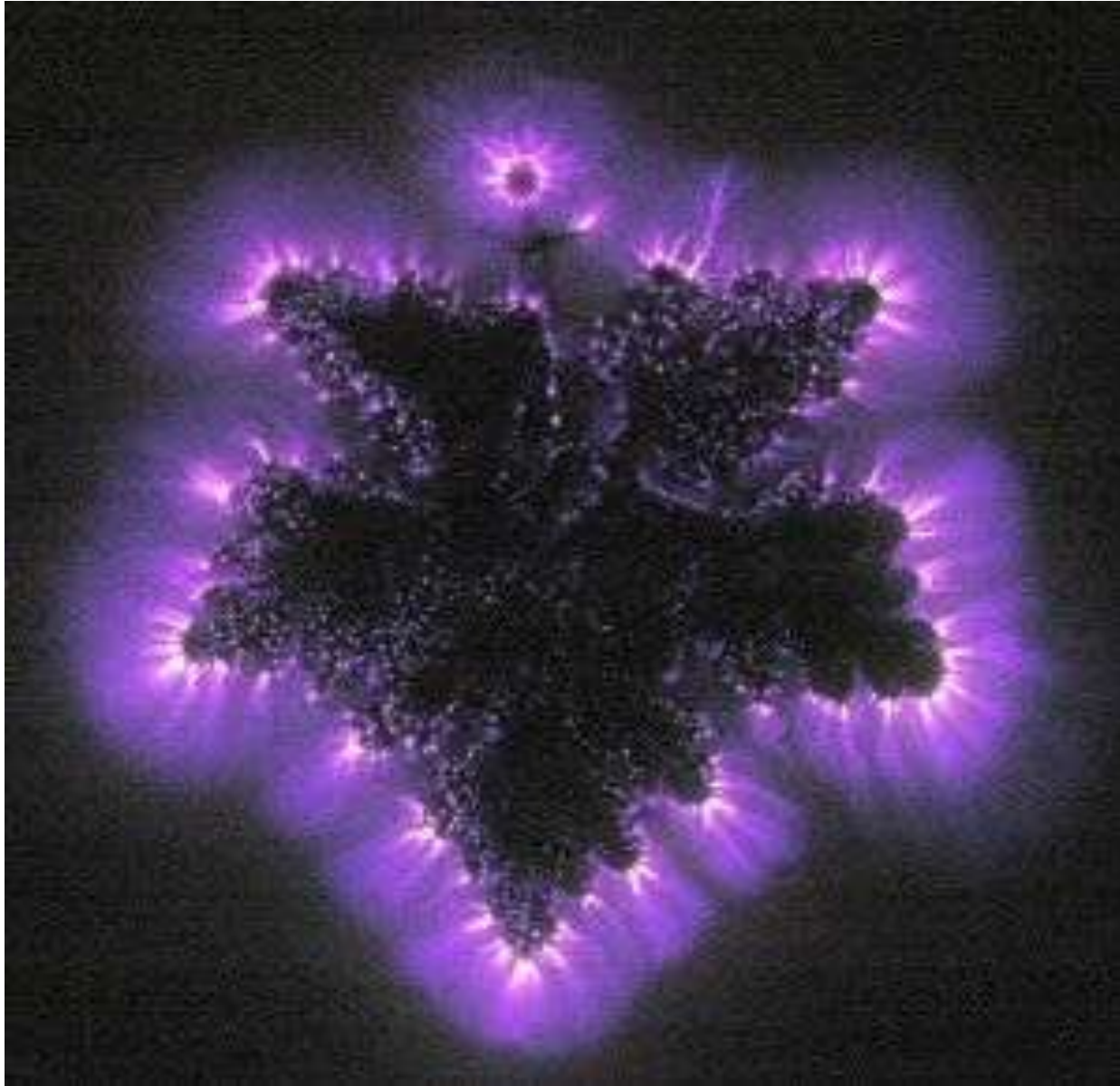
Physics

“If you want to find the secrets of the universe, think in terms of energy, frequency, and vibration.”

Nikola Tesla

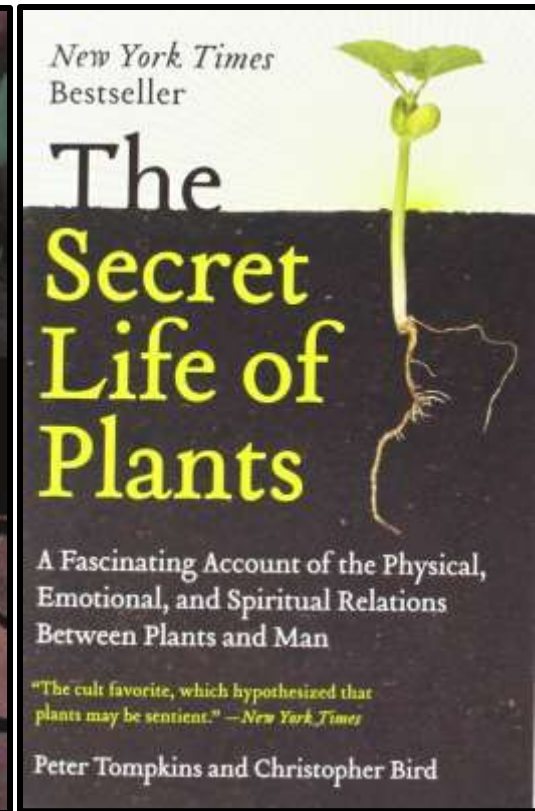
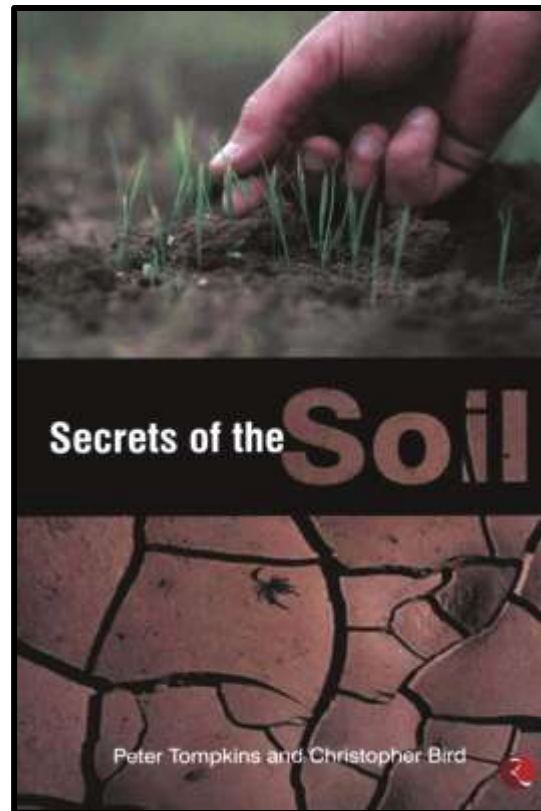


“Kirlian” Leaf Photo



Physics

- Sun, Moon, Stars, Planets
- Earth's Magnetic Field (N/S)
- Song birds
- Your energy
- Music



Now What?

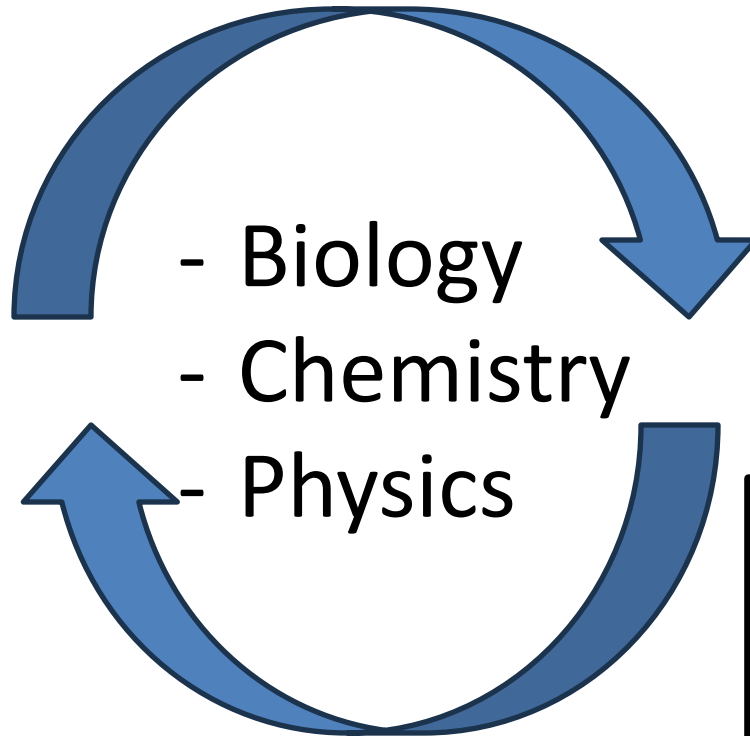
- Where do I Start??
 - It Depends!!
 - But...
 - Garden (Your Health First!)
 - Pasture

Soil Factory



Raw Materials

- Air
- Water
- Minerals



Food



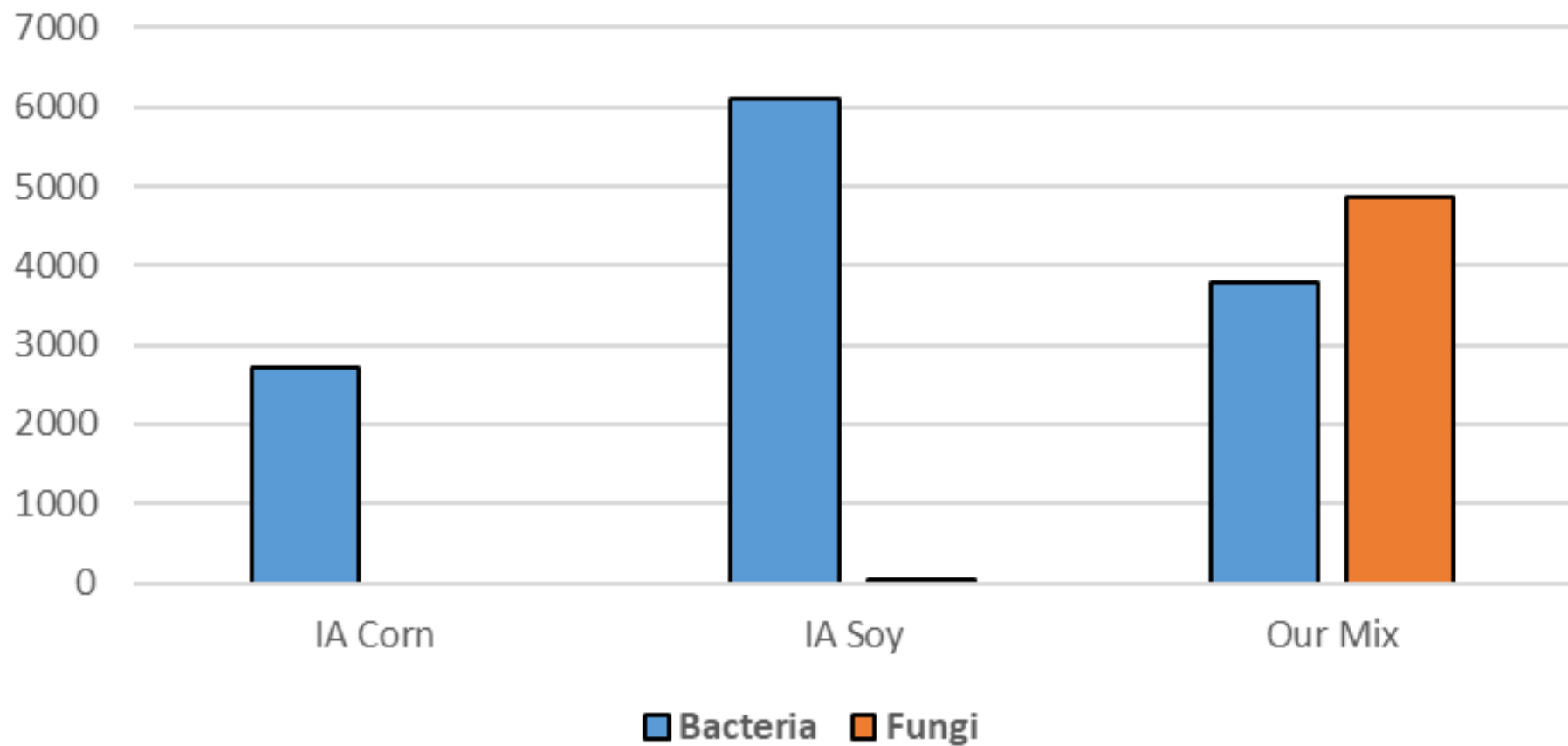
Recycle

“Bad” Inputs

- Biology Killers
 - Excessive Tillage
 - Chemical Fertilizers (N, P, K)
 - “icides”...Herbicides & Insecticides



Bacteria & Fungi

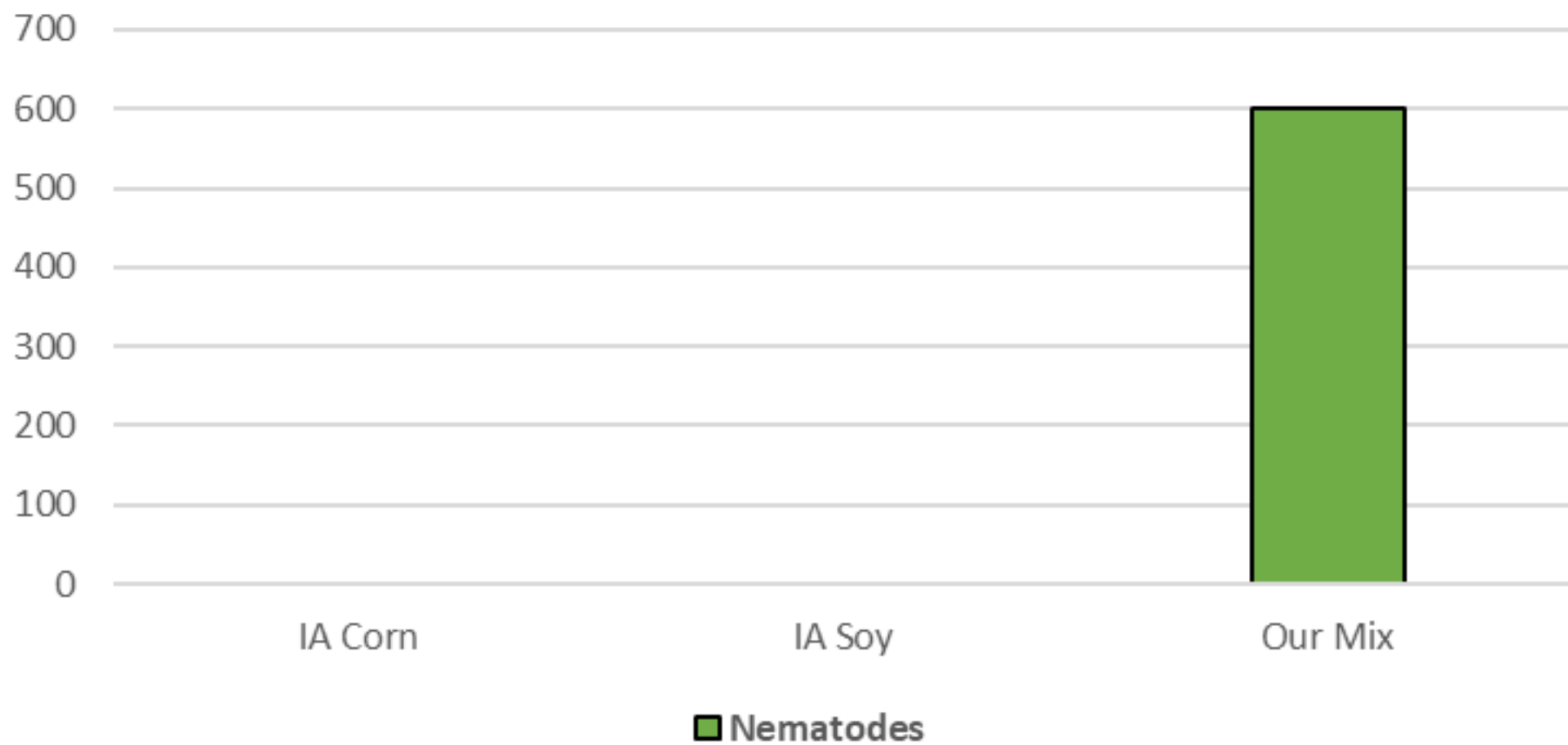


Protozoa



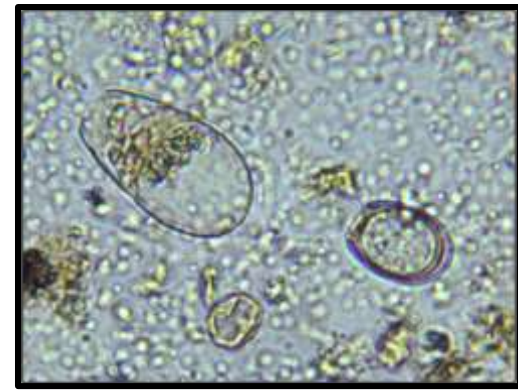
■ Protozoa

Nematodes



“Good” Inputs

- Microbes—workers
- Nutrients—Liquid Fish, Leaves, Hay, etc
- Minerals—Rock Dust, Azomite, Sea Salt, etc
- Energy—Music, Electroculture, etc
- Cover Crops—Nutrients, Energy, Sugar
- Livestock—Nutrients, Energy



Microbe Sources

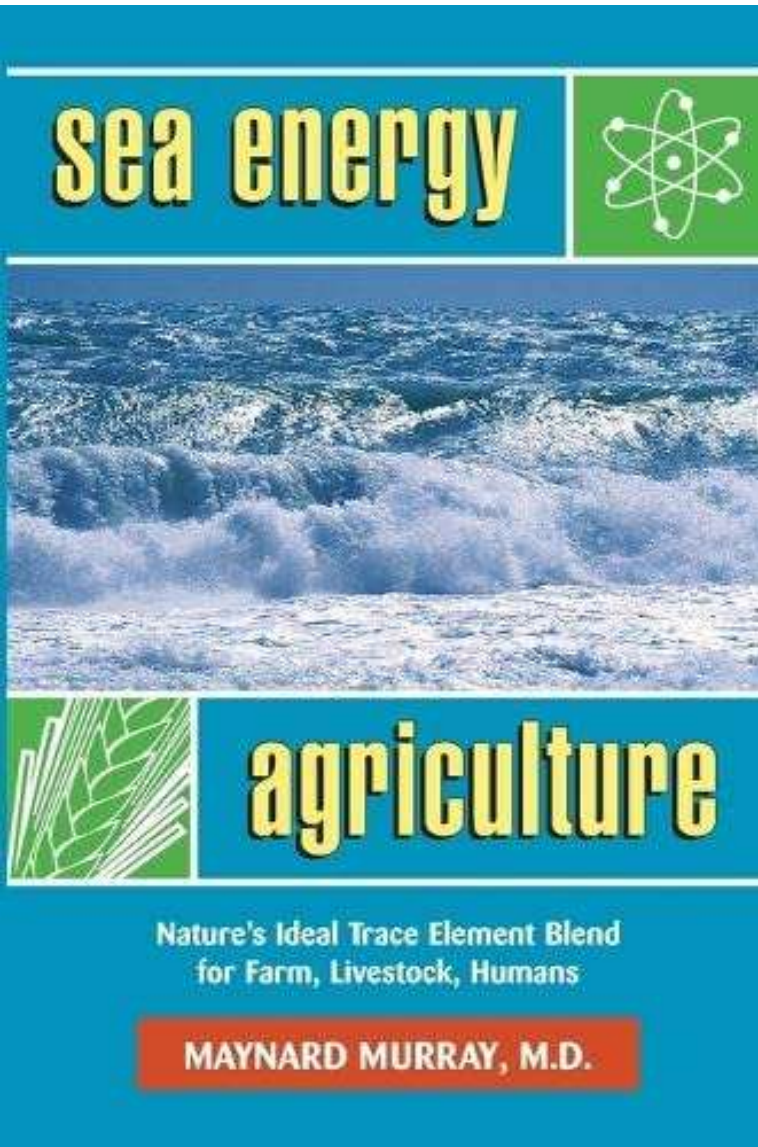
- Livestock & Manure
- Earth Worms
- Static Composting (Leaves, grass clippings)
- Vermicomposting (Red Wiggler Worms)
- Thermophilic Composting
- Dr David Johnson/Su Bioreactor
- Korean Natural Farming
- Raw Milk
- Commercial Products



Mineral Sources

- Rock--Sand, Silt, Clay
- Rock dust (Soft Rock Phosphate, Basalt, Azomite)
- Blood meal & Bone meal
- Organic matter (leaves, wood chips, etc)
- Commercial products

Sea Water Minerals



sea energy

agriculture

Nature's Ideal Trace Element Blend
for Farm, Livestock, Humans

MAYNARD MURRAY, M.D.

- Redmond or Sea 90
 - 200-2200 lbs/acre
- Korean Natural Farming
 - 1g/liter (1:30)



BNLINK Heat Mat

10" x 20.75"



Instructions for use and safety information printed in green on the black mat.



Champion
Small Farm





SEA-90TM
MINERAL AND TRACE ELEMENTS
Known to
All Crops and P
including
Soluble Nutri
ment

Nashville Hydrangeas



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OVER 200,000
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BY MARY APPELHOF
AND JOANNE OLSZEWSKI
FOREWORD BY AMY STEWART

WORMS EAT MY GARBAGE

- COMPOST FOOD WASTE
- PRODUCE FERTILIZER FOR HOUSEPLANTS AND GARDEN
- EDUCATE YOUR KIDS AND FAMILY

HOW TO SET UP AND
MAINTAIN A WORM
COMPOSTING SYSTEM

Compost Tea Making

For Organic Healthier Vegetables
Flowers · Orchards · Vineyards · Lawns

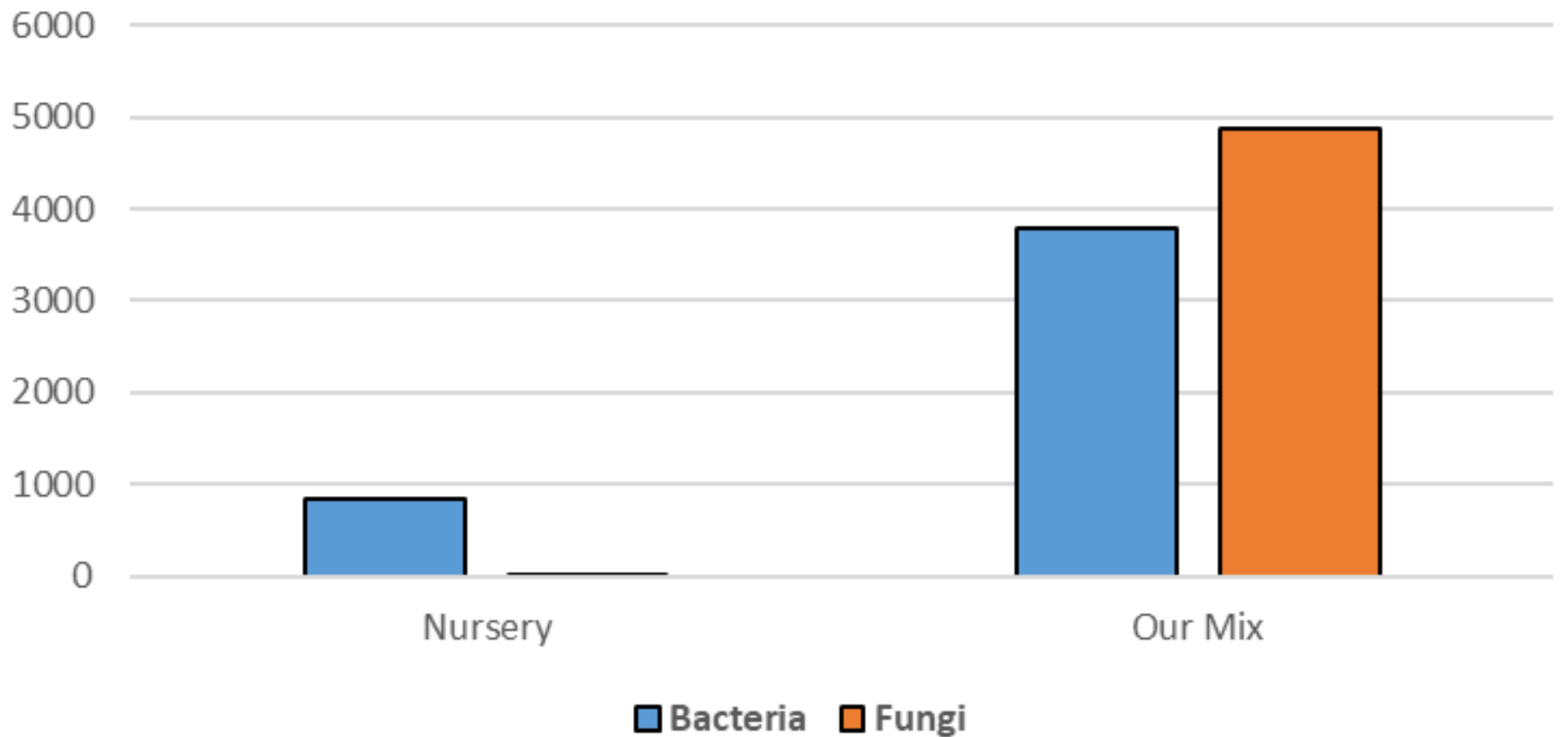


Marc Remillard

Garden Repair (2021)



Bacteria & Fungi



Protozoa



■ Protozoa

Nematodes



■ Nematodes



Liquid Extract



Garden Repair (Fall 2021)



Garden Repair (Spring 2022)



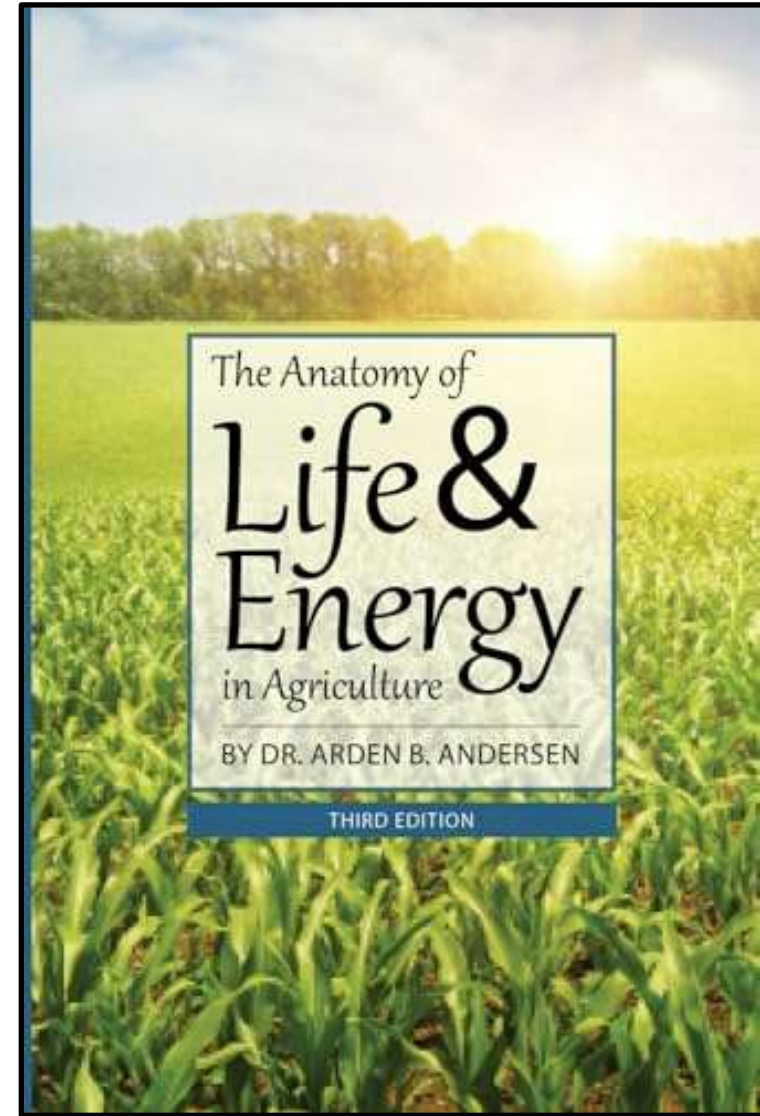


(Summer 2022)



Biology + Chemistry (Summer 2023)

- (All per 1000 ft²)
- Compost 12-184 lbs
- Soft Rock Phosphate 12 lbs
- High-calcium lime 23-46 lbs
- Ammonium sulphate 2.3 lbs



Foliar Sprays--KNF

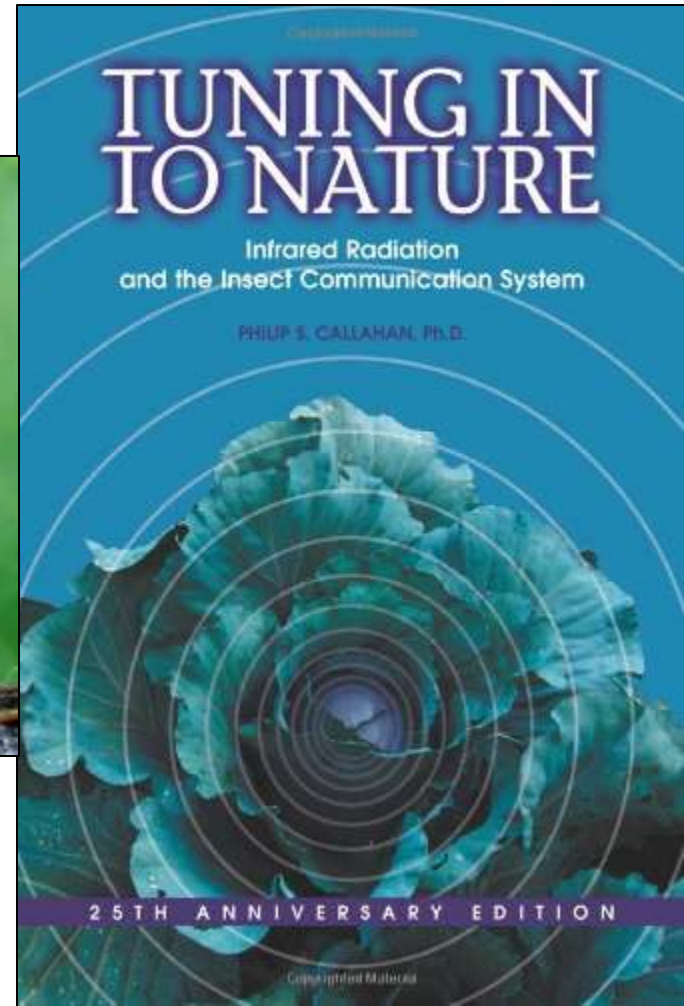






Nutrient Density & Insects

- Nature's garbage collectors
 - Sick plants radiate off-frequency
 - Get Brix ≥ 12



Garden Example (21 Apr 25)



TIMELINE (5 Jun 24)

- 8" wood chips; Apr 21
- 12" moldy hay; Nov 22
- 12" moldy hay; Mar 23
- Corn & Other; Apr 23
 - Poor results
- Covers Rye/Vetch; Dec 23
- Egg Mobile; Feb 24
- 2x Tilled Bermuda; Apr 24
- Soil Drench w/2 lbs; Apr 24
 - Redmond 9 oz
 - Dextrose 10 oz
- Planted; Apr 24
 - Sweet Corn
 - Dent Corn
 - Milpa (GreenCover)



TIMELINE (24 Jun 24)

- Growing well
- Corn Earworms



Penetrometer--Compaction

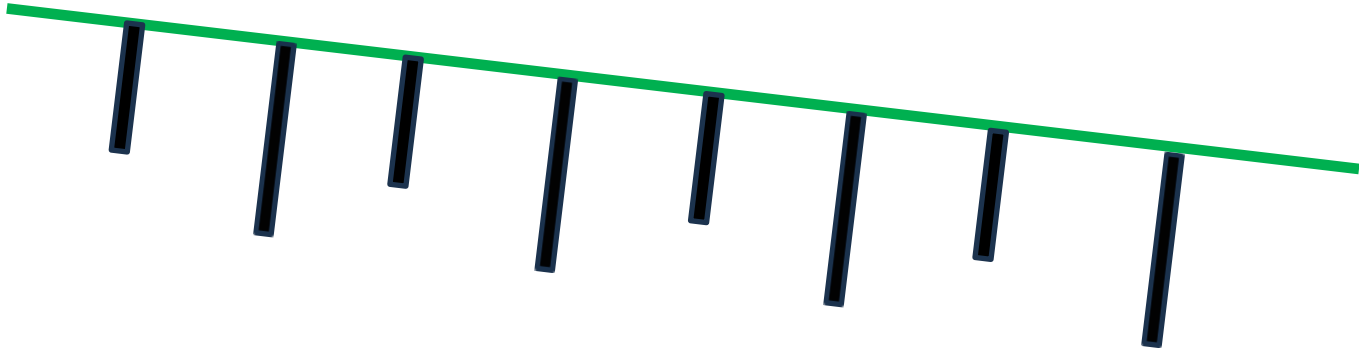
- Compaction
 - 150 psi—3.8"
 - 300 psi—4.5"



AIR



WATER FLOW



SUBSOILER CUTS

Subsoiler



Product Weight: 635 lb.



TIMELINE (16 Oct 24)

- Subsoiler & Biology
- Covers Rye/Wheat
- Soil Drench (3 lbs/12 gal)
- 2.5 lbs Calusolv East
 - (10 lbs/1000 ft²)
- 1 lb Redmond West
 - (4 lbs/1000 ft²)



Hand Seeders—Seed or Minerals



Watering Can—Biology or Minerals



Hand Sprayer Foliars



TIMELINE (24 Dec 24)

- Cover Plants (Rye & Wheat)
- Collecting Solar Energy
- Sugar to biology all winter





Photo Source: Soil Science Society of America

TIMELINE (10 Feb 25)

- Integrate Livestock
- Egg Mobile Grazing



TIMELINE (26 Feb 25)

- Tarped Area
- Terminate Covers



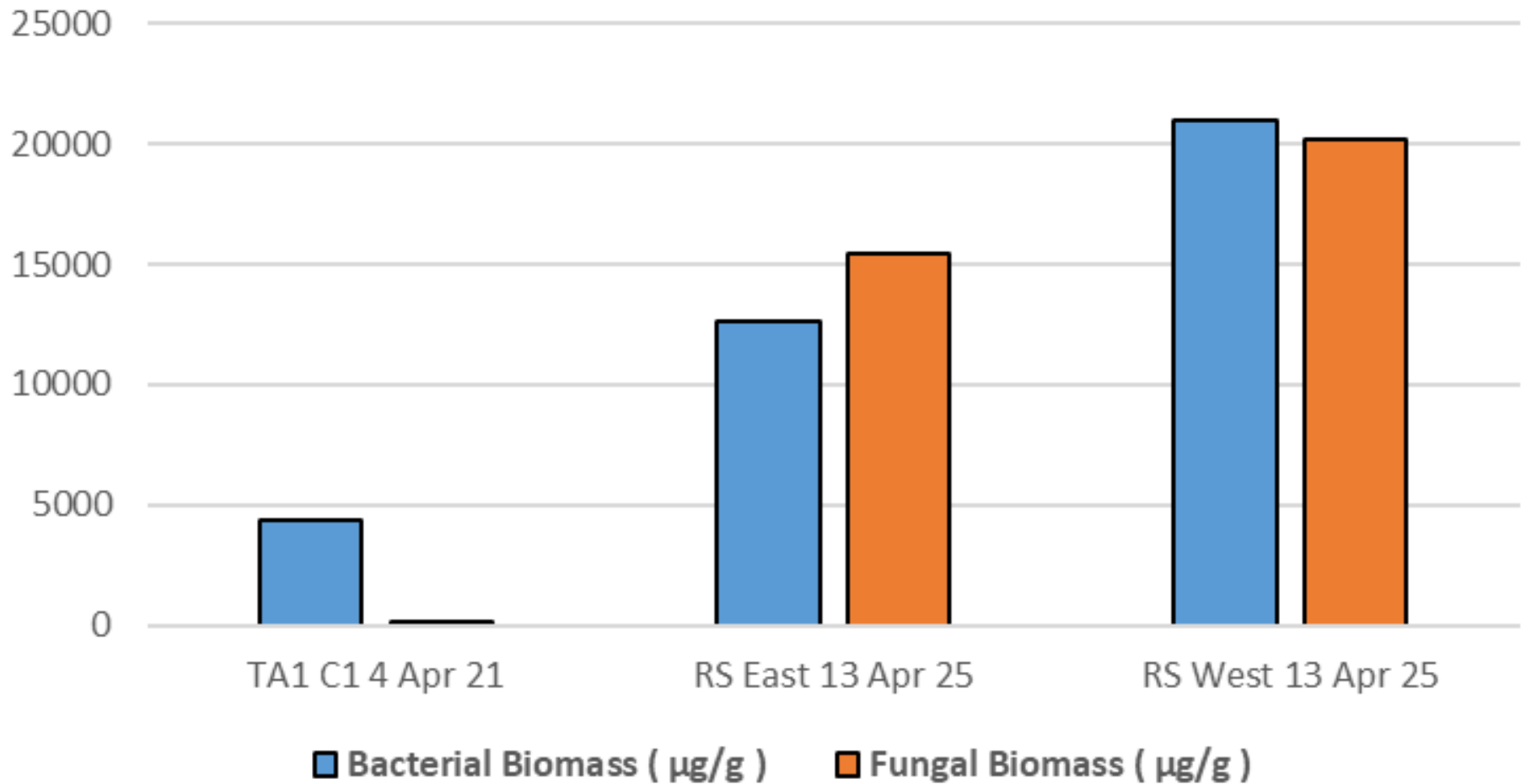
TIMELINE (8 Apr 25)

- Uncovered
- Compaction; Oct 24
 - 150 psi—3.8"
 - 300 psi—4.5"
- Compaction (Apr 25)
 - 200 psi—8.7"
 - 300 psi—13.9"
- Soil Samples; 13 Apr 25



Soil Samples (Apr 13, 2025)

Bacteria & Fungi



TIMELINE (8 Apr 25)

- Shovel Test



Brix Report Card

DATE	ITEM	SOURCE	BRIX		POOR	AVERAGE	GOOD	EXCELLENT
NA	Distilled Water		0					
2-Apr-23	Organic Spring Mix	Kroger	2		4	6	8	10
2-Apr-23	Organic Living Butter Lettuce	Kroger	2		4	6	8	10
2-Apr-23	Organic Honeycrisp Apple	Kroger	11.5		6	10	14	18
4-Oct-23	Sweet 100 Tomato	Garden	10		4	6	8	12
18-Jan-24	Organic Fuji Apple	Kroger	15		6	10	14	18
16-Apr-24	Black Seeded Simpson Leaf Lettuce	Garden	6		4	6	8	10
27-Aug-24	Cherry Tomato Lasagna	Garden	11.5		4	6	8	12
29-Aug-24	Fuji Apple	Garden	18.5		6	10	14	18
29-Aug-24	Grape Tomato Lasagna	Garden	10		4	6	8	12
8-Oct-24	Organic Grape Tomato	Kroger	4.5		4	6	8	12
18-Apr-25	Spinach	Garden	6		6	8	10	12
26-Apr-25	Spinach	Garden	10		6	8	10	12
	Kroger							
	Our Garden							

Caution for Materials

- Gather “organic” foods
 - If it’s lived once, it can live again!
- Bacteria & Fungi take it from there!
- CAUTION—Persistent Herbicides
 - NC State “Herbicide Carryover in Hay, Manure, Compost, & Grass Clippings”

Persistent Herbicides

- Corteva's Grazon[®] (Aminopyralid)
 - Broadleaf weed control in pasture











- Teejet Lawn Spray Gun
 - 1.5 & 3.0 gpm
 - Seaflo 3.0 gpm diaphragm pump (12V DC)





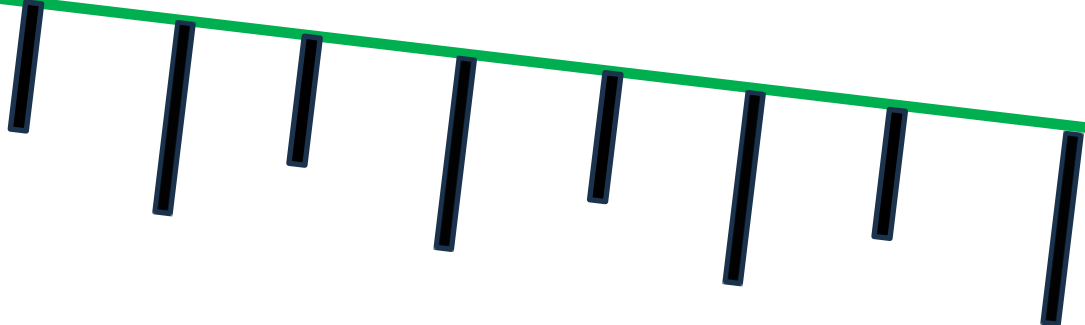
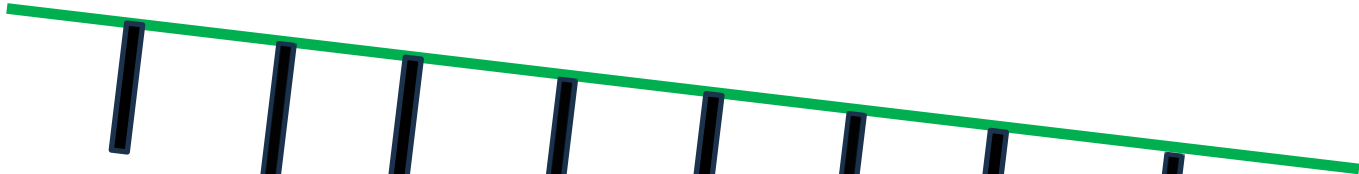




AIR



WATER FLOW



SUBSOILER CUTS









Rotational Grazing



















What If Mowed 24/7??





There's So Much More!!!

- www.Libertytracefarm.com
- References “Books and Resources” Tab
- These Slides “Living Soil” Tab
- Links Past Presentations (2024)
 - (Beginner & Advanced)

Vendors/Booths to Meet

- Weston Price Foundation
- Children's Health Defense
- Redmond—Karson Rippstein
- Firehawk Bioherbicide—Howard Vlieger

What If?

- Chronic disease rates in our children 40%+
- Autism rates in young children 1/36+
- Obesity rates in citizens 42%+
- Cancer rates 1/2
- Affect our military age youth such that 3/4 couldn't join the military
- Spend WWII (\$5.3 Trillion+) every year

Soil Enlistment “Oath”

“To the best of my ability, I vow to help promote, and build soil instead of dirt.”