Intro to “Living Soil”—Beginner

Warning

HUGE, BROAD Topic!!!

- We'll just "Scratch the Surface"
- This science is evolving and current "theories" may change

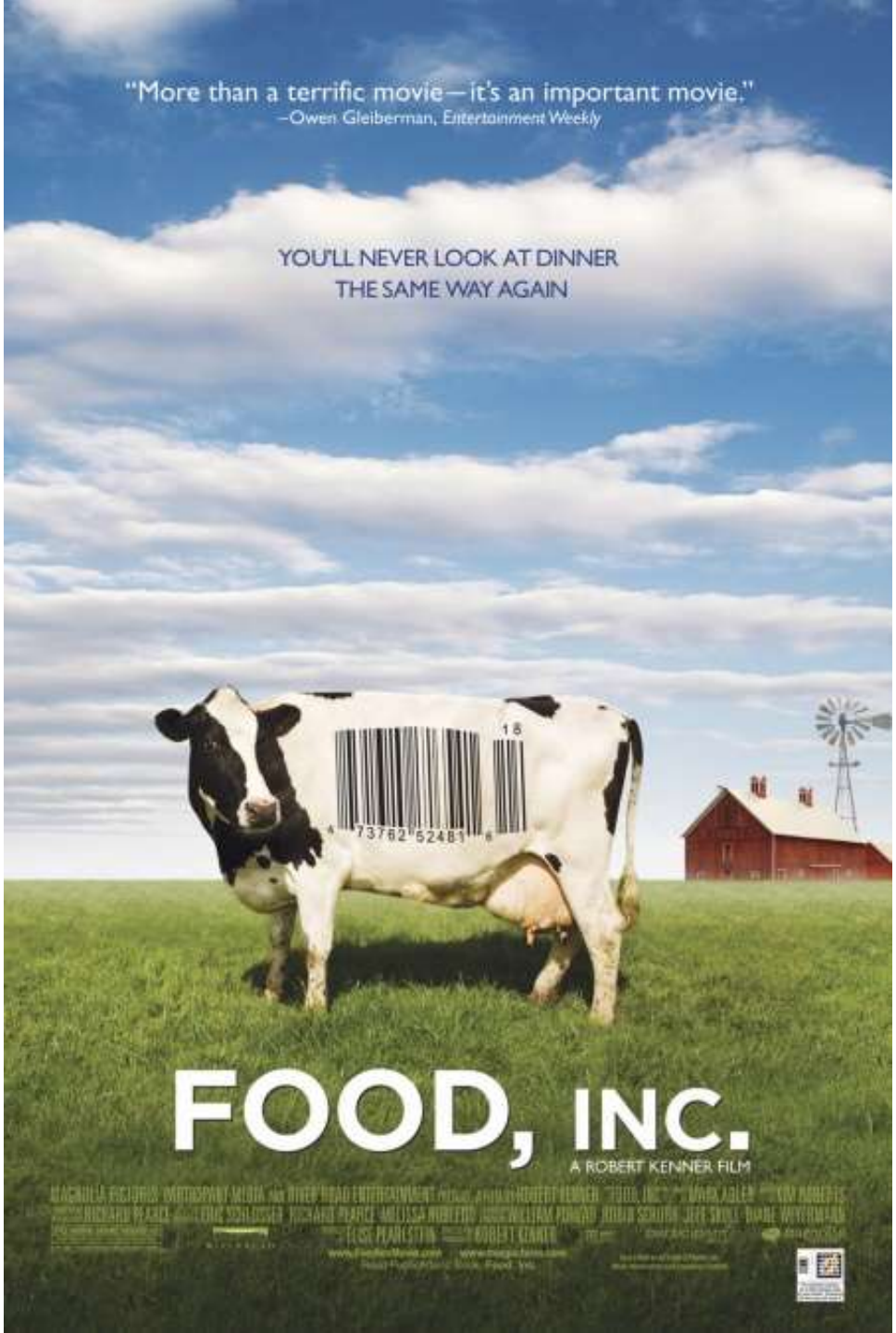
Three Objectives Today

- Why Soil is Important
- Difference Between Dirt and Soil
- How to turn Dirt into Soil

- (Slides @ Libertytracefarm.com)

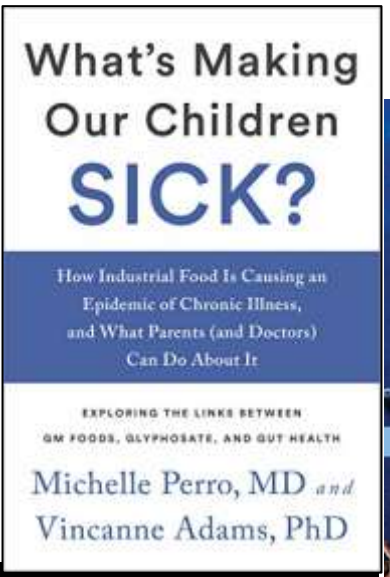
30 YEARS (1985-2015)

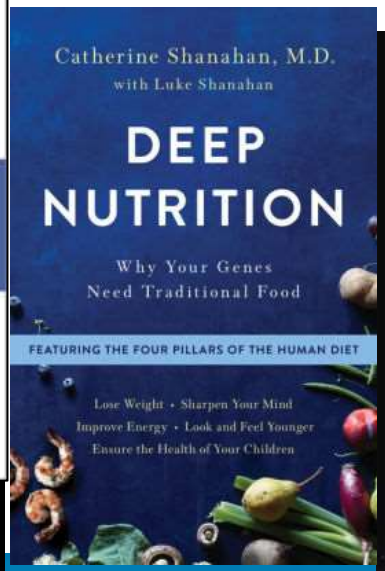
- Technology to solve problems

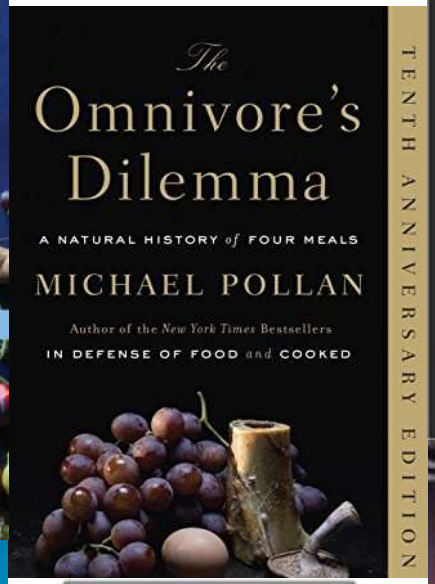

"More than a terrific movie—it's an important movie."
–Owen Gleiberman, Entertainment Weekly
YOU'LL NEVER LOOK AT DINNER
THE SAME WAY AGAIN
FOOD, INC.
A ROBERT KENNER FILM

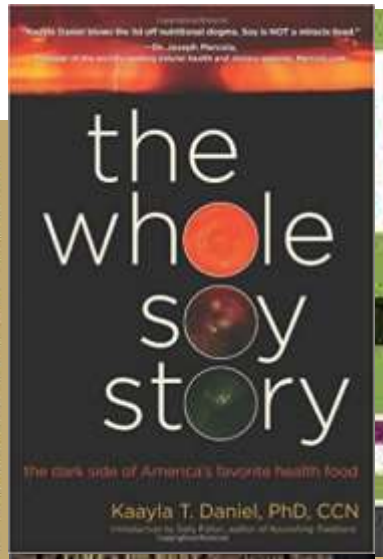
Joel Salatin—Polyface Farm

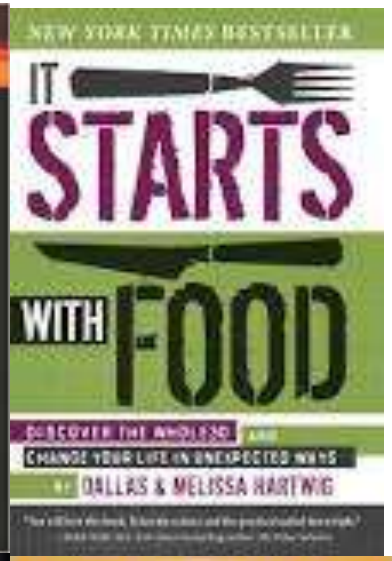
2008 and Every Day Since…

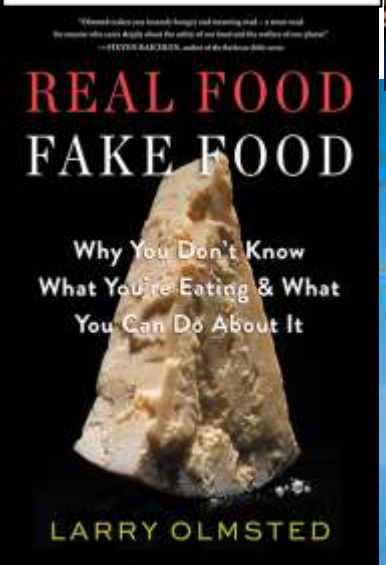


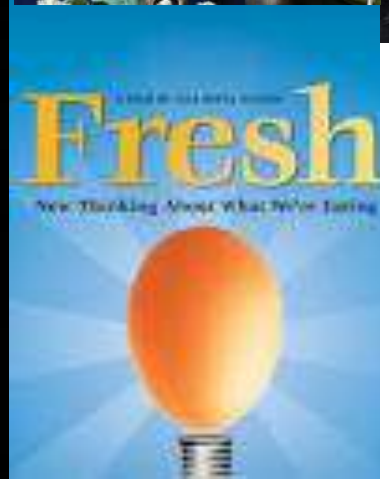


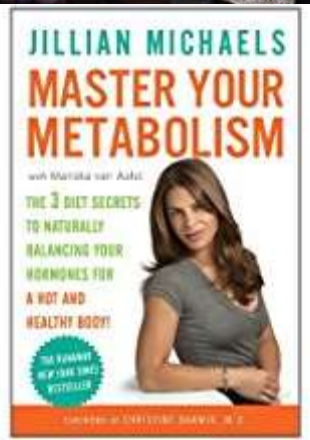


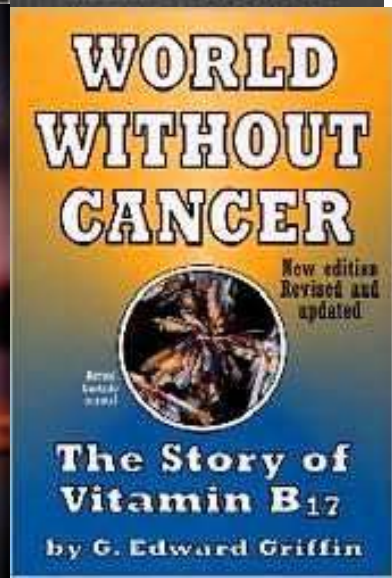




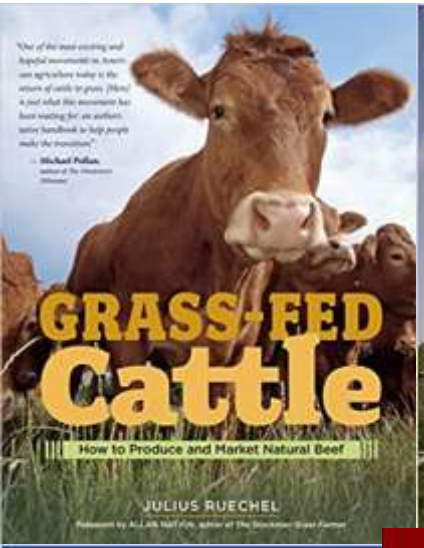


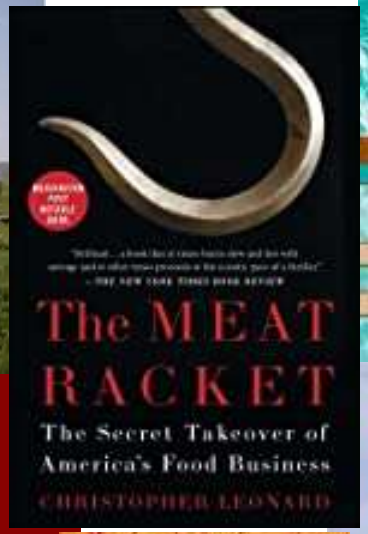


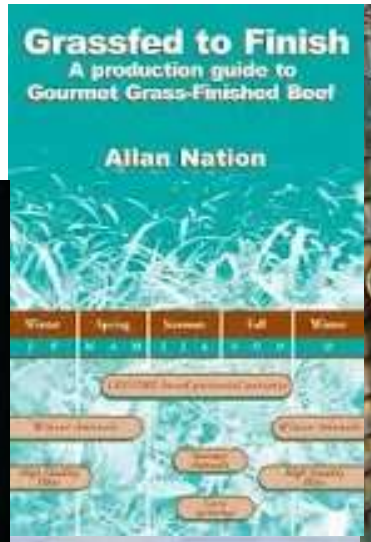


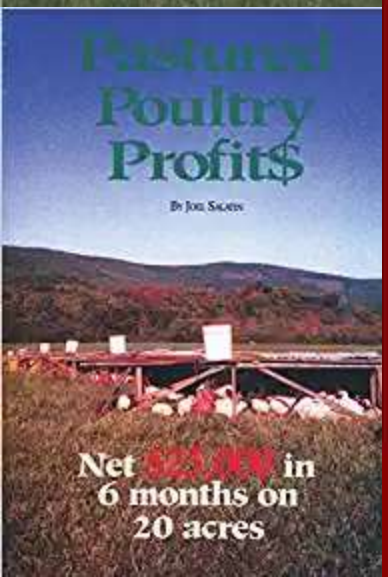


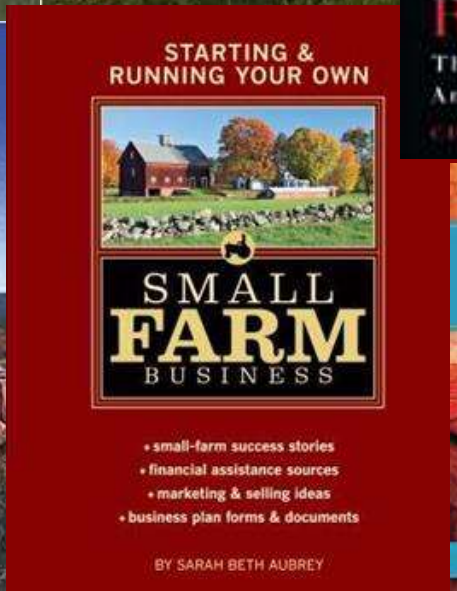
Let's Start a Farm!

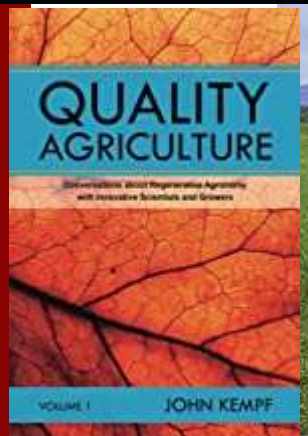


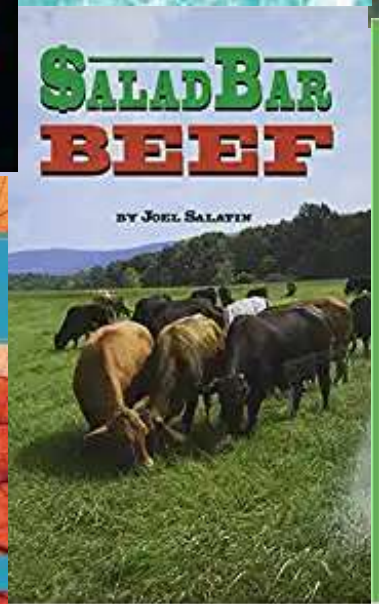


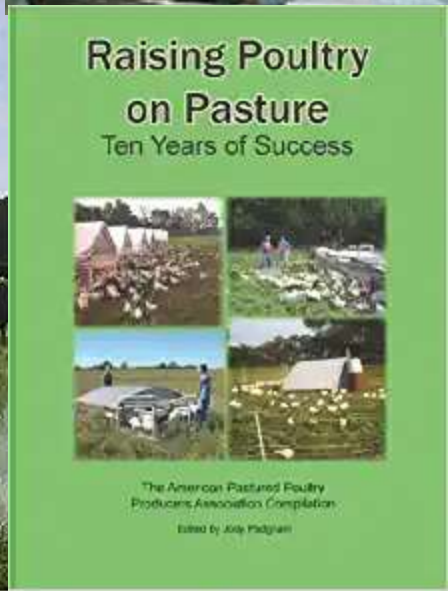












Be Skeptical

"Without data, you're just another person with an opinion"

W. Edward Deming

But, be open minded!

Hmmm…"Blinders" Came Off!

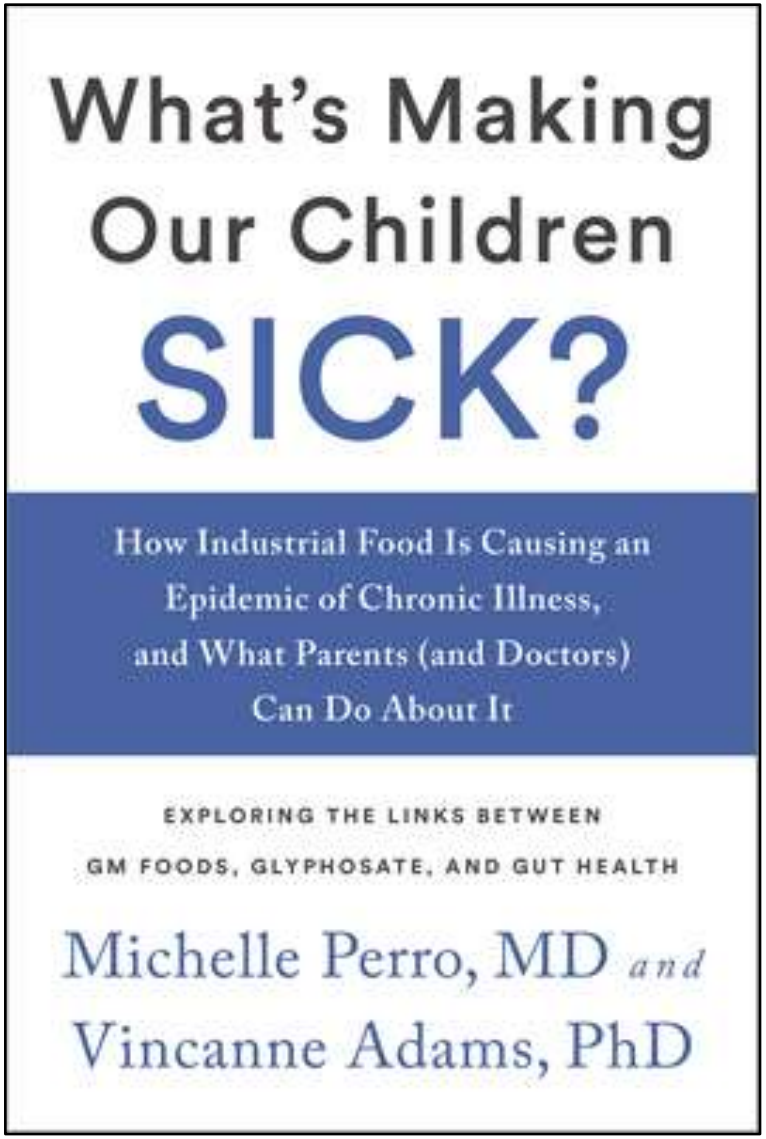
- "Diseases" never heard of as a kid
  - Obesity, Autism, Alzheimers, Parkinsons, Dementia, Diabetes, Cancer, Leaky Gut Syndrome, Irritable Bowel Syndrome, Celiac, Crohn's, Autoimmune Illnesses, Restless Leg Syndrome, Chronic Dry Eye, etc, etc.
- 50% Pharmaceutical Ads
  - "Talk to my doctor about this drug"

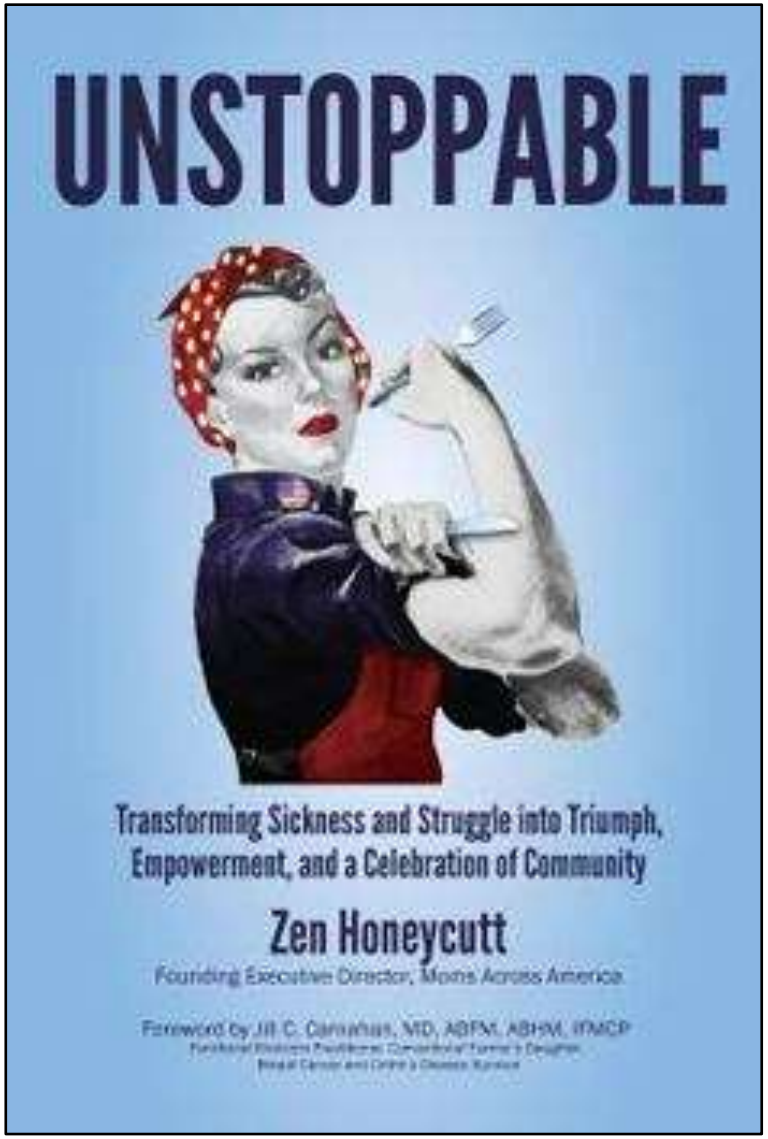
A Few Sad Statistics

- 2017: 75% of our youth 17-24 unqualified to join military
- 1965: 4% of our population had a chronic disease
  - Today 46% of our children have a chronic disease
- 2006: MS only state above 30% obesity--today 41 states
- US spent $4.5 Trillion on healthcare in 2022
  - We spent $4.1 Trillion on WWII (today's dollars)
  - 5+ times Defense Budget ($778 Billion in 2020)

- What's a Trillion??? ($1M/day for how long?)

What's Going On????





MOMS ACROSS AMERICA

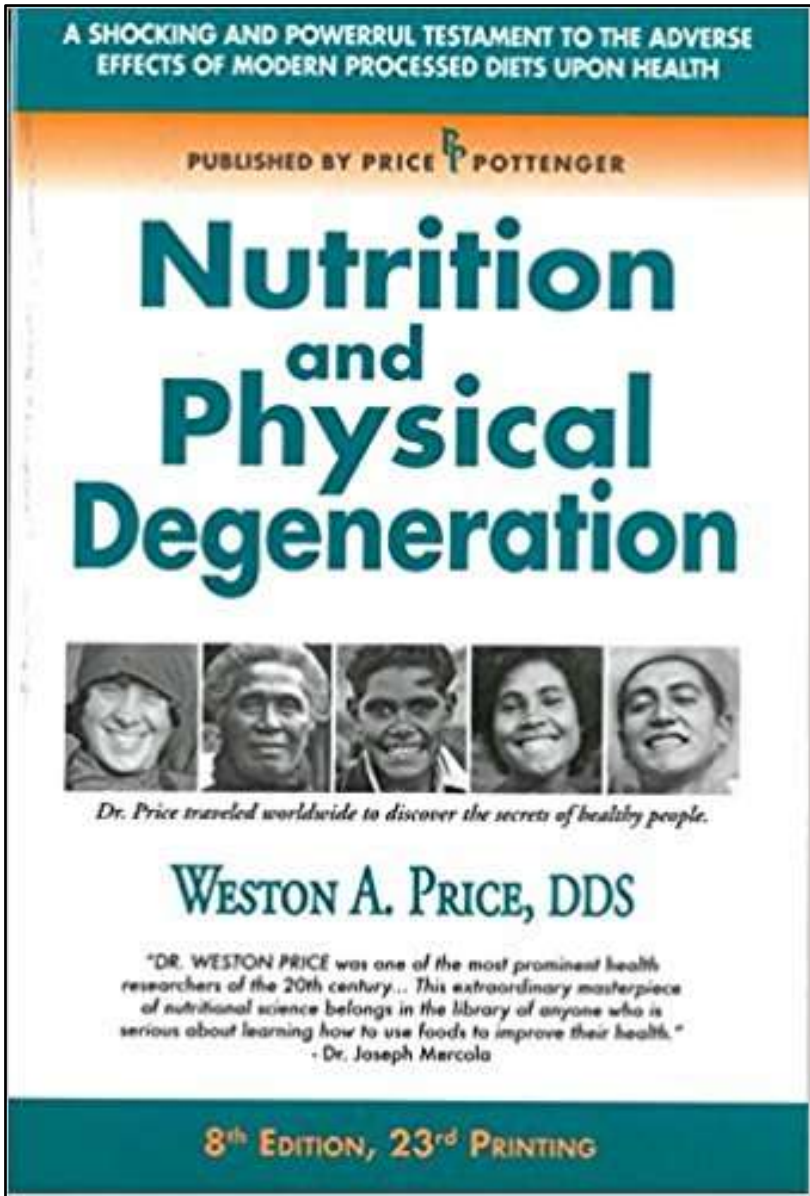
100% of Top Twenty Fast Food Brands Positive for Glyphosate Herbicide 76% Positive for Harmful Pesticides

POSTED BY ZEN HONEYCUTT 4006.40GS ON OCTOBER 11, 2023

Top Twenty Fast Food Brands Glyphosate and Pesticide Testing Report

Moms Across America, a nationwide non-profit, has initiated an extensive testing program on the top twenty fast food brands in America, plus one restaurant, California's In-N-Out Burger. Forty-two samples of 21 brands were tested for the most widely used herbicide in the world, glyphosate, 236 agrochemicals, 4 heavy metals, PFAS, phthalates, and mineral content. The top ten brands were additionally tested for 104 commonly used veterinary drugs and hormones, B Vitamins and calories.

1930s--Dr Weston A. Price



Dr. Price's Findings

- All ate NUTRIENT DENSE foods
  - Vitamins, Minerals, Enzymes, Amino Acids
- Modernized/processed foods brought dental decay and disease

- ABSENCE of nutrients can cause disease!

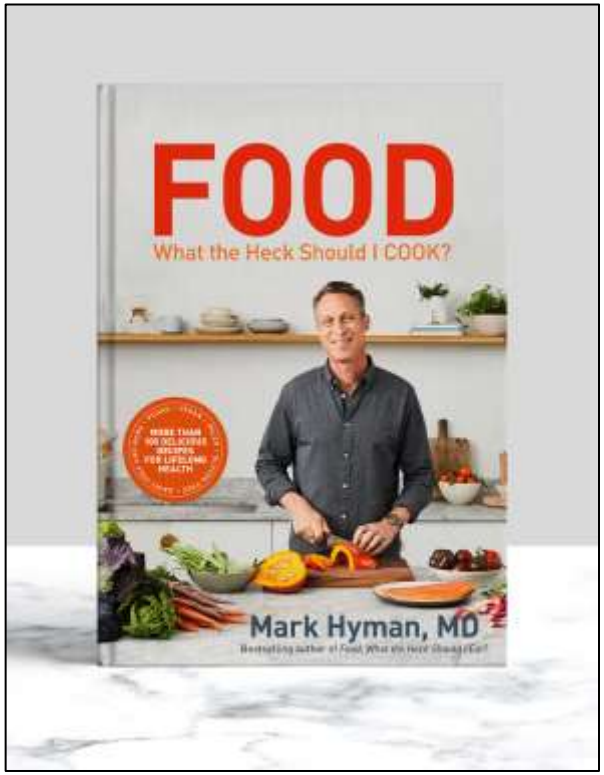
Homestead Example

- “Curled Toe Disease”—Vitamin B

Human Examples

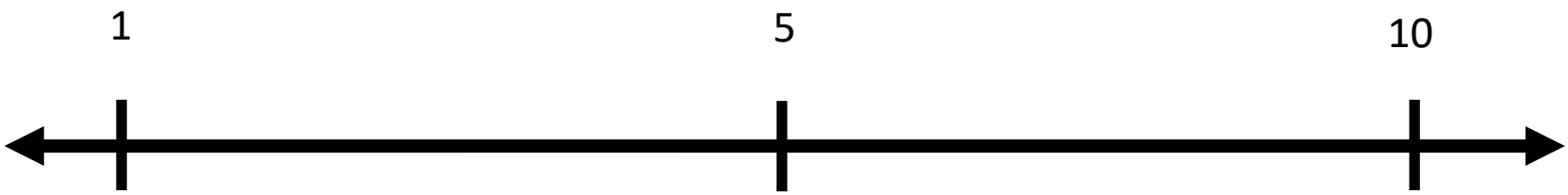
- Scurvy
  - Vitamin C deficiency
- Rickets
  - Vitamin D deficiency
- Goiter
  - Iodine deficiency
- OTHER ????
  - XXXXXX ???

2024--Dr Mark Hyman



“80%+ of all chronic disease is preventable”—through diet!

Health Range (1-10)



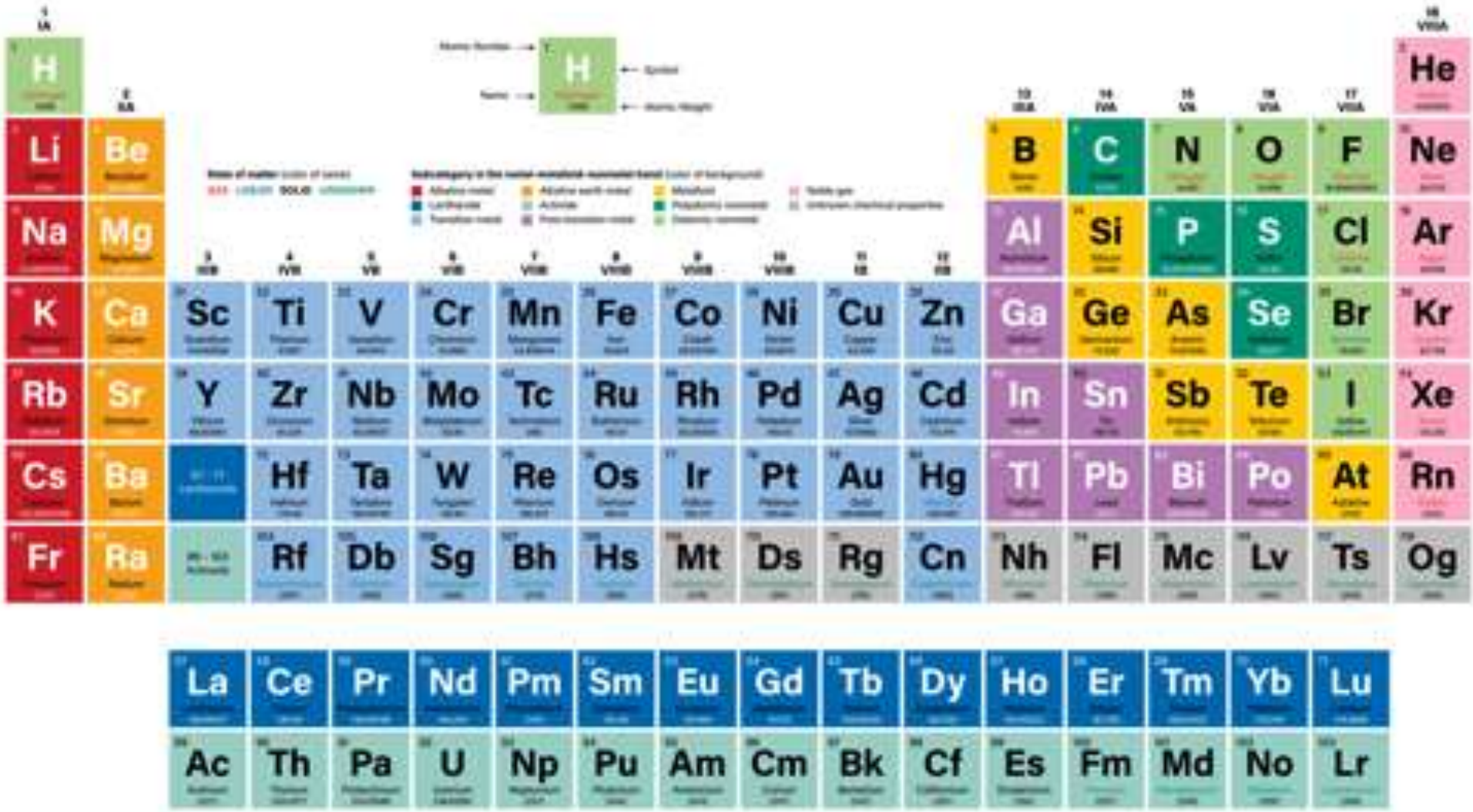
DISEASE

- Chemical Toxins
- Pesticides
- GMOs
- Electromagnetic Radiation
- Excessive Stress
- Nutrient Deficiencies

HEALTH

- Nutrient Density
- Vitamins
- Minerals
- Enzymes
- Amino Acids
- Microbiome

Periodic Table of the Elements



What's "NUTRIENT DENSE" Here?


OVER 35% MORE
Enfamil
NEURO PRO
GENTLEASE ALL IN ONE
Infant formula
Milk-based Powder with Iron
BRAIN BUILDING DHA
designed to help REDUCE CRYING IN 24 HOURS
2'-FL HMO for IMMUNE SUPPORT
0-12


OVER 48% MORE!
NO PALM OLEIN OIL
NO ARTIFICIAL GROWTH HORMONES
Abbott
Similac
PRO-SENSITIVE
For Fussiness & Gas Due to Lactose Sensitivity
IMMUNE SUPPORT
LUTEIN
VITAMIN E
BRAIN & EYE DEVELOPMENT
2'-FL HMO
Human Milk Oligosaccharide
DHA
with Iron
POWDER


VALUE PACK | 1.6 X MORE!
Nutramigen
with Enflora LGG
HYPOALLERGENIC
Infant Formula Powder with Iron
DHA BRAIN BUILDING NUTRITION
FOR FOOD ALLERGIES INCLUDING COW'S MILK ALLERGY
FAST RELIEF FROM SEVERE CRYING DUE TO COLIC
NO ARTIFICIAL GROWTH HORMONES
NET WT 19.8 OZ


42.99
comforts
SOY
INFANT FORMULA
WITH IRON
SOY-BASED POWDER
• Complete Soy Nutrition
• For Fussiness & Gas
• Lactose-Free
• DHA, Lutein & Vitamin E
GROWTH
NET WT 22 OZ
(1.38 LB) 624g


NUTRIENTS
MINERALS
INGREDIENTS: CORN SYRUP SOLIDS, PARTIALLY HYDROGENATED NONFAT MILK AND WHEY PROTEIN CONCENTRATE SOLIDS, SOY, VEGETABLE OIL (PALM OLEIN, COCONUT, SOY AND HIGH OLEIC SUNFLOWER OILS), AND LESS THAN 2% OF
MEAD JOHNSON & COMPANY, LLC
EVANSVILLE, IN 47721 U.S.A.
Mead Johnson Nutrition


No significant difference has been shown between milk derived from rbST-treated and non-rbST-treated cows
Ingredients not genetically engineered
NOT FOR INFANTS OR CHILDREN WITH GALACTOSEMIA
NUTRIENTS per 100 Calories (5 fl oz, prepared as directed)
VITAMINS
MINERALS


INGREDIENTS: CORN SYRUP SOLIDS (47%), VEGETABLE OIL (PALM OLEIN, COCONUT, SOY, AND HIGH OLEIC SUNFLOWER OIL), CASEIN HYDROLYSATE (MILK) (17%), MODIFIED CORN STARCH AND LESS THAN 2%: MORTIERELLA ALPINA OIL*, SCHIZOCHYTRIUM OIL*, LACTOBACILLUS RHAMNOSUS**, CALCIUM CITRATE, CALCIUM PHOSPHATE, POTASSIUM CHLORIDE, POTASSIUM CITRATE, SODIUM CITRATE, CALCIUM HYDROXIDE, MAGNESIUM OXIDE, FERROUS SULFATE, ZINC SULFATE, CUPRIC SULFATE, MANGANESE SULFATE, SODIUM SELENITE, CHOLINE CHLORIDE, ASCORBIC ACID, CALCIUM PANTOTHENATE, VITAMIN A PALMITATE, THIAMIN HYDROCHLORIDE, RIBOFLAVIN, VITAMIN B6 HYDROCHLORIDE, FOLIC ACID, VITAMIN D3, BIOTIN, VITAMIN B12, INOSITOL, VITAMIN A ACETATE, L-CYSTINE, L- TYROSINE, L-TRYPTOPHAN, TAURINE, L-CARNITINE.
MEAD JOHNSON & COMPANY, LLC
EVANSVILLE, IN 47721 U.S.A.
*MODIFIED TO BE BETTER TOLERATED IN MILK-ALLERGIC BABIES
*A SOURCE OF ARACHIDONIC ACID (ARA)
*A SOURCE OF DOCOSAHEXAENOIC ACID (DHA)
**BRANDED AS LGG®, A REGISTERED TRADEMARK OF CHR. HANSEN A/S
Filled by weight, not by volume; some settling may occur.
Mead Johnson Nutrition


USE BEFORE DATE ON BOTTOM OF CAN.
INGREDIENTS: CORN SYRUP, SOY PROTEIN ISOLATE, PALM OLEIN, SOY OIL, COCONUT OIL, HIGH OLEIC SAFFLOWER OR SUNFLOWER OIL, LESS THAN 2%: MORTIERELLA ALPINA OIL*, CRYPTHECODINIUM COHNII OIL**, LUTEIN, FRUCTOOLIGOSACCHARIDES, CALCIUM PHOSPHATE, POTASSIUM CITRATE, POTASSIUM CHLORIDE, MAGNESIUM CHLORIDE, SODIUM CITRATE, ASCORBIC ACID, CHOLINE BITARTRATE, L-METHIONINE, TAURINE, ASCORBYL PALMITATE, FERROUS SULFATE, INOSITOL, MIXED TOCOPHEROLS, ZINC SULFATE, VITAMIN E (DL-ALPHA TOCOPHERYL ACETATE), L-CARNITINE, NICKEL CHLORIDE, CALCIUM PANTOTHENATE, CUPRIC SULFATE, THIAMINE HYDROCHLORIDE, VITAMIN A PALMITATE, RIBOFLAVIN, PYRIDOXINE HYDROCHLORIDE, FOLIC ACID, POTASSIUM IODIDE, POTASSIUM HYDROXIDE, VITAMIN K1 (PHYTONADIONE), BIOTIN, SODIUM SELENITE, BETA-CAROTENE, VITAMIN D3, VITAMIN B12, CHROMIUM CHLORIDE, MONOGLYCERIDES, SOY LECITHIN, TRIBASIC CALCIUM PHOSPHATE, CALCIUM CARBONATE, MANGANESE SULFATE, POTASSIUM BICARBONATE.
CONTAINS: SOY.
PER 100 CALORIES:

Dr Arden Andersen

- Up to 38% decline in nutrients (1950-1999)
  - Protein, Ca, Vit C, P, Fe
  - USDA Data; Davis, Epp & Riordan JACN
- Avg 63% decline (1941-2001)
  - Fe, Zn, Cu, Mn, Se
  - Huling, Dec 2001; Thomas, Analysis of UK, 2003

?

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Is it Nutrient Dense?

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

Refractive Index of Crop Juices -- Calibrated In % Sucrose Or ºBrix

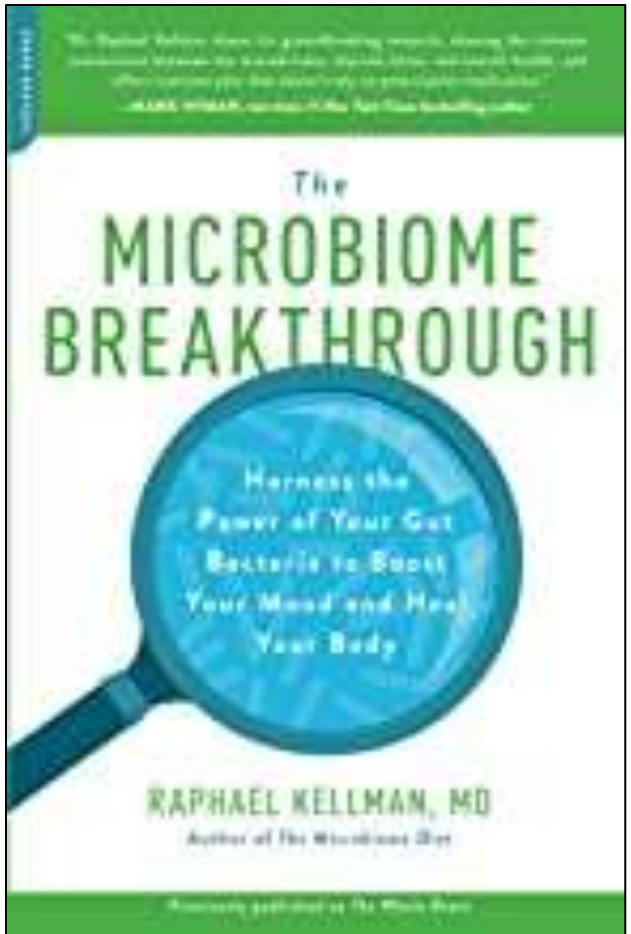
	Poor	Average	Good	Excellent
FRUITS				
Apples	6	10	14	18
Avocados	4	6	8	10
Bananas	8	10	12	14
Blueberries	8	12	14	18
Cantaloupe	8	12	14	16
Casaba	8	10	12	14
Cherries	6	8	14	16
Coconut	8	10	12	14
Grapes	8	12	16	20
Grapefruit	6	10	14	18
Honeydew	8	10	12	14
Kumquat	4	6	8	10
Lemons	4	6	8	12
Limes	4	6	10	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

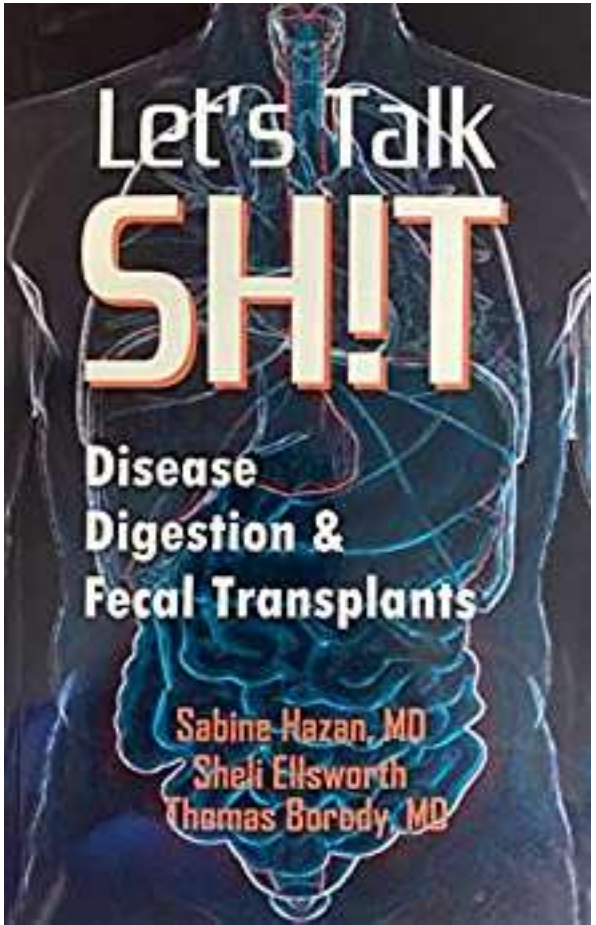
	Poor	Average	Good	Excellent
VEGETABLES				
Asparagus	2	4	6	8
Beets	6	8	10	12
Bell Peppers	4	6	8	12
Broccoli	6	8	10	12
Cabbage	6	8	10	12
Carrots	4	6	12	18
Cauliflower	4	6	8	10
Celery	4	6	10	12
Corn Stalks	4	8	14	20
Corn (Young)	6	10	18	24
Cow Peas	4	6	10	12
Cucumbers	2	3	4	5
Endives	4	6	8	10
English Peas	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

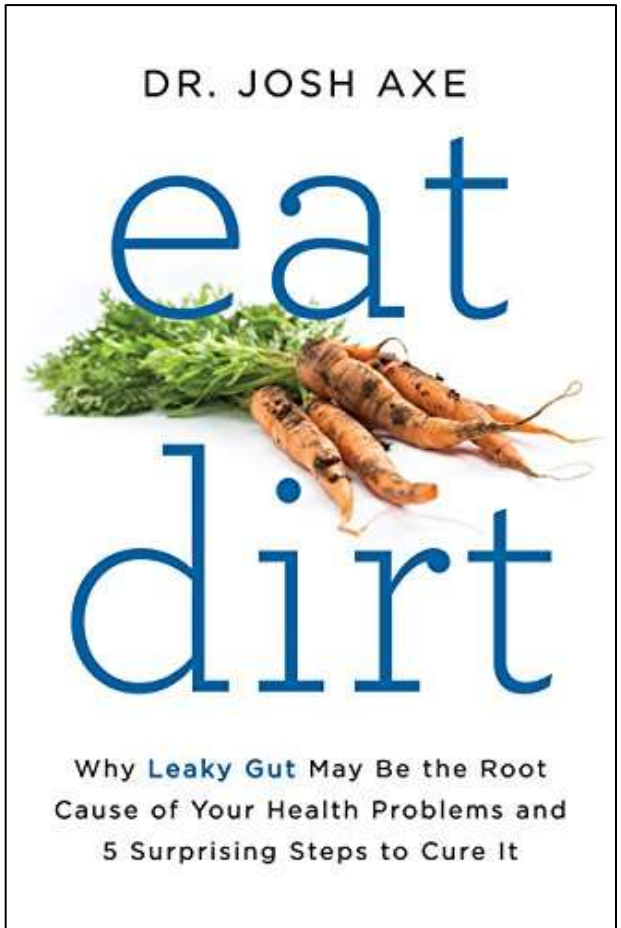
Within a given species of plant, the crop with the higher refractive index will have a higher sugar content, higher mineral content, higher protein content and a greater specific gravity or density. This adds up to a sweeter tasting, more minerally nutritious food with lower nitrate and water content,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

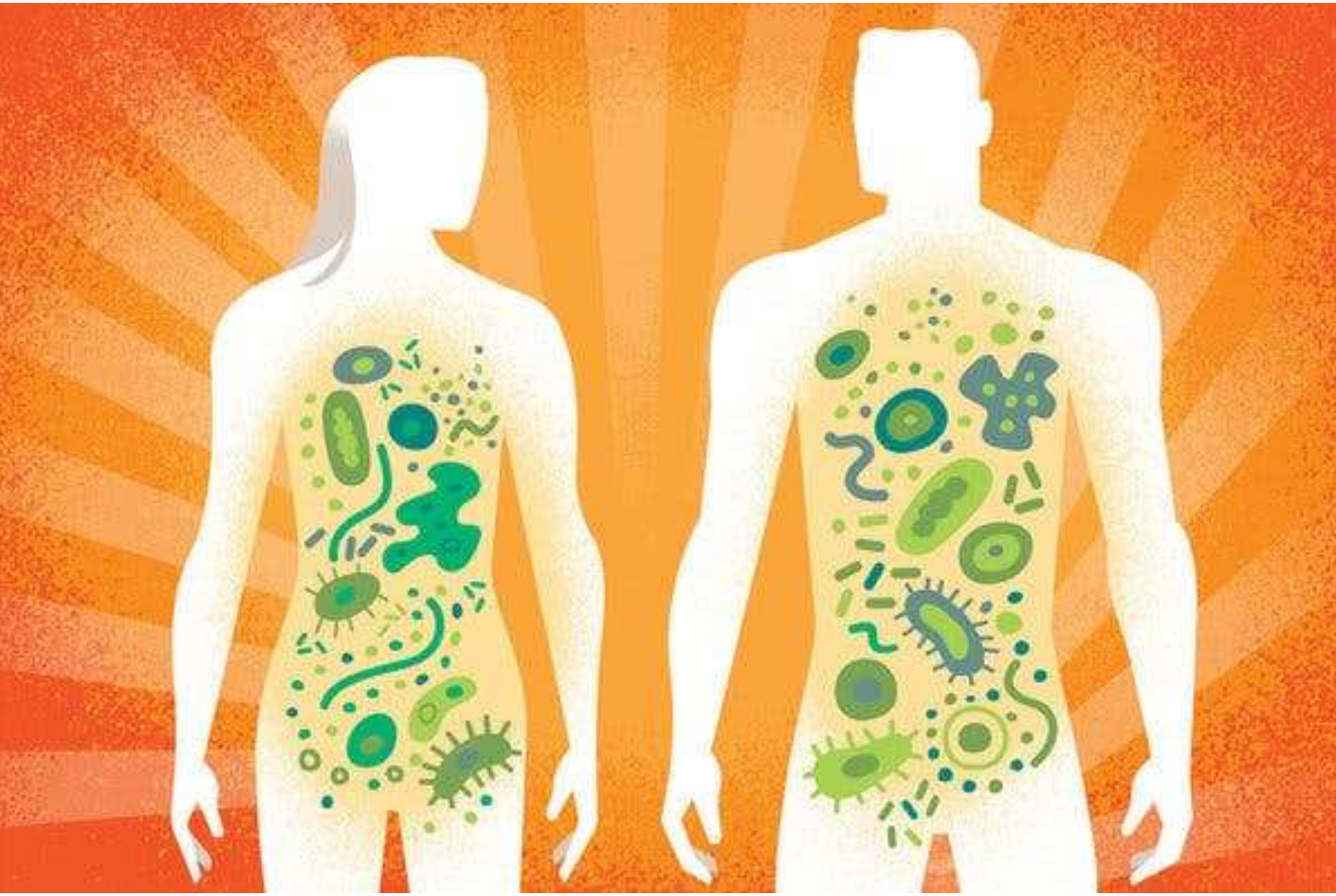
2016 Human Microbiome

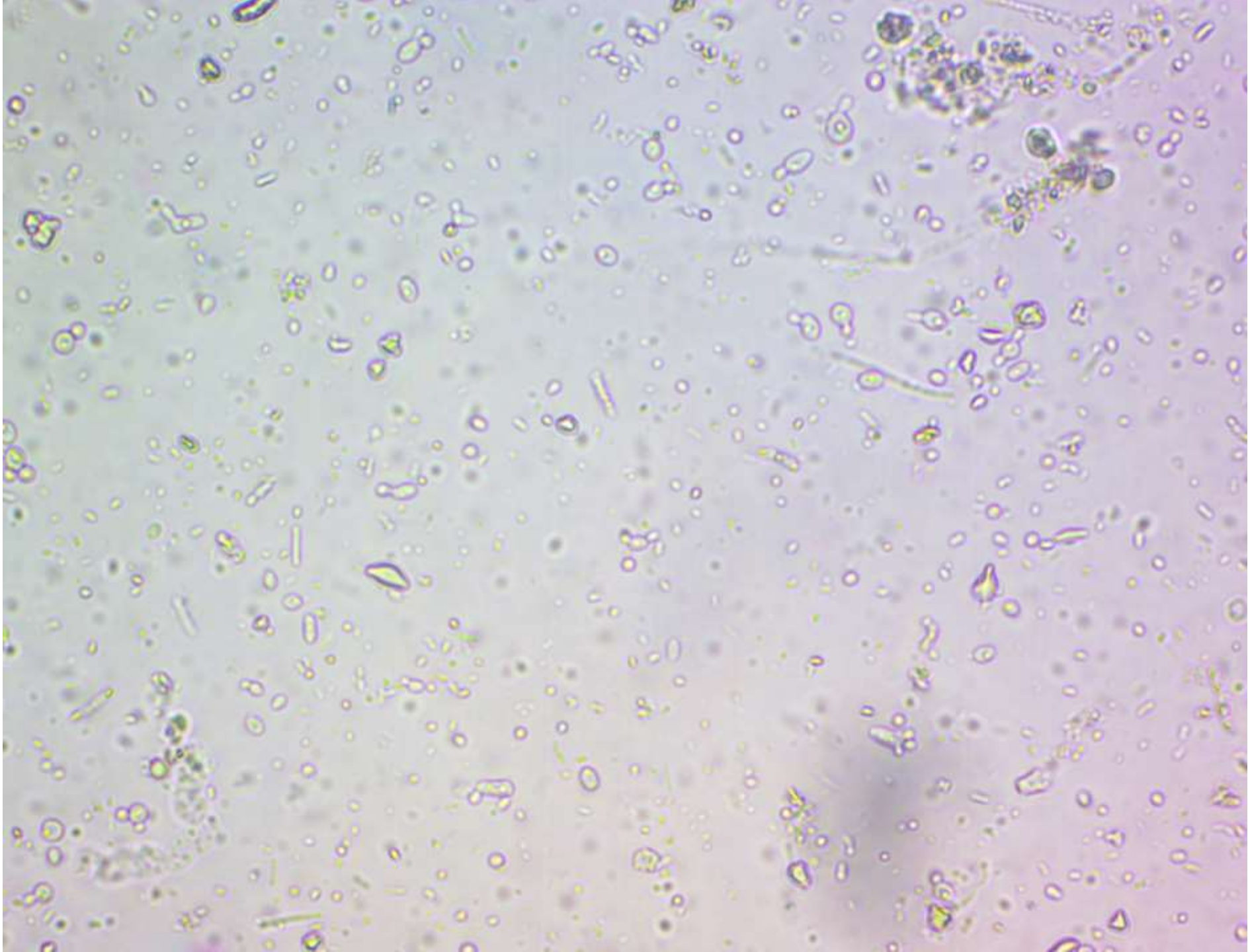
- Very Small Life—can't see with naked eye
- 10X more critters living in/on you than human cells









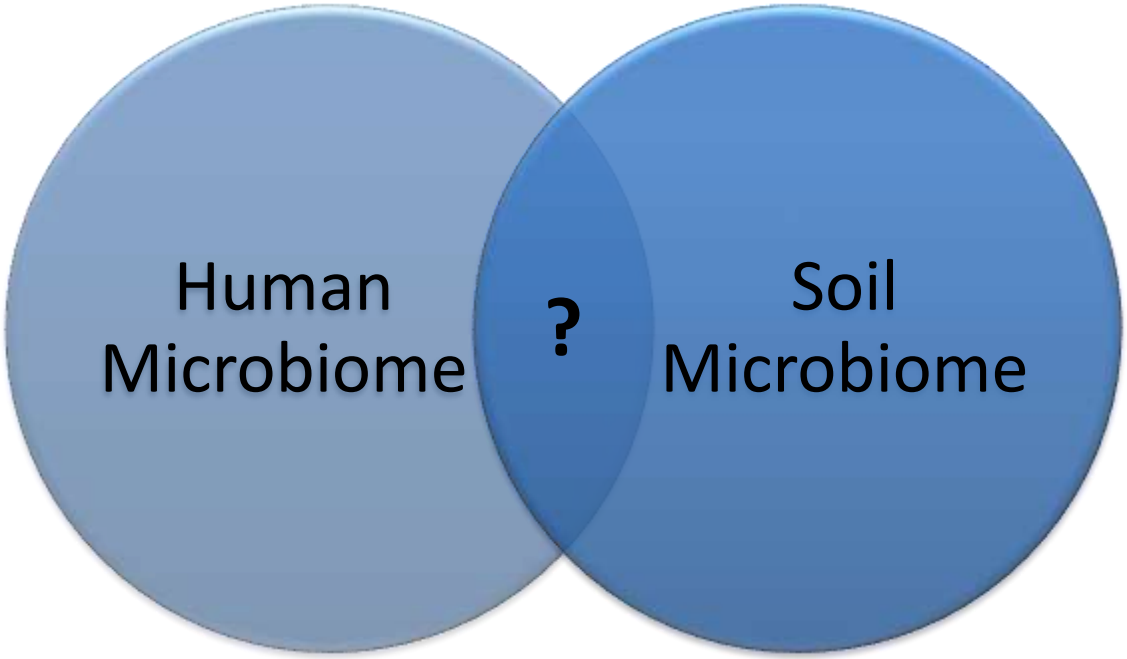


Two Keys to Human Health

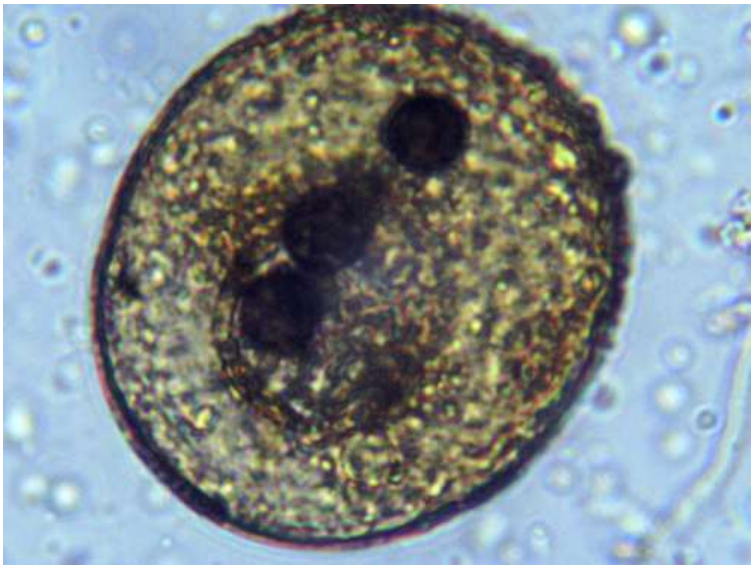
- ✓Nutrient Dense Food
- ✓Healthy Microbiome
- So…where do they come from?

The Soil!

- Nature's perfect plan to inject nutrient density at the bottom of the food chain

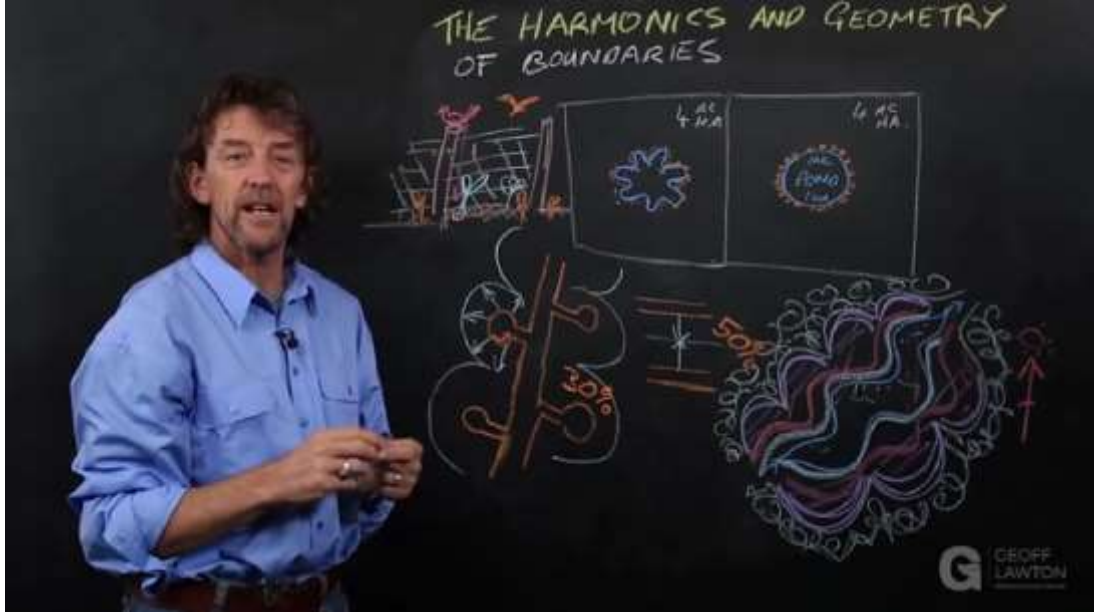


2019 Dr. Elaine Ingham (PhD in 1981)



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

- Korean Natural Farming—Chris Trump
- **Biology is most important ingredient**
  - N, P, K not enough…plants need all nutrients
    - Plant “blood” 1:30 dilution of sea water



Geoff Lawton's

Permaculture Design Certification

Dirt vs Soil

- Dirt–physical rocks, sand, silt & clay
- Soil—living skin of the planet
  - Handful of healthy soil has more critters in it than people on planet earth
  - Not just there for the “hell of it”

But, Dirt's Taking Over

- Modern agriculture focused on "chemistry"
- What kills biology?
  - Excessive Tillage
  - Chemical Fertilizers (N, P, K)
  - "icides"...Herbicides & Insecticides



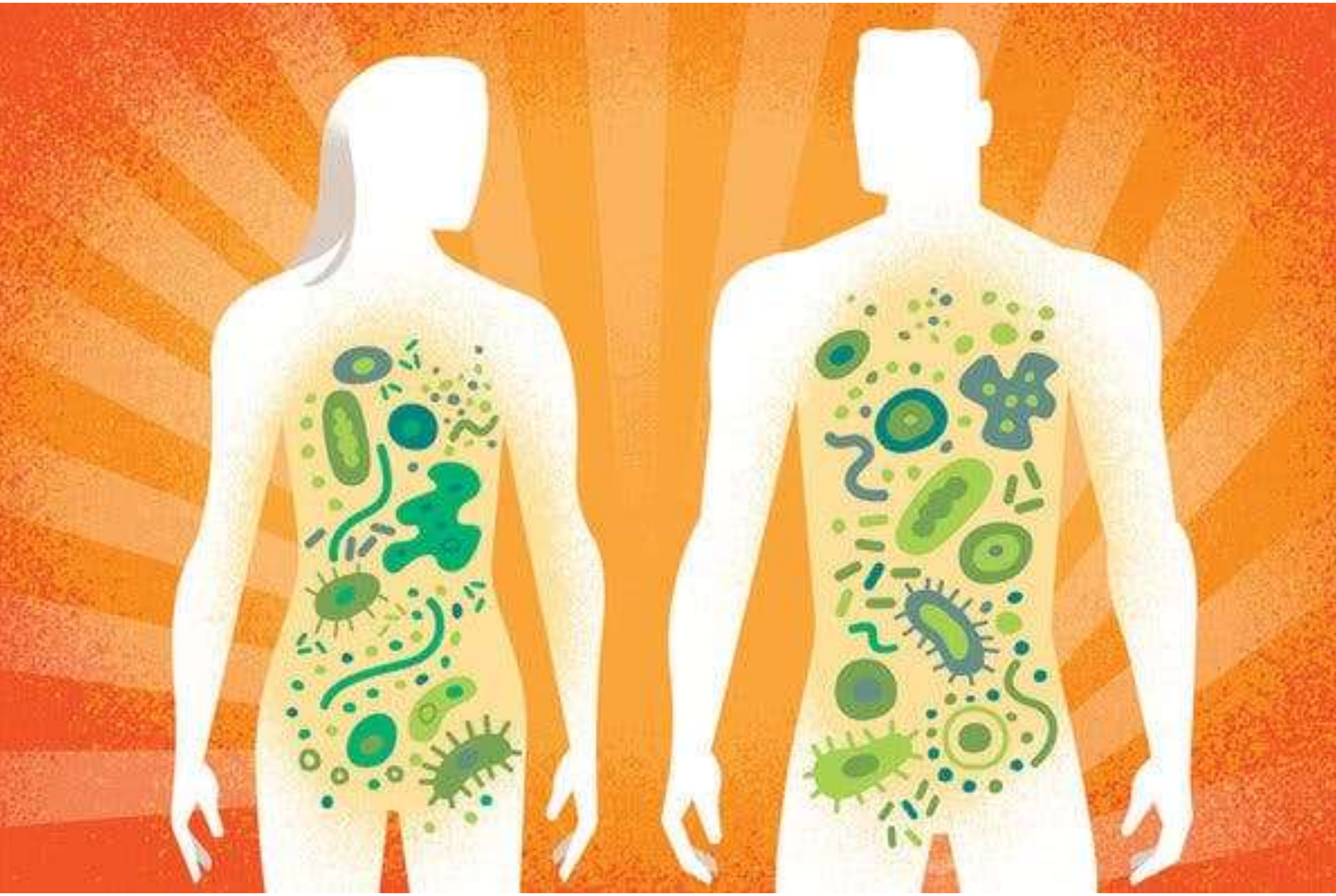

REFILL
Roundup

Symptoms of “Dirt”

- Sick plants—reduced yield/quality
- Pests (weeds, insects, diseases)
  - Need lots of “inputs” and $$
- Poor water infiltration
- Erosion

Seven Dead After Dust Storm Causes Crashes on Interstate 55 in Illinois

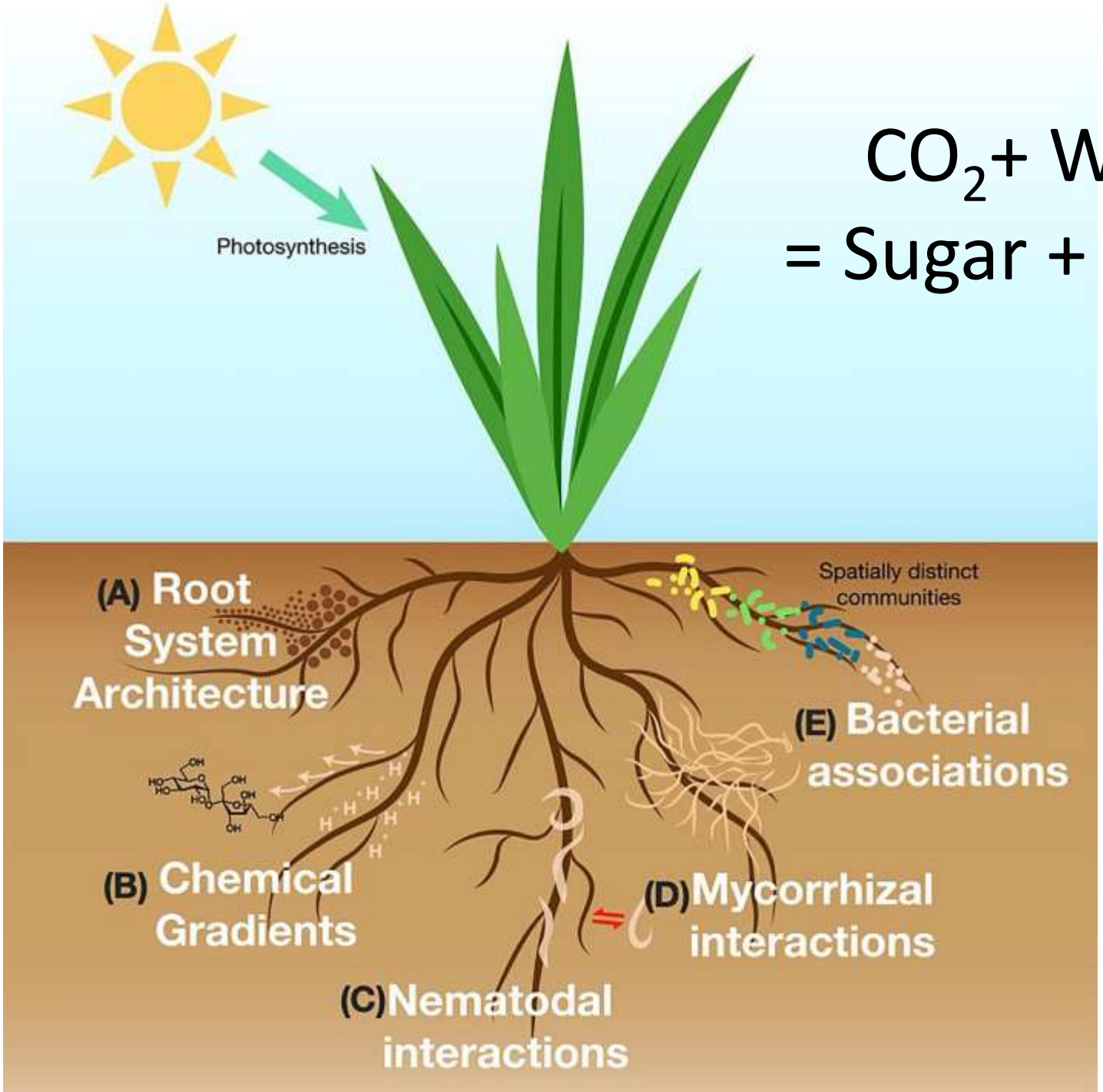
At least 72 vehicles were involved in pileup crashes after a dust storm swept through central Illinois, forcing the closure a key highway in the region.



(Patterns of Nature)
Plants have Microbiome Too!!

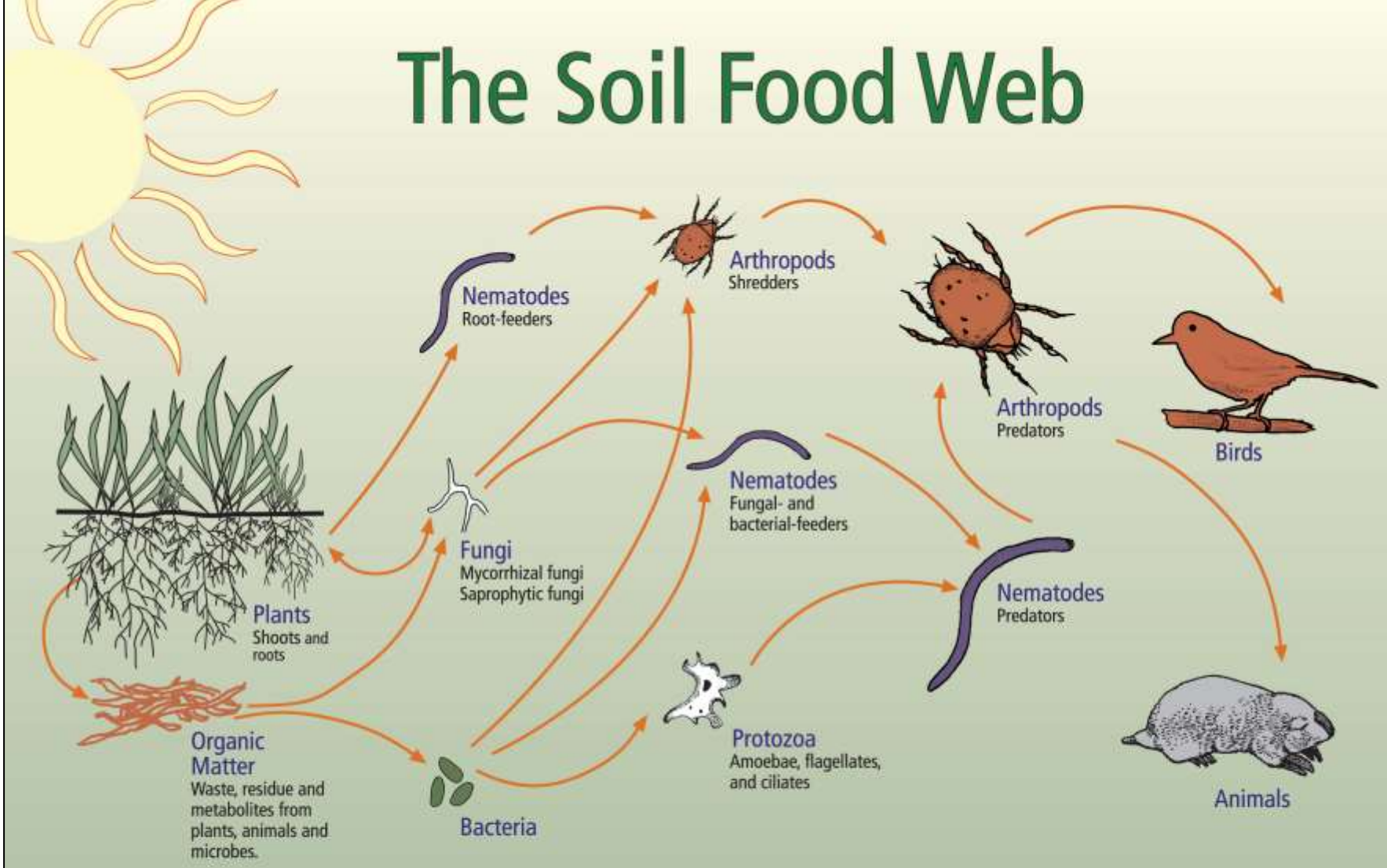
- Caretakers of the plants
  - Live on and inside
  - Recycle nutrients (dead plants/animals)
  - Harvest minerals from sand, silt, clay
  - Make Vitamins & Enzymes plant can't

- Inject Nutrient Density at bottom of food chain



CO_2+ Water
= Sugar + Oxygen

The Soil Food Web



First trophic level:
Photosynthesizers

Second trophic level:
Decomposers
Mutualists
Pathogens, Parasites
Root-feeders

Third trophic level:
Shredders
Predators
Grazers

Fourth trophic level:
Higher level predators

Fifth and higher trophic levels:
Higher level predators


Exposed rocks
Lichens and mosses
Annual weeds
Perennial weeds and grasses
Shrubs
Aspen, cherry, and young pine forest
Beech and maple broadleaf forest
Time

Standard Soil Test

Lab Number: 602069 **Sample Name:** TEST2 **Farm Name:**

Soil Results

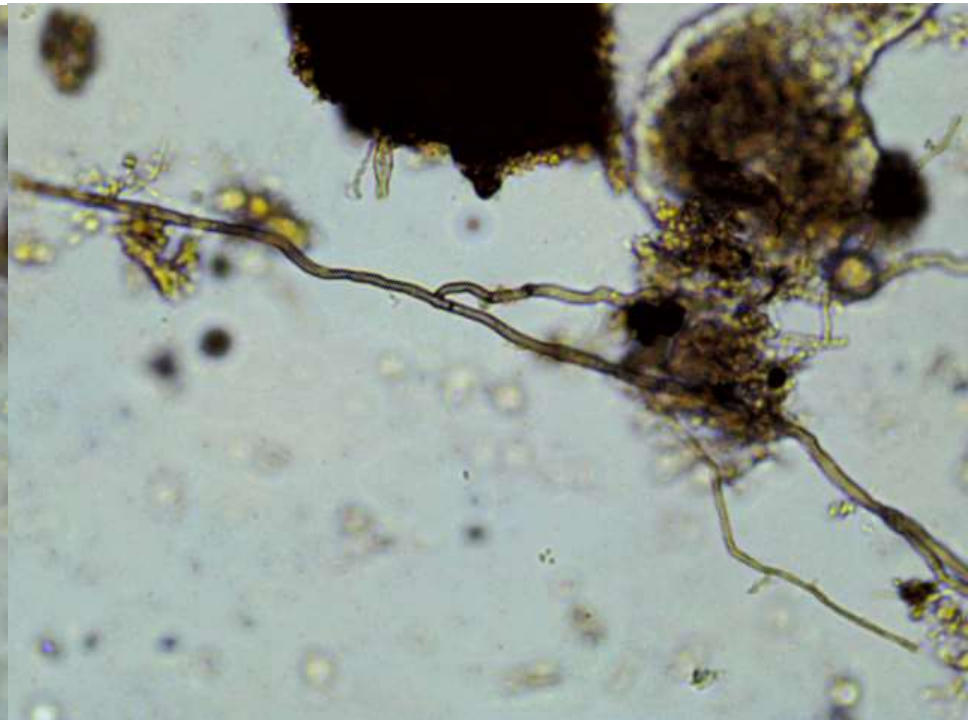
pH		Phosphorus	Potassium	Calcium	Magnesium	Zinc	Iron	Manganese	Boron	Sodium
Soil pH	Buffer Value	P	K	Ca	Mg	Zn	Fe	Mn	B	Na
		Pounds per acre - Mehlich 1								
6.65		25 M	84 L	1842 S	140 S	2.3 S	17 S	20 S	0.5	12

Crop/plant Interpretation ranges on last sheet

L = Low, M= Medium, H=High, V= Very High, S = Sufficient

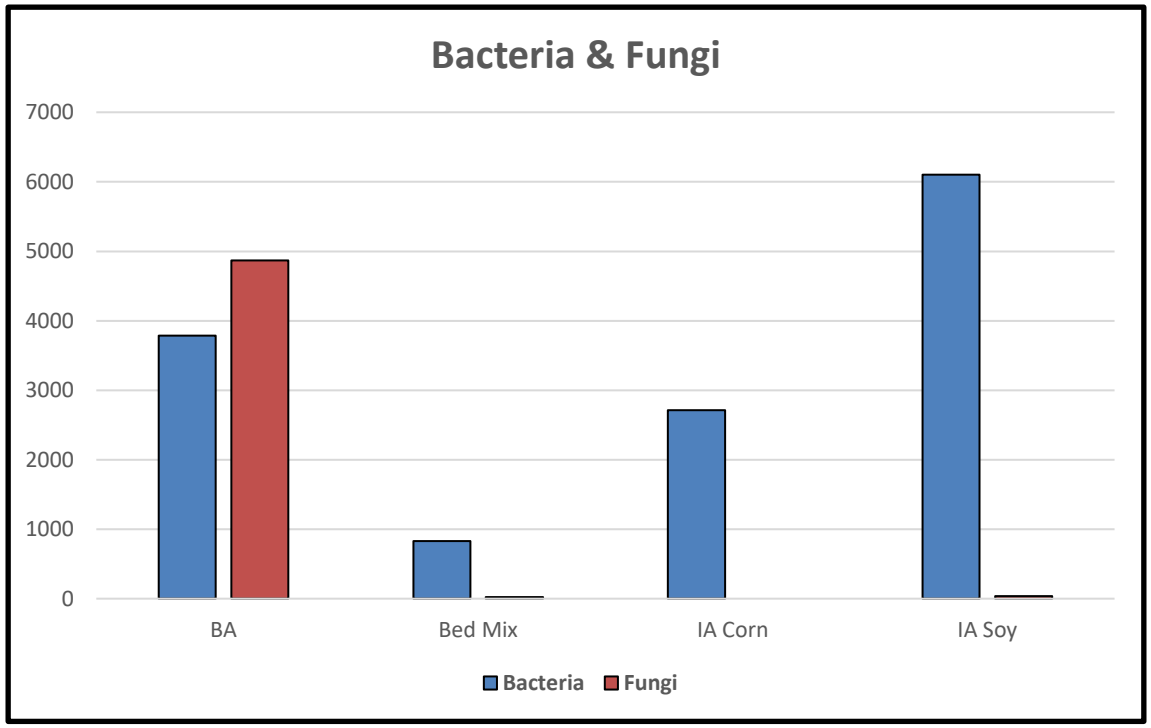
Additional tests, if they were requested											
Sulfur	Nitrogen			Carbon	C/N Ratio	Organic Matter	Soluble Salts	Particle Size Analysis - Hydrometer Method			
LBS/ACRE	NH4-N ppm	NO3-N ppm	Total N %	%	%	%	dS/m	% Sand	% Silt	% Clay	Soil Texture
						3.3	0.03	20	64	16	Silt Loam

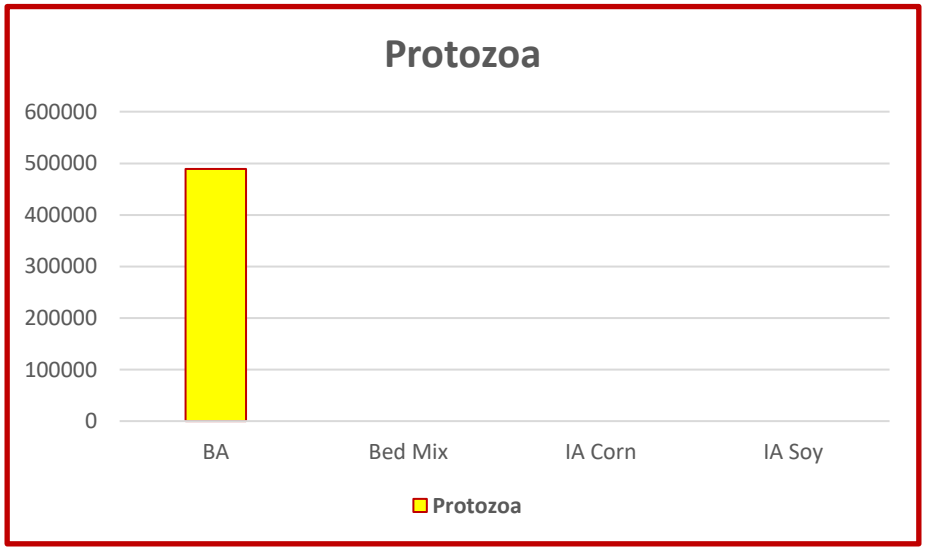


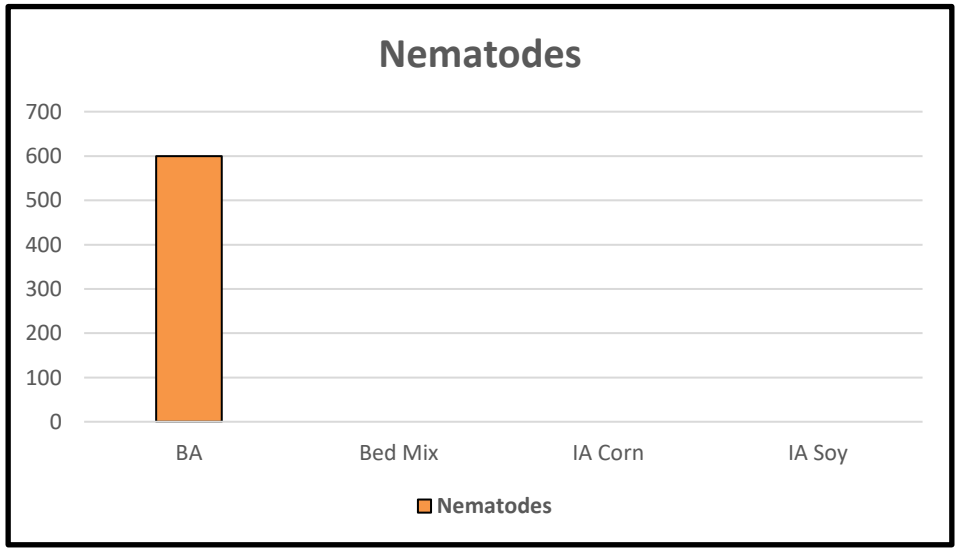



AFExtractDrenchResults_2022-04-11

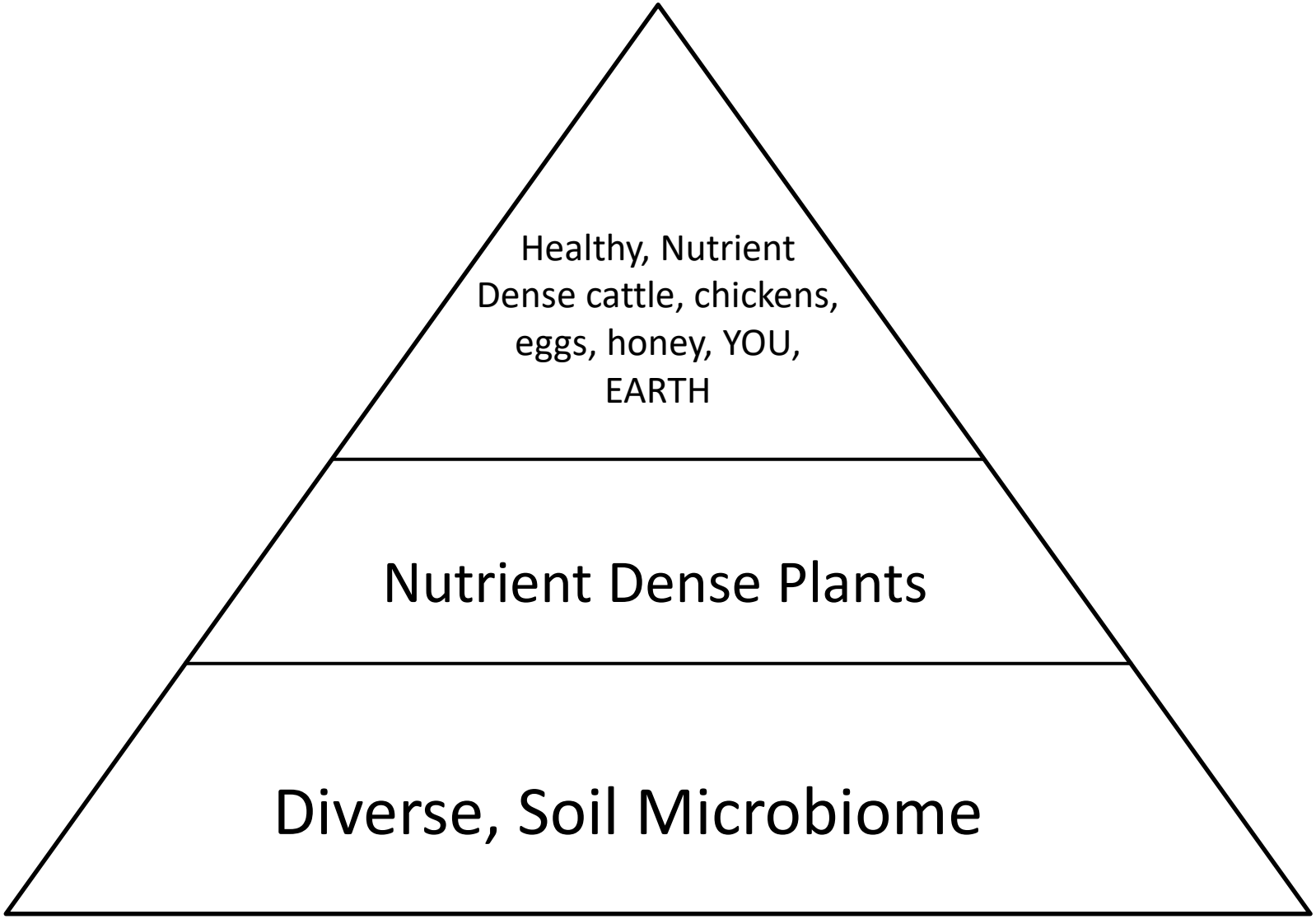
Beneficial Microorganisms	Sample Results
Bacterial Biomass (µg/g)	724.142
Bacterial Standard Deviation Biomass (µg/g)	87.835
Bacterial Standard Deviation as Percentage of Mean	12.10%
Actinobacterial Biomass (µg/g)	0.167
Actinobacterial Standard Deviation Biomass (µg/g)	0.16
Actinobacterial Standard Deviation as Percentage of Mean	95.90%
Fungal Biomass (µg/g)	851.77
Fungal Standard Deviation Biomass (µg/g)	882.451
Fungal Standard Deviation as Percentage of Mean	103.60%
Fungal Average Diameter - Weighted Mean (um)	6.881
F:B Ratio	1.176
Total Beneficial Protozoa (number/g)	136953
Flagellates (number/g)	61629
Flagellates Standard Deviation (number/g)	19519
Flagellates Standard Deviation as Percentage of Mean	31.70%
Amoebae (number/g)	75324
Amoebae Standard Deviation (number/g)	22968
Amoebae Standard Deviation as Percentage of Mean	30.50%
Bacterial-feeding Nematodes (number/g)	21
Fungal-feeding Nematodes (number/g)	0
Predatory Nematodes (number/g)	0
Detrimental Microorganisms	
Oomycetes Biomass (µg/g)	0
Oomycetes Standard Deviation Biomass (µg/g)	0
Oomycete Standard Deviation as Percentage of Mean	0.00%
Oomycetes Average Diameter - Weighted Mean (um)	0
Ciliates (number/g)	3424
Ciliates Standard Deviation (number/g)	4688
Ciliates Standard Deviation as Percentage of Mean	136.90%
Root-feeding Nematodes (number/g)	0
Total Beneficial Protozoa Standard Deviation (number/g)	35807
Total Beneficial Protozoa Standard Deviation as Percentage of Mean	26.10%


Bacteria & Fungi
7000
6000
5000
4000
3000
2000
1000
0
BA
Bed Mix
IA Corn
IA Soy
Bacteria
Fungi


Protozoa
600000
500000
400000
300000
200000
100000
0
BA
Bed Mix
IA Corn
IA Soy
Protozoa


Nematodes
700
600
500
400
300
200
100
0
BA
Bed Mix
IA Corn
IA Soy
Nematodes

The Foundation--Microbiome



Congratulations!

- ✓ First Step—You Know Why!!!!
  - Most important Step!!

Now What?

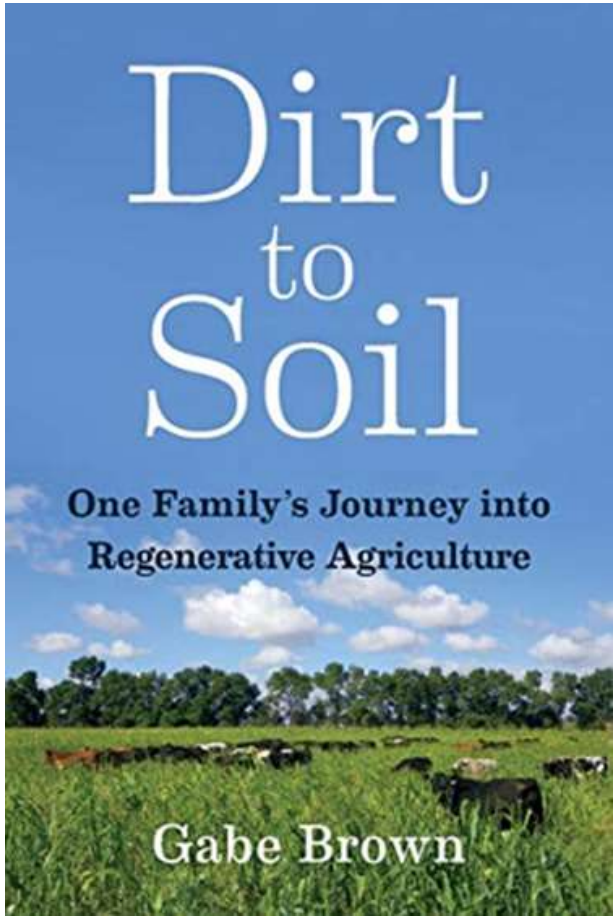
- Become a MICROBE FARMER!!
- Microbiome Needs…
  - Air
  - Water
  - Food
  - Comfort (Shelter)


REFILL
Roundup
Roundup
PowerMAX
HERBICIDE
BAYER
Liberty
WARNING
AVISO

Do This! Regenerative Agriculture

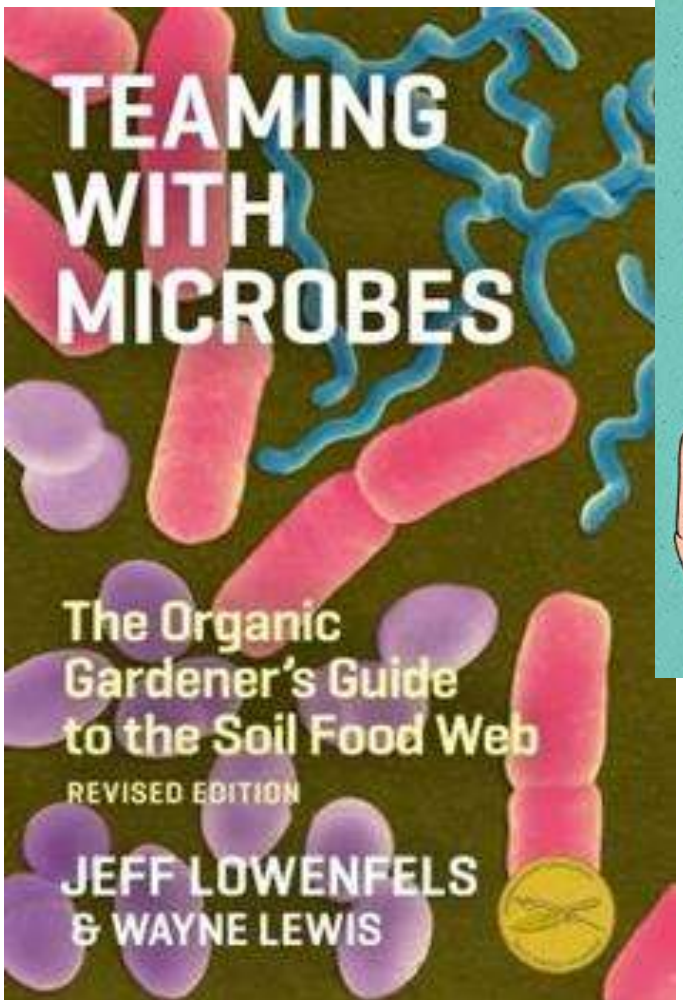
- Farming & grazing practices that:
  - Limit Disturbance
  - Armor the Soil Surface
  - Build Diversity
  - Keep Living Roots in Soil
  - Integrate Animals

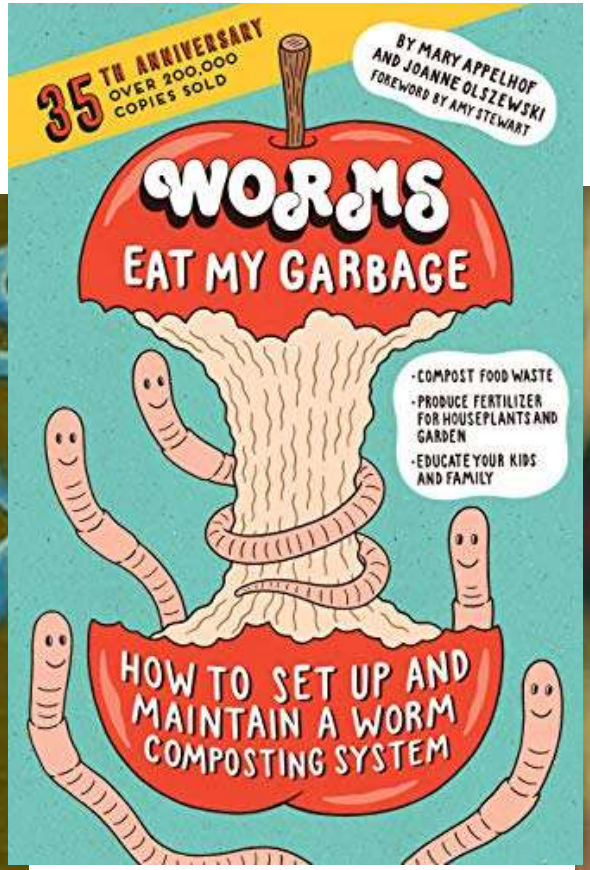
- Urban Landscaping Too!!



Sources of Soil Microbiome

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


TEAMING WITH MICROBES
The Organic Gardener's Guide to the Soil Food Web
REVISED EDITION
JEFF LOWENFELS & WAYNE LEWIS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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
Healthier Vegetables
Vineyards·Lawns
Marc Remillard

Examples

- From Theory to Real World


Exposed rocks
Lichens and mosses
Annual weeds
Perennial weeds and grasses
Shrubs
Aspen, cherry, and young pine forest
Beech and maple broadleaf forest
Time

Garden

Garden

Pasture

Rotational Grazing

Large Scale

- Gabe Brown—5,000 acres in ND!
- Rick Clark—7,000 acres in IN!
- York Farm—10,000 acres in IL!
  - Todd Harrington Case Study at Soilfoodweb.com

Unsung Heroes

- You’re joining something bigger than yourself
- Our farmers/ranchers are unsung heroes
- What’s more noble than growing our food?
- But, the health of your fellow citizens is in your hands

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 ($4.1 Trillion+) every year

1937

"The nation that destroys its soil destroys itself."

- President Franklin Roosevelt

Soil Enlistment “Oath”

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

More Info

- www.Libertytracefarm.com
  - Book/Resource Tab
  - Classes on website & Social Media

- “Advanced” Talk Tomorrow 1:30

More Info (Cont)

- Weston Price Foundation (https://www.westonaprice.org/)
- Childrens Health Defense (https://childrenshealthdefense.org/)
- Moms Across America (https://www.momsacrossamerica.com/)
- Howard Vlieger, Contact Organics

A NEW BEGINNING!