

Chapter 5

Working with the Soil Food Web

Lecture 27 - Case Studies

Ukraine

Cannabis Farms

ZZ2 Tomato, South Africa

Large Scale Ag

Big Ag claims that “going sustainable” means lower yield, more weeds, poor nutrition

But our studies show that if soil life is improved

- Soil structure is built; roots go deeper, no need for inorganic fertilizers
- Balanced nutrients in plant material
- Weeds do not grow, do not compete with the crop
- Water holding increases; no need for constant irrigation
- No need to rotate crops
- Diseases not an issue

The Process of Conversion of Dirt to Soil

- Client Consultation: What is desired?
- Initial Site Assessment: What is present?
- Produce the Biological Plan: How to get the minimum levels of organisms back into the soil? Maintain them?
- Start applications of biology
- Check biology to make sure conversion is happening
- Apply any biology still lacking

Case Study of Barley Grown in Ukraine (2009)

Dr. Ingham was invited to help improve the harvest of a large barley farm in Ukraine near Sebastopol. In 2008, land was treated with organic fertilizer lacking good biology and yields were very low.

Initial Site Assessment:

- Compaction: 150psi at 2 - 6 inches; some surface compaction
- Soil Biology: Only Bacteria - massive biomass 15,000µg/g
- Soil Chemistry: Ca:Mg ratio at 2:1, more calcium required
- Water Infiltration rates: 5 - 10 seconds/drop
- Pests - Thrips, White flies, Mildew, Blight, Root-Feeding Nematodes

MVOA Ukraine Barley 2009

Metric	Control	Extract
Weeds/m ²	40-44	12-15
Tillers/Plant	1.6	2.8
Seeds/Seed Head	30	36
Plant Height	1m	1.25m
Compaction Depth (150psi)	4.5cm	15-24cm
Root Length at Heading	3cm	6-10cm



Soil Food Web Cannabis Case Studies

Case Studies from Soil Food Web Consultants working with Cannabis Growers in North America



Scott & Sara Skamnes

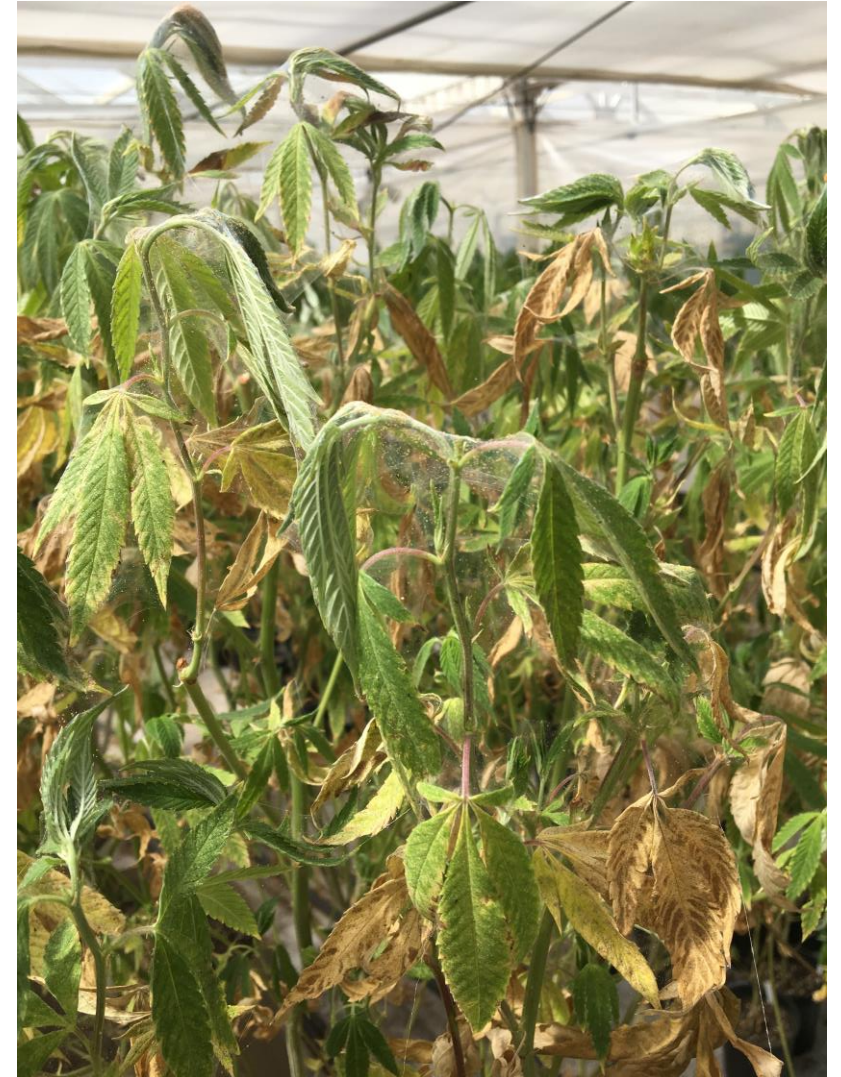
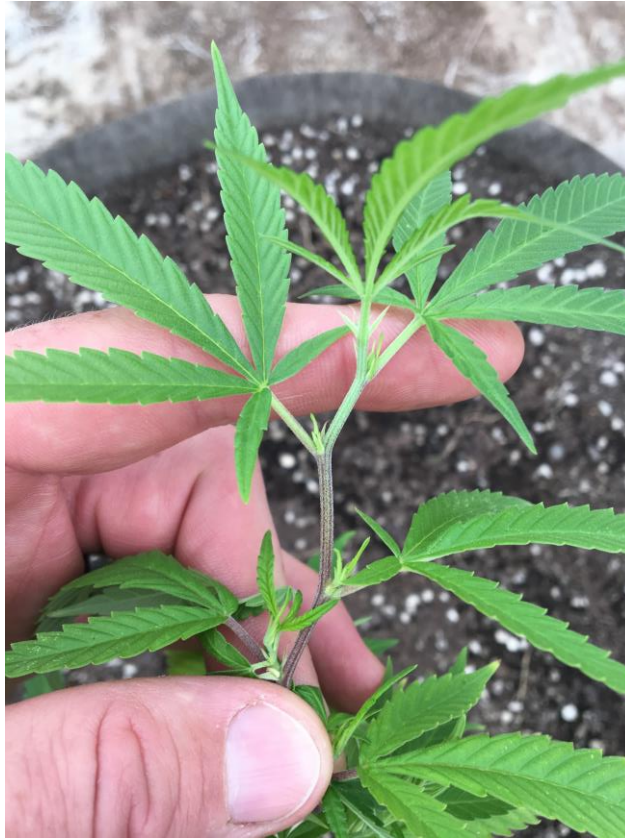
- Soil Food Web Consultants
www.crescivesoil.org
- Work with Cannabis Growers across North America
- Their efforts have helped growers cut inputs, fight diseases, and get greater yields.



Saving Cannabis Plants from Disease

Much of Scott and Sara's work involve saving stressed or diseased Cannabis Plants from dying and spreading diseases to the entire operation.

By making and applying BioComplete™ Soil Amendments, they have demonstrated that diseases can be eradicated without toxic chemicals and that plant health and productivity can be greatly enhanced.



Cutting Chemical Fertilizer/Pesticide/Herbicide/Fungicide Use

By helping clients switch to Dr. Elaine's™ Soil Food Web Approach, Crescive Soil Services was able to help clients eliminate their use of chemical inputs.

Tests confirmed that:
Fertilizer/Pesticide/Herbicide/Fungicides
and infectious bacteria were not detected
in their clients' Cannabis Plants.

<u>Test Details</u>		
<u>Pesticides</u>	<u>ppm</u>	<u>LIMIT ppm</u>
Acequinocyl	ND	4.00
Avermectin B1a	ND	0.05
Bifenazate	ND	15.00
Bifenthrin	ND	0.05
Captan	ND	0.05
Cyfluthrin	ND	4.00
Cypermethrin	ND	0.05
Daminozide	ND	0.05
Dimethomorph	ND	60.00
Etoxazole	ND	7.00
Fenhexamid	ND	30.00
Flonicamid	ND	7.00
Fludioxonil	ND	0.02
Imidacloprid	ND	0.05
Myclobutanil	ND	9.00
Pacllobutrazol	ND	0.05
PCNB	ND	0.20
Piperonyl Butoxide	ND	2.00
Pyrethrins	ND	1.00
Spinetoram	ND	1.70
Spinosad	ND	1.70
Spirotetramat	ND	10.00
Thiamethoxam	ND	0.02
Trifloxystrobin	ND	11.00

Massive Yield Increases



Large-scale commercial Cannabis farms average approx. 23-45 lbs. of harvested material per 1,000 sq.ft.

Scott & Sara's clients, using Dr. Elaine'sTM Soil Food Web Approach, harvest as much as 80-100 lbs. per 1,000 sq.ft.

This is an increase of ~100%

Cutting Input Costs

Typical bottled nutrient programs cost between \$2-3 per sq.ft. of canopy, per harvest cycle.

Average cost of applying Dr. Elaine's™ Soil Food Web Approach is between \$0.50-\$1 per sq.ft. This represents a saving of over 60%.

Indoor yields with Dr. Elaine's™ Soil Food Web Approach meet or exceed hydroponic claims, while eliminating subsequent crop losses during subsequent years.

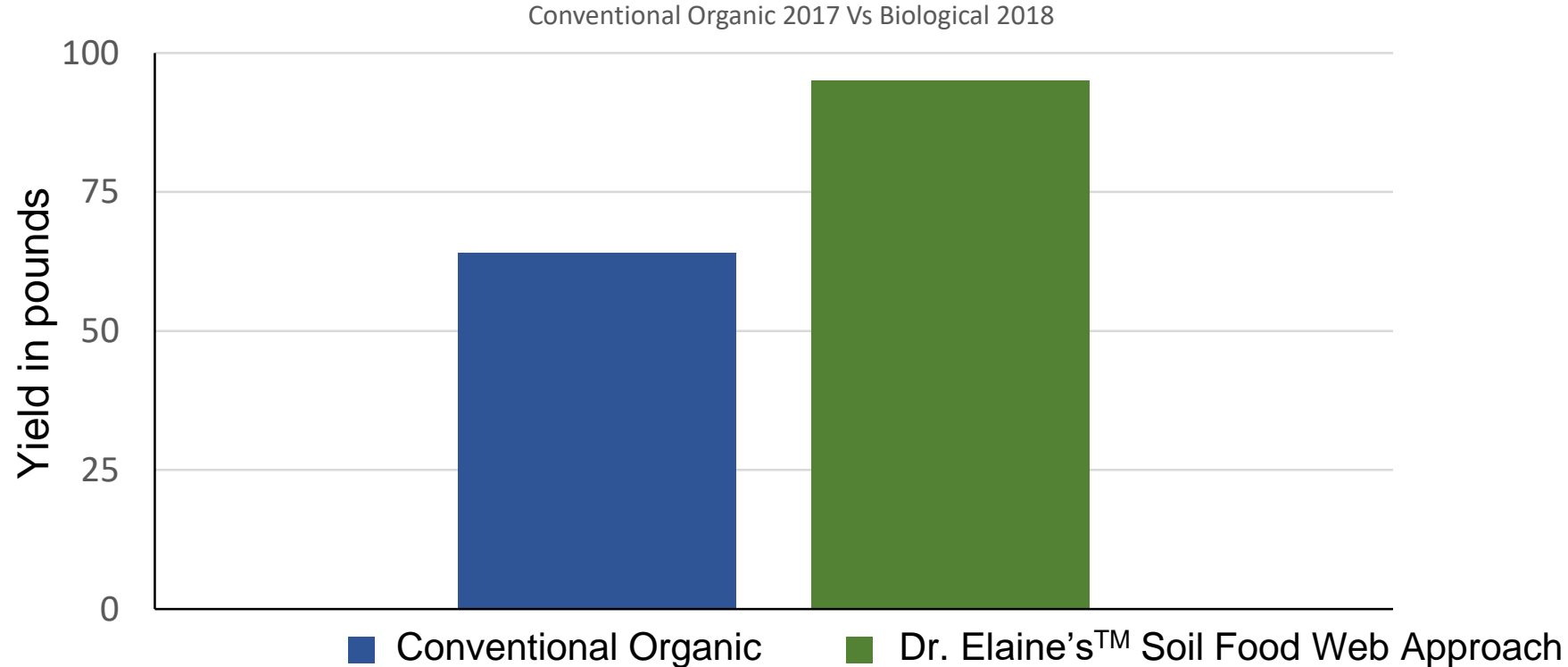


Keisha and Casey

Keisha and Casey,
Soil Food Web Consultants
in training, helping clients
eliminate chemical inputs
while substantially
increasing their yields.



Yields Substantially Increased

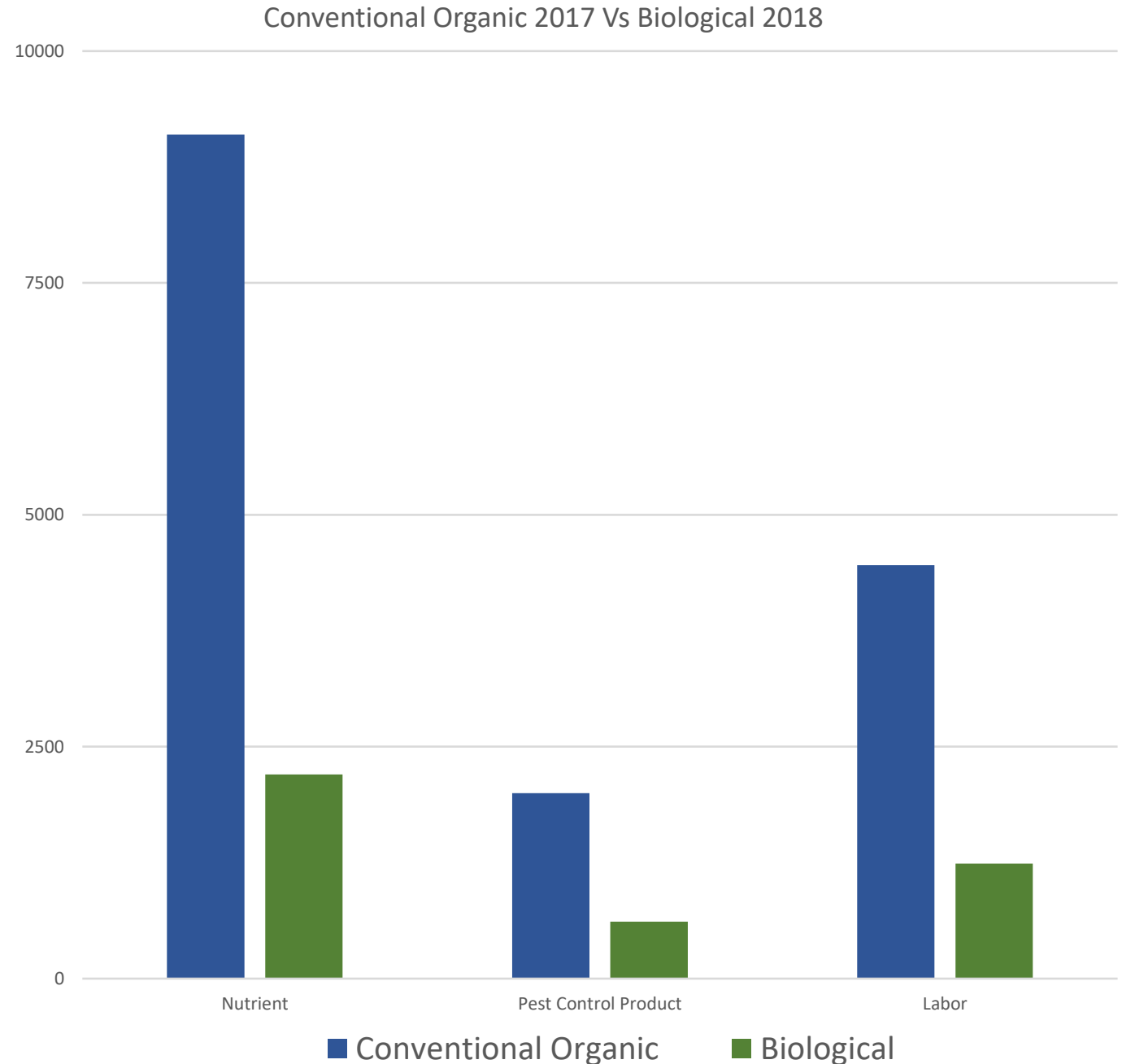


Data gathered by Keisha and Casey from work done on transitioning from conventional-organic methods to Dr. Elaine'sTM Soil Food Web Approach, demonstrating a ~50% yield increase while dramatically reducing costs.

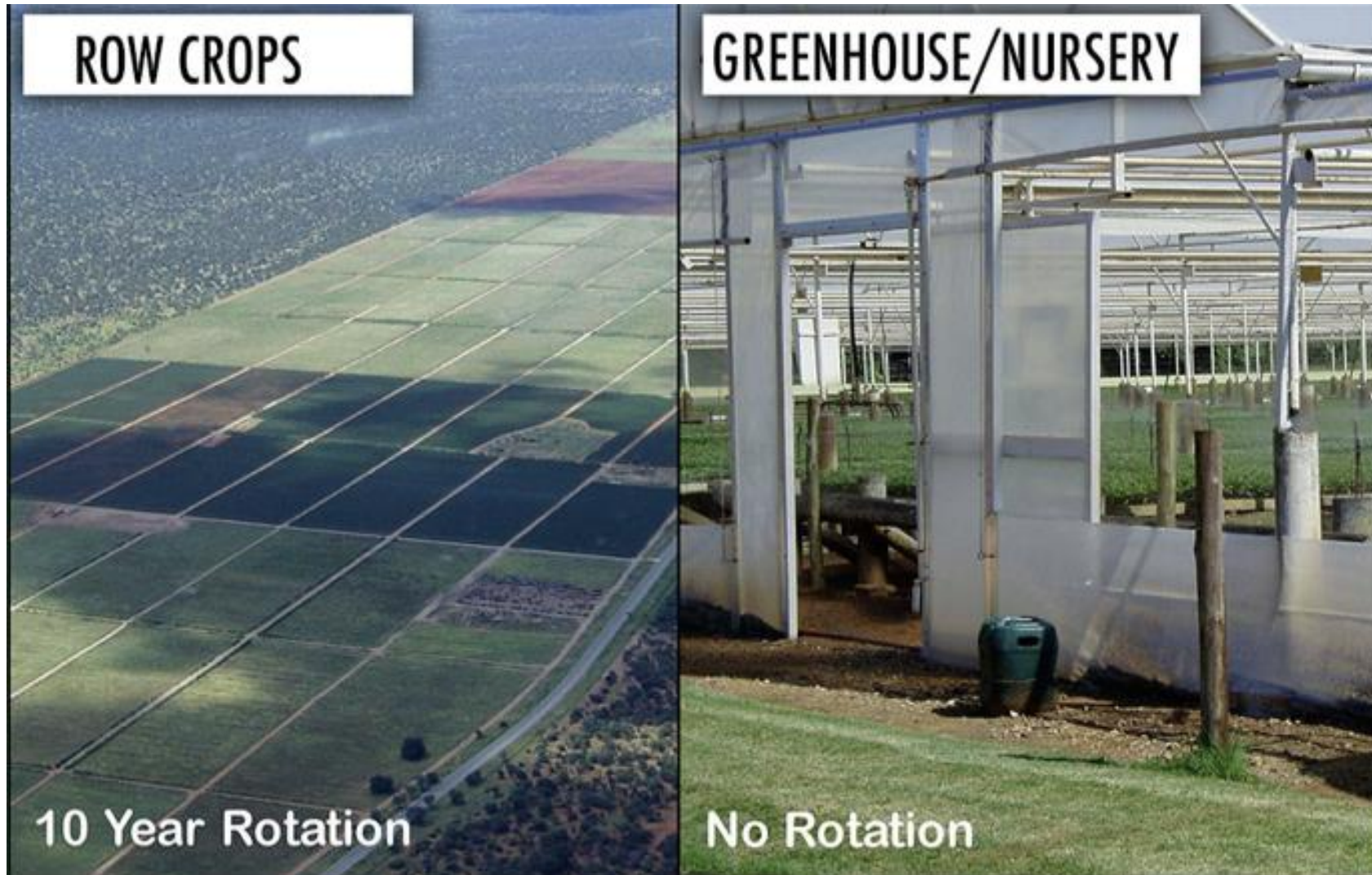
Not only did yields increase with Dr. Elaine's™ Soil Food Web Approach, the **costs dramatically decreased**.

- Nutrient Costs: down by more than **75%**
- Pest Control Costs down by over **60%**
- Labor Costs down by more than **65%**

All data from June-October growing season, in 2017 vs. 2018.



ZZ2 – 5,000Ha Tomato Farm, South Africa



ZZ2 – Problems Faced

- The owners of ZZ2 in South Africa were using conventional-chemical agriculture.
- Diseases, pests, water use, nutritional loss, and erosion were all increasing year-on-year.
- The time that land had to stay out of tomato production (fallow) in order to deal with those problems increased from 1 or 2 years, up to 10-14.

A way to turn this around was needed.

ZZ2 – Before Treatment

Initial Site Assessment:

1. Compaction at surface (150 psi) and at 4 – 6 inches, >300 psi.
2. Root Depth: Roots at surface, no deeper than 3 to 5 inch depth
3. Soil Biology: Many bacteria, but only a few species.
4. Soil Chemistry: Ca:Mg ratio at 4:1; calcium required
5. Water infiltration: Erosion, sheeting of surfaces. Water drops can't move into the soil.
6. Pests & Diseases: Aphids, White flies, Mildew, root-feeding nematodes, weeds tilled out on raised beds
7. Standard applications of lime, gypsum, sulfur (fungicides), insecticides, inorganic fertilizers

Treatment Protocol

ZZ2 made BioComplete™ Soil Amendments on site under Dr Ingham's guidance.

In the Greenhouse

- BioComplete™ Tea was applied to 'seedlings/starts' as a foliar application, at first true leaf stage.
- BioComplete™ Extract was delivered via the irrigation system to each plant as a soil drench.

On the Land

- The BioComplete™ Compost was applied as planting beds were being formed and was placed in furrow down the middle of each bed: ~10T/Ha (4T/Acre) applied in this way.
- 2 rows of tomatoes were planted per bed – one on each side of the furrow.
- BioComplete™ Extract was applied as soil-drench soon after planting.
- 2 applications of BioComplete™ Tea were applied to the foliage – the first at 2 weeks after true leaf stage, and the second at 3 weeks after true leaf stage.

Results: Plant Health

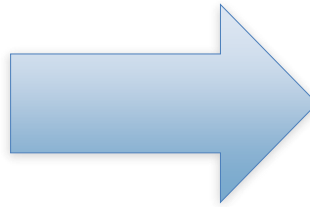


Results: Soil & Yields

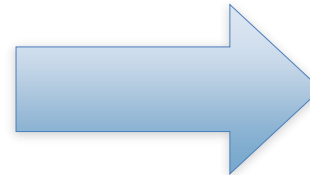
Conventional Approach

- 1-2 years of production followed by 10 – 14 years of fallow due to huge pest & disease issues
- Only 18% was first grade quality
- Yield of 80 tons/ha

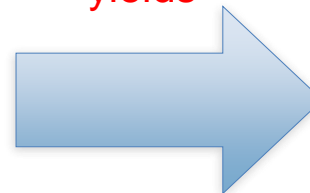
Better land use



Better quality



Higher yields



After implementation of Dr. Elaine's™ Soil Food Web Approach

- Worst land: 3 years of tomato followed by 1 year of fallow
- Best: Continuous tomato production without fallow period or crop rotation
- 50% first grade quality
- 100-110 tons/ha initially, up to 120 tons/ha within a year

Record Breaking Pumpkin

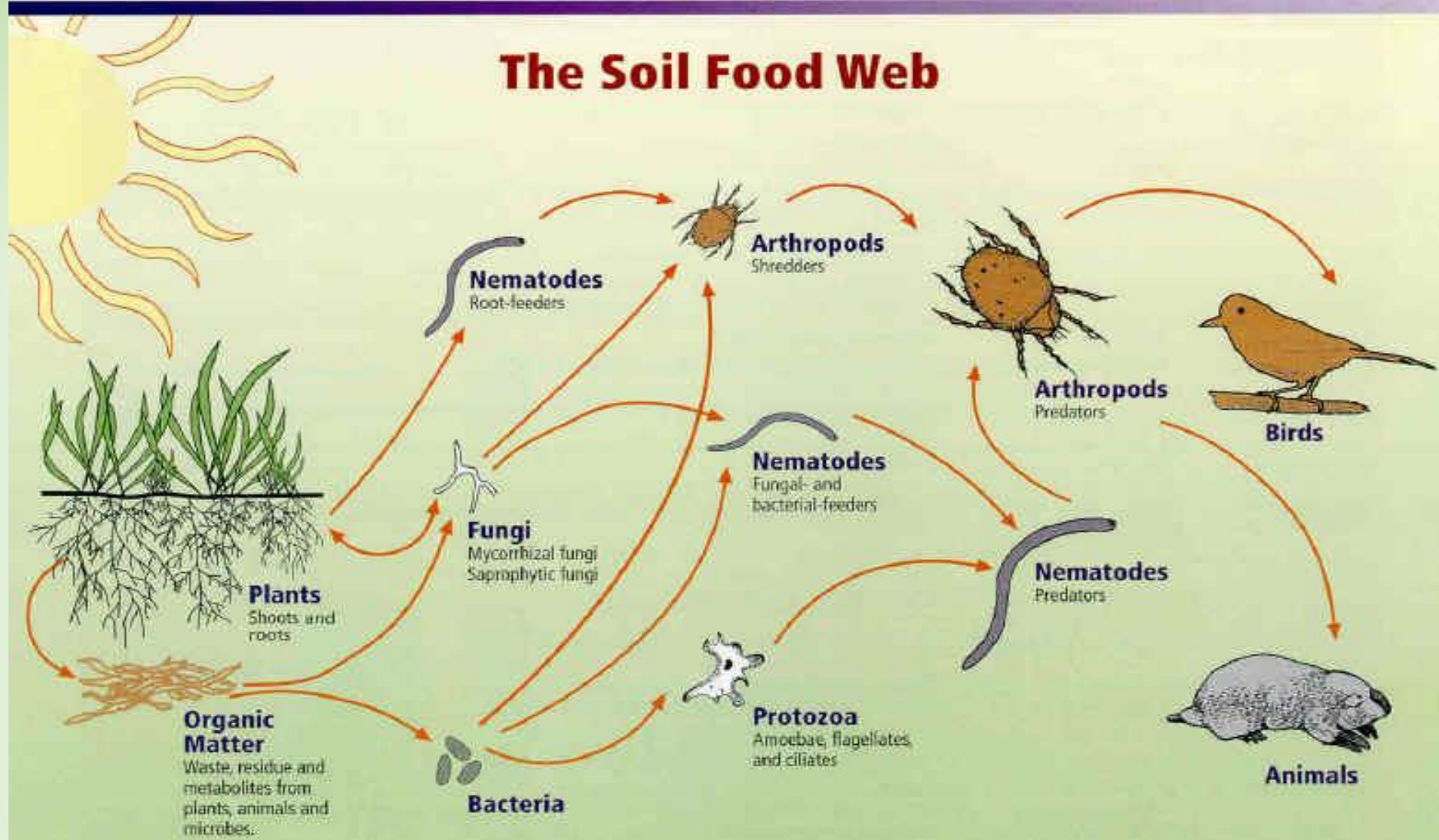
“Three years ago we went 'no till' and in consultation with Matt Slaughter we started to shift the biology in the right direction for our crop. The results were beyond expectations. Last year we grew the California/West Coast record 1645.5 pound pumpkin (largest ever grown west of the Rockies and 13th largest of all time). Attached is a picture of the pumpkin just before loading for the weigh off. There is no doubt that the soil food web fed the plant. Thank you for your work that gave the knowledge to assess and correct the biology.”

Brant J. Bordsen

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The Soil Food Web



First trophic level:
Photosynthesizers

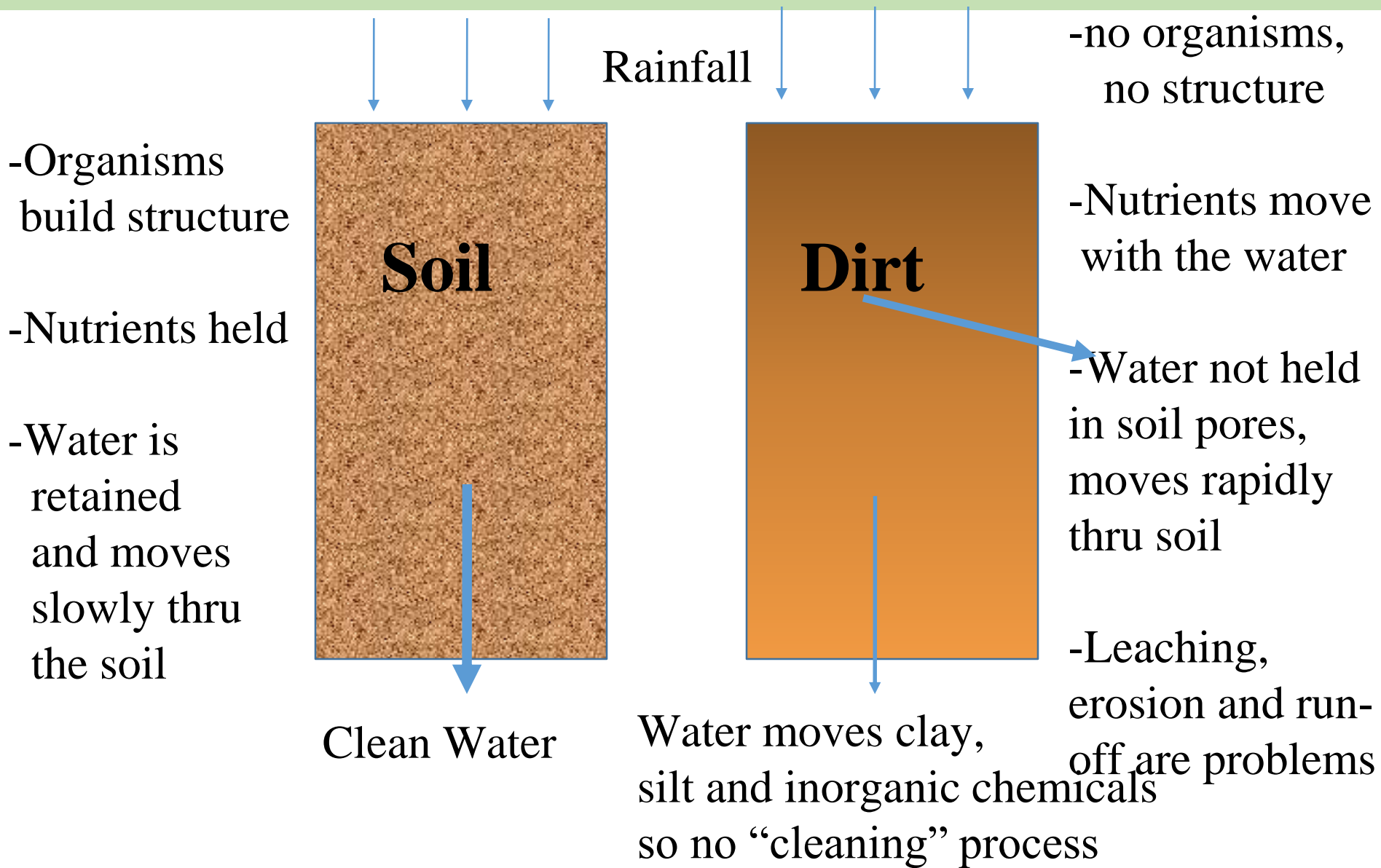
Second trophic level:
Decomposers
Mutualists
Pathogens, parasites
Root-feeders

Third trophic level:
Shredders
Predators
Grazers

Fourth trophic level:
Higher level predators

Fifth and higher trophic levels:
Higher level predators

Soil results in clean water - Dirt results in problems



ALL the Biology Must be Present

- Which is “most important?”
- Holistic system, can't forget any part
- No retention without bacteria and fungi
- No return to plant available forms without protozoa, beneficial nematodes and microarthropods
- Need to understand the **WHOLE** food web

There is Hope.....

- We can return the world's soils to health
- It will not cost billions, or even millions of dollars
- It will not take years
- Within one growing season, you can get the increased yields, decrease your costs and improve nutrition in the food you produce
- IF you get the biology right for your plant
- IF you get the **WHOLE FOOD WEB** back
- And now..... it is up to you to go forth and help spread this knowledge