BioComplete™ Liquid Amendments

Lecture 11 – Application Methods (Part 3)

Biological vs Conventional Approach to Soil Management

BioComplete™ Tea Test Trial

Summer 2003

by Abron New Zealand

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Background

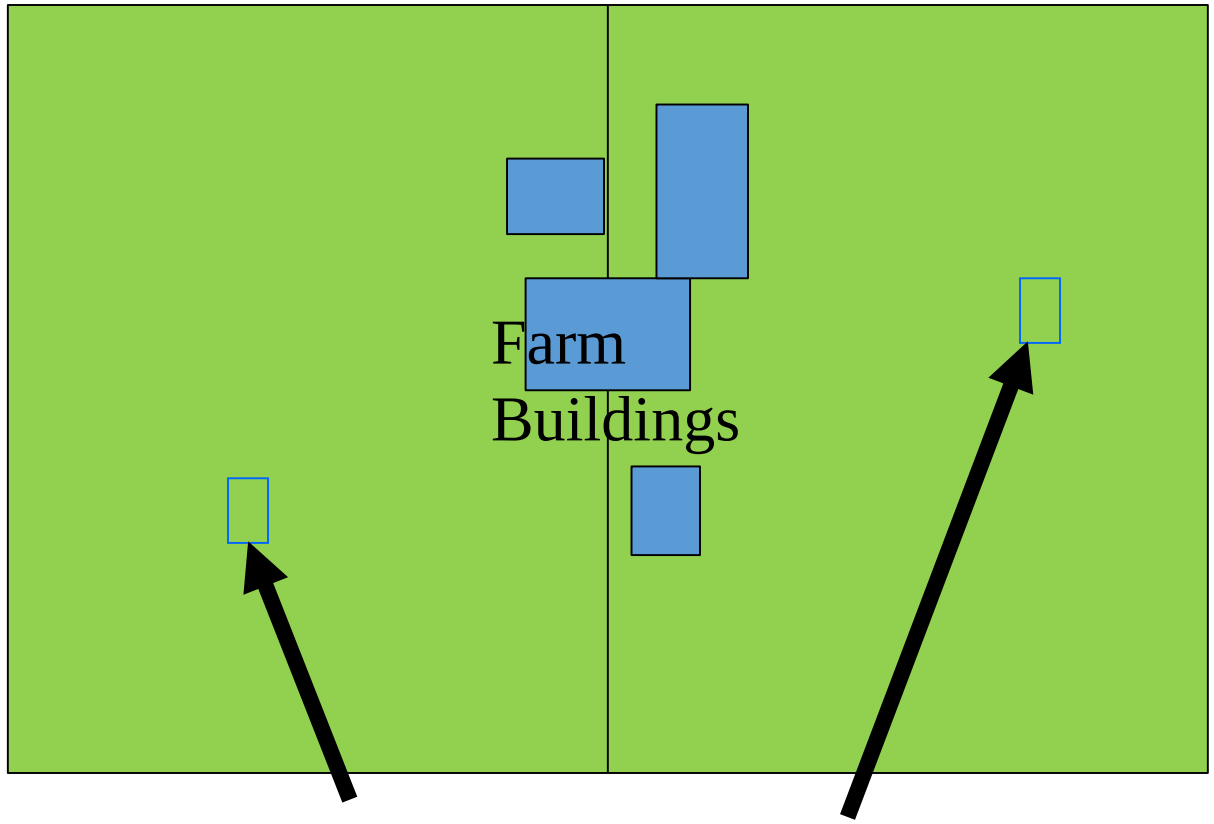
- Trial area consists of two plots fenced off from stock and the pasture harvested every 20-30 days using a mower.
- Trial was carried out on a conventional dairy farm in the Bay of Plenty, New Zealand.
- All testing is done by Hill Laboratories and the Soil Foodweb Institute NZ.
- Trial overseen by Mark Macintosh of Agfirst Consultants.
- Trial started 1 October 2003.
  Trial finished 24 February 2004.

Dairy Farm

Standard Management

Biological Management

Half the herd on this side; same degree of facial eczema to start.



Half the herd on this side; same amount of facial eczema to start.

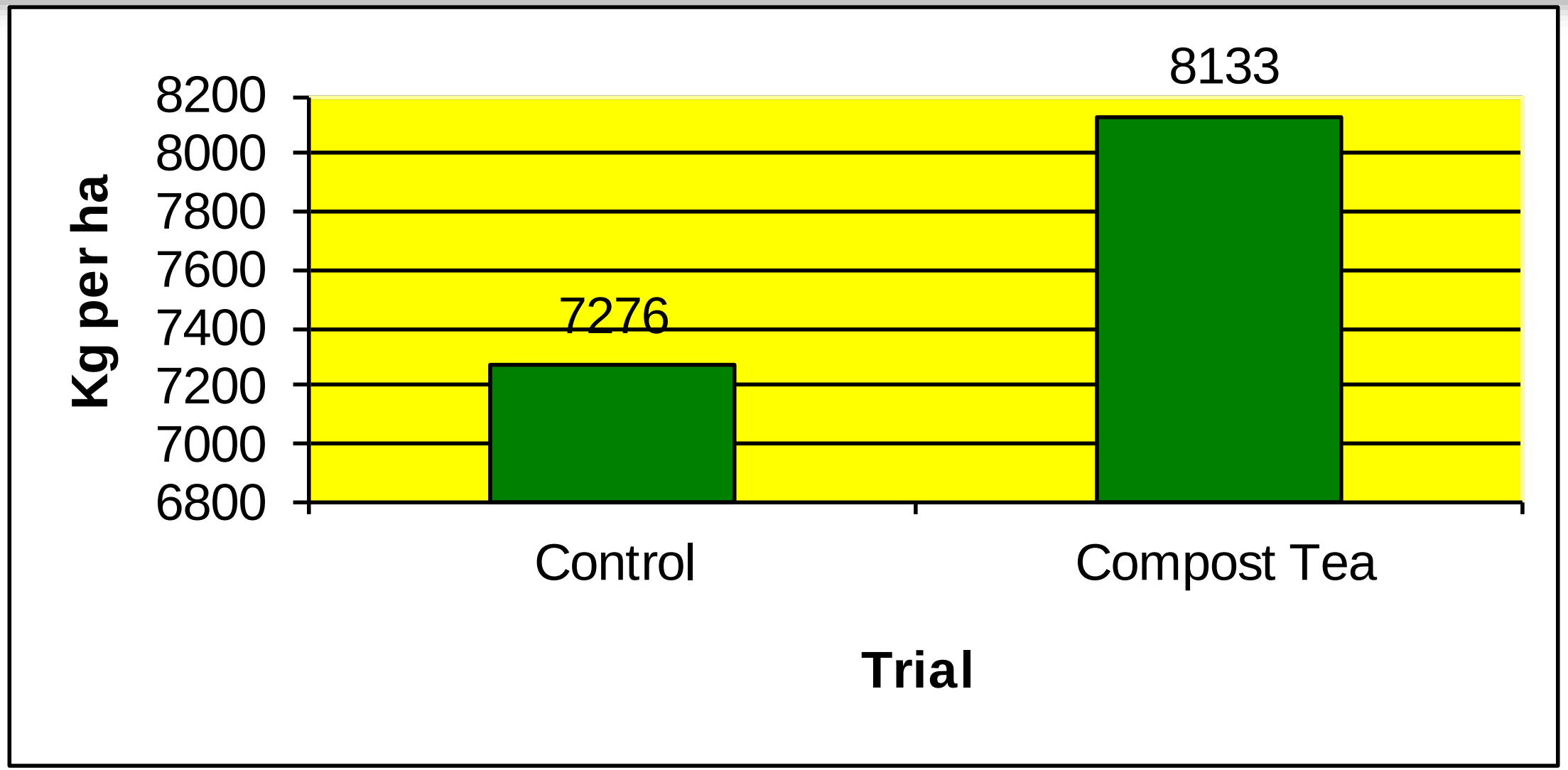
1 HA fenced areas, similar vegetation to begin

Treatment

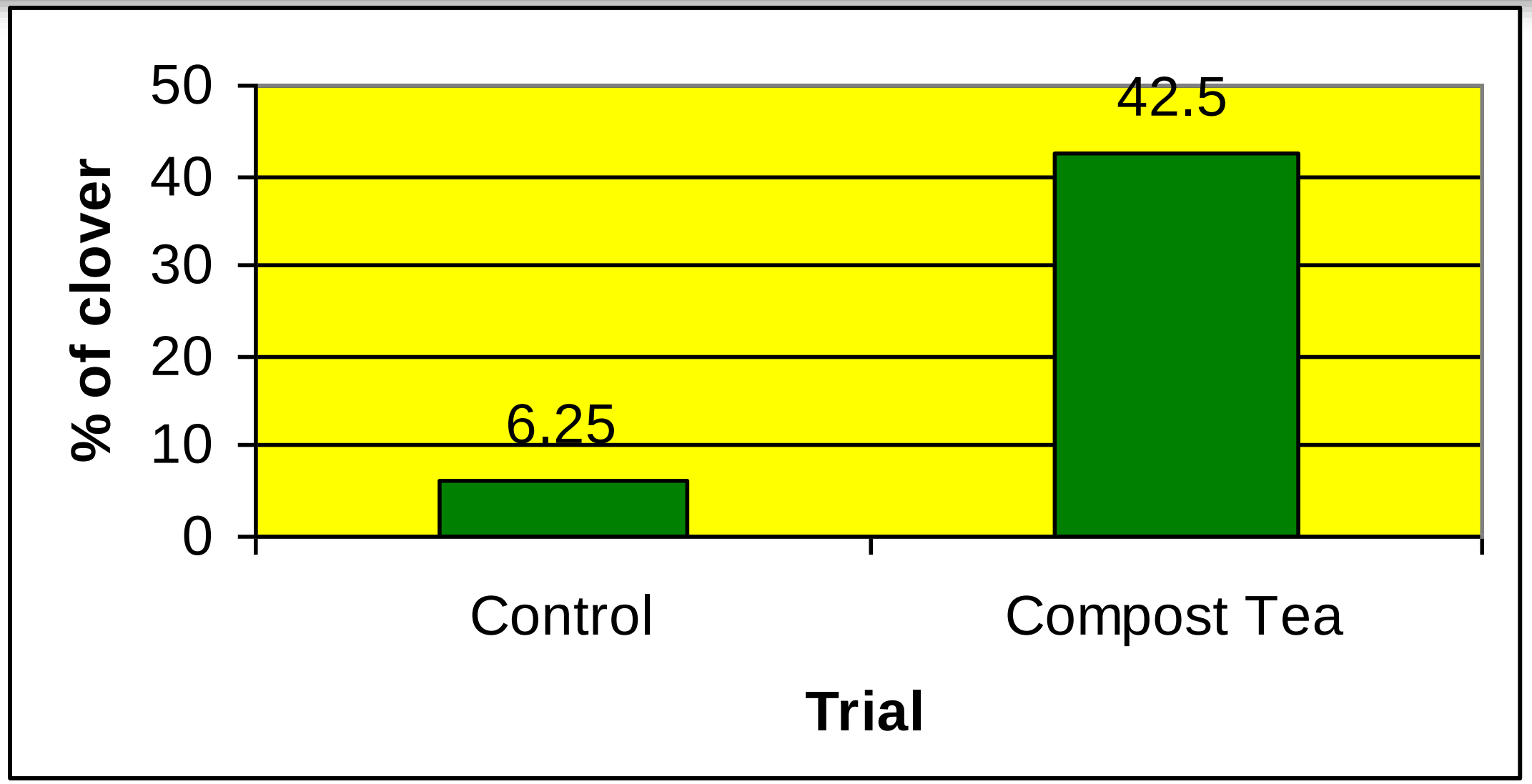
- **Biological Management - BioComplete™ Tea Plot**
  - Three applications of BioComplete™ Tea and foods at 150L/ha applied every 4 weeks starting in October 2003.
  - No fertilizer had been applied to the BioComplete™ Tea trial plot for the 12 months prior or throughout the trial.

- **Standard Management - Control Plot**
  - Conventionally fertilized with urea at an application rate of 75kg/ha every 6-8 weeks (450kg/ha per year).
  - Phosphate Sulphur Magnesium applied at industry maintenance levels.

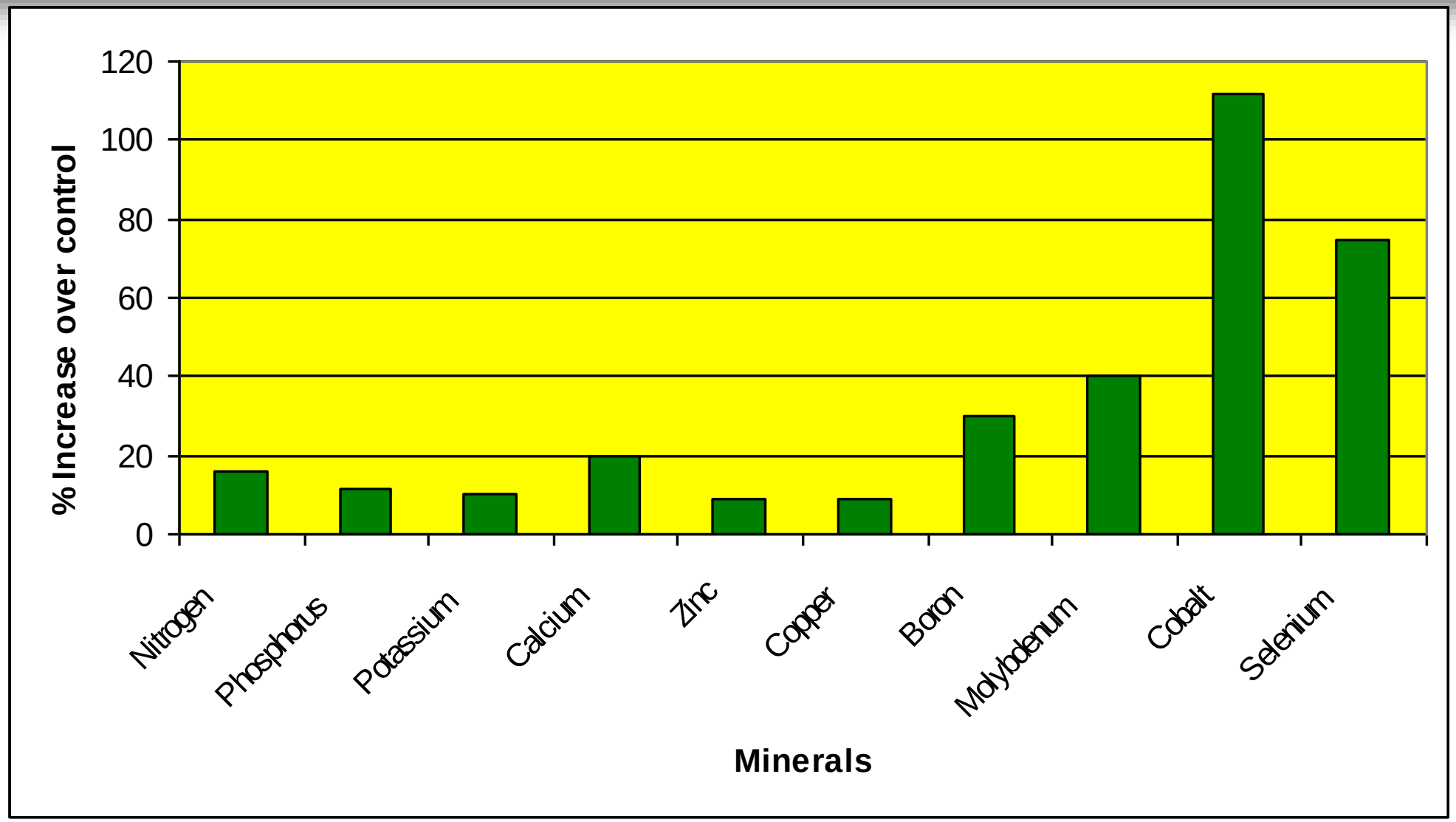
Total Dry Matter Grown



Average Clover % in Pasture Sward



Herbage Mineral Levels



Biological Soil Test Results

Soil Food Web test done 4 weeks after 3rd application - Dec 2003

Biomass Data	Control	BioComplete ™ Compost Tea
Active Bacteria (ug/g)	64.2	30.4
Total Bacteria (ug/g)	348	257
Active Fungi (ug/g)	0.5	144
Total Fungi (ug/g)	113	227
Fungi to Bacteria Ratio	0.32	0.88
Fungi Hyphal Diameter (um)	2.5	3
Protozoa (per gram)		
Flagellates	8395	58730
Amoebae	8395	5873
Ciliates	4046	1767
Mycorrhizal fungi root colonization (%)	0	4

Nematodes

Numbers per gram fresh soil

Type	Control	BioComplete™ Compost Tea	Variance
Bacteria feeders	1.98	4.52	128%
Fungal feeders	0.99	1.58	60%
Fungal / Root feeders	1.09	0.24	-78%
Root feeders	0.99	0.12	- 87%
Predatory Nematodes	0	0	0

Key Results

- 11.78% increase in total dry matter grown over the control.
- $307/ha increased milk income from the extra dry matter grown.
- Big increases in herbage mineral levels, resulting in reduced animal health costs.
- 780% increase in clover content giving the soil access to more free nitrogen.
- Huge reductions in root feeding nematodes, providing a better environment for increased clover growth.

Summary

- The results from the trial show a significant increase in total yield.
- More high quality pasture grown through the summer means more milk at a lower cost.
- The huge increase in clover will mean substantial reductions in fertilizer nitrogen - this is possible because of the increased nitrogen fixing ability of the clover.

Perennial Cover Plants

1. **Short aboveground, no-mow, broadcast seed**

2. **Deep roots**

3. **Feed soil life: maintain activity**

4. **Prevent weeds**

Many Ways to Achieve Success

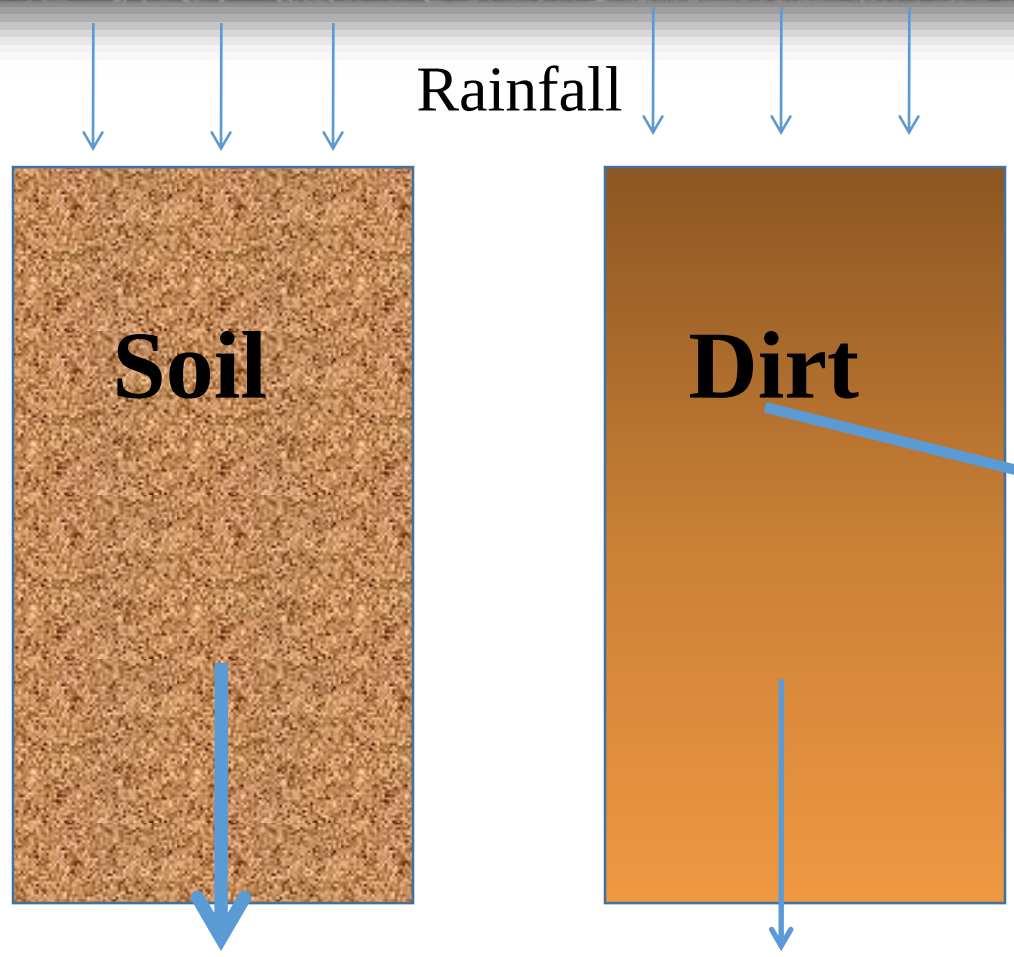
- Assess the life present in the land at the start.

- Compaction?
- Lack of Life?
- Weeds?
- Pests, Diseases, Parasites?
- What is nature trying to tell you?

- What is the best way to add the organisms?
- Did the organisms survive the trip to the soil (Pilgrims at Plymouth Rock)?

Did the Dirt Get Converted to Soil?

- Organisms build structure.
- Nutrients held.
- Water is retained and moves slowly thru the soil.

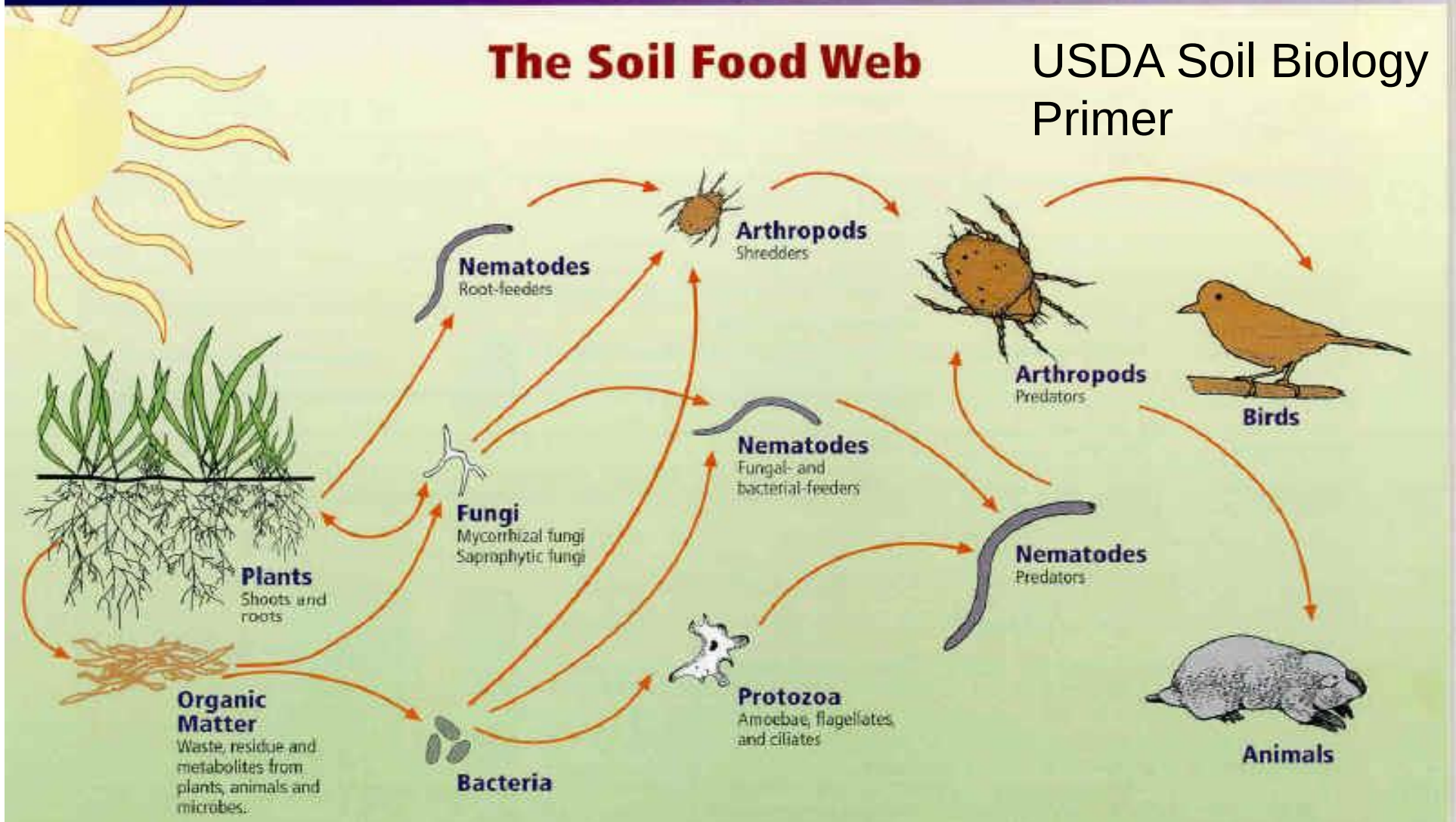


- No organisms, no structure.
- Nutrients move with the water.
- Water not held in soil pores, moves rapidly thru soil.
- Leaching, erosion and run-off are problems.

Water moves clay, silt and inorganic chemicals so no “cleaning” process.

The Soil Food Web

USDA Soil Biology Primer



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