

A MICROBIAL APPROACH TO SOIL MANAGEMENT

#### REFERANCES

- Dr Elaine Ingam Soil Food Web
- Dr Arden Andersen
- Gary Zimmer, Gerry Bernetti USA Biological Farmers
- Graeme Sait NTS Ltd

### NUTRITION IN FRUIT AND VEGETABLES

Overseas research tells us that there is not the nutrition in commercially grown fruit and Vegetables that there was 30 years ago.

# SOME EXAMPLES

Table 1 average changes in the mineral content of some fruits and Vegetables1963- 1992	
MINERAL	AVERAGE % CHANGE
Calcium	-29.82%
Iron	-32%
Magnesium	-21%
Phosphorus	-11%
Potassium	-6.5%

<u>Fruits& Veges tested:</u> Oranges, Apples, Bananas, Carrots, Potatoes, Corn, Tomatoes, Celery, Lettuce, Broccoli, Bollard Beans, Chard

Latest figures available indicate up to 42% loss of nutrition in some cases

### MINERALS AND BODY FUNCTION

CALCIUM Bones and teeth 48% of body mass

- MAGNESIUM Needed for calcification or bone building, Plays a central role in insulin secretion , Low magnesium creates a fatigue syndrome. Aids with reducing cramps and mussel spasms.
- PHOSPHORUS Required for energy, required for kidney function, nerve impulses and heart regularity
- IRON Helps drive your immune system
- POTASSIUM Regulates acid balance in body fluids, Plays an important part in muscle excitability

#### WHY?

- Modern farming practices.
- Economic pressures.
- Supermarket expectations.
- Pesticide use.





# Nutrient Pathways

Biological

- Chemical Or Acid Reaction
- The nutrient combines with water and Hydrogen to enable it to become plant available
- The nutrient is consumed by microbes, usually Bacteria, which in turn die and release the nutrients

### MICROBE FUNCTIONS

- FUNGI
- Primary digesters Organic matter manufacturers
   Saporiphic fungi
- Disease management functions
   Trichoderma
- Calcium and nutrient Storehouses
   Mycorrhiza











### BACTERIA

- Soil mixers secondary digesters
- Convert wastes into nutrients
- Nutrient storehouses
- Create soil structure



#### Viruses

- Kill predatory Bacteria
- Aid in the release of plant available nutrients

### PROTOZOA

- Consume Bacteria
- Release Nitrogen and other nutrients into the soil in plant available form

#### Nematodes

- Not generally found in garden soils
- Good and Bad nematodes
- Consume Fungi and Bacteria to release plant nutrients







### MID GRASSES AND VEGES RATIO FUNGI TO BACTERIA 0.75 MYCORRHIZAL VEGES NON MYCORRHIZAL VEGES Asparagus, Beans, Onions, corn,

Asparagus, Beans, Onions, corn, carrot, parsnip, celery, cucumber peppers, squash, leek, lettuce, peas, potato, tomato, yam

Brassicas like cabbage, caulis, sprouts, kale Radishes Turnips

### Visual Soil Assessment

- SIGHT
- SMELL
- FEEL
- COMPACTION
- MOISTURE
- ORGANIC MATTER





### REPLACING THE MISSING MICROBES

- Composts
- Vermcastes
- Compost Teas ( Microbial inoculums)
- Single species Microbes

### Nature's Cycles

- Carbon Cycle CO2 available from the atmosphere
   Carbon loss through harvesting and decomposition
- Nitrogen Cycle Provides up to 20% of plant's Nitrogen requirements through nitrogen fixing

   Nitrogen loss through volatising as ammonia gas

### Microbe Foods and Beneficial Soil Additives

- Humates Feed fungi, support nutrients, add carbon to the soil, help retain soil moisture
- Fish Hydrolysate Contain oil and protein, feed fungi and bacteria contain micro nutrients, aid in soil structure.
- Seaweeds Contain micronutrients, feed micro organisms especially bacteria
- Molasses Carbohydrate as microbe food
- Fertilisers In moderation. Foliar feeding 60% more efficient than soil application for micronutrients. NPK for soils.

# BIOLOGICAL SOIL and COMPOST ANALYSIS

- Soil Food Web NZ
- 32 Braxholm ST
- Roxburgh.

#### • www.soilfoodweb.co.nz

Download sample submission form and sampling instructions