

Growing Nutrient Dense Food

The nutritional and ecological
resilience approach to food security



Permaculture Design
gives us a process which supports us to
make intelligent decisions towards a
regenerative future



- Ethics
- Principles/Patterns
- Creative Design Process
- Choose Strategies
- and then Techniques



Bill Mollison

- “It’s not good enough to be well intentioned, we must be well informed!!!”



Dr Weston A. Price

- Weston Price came to the conclusion that there is a direct link between nutrition and human health, physical health, mental health and emotional health
- Indigenous people he studied all followed same principles in their diets
- All the groups of indigenous people he studied had incredible health



- Indigenous peoples were getting 10x fat soluble vitamins and 4x minerals in their diets
- For more info see 'Nutrition and Physical Degeneration' by Weston A. Price



- In 1992 at the Earth Summit it was confirmed that soils on a global level had lost 75% of the minerals they had held in relatively recent times
- In the U.S. 85% of the minerals were gone
- We know there is a direct link between mineral levels in the soil and mineral levels in our food and our human health



- According to a 150 page report entitled ‘Diet, Nutrition and Prevention of Chronic Disease’, which can be viewed on line at W.H.O. website
- A majority of people in the ‘developed’ world are suffering from Type B malnutrition. The research revealed a nutritional link to every disease studied.



- The International Journal of Biosocial Research cites numerous examples of single nutrient deficiencies which have contributed to diminished mental capacity, mental emotional disorders, behavioural disorders, eating disorders, drug and alcohol addiction, autism and violence.



Epigenetics

**Environment Determines
Genetic Expression**



- we now understand that the quality and levels of vitamins minerals and fatty acids in our food is what communicates with our 'junk DNA' and that the quality of that communication is what determines the tags placed on our DNA which determines how our DNA expresses and how DNA of future generations expresses



- We also now understand we can change the tags, change the way our DNA expresses by changing the environment
- This is true for both our plants, our food, and ourselves



CoEvolution

- Our food plants co-evolved in very specific soils within a very specific ecosystem
- minerals
- Microbes
- birds
- insects
- plants



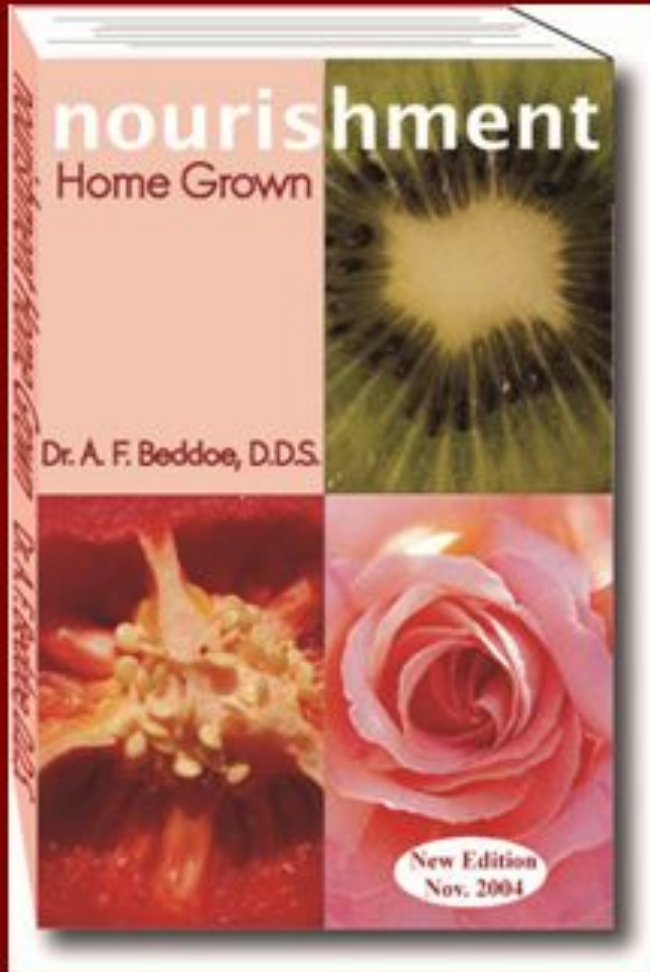
- For our foods plants to grow to their potential and be nutrient dense they need an environment similar to that they co-evolved in
- same for humans



Seeds

- How do seeds affect the nutrient density of our food?
- Hybrid seeds - enzyme blockers
- Heritage seeds potential to fully nourish us
- Seeds of our own ancestors nourish us best... HOW?
WHY?
- Glyphosate..... effects, implications





Nourishment Home Grown

AF Beddoe

- Creation is the putting together of light/energy into matter.
- If we study this we discover how healthy cells can be built in plants, animals or humans and how to supply that healthy cell with the energy needed to sustain it on it's frequency in a best functioning condition.
- Once we know that we can co-operate with nature/creation through laws/patterns that build healthy productive gardens, farms and body temples!



- The fundamental building blocks are the basic atomic elements as described by traditional science in the Periodic Tables.
- These elements combine to form various molecular structures that make up all biologic life.
- These elements all have certain chemical, physical and electromagnetic properties.
- These properties are expressions of energy that are contained within the atoms of these minerals.



- This energy is available and exchangeable in the growth process of plants and animals (and humans!).



- The plant uses 84 different minerals. When any of these are missing or in short supply, or when something interferes with its proper uptake, or combining into organic plant structure, the plant will begin to experience deficiency.
- If the deficiency is prolonged or severe enough, the symptoms will manifest as plant disease or insect problems.

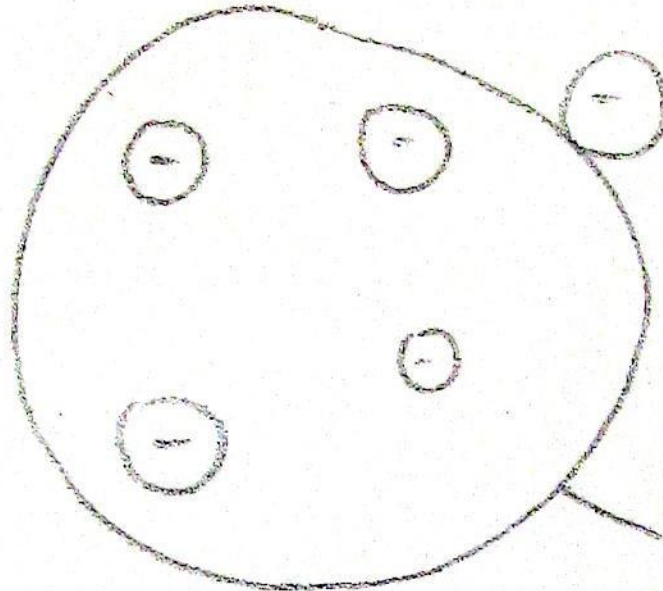


- The true measure of the mineral supply coming from the soil is the sugar content of the juice of those plants.
- This concentration of sugars, vitamins, minerals, amino acids, proteins, hormones, and other solids dissolved within the juice is measured in BRIX (ratio of the mass of dissolved solids to water) and the same method can be used to determine the nutritional density of most foods, and the sap of plants.
- When plants are grown in soil with balanced and high fertility, the BRIX reading of the plant sap and juice of the produce is significantly higher than the same plant grown in less than ideal conditions



Carbon The Moisture Regulator: Humus holding minerals and water

1.



humus particle

The surface of the humus particle is negatively charged.



- Carbon can hold 4 x its weight in water.
- The lower the carbon the less water can be applied at a time.
- Carbon forms the basis of your soil's mineral energy savings account. It holds onto soil nutrients until plant roots can use them both before and after bacteria work on them. Ideal level is 10% soil weight.



Understanding the Principles or 'Laws of Nature'?

My teachers have been and still are:

Ardern Anderson

Dr Carey Reams

A.F. Beddoe (Nourishment Home Grown)

Biological Movement around the world but specifically
USA and NZ and Australia

Graham Sait Nutritech Solutions

Acres USA

Grant Paton Enviromental Fertilisers



Nature Follows the Line of Least Resistance

- The greater the mineral content in the top soil, the less the resistance in that soil and the greater likelihood the current will stay flowing in the soil. The greater the mineral content within a plant, the easier it will be for the plant to have electric current flowing in it.
- It will have better magnetism or attraction for more mineral energy. Therefore the plant will draw in more electromagnetic energy and be a top quality plant in every aspect.



The Importance of Calcium

- Calcium is used by weight and volume more than any other mineral element. The result of all the functions of calcium is the manufacture of amino acids for the making of plant protein and human food.
- Thus the more calcium that is transported into the plant, the greater the plant's ability to attract nutrients out of the air - chiefly carbon dioxide, nitrogen, potassium and magnesium.



7:1

- available calcium and available magnesium need to be in a ratio of 7:1
- Calcium is the most critical mineral, and the one that is most likely to be missing
- Levels not as critical as ratio



Phosphate Controls Sugar Content

- Phosphate, the phosphorous-oxygen complex, is the carrier of the mineral from soil to plant, also the catalyst in the sugar making process, called photosynthesis, that takes place in the leaf of the plant.
- Water and oxygen are brought together in the chloroplast during the heat of the day to make crude sugar. Phosphate is the catalyst for the process. The mineral elements carried in the phosphate, are left behind when sugar is formed. This is why the higher the sugar, the higher the mineral content.



1:1

- Available phosphorus:potash ratio 1:1 garden and pasture 2:1
- Implications of not having phosphate in the soil: Minerals go into plant in nitrate form, low brix, low level carcinogenic
- Phosphorus usually low, or locked up
- Phosphate is like the usher at the wedding,



Getting The Ratios Right!

- The plant uses 84 different minerals. When any of these are missing or in short supply, or when something interferes with it's proper uptake, or combining into organic plant structure, the plant will begin to experience deficiency.(Law of Minimum Justice Von.....)
- If the deficiency is prolonged or severe enough, the symptoms will manifest as plant disease or insect problems.



Energy Release

- Plants live off the energy release from the elements interacting as the elements synchronise in ionic molecular form in the soil. The interaction of the minerals within the soil solution is similar to the reaction seen when putting vinegar and baking soda together.



- Out of these basic understandings (principles, Laws of Nature) we can begin to see patterns in our natural world which can then become the base upon which we build our strategies and techniques.



Crop Health Transitions



Stage 1

- Adequate sunlight, air, water, and the right minerals in the right relationships, creates an efficient photosynthesis process where plants absorb carbon dioxide from air, water from the soil and with energy input from the sun begin producing plant sugars.. Carbs!
- Initially simple sugars, monosaccharides, fructose, glucose and dextrose.



- As this process evolves, more complex sugar, polysaccharides, begin to develop. Cellulose, lignin, pectins, and starches which are structural and storage carbohydrates and they are produced in greater quantities as plants become healthier.
- ‘Pathogens’ alternaria, fusarium and verticillium cease to be a problem at stage 1.



Stage 2

- As photosynthetic energy increases plants begin to transfer greater quantities of sugars to root system and to the microbial community in the rhizosphere.
- This will stimulate them to mineralise and release minerals and trace minerals from the plant matrix in a plant soluble form.



- Plants then utilize these essential minerals as enzyme co-factors which are needed to form complete carbohydrates and especially proteins
- Soluble sugars, monosaccharides, when partnered with nitrogen are base materials used to form amino acids - insect food
- Through the action of enzyme catalysts, these amino acids are bonded together to form peptides, from which complete proteins are formed
- Stage 2 gives plants resistance to larval insects, corn earworm, cabbage loopers and leaf miners



Stage 3

- As photosynthetic energy efficiency increases plants develop a surplus of energy beyond that needed for basic growth and reproduction of which up to 70% is translocated to the root system
- Next the plants begin to store this surplus energy in the form of lipids (plant fats) in both vegetative and reproductive tissue: vegetative omega 3 reproductive omega 6



- Lipids are needed to form the phospho-lipid cell membrane. As lipid levels increase, the membrane becomes stronger and more resilient and more resistant to fungal pathogens, mildew, blight, scab, rust, fire blight and bacterial spot.
- This will not happen without a functional rhizosphere



Stage 4

- Elevated lipid levels are then used to build complex plant protectant compounds, essential oils for protection from climate change, UV radiation, insects and herbivores.
- These compounds are called terpenoides, bio-flavanoids, carotenes, tannins and they contain antifungal and antibacterial properties as well as digestive (enzyme) inhibitors
- Once plants reach stage 4 they become immune to insect attack, beetles etc.
- Based on an article by John Kempf of Advanced Agriculture Middlefield Ohio



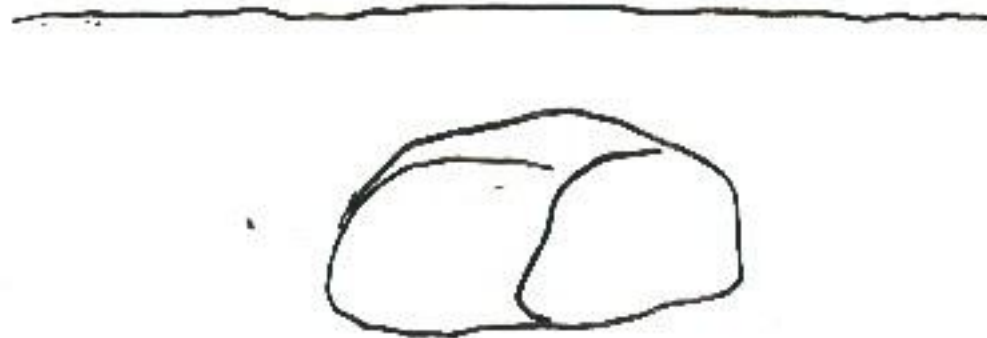
How A Plant Grows

some patterns

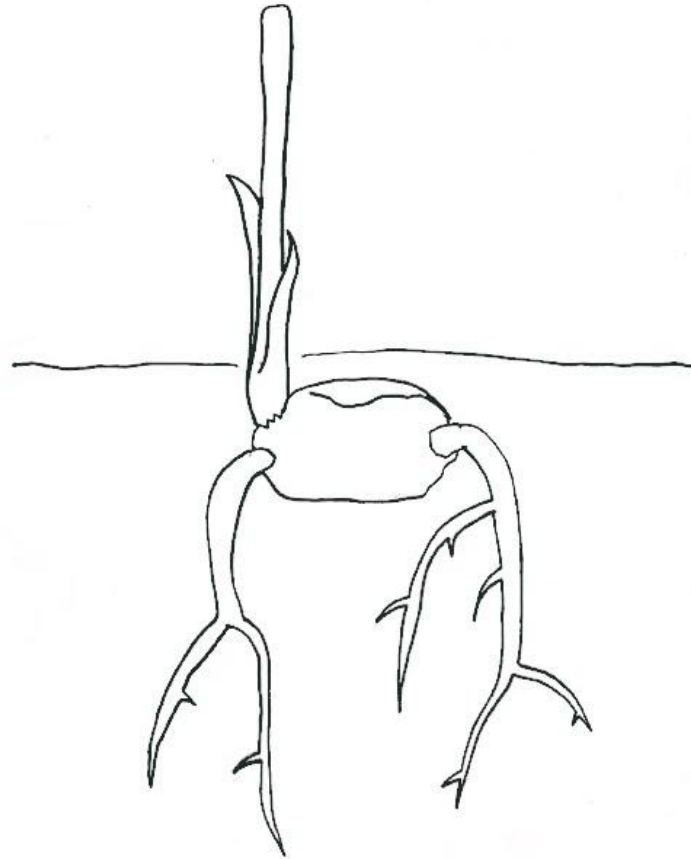
During the life of a plant $\frac{1}{4}$ of the sugars/energy produced goes to root biomass production, $\frac{1}{4}$ to root exudates, $\frac{1}{4}$ to growth of plant structure, $\frac{1}{4}$ to seed production



STAGE 1 : GERMINATION



STAGE 2: SEEDLING



50%

PLANT BIOMASS

15%

ROOT EXUDATES

35%

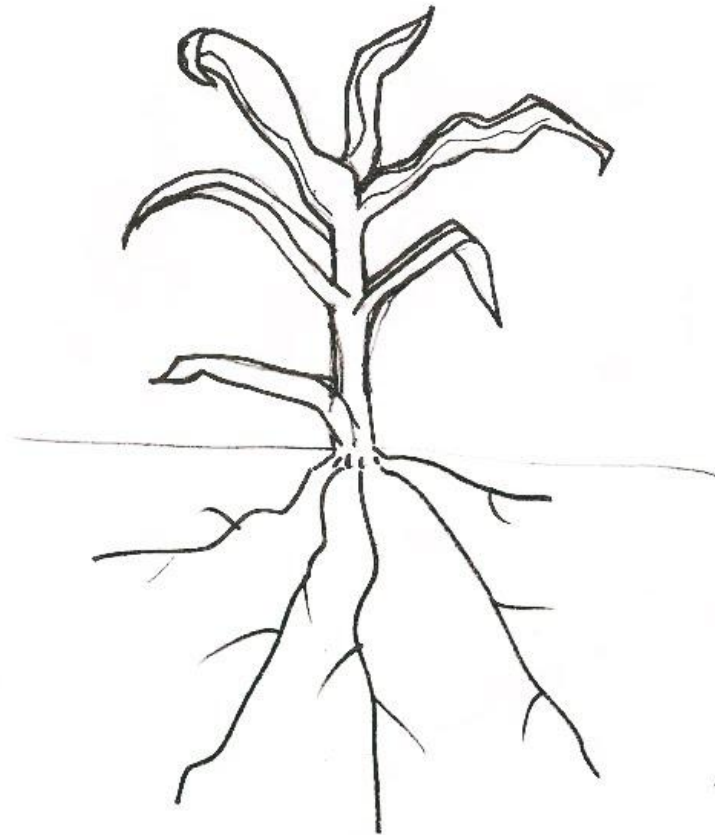
ROOT BIOMASS





STAGE 3: FORMING

⇒ CRITICAL DEVELOPMENT



33%

33%

33%

PLANT BIOMASS ROOT EXUDATE ROOT RINFLASS





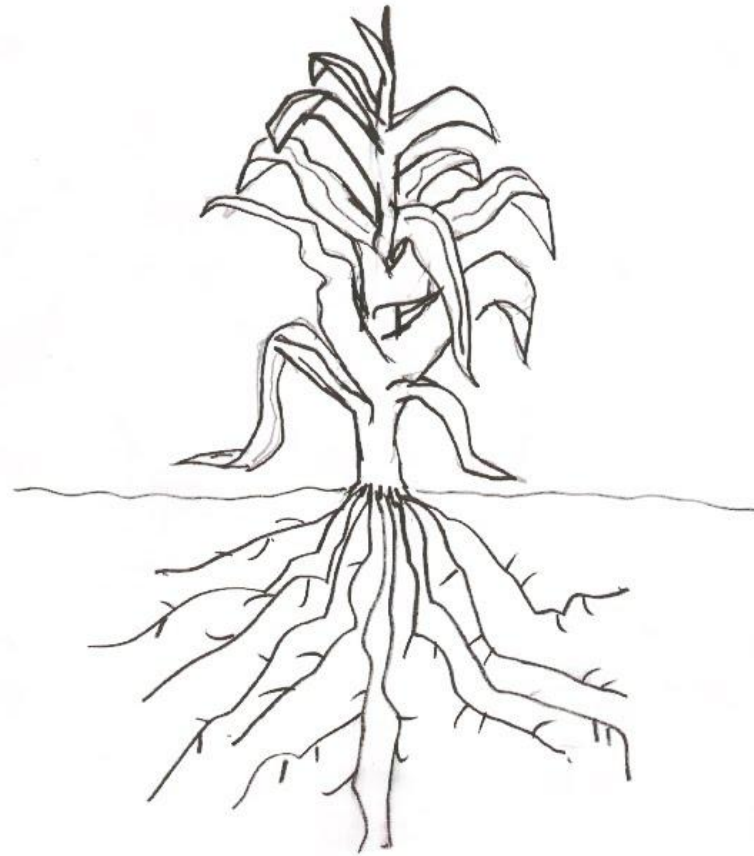
IN CASE OF DEFICIENCY:



25% PLANT BIOMASS
10% ROOT EXUDATES
25% ROOT BIOMASS
10% Fruit



STAGE 4: EXUDATES



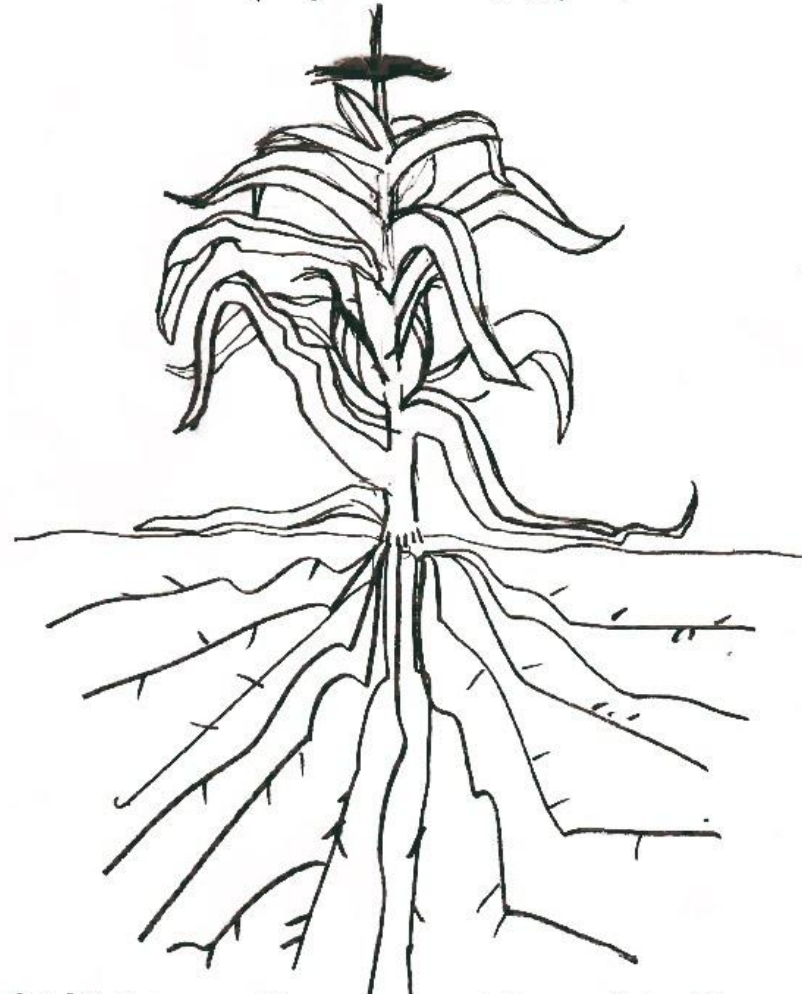
75%
ROOT EXUDATES

12.5%
PLANT BIOMASS

12.5%
ROOT BIOMASS



STAGE 5: POLLINATION



75% ROOT
EXUDATES

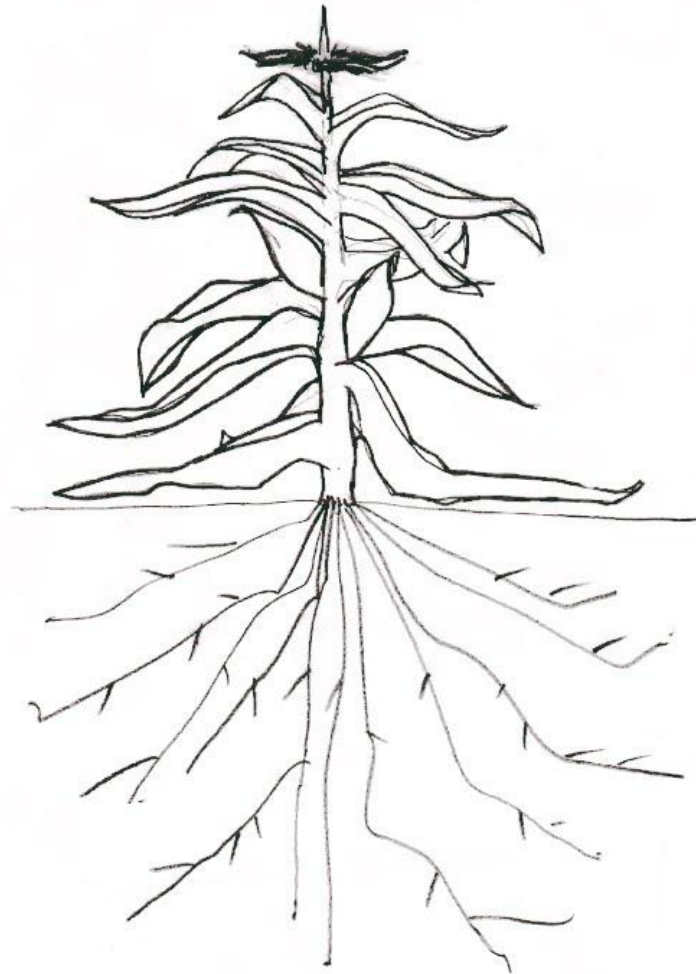
5% PLANT
BIOMASS

10%
FRUIT

10% ROOT
BIOMASS



STAGE 6 = REPRODUCTION



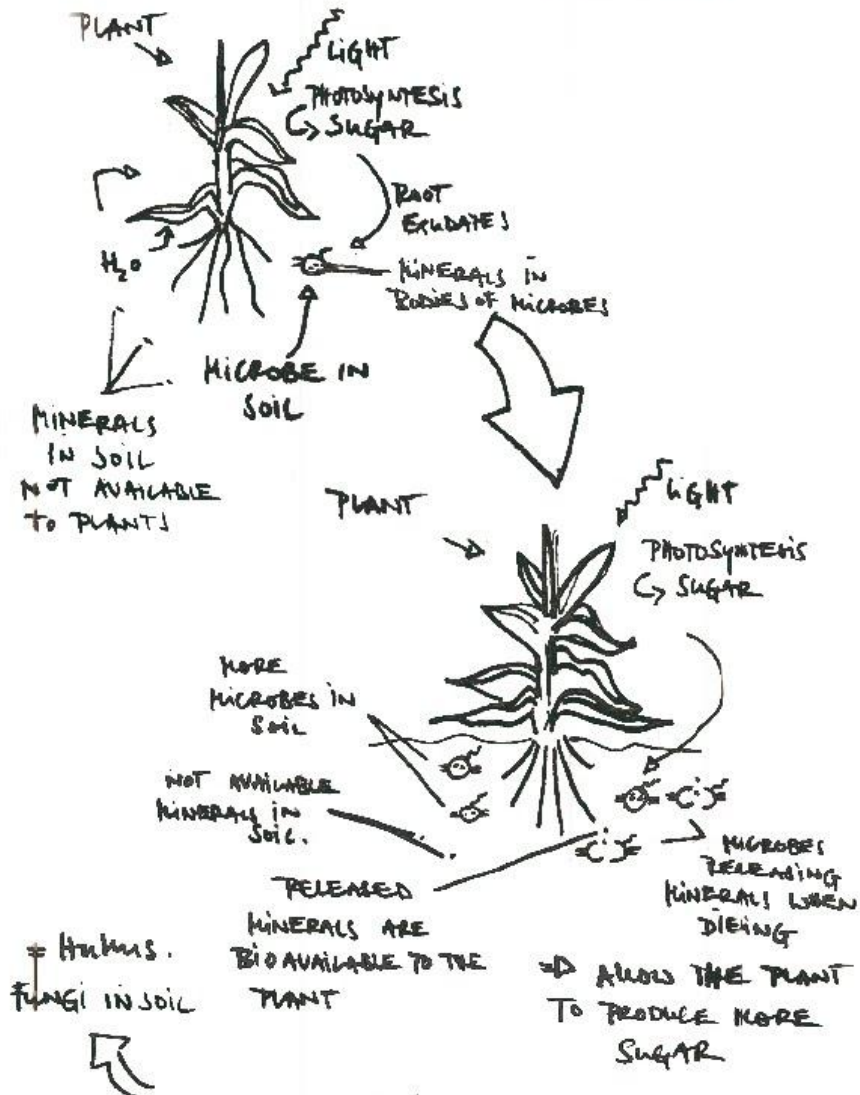
80% Fruit

10% Root
EXUDATES

10% PLANT
DEVELOPMENT



EFFECT OF MICROBES IN SOIL

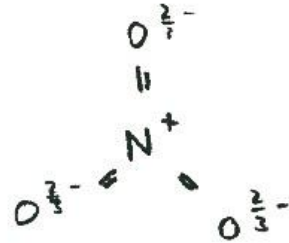


NITROGEN IN SOIL

AMMONIUM NITRATE : NH_4NO_3

-> SOURCE : COW MANURE

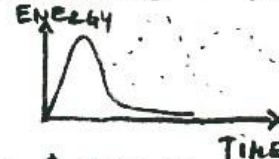
CAN BREAK INTO:



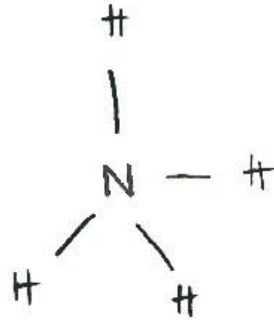
NITRATE NITROGEN = NO_3^-

ANIONIC -> GROWTH

INSTABIL = FAST RELEASE



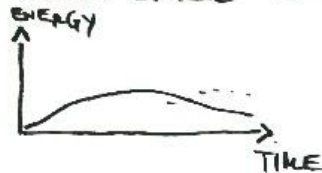
-> ENERGY UPS & DOWNS = GREEN & YELLOW



AMMONIA NITROGEN = NH_4^+

CATIONIC = SEEDING

MORE STABIL = SLOW RELEASE



- So we've learned a few principles, perhaps some of the key ones, we're on the journey...
- Time to enter a design process and use everything we know to create some sensible strategies for our situation based on an understanding of the principles involved and a knowledge of the local patterns involved

