

November Biological Farming Roundtable Notes

What: The Biological Farming Roundtable was held at the NutriSoil Production and Education Facility on Thursday the 26th of November.

Why: The aim of the Biological Farming Roundtable is to use papers/articles written by leading biological thinkers to initiate discussion and to help farmers learn and apply the information on farm.

Who: This Roundtable discussion was based on a quote from Dr Elaine Ingham. Elaine is an American Soil Biologist, she is founder of the Soil Food Web and known as a leader in Soil Microbiology and research of the Soil Foodweb.

Walter Jehne attended this Roundtable via telephone link as a subject matter expert. Walter is a Soil Microbiologist and Soil Ecologist. He is the Co-Founder of Healthy Soils Australia, a former CSIRO scientist and recently presented at the UN Global Soils week in Berlin.

THE QUOTE

Soil Learning Centre

“There is no soil on this planet where a plant is growing that lacks the mineral nutrients to grow plants...”

... this whole concept of we have to be putting out these inorganic fertilizers, we've got to put out rock dust, we've got to put out lime, we've got to put out gypsum is just people trying to sell you a product that you don't need, *because all the minerals that your organisms need are already in the mineral component of your soil.*”

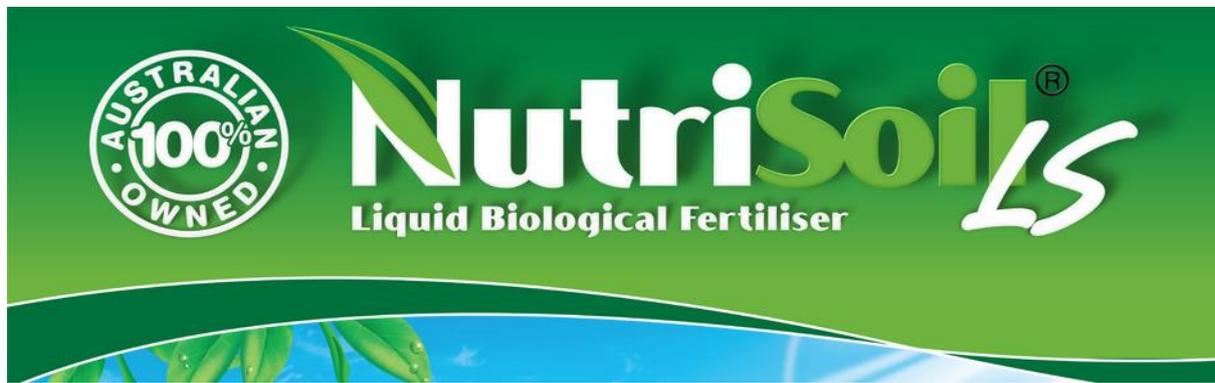
- Dr Elaine Ingham



Mailing Address: PO Box 1610 Wodonga VIC 3689. Street Address: 343 Whytes Road Baranduda VIC 3691.

Phone: (02) 6020 9676 WORM Fax: (02) 6020 9602 Email: enquiries@nutrisoil.com.au

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THE ASSUMPTIONS

The group agreed on some basic assumptions before discussing the quote.

Assumption One: What is Soil?

We know that soil has three functions - Biological/Physical/Chemical

What is Soil made from?

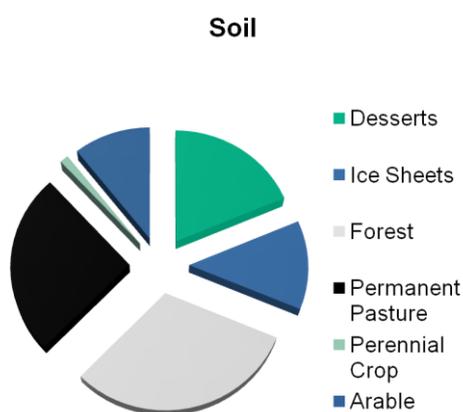
Sand/Silt/Clay/Air/Water/Organic Matter

Assumption Two: Nutrients in soil are finite. They are only able to be recycled.

Discussion of a worms functions: When a worm consumes a mineral such as calcium, the biological processes in their gut solubilise the calcium (make the calcium plant available).

A higher amount of plant available calcium is excreted by the worm. The worm cannot make more calcium.

Assumption Three: We commonly hear that there is only 11% of the world that is capable of sustaining annual crops.



Reasons supporting this statement are:

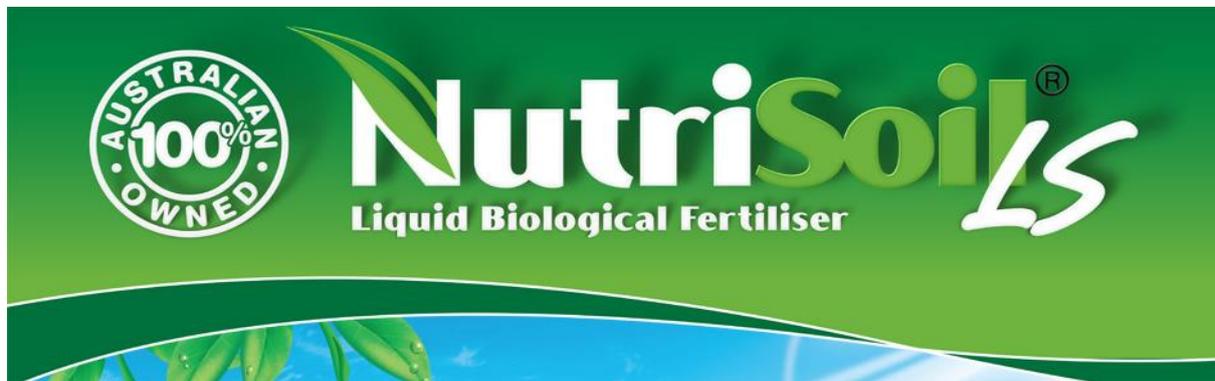
- Deserts are not fertile soils,
- Permanent pasture is often very low in rainfall and susceptible to drought mostly used for feed for livestock like cattle and sheep and
- Forests are too cold or have shallow soil.
- In the world the average size of land that can produce crops per person has decreased from .37 HA to .2HA
- As the human population grows our land is put under more pressure to produce more food per acre.



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This Assumption was challenged by Walter Jehne. Walter believes that this 11% is not necessarily limited. It is how the land is managed. **Walter suggests that if we grow the plants, we can change the soil.** (More discussion on how to grow the plants will follow in this paper.)

Other important considerations were also recognised: TIME / LAND AVAILABILITY / NUTRIENT DENSITY NEEDED IN FOOD / PROFITABILITY.

BREAKING DOWN THE STATEMENT

The group broke down the statement. What is Elaine trying to tell us?

1. Plant is growing – We are referring here to a soil that obviously has some nutrients, it's not a toxic waste dump.
2. The inorganic fertilisers are all put into one bag including rock dust, lime, gypsum. We know we are talking about a non living fertiliser– (inorganic - non-living)/(organic – living).
3. Is the concept of low fertility soil a myth?
4. Minerals that organisms need. Plant/microbe connection.
5. This statement is sitting in isolation without Elaine's full explanations. It would be very dangerous to take this statement to be correct in all situations.

WALTER JEHNE'S RESPONSE

It is valid to say that we can often increase the availability of most nutrients up to 10 fold in most soils by restoring healthy soil structures cation exchange capacities and microbial solubilization and uptake processes.

Conversely we can also degrade these processes by excess cultivation, fertilizer or bio-cides for example and reduce nutrient availabilities up to 10 fold even where we add (and have to add) artificial nutrients.

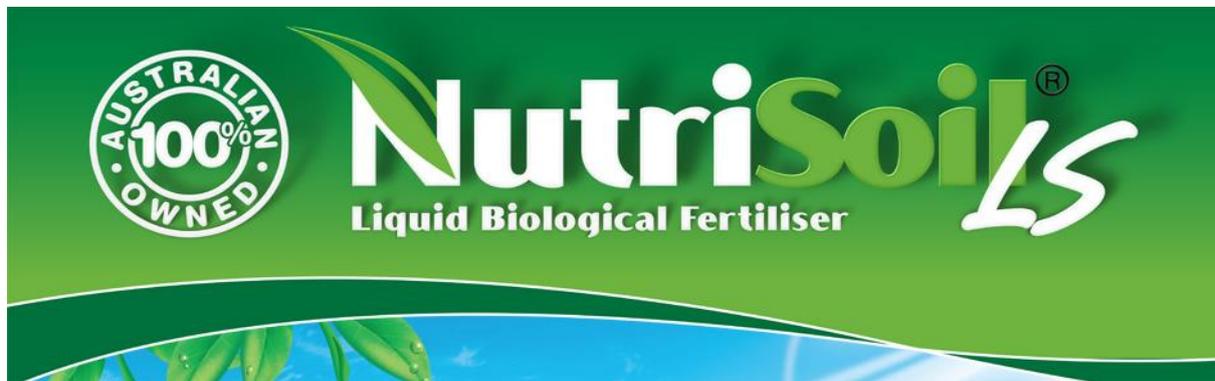
However that does not mean that all plants growing in a soil without fertilizer will have adequate nutrients. Many plants can grow and survive at sub-optimal or even starvation levels of nutrients. This does not make them healthy or the food from them nutritious. Many no/low input organic systems risk growing at such sub-optimal or starvation levels so we cannot claim they are healthy just because they are grown organically without artificial inputs.



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Similarly plants grown with the correct, but not excessive, added nutrients may be more healthy and nutritious even if not deemed organic because of these additions.

So, to be healthy and nutritious, plants have to have the nutrients available to them that they need. By making more of the total pool of soil nutrients more available organically (ie microbially) grown plants can often be more healthy and nutritious even without high nutrient inputs.

However, the total nutrients in a soil are finite and limited and can be deficient thereby preventing or limiting plant growth. Constantly harvesting and exporting plants such via hay production .e.g. modern dairying, can rapidly deplete essential plant nutrients in a soil and limit plant growth. While increasing their microbial availability can help offset these limits in the short term, as we are still mining and extracting these nutrients, we are just degrading them and their fertility faster.

In these cases to support plant growth we need to return such essential limiting nutrients back to the soils, ideally in available forms. This was the case for many of Australia's very old leached soils like the little desert in western VIC where essential trace nutrients such as copper had to be added artificially to enable healthy plant growth. While the correct mined fertilizers will be beneficial, such nutrients can also be supplied via the recycling of organic wastes onto these soils.

In most cases rebuilding natural closed nutrient cycles via herbivores or the return of urban nutrient wastes can avoid such nutrient depletion and progressively enhance the availability of nutrients in and the health of that soil. Bird droppings, dust, fish migrations and seaweed can also often help in recycling essential nutrients from sinks back to source lands.

ERIC LAVIS'S RESPONSE

FARMER, BUNGOWANNAH, NSW

IT depends on the amount of production that the land manager requires to produce to the soil's capacity and relevant moisture available.

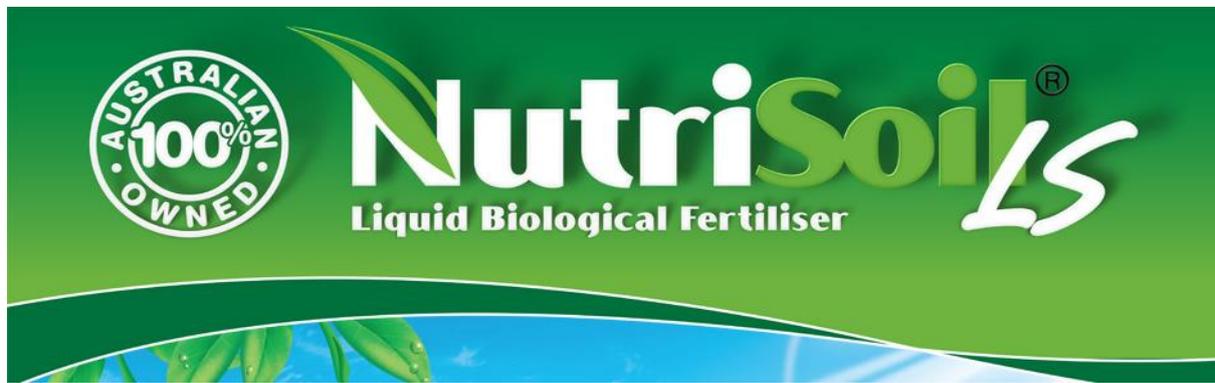
Soils are nutrient unbalanced for OPTIMUM production, according to their geological makeup. Some rocks are higher in some elements than others and resulting soils are unbalanced for the healthiest food production possible. I believe William A Albrecht researched on the BEST Balances for healthy soils and food.



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While in theory, Dr Ingham is correct, and under Organic theory she is correct, this thinking does not take into account the TIME factor needed in agriculture to correct any deficiencies.

In agriculture, TIME is important to correct any deficiencies for the health of the crop/livestock/animals and humans further down the food chain in the shortest time available. If this is not done, then ill health WILL result.

Biological activity is needed to mobilise the elemental to nutritional through the formation of AMINO Acids. If balanced elements are not in the soil, then this cannot happen (see Hugh Lovell's Biological Sequence of plant Nutrition), resulting in unhealthy food production and ultimately disease.

Weed plants grow to correct specific soil nutrient deficiencies (each plant enhances a specific sequence of nutrients), so we, as farmers must learn to understand which weed species requires specific nutrients, as they are trying to enhance those nutrients that are deficient. I believe we can read those deficiencies through the COLOURS of their FLOWERS and NECTAR and learn to

FERTILIZE so as those plants do not NEED to grow, resulting in Healthier, more nutritious food.

We must learn to improve from past experience, not repeat past mistakes.

GROUP DISCUSSION POINTS

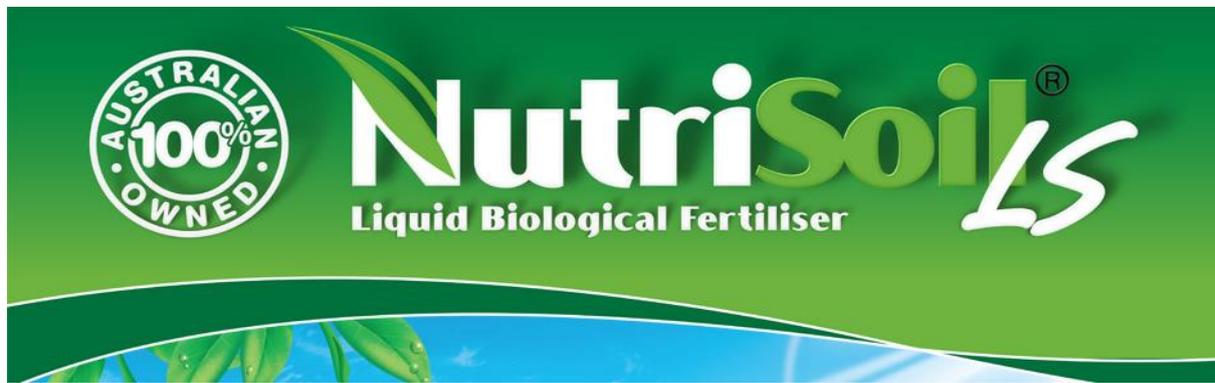
- Time and profitability of a farming system can be a major contributing factor in decision making.
- Is the quote right or wrong? Elaine mostly makes a valid point: re overuse and misuse of inorganic inputs/fertilisers can disrupt the biological functions of the soil.
- Walter Jehne believes 90% of inputs currently being added to soils are causing harm.
- We need to be intelligent about inputs.
- Think of soil minerals and nutrients as a cycling process.
- How can we recycle waste back onto the land?
 - o Mineral licks supplied to animals – microbial digesters
 - o Adding seeds to mineral mixes to sow paddocks
 - o Composts



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- Worm Leachate
- Worm Castings
- Seaweed
- Fish
- Compost Tea
- Dung Beetles
- Decomposed Milk – Walter Jehne suggested the best way for milk to be applied to soils and plants is through an animal consuming it and

Limit of soil tests

- Modern agriculture relies on soil tests, but they don't tell the full story, because they don't tell what is limiting availability.
- For instance 95% P is locked up in soil. You need to understand the processes that are causing this to address the problem.
- Another challenge is understanding the different types of soil tests Eg: The difference between a Colwell P test and an Olsen P test is the amount of time the soil is shaken. A Colwell P test is shaken for 16 hours, the cheaper Olsen P test is shaken for ½ an hour. A Colwell test will show more phosphorous in a given sample than an Olsen test.
- If you wanted a soil test that would be able to tell you ALL the minerals you have in your soil accurately, you could not afford it!

Enhance nutrients availability first! How?

- Letting the biology do their job - they make nutrient available (see list below)
- Changing the Ca/Mg balance can change productivity
- Water, aeration and food source for biology to make nutrient available

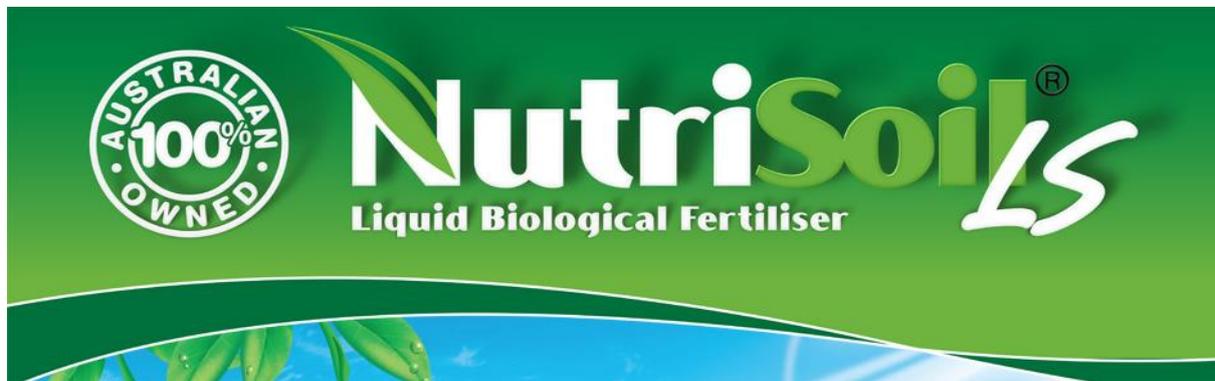
Biological farming is about practices that focus on building and protecting the life in the soil. A biologically active soil, is a healthy soil and is capable of driving the necessary chemical processes to feed the plant.



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Practices that protect and encourage biology/life in the soil?

- Reduced tillage
- Reduced chemical use
- As much green plants as seasonally possible
- Dry litter maintained over summer
- Smart grazing practices – mob grazing, rotational grazing
- Enhanced natural ecosystems – flowering plants, wetlands, shrubs etc
- Reduced monocultures
- Cover crops – can be sometimes just what we call weeds
- Plant selection helps put nutrients back into the system – e.g. legumes and clovers can fix Nitrogen from the air.

In further discussion:

Remember to keep records including taking before and after photos when making changes in paddocks.

Transmutation: Biological transmutation is referring to transmuting elements with enormous energy, like nuclear energy, for changes to occur within living organisms. For more information see - Kervran's Proof of Biological Transmutation.

Energy towers effect water structure through light. For more information see – UTube clip 'Barrie Trower'.



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