

## October Biological Farming Roundtable Notes

**What:** The Biological Farming Roundtable was held at the NutriSoil Production and Education Facility on Thursday the 29th of October.

**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 the article: "Gradual incorporation of biological principles paying dividends for mixed farming business". Australian Farm Journal, July 2010.

### THE FARM

Mixed Farm in Wyalkatchem, WA. 327 mm annual rainfall. 160 to 170 millimetres in crop annual rainfall. Cereal crops and Merino sheep. Struggling to maximise crop production in dry years.

### END IN MIND

Di and Ian Haggerty's aim is to make a system where soil microbes increase the nutrient and moisture holding capacity of the soil and reduce pest and disease problems.

### THE HOW

#### Summer Weeds left to Grow in Between Crop Rotations.

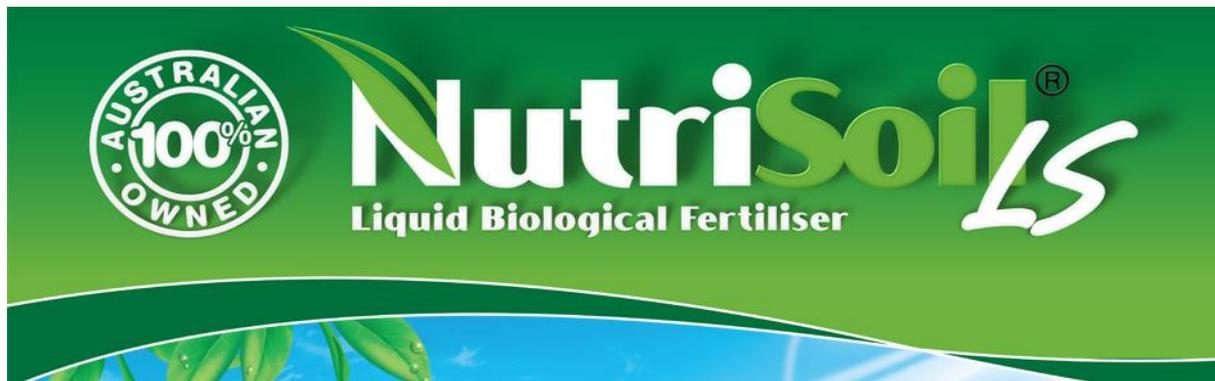
Ian chooses this system as opposed to sowing a cover crop because he believes high plant biomass is more important than species. Better pasture species will become more prevalent naturally as soil conditions improve.



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“We are told to kill the weeds, like wild radish, with a chemical and then they tell us to plant another radish species as a cover crop. Taking into consideration the cost, it’s not affordable to sow cover crops in our system. We prefer to support the plant that chooses to grow there.”

Di Haggerty, 2015.

“We are killing the plants that want to grow and growing the plants that don’t want to grow.” Colin Seis, 2015.

### Benefits of Keeping Summer Weeds as Opposed to Soil in Fallow

The benefits from the presence of living plants year round reduces erosion, buffers soil temperatures, enhances water infiltration and improves habitat for microbes to live.

Higher densities of mycorrhizal hyphae are found in healthy perennial grasslands than any other plant community. (Christine Jones, 2009). These fungal hyphae’s are the plants main access to phosphorous.

Summer weeds produce food and provide shelter for the microbes between crop rotations. Weeds photosynthesise, pumping sugar (plant exudates) into the soil to feed the microbes. Microbes increase and diversify as more sugars are fed (returning nutrients to the plant to continue its growth) – **Microbes are the key to building humus in the soil and solubilising nutrients for plant uptake for following crops – BUT green plants are the key to having an abundance of microbes.**

The microbes create glues that hold soil aggregates together. If the land was left in fallow over summer, common practice in the conventional system, the soil is easily swept away by the wind (top soil lost/erosion).

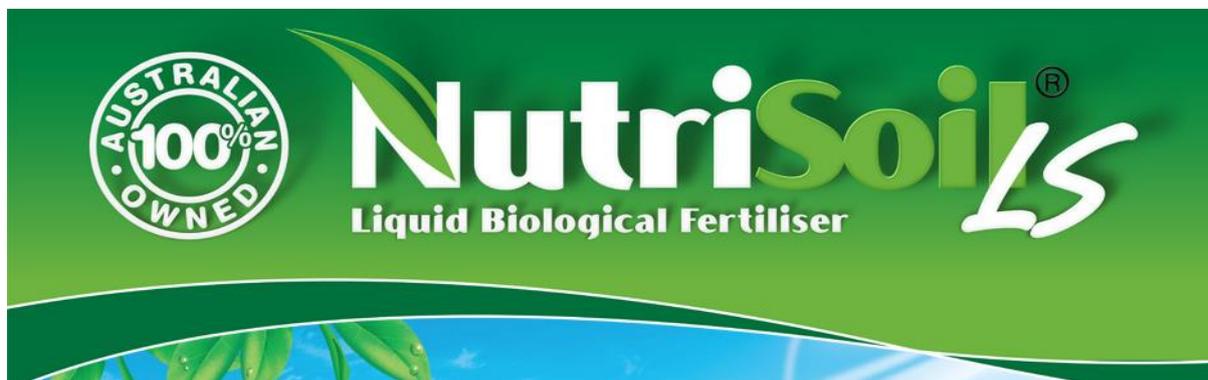
Sheep graze on the weeds adding nutrients to the soil and food for the microbes through their manure.



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### Reduction in Need to use Mineral Fertilisers.

After a number of years the Haggerty's reached a point where they **didn't use any mineral fertilisers** on their crop. The use of NutriSoil and Compost Tea built a high microbial community in the soil that is making nutrient available to the plant in the ratios that the plant requires.

Haggerty's play with the rates and make gentle changes that don't shock the soil, or the bank account. NutriSoil is used in transition paddocks with other conventional fertilisers, gradually the conventional fertilisers are reduced. NutriSoil, a Compost Tea extract and a small amount of Black Urea (which is Urea coated in Carbon) is often used in fully transitioned paddocks.

### Herbicides Used

The Haggerty's use **herbicides** to control weeds that compromise the crop yield, over time the use of biological agents alters the types of weeds and the herbicides offer more effective control of the tough to kill weeds.

Healthy biological soils are able to manage small amounts of chemical usage. Haggerty's have results that prove the herbicides they have used in their system have **no residue in the grain harvested.**

### THE RESULT

Having good soil biology, good ground cover and increased soil carbon means they are now holding onto moisture that would have been previously lost.

When the soil microbes are functioning well, mineral problems resolve themselves, simply supplying minerals is not enough – and soil samples taken over their transition has proven this. Many nutrients, like calcium, are now highly available without the need to apply lime.

Lower levels of chemical are now effective.

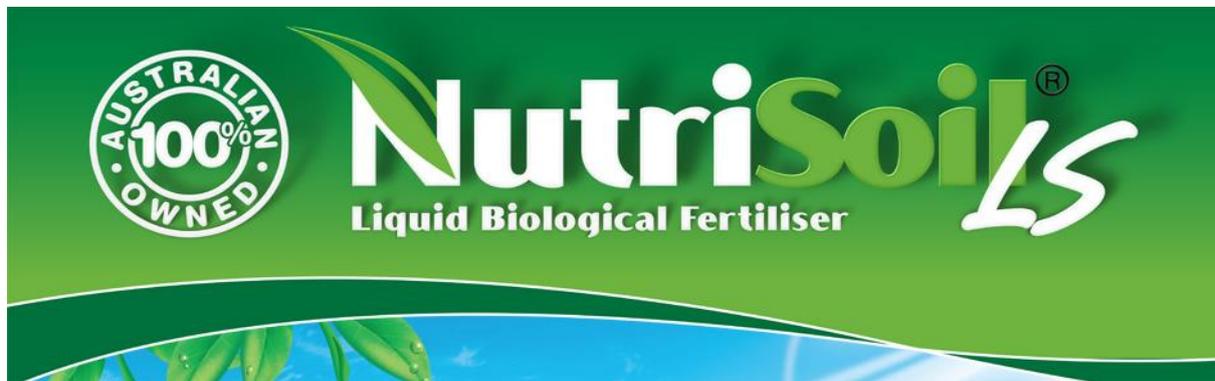
Carbon has increased by 35% in 7 years 2003 to 2010.



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Flocks of sheep have developed a microbial balance in their gut and no longer need drenching for parasites, mulesing or grain supplement.

### REFLECTIONS

It's important to transition from one system to another. When Ian and Di Haggerty develop a new property, they marry the conventional and the biological systems together, then over time transition to the biological system.

Introducing a biological component to the system can vastly improve the performance of mineral fertilisers. The fulvic acids in a worm liquid makes nutrients more absorbable into the plant.

### DISCUSSIONS

**Discussion Point:** Crops grown in a biological system tend to grow slower. Conventional crops can have faster growth with more tillers (leaf or lateral branches). The tillers are *seen* to have better opportunity to photosynthesise and provide a canopy for the bare soil in the early stages of tillering.

#### Group Discussion:

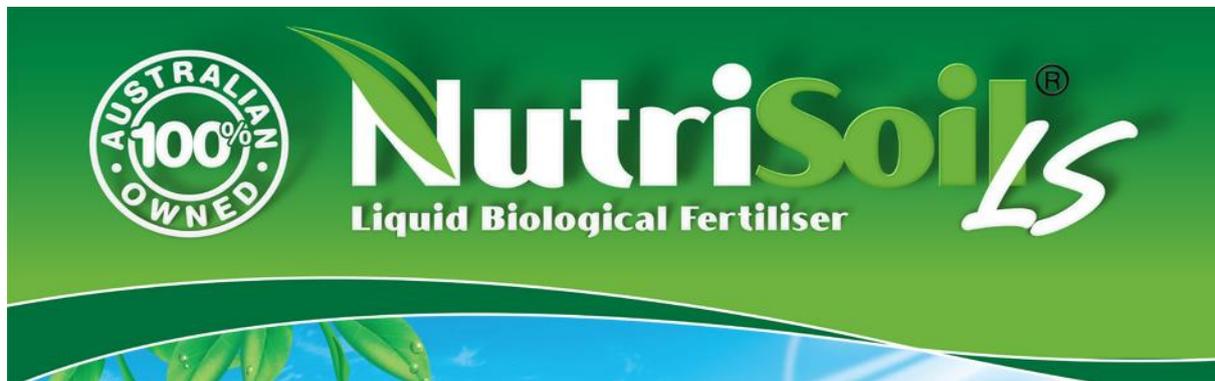
- A biological grown crop will grow a large root system to establish the plant's food and water source before emerging out of the ground. This root establishment will enable the plant to deal better with stress such as drought and frost.
- A conventionally grown crop will access nutrient from the applied fertiliser, spending less time establishing its root system. Shallow root systems leave plants exposed to drought, frost and disease.
- Biologically grown plants tend to grow wider tillers throughout the lifecycle of the plant as opposed to a conventionally grown plant which will tend to grow higher. (Maarten Stapper, 2015)



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- Plants colonised by the microbe mycorrhizae exhibit higher leaf chlorophyll contents and higher rates of photosynthesis than non-colonised plants. This enables them to fix greater quantities of carbon for transfer to fungal hyphae in the soil. (Christine Jones, 2009)
- Research has proven that NutriSoil increases Mycorrhizal Fungi by up to 70% and fertilisers (MAP, DAP and Urea + Superphosphate) destroys the establishment of Mycorrhizal Fungi. Research has also proven that seeds that have established a relationship with Mychorizal Fungi can take up phosphorous from Super Phosphate Fertilisers.
- Research has proven that the addition of a worm leachate increases the chlorophyll content of a plant, making the plant photosynthesise more efficiently.
- The biological plant is leaving the soil more exposed/without a canopy. Solutions discussed to decrease the exposure of soil for a biologically grown plant were:
  - plant the rows closer together
  - broadcast seed once precision planting has been carried out (this also helps with weed suppression)
  - pasture cropping
  - planting perennial clovers which consistently emerge after sowing
  - It was also agreed that the benefits of the root establishment far outweigh the negatives of the soil being exposed in this situation.

#### Discussion Point

Supplying minerals is not enough for maximum plant growth efficiency.

#### Group Discussion:

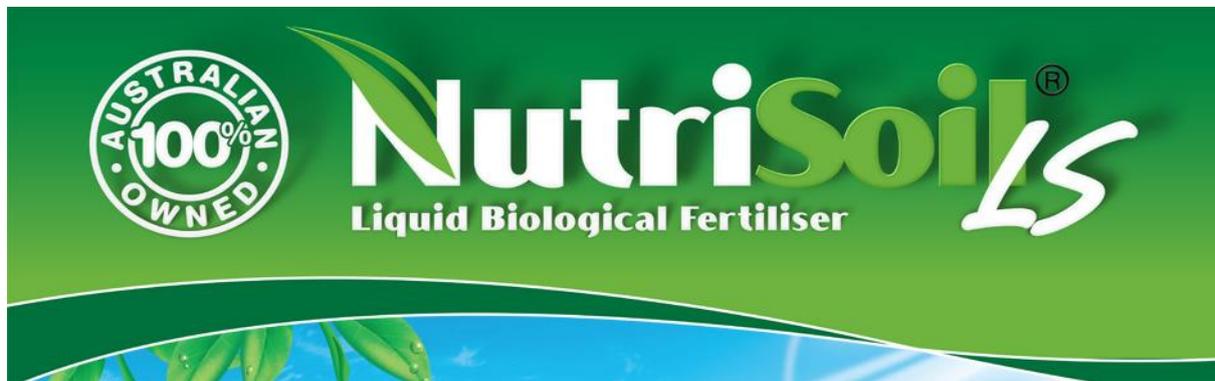
- Feeding the biology in the soil will assist with solubilising added minerals, making them plant available.



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- Worm leachate contains plant growth regulators including fulvic and humic acids. Fulvic acids can make minerals more available to plants, resulting in lower application amounts required.

#### **Discussion Point**

Soil Microbes increase water holding capacity and reduce pest and disease problems.

#### **Group Discussion:**

- Soils that have low organic matter often form a cap where water is unable to infiltrate. This is called non wetting soils.
- In association with plants, microbes create humus. Increased organic matter/humus increases water infiltration per hour.
- For every 1% in organic matter you can hold an additional 75 000 litres of water.
- Plants grown with VermiCast have been proven to demand less water for irrigation. VermiCast sucks up water and holds onto it for the plant to use as it needs.

#### **Discussion Point**

#### **Beyond Organic**

Biological Farming has been recently termed “beyond organic”. In current times achieving an organic status is possible by removing chemicals from the system. This practice alone does not restore soil fertility and can still result in low levels of nutrition in food.

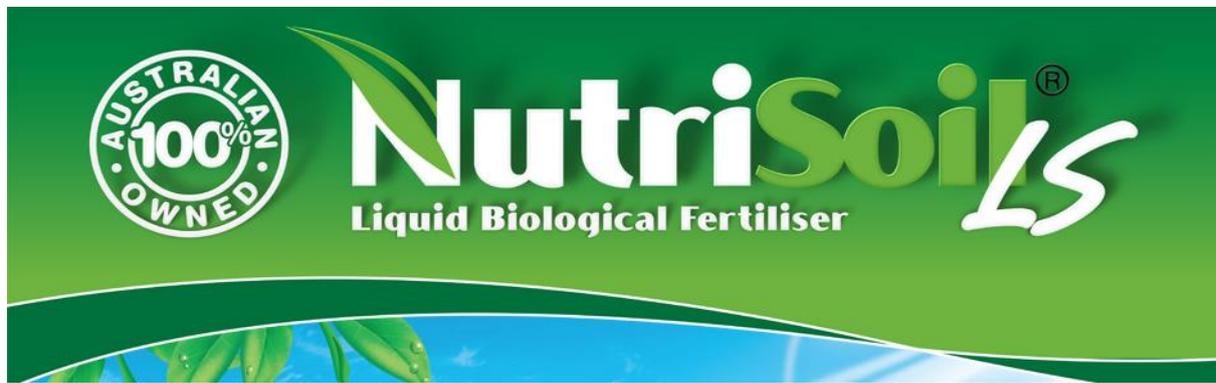
Biological farming is focused on regenerating soil fertility through feeding the biological system in the soil. In this system, there is a large scope of opportunity to build soil fertility while also creating a soil that can biodegrade small amounts of chemical usage to ensure nutritional integrity in food is maintained.



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#### LEADERSHIP IN AGRICULTURE

The article discussed in this paper was written in 2010. In October 2015 Ian and Di Haggerty, along with Scott McClean, launched a website [www.biogrowers.com.au](http://www.biogrowers.com.au). This website promotes a market for Biological producers to be recognised for the quality, nutrient rich food they produce.

Traditionally, if biological growers were not organic, there was very little opportunity to sell their produce in bulk at a premium price. Bio-Integrity Growers Australia promotes – “Your food, your world, in our good hands.” Take a look at this website, they are looking for more farmers to get on board!



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