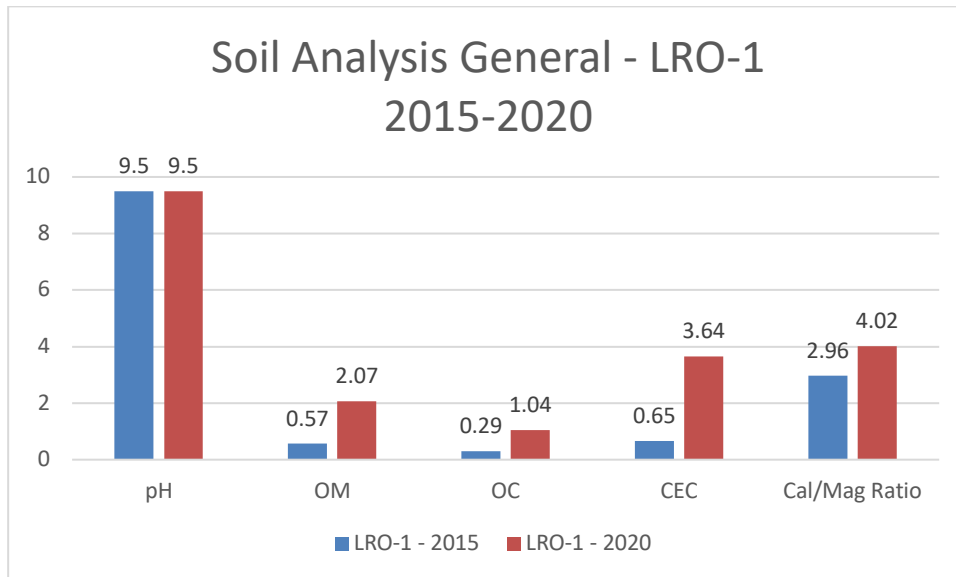


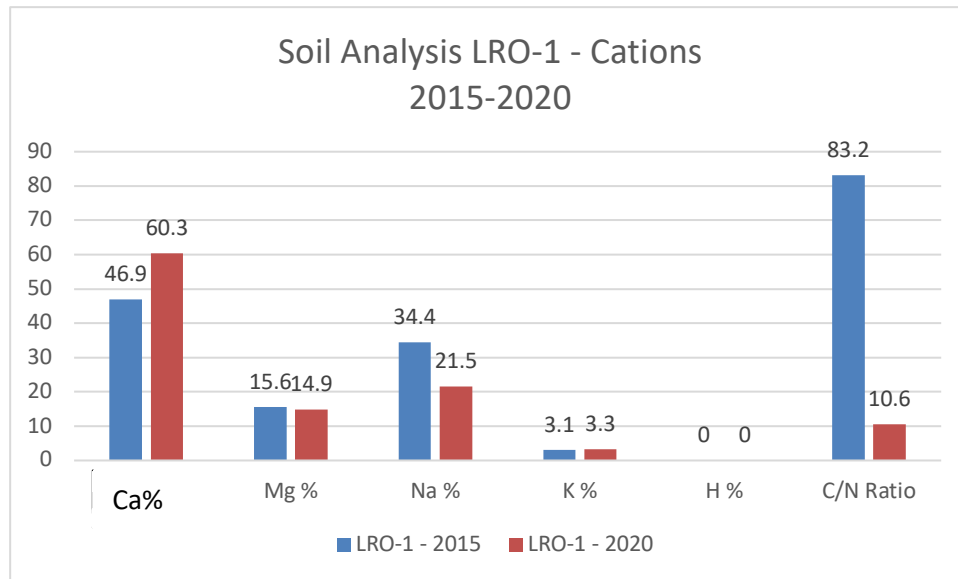
LONGRIDGE OLIVES SOIL REPORT 2015-2020

SOIL COMPARISONS LRO-1



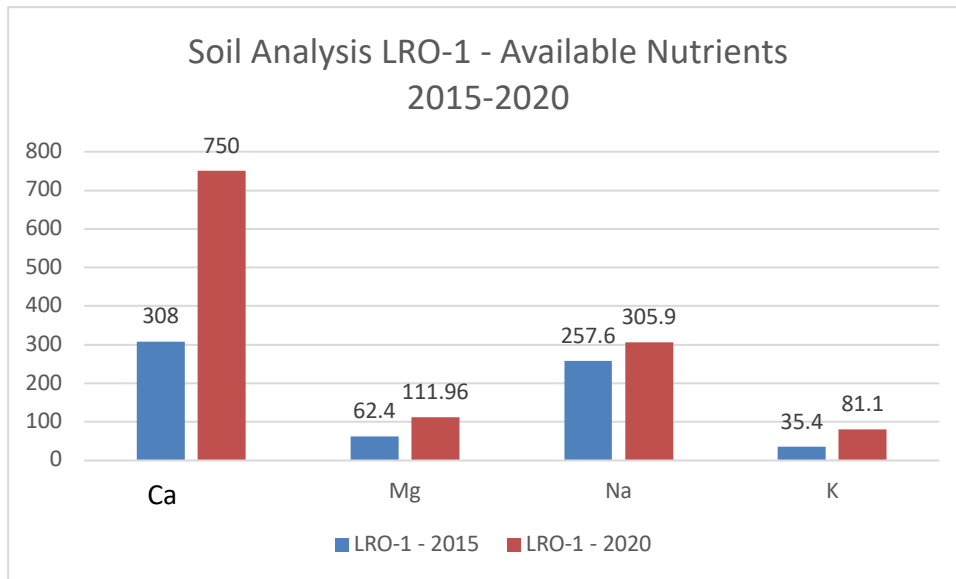
- pH is exactly the same and is far too high. BioBoost Enhance will stimulate the bacteria directly and the potassium in the BioBoost Enhance will directly stimulate the energy conversion in the bacteria (ATP and ADP molecules). This will assist the bacteria to function in the current high pH at a greater level and over the coming years, we should see the pH along with available sodium reducing.
- Organic matter has increased by 263% and organic carbon has increased by 258%
- CEC has increased by 460%
- Cal/Mag ratio should be between 2-4 but it is important to reference this against the cation balance of each nutrient

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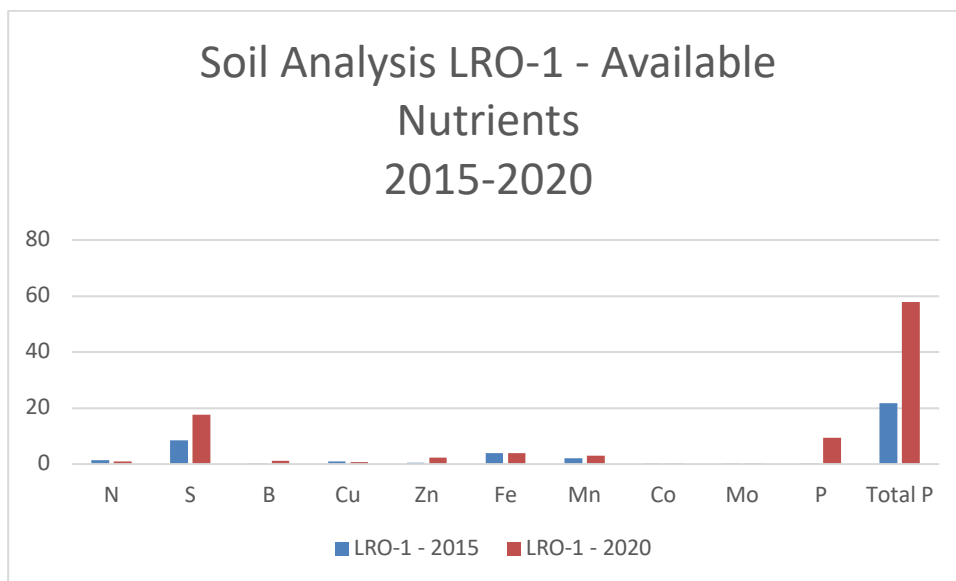


- Calcium is closer to the desired percentage of 65%
- Magnesium is within the desired percentage of 15%
- The soil is extremely sodic. Sodic soil is soil with an exchangeable sodium percentage of 6% or greater of the exchange capacity. Although levels have decreased by 60%, the sodium levels are extremely high and need addressing. (see recommendations page)
- Carbon/Nitrogen ration is important for biological growth. To acquire the **carbon** and **nitrogen** a **soil** microorganism needs to stay alive (body maintenance + energy) it needs a diet with a **C:N ratio** near 24:1, with 16 parts of **carbon** used for energy and eight parts for maintenance
- The average soil c/n ratio should be between 10-15 as this strikes a good balance of the tree's requirements and the microbial requirements
- When the carbon/nitrogen ratio is too high as it was previously, decomposition of plant materials ceases and organic matter production stops. This was evident at an organic matter content of 0.1%. There is improvement in the organic matter levels and the c/n ratio has reduced significantly

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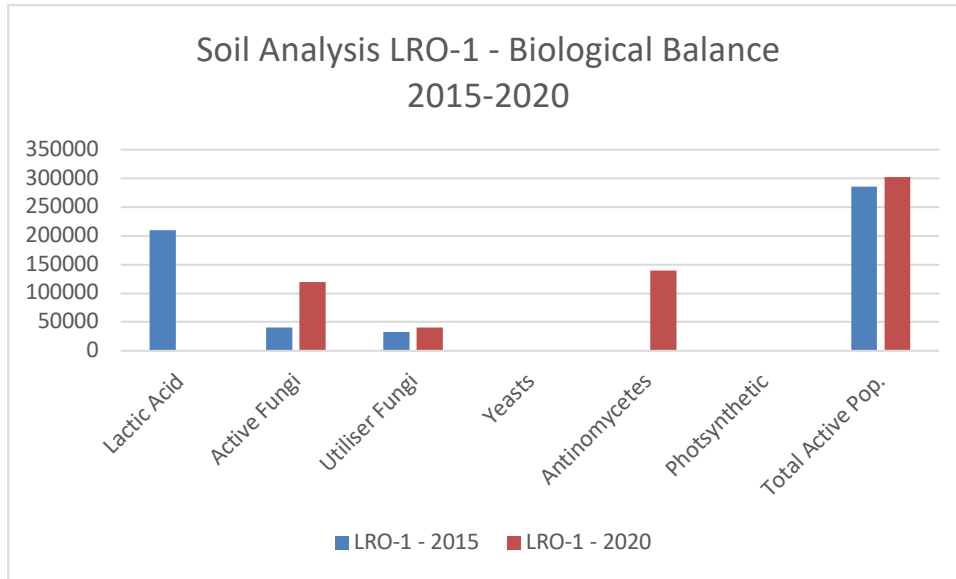


- Calcium availability has increased by 143%
- Magnesium availability has increased by 79%
- Potassium has increased by 129%
- It is clear that the Bactivate Program is improving the soil structure, the organic matter and carbon content, the cation balance, the nutrient availability and the biological balance



- Available phosphorous has increased by 9360%
- Total phosphorous has increased by 166%. This is directly related to the soils CEC (the cation exchange capacity) as this is the soils ability to hold on to nutrients for the bacteria and fungi to convert.
- Available sodium has increased over the period by 18%. This could be due to the unlocking of nutrients by the bacteria but over the next few years, this number should start to decrease as the sulphur cations continue to fall

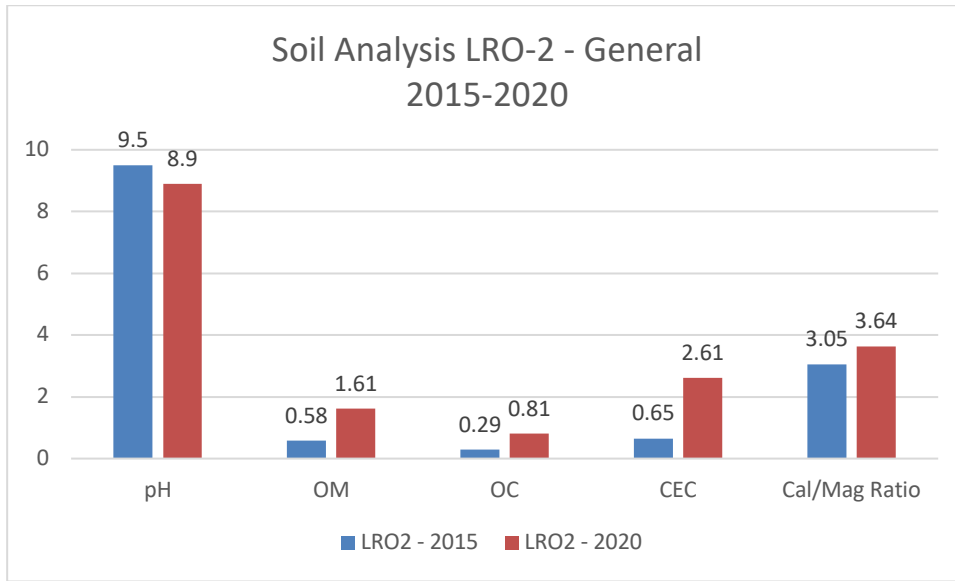
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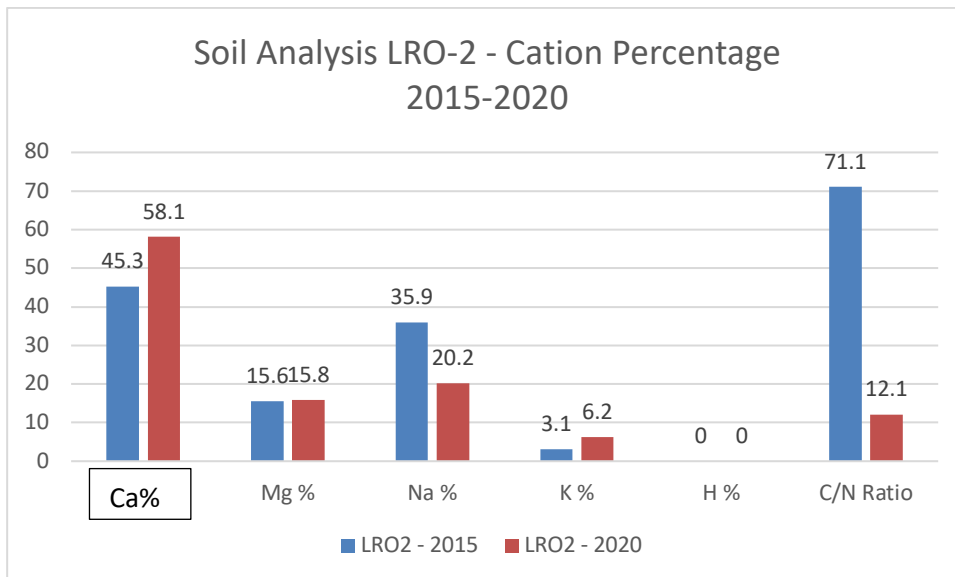
- Lactic Acid bacteria proliferate in anaerobic soil and are also present when there is pathogen activity in the soil. The reduction of Lactic Acid Bacteria along with the increase in active and utiliser fungi shows the change in the biological content of the soil.
- Antinomycetes are converters in the soil and can break down hard to decompose compounds. These species are found in higher levels in higher pH soils. These bacteria will be breaking down the organic matter in the soil. These bacteria can also show up in the test SWEP provide as the Bacillus bacteria that you have been applying.
- The soil is still in need of repair and with the pH at the levels they are at, the bacteria added from Bactivate won't be functioning at their full capacity. This will be addressed with BioBoost Enhance as this carbon source will directly stimulate the bacteria to grow and multiply and improve their rate of function.

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SOIL COMPARISONS LRO-2

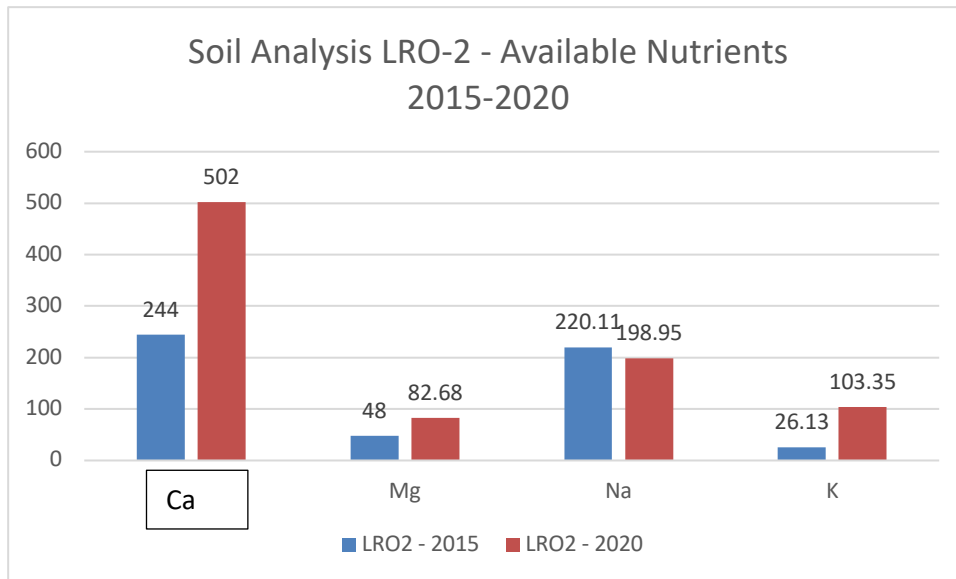


- pH has reduced by 0.6
- Organic matter has increased by 177%
- CEC has increased by 301%
- Cal/Mag ration is in a much better shape as the calcium cations have increased closer to the desired level in the soil while magnesium has stayed at the correct levels

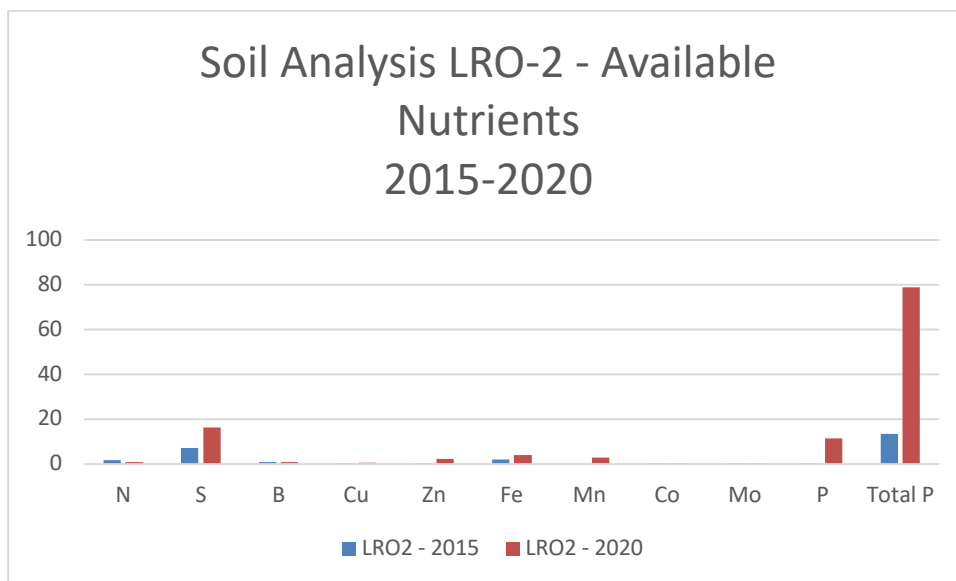


- Calcium cations have increased to closer to the desired levels
- Sodium cations have reduced by 78%. This is critical to continue to reduce the sodium cations in the soil
- Potassium cations have increased closer to the desired levels
- Carbon/Nitrogen ratio has reduced back to desired levels and will stimulate decomposition

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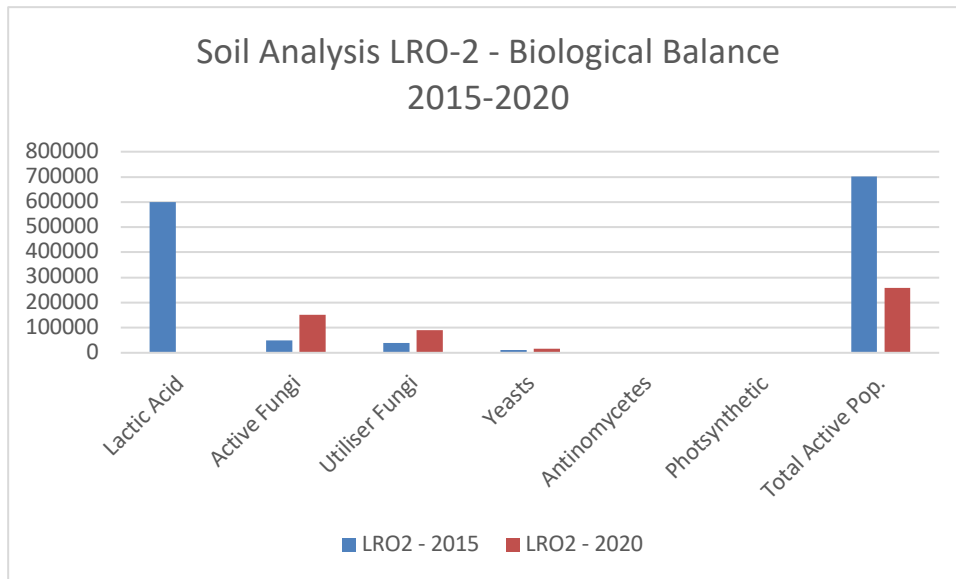


- Calcium availability has increased by 105%
- Available magnesium has increased by 72%
- Available sodium has decreased by 9.6% although this number needs to reduce to less than 70 ppm. BioBoost Enhance will stimulate the bacteria further to continue to bring this number back down



- Of biggest note is the available phosphorous increasing by 11300%
- Total phosphorous has increased in the soil by 480% indicated by the increased CEC allowing the soil to hold onto nutrients better for conversion

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- The biology counts are similar to LRO-1 showing improved fungal activity (the fungi can sometimes include bacteria in these counts)
- The biological population is in better balance with the bulk of the microbes counted in the 2015 soil test being lactic acid bacteria (see note from LRO-1 biological assessment)
- Antinomycetes will grow depending on a number of factors outside of organic matter content such as mycelium growth and density. In higher density plantings, antinomycetes will not grow anywhere near the level they grow in less dense plantings.

CONCLUSIONS:

With the soil structure as it was, and the water source being used from the bore, the improvements in the soil structure, organic matter, CEC and nutrient availability is nothing short of remarkable. One of your biggest limiting factors is the water coming from the bore. Sodium is extreme, and the chloride level is very high, along with a pH of 8.2 adding to the already high pH levels found in the soil.

Bioptiv (AUS) have developed a new version of Bactivate BioBoost called Bactivate BioBoost Enhance. BioBoost Enhance has been developed using plant-based carbons instead of BioBoost’s lignite coal-based carbons. Coal based carbons will feed soil biology to a certain level, but the microbes don’t recognise coal-based carbons at the same level they recognise plant-based carbons. Soil microbe’s main food source are the exudates (waste product) that plants and trees excrete from their roots. The carbon source in these exudates is different to the carbon source in lignite coal, hence the biology’s ability to utilise for energy and reproduction. Bactivate BioBoost Enhance contains these plant-based carbons along with NPK & trace, particularly potassium. Potassium plays an extremely important role how the bacteria store and use energy through ATP and ADP molecules. Carbon and potassium are key drivers in this process and were the catalyst for the development of this new product. As an added bonus, we are now manufacturing Bactivate BioBoost Enhance right here in Melbourne.

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If you are still using the bore water that was analysed in the 2013 water report, we need to discuss treating the water to remove the salt content as a matter of equal priority. Let's discuss once you have read the report. I have another company I can contact for this solution.

It is also important to keep the inter rows as clean as possible and free of weeds and plant debris. This can change biological levels and possibly invite soil pathogen activity.

BACTIVATE PROGRAM RECOMMENDATION PER HA:

As both soil analysis are showing similar starting points and changes and improvements over the past 5 years, the program will be same for the whole of farm for 2020/2021

September 2020:

Soil:

- I. Bactivate Plus 5 Microbial Liquid – 1L
- II. Bactivate BioBoost Enhance – 2.5L

Foliar:

- I. Bactivate Seaweed Solution – 2.5L mixed into 100-150L water

November 2020:

Soil:

- I. Bactivate BioBoost Enhance – 2.5L

Foliar:

- I. Bactivate Seaweed Solution – 2.5L mixed into 100-150L water

January 2021:

Foliar:

- I. Bactivate Seaweed Solution – 2.5L mixed into 100-150L water

- Bactivate BioBoost Enhance is our new plant-based carbon product designed to work directly with the bacteria that we are adding to your soil by the team that developed Bactivate Microbial products. The original Bactivate BioBoost (which we still use and supply in certain soil conditions) is a coal-based carbon source and will provide a level of carbon as a food for the bacteria. This was the best technology that we had at our disposal and over the past 12 to 24 months, we have developed a plant-based carbon product, Bactivate BioBoost Enhance. The biggest difference is that by manufacturing BioBoost Enhance using a plant-based carbon source, the bacteria and fungi recognise this carbon at a greater level as

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this replicated the exudates that that the tree releases from its root structures as a waste product. This waste product is carbon rich and directly feeds and stimulates biological growth and development. We have also added in NPK and trace elements to BioBoost Enhance, particularly potassium, as potassium is directly involved in the energy production of soil microbes. This will lead to improved colonisation of the bacteria at the root zone which in turn will lead to improved balance and cropping outcomes for the trees.

- Based on the soil analysis between 2015 and 2020, it is clear that there have been significant improvements in almost all areas, but the available sodium and pH is indicating that the Bacillus bacteria aren't functioning at capacity due to limiting factors. This is clear as the pH hasn't reduced over 5 years and the available sodium has increased even though the sodium cations have significantly reduced. To get the bacteria to start performing at capacity, we need to directly stimulate their growth and reproduction using BioBoost Enhance for the upcoming season

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