

Naringal Property:

The Naringal trial officially got underway in November of 2011. The initial part of the program was to apply to the turnip crop to suppress diamondback moth and increase the quality and vigour of the crop. We are also applying to Lucerne crops and pasture over the coming 12 months. We are looking at achieving the following:

- Improve biology in the soils, therefore improving the herd health. This will lead to increased milk production and quality, reduced scouring and general improved herd health
- Decrease the amount of Urea used on the property
- Decrease the amount of chemical fertilisers used on the property
- Reduce leeching in the soil
- Reduce pest attack in cropping and improve growth without the use of chemicals
- Increase water holding capacity of the soil

The initial stage of the Bactivate Program was applied in late November onto a crop that was already in the ground (see figure 1 & 2)



Figure 1 – Left side of crop 17-11-11



Figure 2 – Right side of crop 17-11-11

The Bactivate program was applied to $\frac{3}{4}$ of the crop from the left hand border, leaving $\frac{1}{4}$ of the area untreated (see figure 3 & 4)



Figure 3 – Left side of crop – Treated



Figure 4 – Right side of crop – Untreated

The initial results after only 3 weeks are very promising. The treated area with the Bactivate program has shown improved growth and colour. The farmer also commented that seeds from last year's crop had also germinated in the treated area. The non-treated area was a lighter green and definitely smaller in size. The diamondbacks had attacked both sides of the crop, but the instance of visible attack on the treated side was a little less. As the program had only been applied for 3 weeks, we weren't expecting suppression of the moth at this stage. The crop needs to be treated at time of planting to allow the biology to assist the crop in naturally suppressing the pests. This crop was treated well after planting.

The trial is continuing in a freshly planted crop and Lucerne.

Garvoc Property:

The initial purpose this trial was the following:

- Improve quality of pasture
- Increase moisture holding capacity of soils
- Improve biology in soils
- Increase silage production/Quality of silage
- Reduce chemical fertilisers used on property

The trial started in June 2011 on 2 paddocks that the farmer told me were his worst. These paddocks struggled for growth and the farmer had trouble getting the cows to eat it off. The initial soil test showed that the paddocks had problems from nutrient lock up to poor biology levels. The program was applied in these paddocks in June 2011. Over the following months, the paddocks responded by adding better growth than had been seen in previous years. The farmer also commented in November 2011, that when he sent his cows to graze on the paddocks, he usually saw them heading back down the road at around 2pm in past years, with the paddocks far from grazed off. This year, the cows strip grazed the paddocks for 3 days and ate them off entirely. This is due to the biology improving the sugar content of the pasture. This

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not only makes it sweeter for the cows, they get more goodness from it than chemically grown pastures. The regrowth was also improved with higher levels of clover. The bacteria assist in fixing nitrogen, which is one of the factors behind the improved clover growth.

We began the silage program in November. The purpose of the program was to improve the quality of the silage, increase the amount of bales and improve the regrowth. The silage was baled in mid-December. The farmer commented that he had a small increase in the amount of bales this year. Upon inspection of the paddocks, he also commented on the regrowth of the pasture. In the Bactivate Program treated areas, the regrowth had come back quicker and greener than in the control paddock (see figure 1 & 2). These photos were taken on the same day. The farmer treated paddock 1 with Carbon, Seaweed and chemical fertilisers. Paddock 2 was treated with the Bactivate program. We reduced the chemical fertilisers by over 60%.

As the biology enters the soil and starts working at the root zone, we achieve improved results year on year, with the ability to reduce chemicals and fertilisers even further.



Figure 1 – Paddock with carbon, Seaweed & Chem Fert



Figure 2 – Treated with the Bactivate Program

UPDATE 17/01/2012:

After a discussion with the farmer on 17/1/2012, he indicated that there has been a lack of rain in the area and his paddocks were suffering due to the fact. The paddocks were yellow and very dry. He has informed me that after an inspection of the Bactivate treated paddock on 16/1/2012, that he was surprised to see that it was still holding its colour and looked quite lush. This is due to the bacteria's ability to draw moisture from the night air and allow the soil to hold onto it, making moisture available at the root zone. Previous studies have shown up to a 30% increase in

moisture holding capacity by using the Bactivate Program. For dry land farming, this is invaluable.

Grassmere Property:

The purpose of the trial in Grassmere was to show the farmer that he can apply less chemical fertilisers to the property, while still achieving excellent pasture cover. We also wanted to display that the programs can be run cost effectively. The farmer gave us his worst paddock. This particular paddock was weedy and the pasture development was not great quality. The farmer had trouble getting the cows to eat this paddock off. For the purpose of the trial, we split the paddock in half. The left side of the paddock was treated with the Bactivate program and the right was treated conventionally. The Bactivate Program side had all fertilisers reduced by 50%.

The initial soil test showed lack of biological balance as well as nutrient deficiencies. The program began in July 2011. The first assessment was on 12th October 2011. The farmer believed that the non-treated side had shown a little more growth at this stage, but it was pretty borderline. (See figure 1 & 2). The exciting part of this was that we had reduced the Bactivate Program site by 50% and still had similar growth.



Figure 1 – Control site

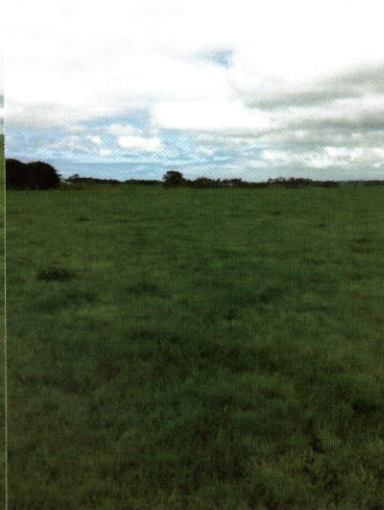


Figure 2 – Bactivate Program

The root development in the Bactivate Program treated side was significantly greater. The biology had coated the roots and allowed the pasture to take up more nutrients and moisture, even at a 50% reduction (see figure 3 & 4). There was also a visible difference in the amount of worm activity on the Bactivate Program treated side.



Figure 3 – Bactivate Program treated side



Figure 4 – Control side

The follow up visit, conducted on December 23rd, showed a remarkable difference in both sides of the paddock. The paddock had recently been eaten off by the cows. The Bactivate Program side was eaten down and was showing little or no signs of weed (see figure 5). The control side hadn't been eaten off by the cows and was full of thistle and cape weed (see figure 6). These photos were taken on the same day in the same paddock.



Figure 5 – Bactivate Program side 23-12-11



Figure 6 – Control side 23-12-11

Upon looking at the photos, it's difficult to believe that this is the same paddock. Figure 7 shows a picture of the paddock taken in the middle.



Figure 7 – The both sides of the paddock (Bactivate Program – Right / Control side – Left)

The root development of the pasture was again increased on the Bactivate Program side of the paddock (see figure 8 & 9)



Figure 8 – Roots of pasture in Bactivate Program side



Figure 9 – Roots of pasture in Control side

As seen in the above photos, the root development in the side of the paddock with the Bactivate Program is significantly greater. Over the 6 months since the Bactivate Program was applied, the Bacillus bacteria have colonised at the root zone and assisted the pasture to take up nutrients at a higher rate. The over use of chemical fertilisers such as Urea give empty growth, which directly affects the cow's milk quality and production. Although in the early stages of the program, it seemed as

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though the chemical fertilised side of the paddock was performing a little better due to the growth rate of the pasture, it's quite clear that biological side has improved the condition of the soil, reduced the impact of weeds and improved the quality of the pasture. The farmer was quite stunned upon inspection of the paddock.

Conclusion:

The initial results of these trials are evidence that the implementation of the Bactivate Program has improved the soil structure and the pasture/crops that are being grown. We have been able to significantly reduce chemical fertilisers, while getting better results in growth, root development, disease suppression and moisture holding capacity of the soils. Each of the farmers participating in the program is extremely happy with the results and will continue with the program. Over the coming year, we will start to monitor the herd health and milk production as the programs are implemented across the properties.