

Biostimulant Programme

Trial sheet

Soil improvements after using the Biostart programme across different crops



Background

Long term biostimulant trials were conducted on a vineyard, as well as kiwifruit and apple orchards. In these trials soil carbon and other soil and crop improvements were measured.

Trial Description

The biostimulants used in these trials were:

- Mycorrcin is a soil biostimulant that activates beneficial soil microbes, which stimulate healthy root growth and development leading to higher nutrient uptake, faster crop establishment and greater crop yield and quality
- Digester is a soil biostimulant that activates the soil microbes that breakdown organic matter from crop residues which recycles nutrients faster and improves soil structure
- Foliacin is a foliar-applied biostimulant that repairs leaf biofilm after spraying and enhances plant resilience after environmental or chemical stress.

Vineyard Trial

The vineyard trial was conducted over four years on a Pinot noir block at Accolade Wines' Mudhouse Vineyard in Wairau Valley (Marlborough) using the Biostart vineyard biostimulant programme (Mycorrcin, Foliacin, and Digester), and one application of compost at 5 T/ha under vine after year three.

Mycorrcin was applied at bud break and with all weed sprays (2–3 per year), Foliacin was applied regularly with all cover sprays throughout the season (7–9 application/season) and Digester applied in autumn. Compost was applied under vine in autumn at 5 T/applied ha. Soil samples were taken in spring (18 months later) at a depth of 150 mm across the vineyard trial area and then analysed to assess the impact of the Biostart programme on the soil.

Vineyard Results

After four years, the Biostart treated soils had 24% more carbon than the untreated soils — equating to 7 tonnes of carbon/ha more and a lift in soil organic matter from 4.5 to 5.6%.

Table 1. Impact of a long-term BioStart biostimulant programme on vineyard soil and organic matter.

Test Name	Standard	Biostart	Difference	%
Organic Matter (%)	4.5	5.6	1.1	25%
Total Carbon (%)	2.6	3.2	0.6	24%
Soil Carbon (T/ha; top 15 cm)	35	42	7.0	20%

This trial also measured the impact of the increased soil carbon on other soil chemical and biological parameters. These benefits included: improved soil aeration, higher CEC, higher soil microbial count, improved anion (N, P, S and B) availability, as well as improved cation availability (Ca, K, Mg).

These improvements in soil chemistry and biology explain how the biostimulants improved the biological environment that led to the lifts in yield and wine quality also measured in this trial.





Kiwifruit Trial

A three-year trial was undertaken on a Hayward kiwifruit Orchard in Edgecumbe, Bay of Plenty. The orchard consisted of two adjacent, equal-sized blocks one of which was treated with the Biostart Mycorrcin and Digester programme with the other block being the standard grower programme. The fertiliser and agrichemical programmes used on each block was identical. The blocks were both poorly drained Omeheu gritty loamy sand.

The programme consisted of four Mycorrcin applications (total of 14 L/ha/year) and one autumn application of Digester (6L/ha/year). Mycorrcin was applied either by floodjet (Spring and Summer) or added to herbicide applications.

For each year of the trial kiwifruit harvest yields were recorded, and the soils and leaves were tested. Soil samples were taken to a depth of 150 mm and analysed.

Kiwifruit Results

The soil carbon content was increased by 27% (Table 2) and there were higher leaf nutrient levels for N, P, S, K, Ca and Mg. These improvements lead to a 16% increase in kiwifruit yield and a higher orchard gate return over the three year trial.

Apple Trial

Several three-year trials were undertaken in Hawkes Bay apple orchards. The apple varieties in these orchards included Pink Lady, Envy, Pacific Queen and Fuji and each orchard had soil issues including lower than desired organic matter. The programme consisted of three applications of Mycorrcin (total of 14 L/ha) and one autumn application of Digester (4L/ha/year).

Table 2. Impact of a long-term Biostart biostimulant programme on kiwifruit soil and organic matter.

Bay of Plenty Orchard, Hayward (green)	Organic Matter (%)	Total Carbon (%)
Pre-trial		
Standard	9.1	5.3
Biostart	8.9	5.1
End of Year 3		
Standard	9.5	5.7
Biostart	11.1	6.5
Differences Year 1 to 3		
Standard	0.4	0.4
Biostart	2.2	1.4
Difference (%)	25%	27%

Apple Results

There was an average improvement of 36% in soil carbon content over the three-year trial. Soil carbon levels were lifted from 2.5% at the start of the trial to 3.2%, while there was no change in the untreated areas (Table 3). Other orchard benefits were earlier ripening, bigger sturdier trees, better colour and flavoured apples, higher brix and pressure, and better fruit storage.

Conclusion

The results show that Biostart's biostimulant programme creates the biological conditions that lead to increased soil carbon as well as higher plants nutrient uptake and increased crop yield and quality in a range of crops.

Table 3. Impact of a long-term BioStart biostimulant programme on apple orchard soil and organic matter.

Hawkes Bay Orchard	End of Year 1		End of Year 3		Differences Year 1 to 3		Carbon % increase
	Standard	Biostart	Standard	Biostart	Standard	Biostart	
Royal Gala							
Organic Matter (%)	3.2	2.9	3.2	3.7	0	0.8	28%
Total Carbon (%)	1.9	1.7	1.9	2.2	0	0.5	29%
Pink Lady							
Organic Matter (%)	3.2	2.7	3.3	3.3	0.1	0.6	22%
Total Carbon (%)	1.8	1.6	1.9	1.9	0.1	0.3	19%
Fuji							
Organic Matter (%)	1.9	1.4	2.8	2.6	0.9	1.2	86%
Total Carbon (%)	1.1	0.8	1.6	1.5	0.5	0.7	88%
Pacific Queen							
Organic Matter (%)	2.5	1.8	2.3	2.7	-0.2	0.9	50%
Total Carbon (%)	1.4	1.0	1.4	1.6	0	0.6	60%