

Healthy Plants – Healthy People

SOYBEAN TRIAL

WITH SOIL BIO-BOOSTER

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Summary

Bio-Booster was applied to soybeans to test effects on yield and soil. The Bio-Booster is based on local soil biology, brewed on farm and was injected into the soil. Additional costs are minor inputs into the Bio-Booster and one pass of a tractor.

Soybean yields in the treated areas averaged 9% higher than the controls. This gave an estimated \$190 increase in Gross Margin/ha. Better drainage and an increase in soil biology were recorded in photographs. Observations indicated a spreading of the soil biology into adjacent rows of the untreated area. Rows were 2 metres apart.

Trial

The paddock had grown sugar cane for the previous four years and soybeans are used as a break-crop. The farm uses trash blanket, minimum till and controlled traffic practices, all part of regenerative agriculture. Controlled traffic farming uses computers and satellites to steer machinery on designated tracks to minimise compaction.

Application of the Bio-Booster @ 100L/ha and Sea Minerals @ 3L/ha required one pass by a tractor with coulters and 1,000-litre tank. The Bio-Booster was applied at low pressure through pipes behind the coulters into the soil at about 10 cm deep.



Site 1 The Bio-Booster was applied on 6 November 2020. Soybeans were planted on 12 January 2021 following normal practices and rates. The variety was Kuranda. The area had been fertilised with 150 kg/ha GF402 (7N:6P:32K:2S).

Site 2 The Bio-Booster was applied on 23 December 2020. Soybeans were planted on 12 January 2021, using the same practices, rates and fertiliser.

Observations - Site 1

Following an irrigation of 45 mm on 17 February, a visual inspection of the soil was made.

6 hours after irrigation – free water (light patch) in Photo 1 - none in Photo 2



**Photo 1 Control 6 hours after irrigation
8 holes 30 cm deep showed water present**



**Photo 2 Bio-Booster 6 hours after irrigation
8 holes 30 cm deep showed NO water present**

Water present indicates poor soil drainage. Roots require water and oxygen to live and be active. Seeing water in the soil like the Control indicates lack of oxygen. If waterlogging is short term, say a few hours, it will restrict root function but cause little or no permanent damage. If it is days or weeks, it will kill roots. Lack of oxygen encourages the spread of root diseases like Phytophthora.

A second inspection was made on 19 February. Both times 8 holes were dug in the control and 8 in the treated areas – in adjacent rows.

30 hours after irrigation – once free water has drained, it leaves behind soil with good air.

Photo 3
Control 30 hours
after irrigation.
Top 10 cm with
good air



Photo 4
Bio-Booster 30
hours after
irrigation.
Top 30 cm with
good air



Surface soil-free areas on the shovels in photos 3 and 4 above – indicated by white lines - show the depth off well drained soil. This shows an increase of well-drained soil from 10 to 30 cm. The soil below 10 cm in photo 3 is still saturated, tight and too wet. Not shown in photo 4 is the surface with crumbly, aerated structure for more than 30 cm. The presence of fine crumbles indicated active biology. (Too fine to be visible on these photos.)

Observations - Site 2



Photo 5 Pulled weeds:
Treated - Left and
Control - Right



Photo 6 - Sand grains - control



Photo 7 Sand grains - treated

Photo 5 taken at 26 April shows samples of weeds with soil adhering to roots. The adherence of soil to roots is a good indicator of biological activity in the rhizosphere.

Soil from the treated and control areas was then photographed under a microscope. Photo 6 shows grains of sand from the control soil with very clean sand particles. Photo 7 shows grains from the treated soil with dark stains and less light being reflected indicating the presence of humic compounds. The increased soil adhesion to roots and production of humic compounds on the sand grains indicate an increase in soil biological activity and organic carbon.

Yield and Increase in Gross Margin/ha

Yield samples were taken on 21 May, 150 days after application of the tea. Treated and control were hand-sampled with 8 replications, each 2 m of bed with 2 rows per bed. Samples from treated areas showed a 9.1% yield gain over untreated areas.

A 9% increase on 3.5 t/ha yield equates to 0.32 tonnes soybeans. At \$750/t this equates to an income increase of \$240/ha. The cost of Bio-Booster was \$20/ha and application about \$30/ha, giving an increase in Gross Margin of \$190/ha.

For full and lasting benefits, farming practices **must** be adjusted to protect and nurture the soil biology.