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AN APPLICATION OF VIROSOIL™ TECHNOLOGY

CASE STUDY: TRYTON'S USE OF VIROGROW™ REAGENT WITH BIOSTARTER AND BIOBALANCE FERTILIZERS

“You definitely knew when you were going through the treated areas with the picker that there was more on it...”



< Image courtesy
of Cotton Australia



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Images courtesy of Cotton Australia

INTRODUCTION

This work was carried out by Tryton, a strategic partner of Virotec Global Solutions in Australia. The purpose of this case study was to document the benefits of post-emergent applications of Tryton's BioBalance and BioStarter fertilizers on the growth of cotton.

Both BioBalance and BioStarter fertilizers contain Virotec's ViroGrow™ reagent, a soil amendment additive which had previously been found to provide the following benefits to Tryton's fertilizers:

- > A substantial improvement in pH buffering capacity;
- > The elimination of carbon dioxide production in, which increases the shelf-life of fertilizer products;
- > Increased silica- and calcium-based micro-nutrients; and
- > The removal of copper, manganese and aluminium from surrounding soils.

BACKGROUND OF THE WORK

> **Grower**

Lou Greech is the owner of 'Nundah', a family run cotton farm on the edge of Narromine, NSW. Lou was chosen for his interest in what happens in his soils. He is also an experienced cotton farmer who has been in the industry for a number of years.



Narromine, 458 kilometres north west of Sydney, is at the heart of one of the largest cotton farming districts in Australia.

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> **Product Application**

The fertilizer products were applied at early squaring (seven to eight nodes) in the following way:

- > Treatment #1: Control;
- > Treatment #2: 40L per hectare of BioBalance; and
- > Treatment #3: 40L per hectare of BioStarter.

The control was treated using the usual paddock treatment of fungicides, herbicides, insecticides and fertilizers, which also form the base application for Treatments #2 and #3 above.



Cotton crop at Nundah prior to planting Field II.

> **Field**

The product was applied to Field II on Nundah. This field is a red loamy soil, known as a red brown earth with a pH (CaCl₂) of 6.5. The country has been cropped intensively with cotton for the past ten years. Field II was not the best performing field on the farm, but yielded above expectations. The crop was very patchy throughout the field and the western edge was the highest yielding. The eastern edge had watering difficulties during the season due to the hotter weather that was experienced in the region.

> **Management**

Field II was managed exactly the same as the rest of the farm. It received eight irrigations, averaging about 9.0 ML per hectare. The insect pressure was intense in the early parts of the season, but slowed down toward the middle and end of the season. There were not as many sprays as the average year.

> **Fertiliser**

Field II received 230kg/ha of nitrogen, 33kg/ha phosphorous and 30kg/ha potassium. Two foliar applications of multi-nutrient mixtures, with an emphasis on potassium, were also applied.

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Expected benefits from the application of the treatments were:

- > Healthier seedlings;
- > Increased uptake of nutrients;
- > Less root disease incidents;
- > More soil water retention;
- > Less compacted soils; and
- > Positive change in soil pH in the first six weeks.



Tryton's operations team in the field at Nundah.

> **Sampling and Monitoring**

Plant monitoring occurred on or about zero, three, six, and nine weeks after application (WAA). The following plant health and development indicators were monitored to determine plant health, vigour, plant earliness, and maturity by assessment:

- > Plant height at zero, three, six, and nine WAA;
- > Number of nodes at zero, three, six, and nine WAA;
- > Height : node ratio at zero, three, six, and nine WAA;
- > Fruiting factor at three, six, and nine WAA;
- > Nodes above white flower (i.e. from peak bloom to cut out) at nine WAA;
- > Nodes above cracked boll (i.e. late season after cutout, before defoliation) at 14 WAA; and
- > Total fruit and fruit retention at three, six, nine, and 12 WAA.

Yield has been determined by harvesting each treatment into its own module. Module weight comparison has determined yield differences. Fibre quality indicators will be available following ginning.

> **Methods**

This trial was conducted on a replicated, random plot design. There were three replicates of each treatment. Each plot was an area of 24m in width and 550m in length (i.e. 1.32ha). Of these plots

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only 60 rows were picked. This was the result of the physical amount of cotton that could be fitted into each module. The total area of seven hectares was managed the same as the rest of the field.

PLANT MONITORING RESULTS

Height (cm)	Treatment #1	Treatment #2	Treatment #3
0 WAA	17.0	17.8	17.4
3 WAA	46.5	51.4	46.5
6 WAA	76.5	78.0	78.0
9 WAA	81.5	83.6	81.8

No. of Nodes	Treatment #1	Treatment #2	Treatment #3
0 WAA	7.4	7.9	7.6
3 WAA	12.3	13.9	14.3
6 WAA	16.0	17.0	17.0
9 WAA	20.0	20.9	20.4

Height: Node Ratio	Treatment #1	Treatment #2	Treatment #3
0 WAA	2.30	2.25	2.29
3 WAA	3.80	3.71	3.24
6 WAA	4.78	4.59	4.59
9 WAA	4.08	4.00	4.01

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Fruiting Factor	Treatment #1	Treatment #2	Treatment #3
0 WAA	0.96	1.10	0.70
9 WAA	13.68	12.87	11.10

Nodes Above White Fruit	Treatment #1	Treatment #2	Treatment #3
9 WAA	1.87	1.33	1.93

YIELD RESULTS

	Treatment #1	Treatment #2	Treatment #3
Yield (bales/ha)	7.77	8.44	8.46

DISCUSSION

The trial was aimed at demonstrating the benefits of the two Tryton products. These two products, BioBalance and BioStarter, were expected to benefit the crop by increased uptake of nutrients, less disease incidents, more soil water retention, less compacted soils and a positive change in soil pH. The field was monitored at regular intervals throughout the season and the results recorded.

The products were easy to apply. Because the treatments were sprayed as an “over-the-top” application, at the time when the plant was at eight nodes, seedling emergence, seedling health, plant stand numbers were not monitored. The monitoring was conducted at zero, three, six and nine weeks as well as before defoliation. The standard processes for measuring the plants’ height, number of nodes, fruit counts, number of flowers and nodes above white flower were used. Visual assessments for any diseases that might have been present were also carried out.

The product went out at a rate of 40L/ha in 250L/ha of water. The biggest difficulty was changing over the product after only a small area applied which was due to the nature of the trial. The high water rates could be an issue to the grower; in the current trial, four hectares per load were achieved.

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There was no significant difference in any of the counts or visual signs during the season that one area was better than the other. It was not until picking that the two trial sites (Treatments #2 and #3) showed to be higher in yield potential. When driving the picker, it was observed that these sites were whiter and denser within the rows. It was also observed that the basket on the picker was filling up a lot faster than it did in the control area.



Example of a cotton ball on Field 11 crop at Nundah after treatment with BioBalance.

CONCLUSION

The trial proved to be a success for all parties involved. The results show that by using either of the two products an expected cotton yield benefit should be seen. Prior to the trial, it was not clear what expectations should be placed on either product, but the 9% yield advantage in one season was a surprise. This result means that the products not only paid for themselves but also increased profits for the grower, which was the desired outcome. Further work will consider the “carried on benefit” within the soil.

If the products continue to have a positive impact on the life cycle of the soil, they should continue to increase productivity and yields in that field. While the present results represent a significant result after one season, it is expected that benefits will continue into the next few seasons.

GROWER COMMENTS

“You definitely knew when you were going through the treated areas with the picker that there was more on it. The baskets were filling much quicker and we had the compactors running half a lap earlier. I would definitely like to try some in the future on a couple of fields next season. I would also like to trial soil injecting the product in future.”

LOU GREECH
Owner, 'Nundah', Narromine