CASE STUDY

SEPTEMBER 2019

Soil Wealth NURTURING CROPS

Integrated Crop Protection PROTECTING CROPS

SOUTH AUSTRALIAN GROWER COMPOST TRIAL

KEY MESSAGES

- ✔ **Compost can contribute to:**
  - ✔ **reduced fertiliser use**
  - ✔ **better soil water holding capacity, so less irrigation**
  - ✔ **more even crop growth and quality**
  - ✔ **healthier root growth and better uptake of trace elements**
  - ✔ **less pest and disease pressure.**

ORIGINS OF THE PROJECT

This project was part of the Horticulture Sustainable Ag Program – 'Soils in Action' project – run by AUSVEG SA, with oversight from Adelaide and Mount Lofty Ranges Natural Resources Management (NRM) Board (funder), and contributions from the Soil Wealth ICP project.

Grower led trial set up and management

Trial objectives: To promote greater understanding of the use of organic soil amendments, reducing inputs of mineral fertilisers and encourage the use of soil, plant and water testing as well as nutrient budgeting. The aim was to limit overuse and waste of farm inputs and associated off-site effects (e.g. via nutrient leaching, run-off.)

Project managers: Jordan Brooke-Barnett (AUSVEG SA) and Doris Blaesing (RMCG).

Technical support: Doris Blaesing & local agronomists.

AUSVEG SA
Representing South Australian vegetable and potato growers

This project was supported by funding from the Adelaide and Mount Lofty Ranges Natural Resources Management Board and Hort Innovation.

Supported by

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S.A. GROWER COMPOST TRIAL
September 2019

SoilWealth NURTURING CROPS

Integrated Crop Protection PROTECTING CROPS

The Soils in Action project was run by AUSVEG SA from early to mid 2019 on the Northern Adelaide Plains. The objective was to establish two demonstration trial sites to showcase compost use in commercial vegetable production to improve soil health and reduce the use of inputs e.g. of fertilisers and irrigation water.

Expressions of interest were called for, with the two successful growers being Day Van Dang (greenhouse cucumbers) and Anthony De Ieso of Thorndon Park Produce (field grown kale).

Jordan Brooke-Barnett (AUSVEG SA) and Dr Doris Blaesing (RMCG) established the two trial sites. This involved:

- conducting initial soil testing and analysis
- arranging for delivery and spreading of two custom types/mixes of compost (donated by Peats Compost) - see Tables 1 and 2
- developing a trial protocol for each site
- arranging a trial agreement with each grower.

The trials were grower managed demonstration trials (not fully replicated research trials) to fit in with 'business as usual' commercial operations as much as possible:

- composts treatments were applied in blocks (see Table 2 and Figure 1)
- an untreated control was included
- for the field trial, soil moisture monitoring logging equipment was installed to observe the effect of compost on soil moisture and irrigation needs.

RMCG and AUSVEG SA briefed local agronomists working with each property on the trial process and management, with RMCG providing input regarding crop recommendations and management.

Table 1: Compost criteria for the grower

Greenhouse vegetables	Field grown vegetables
Fit with production i.e. no negative effect on trial crop or following crops	
Not too costly to implement and tying up labour and equipment and needing water, fertiliser and a lot of looking after, preferable decreased input costs (nutrients, water, chemicals), labour and soil preparation costs	
Fit with time of year crops are planted, harvested and replanted	Fit with time of year crops are planted, harvested and next crop is planted
Lessen disease pressure	Lessen salinity effect on crops and soil
Not affecting soil pH, balanced nutrition, lower salinity and sodicity risk	
No food safety risk	
More even water infiltration and drainage, no water logging	
Even crop growth – and ideally increased marketable yield / pack out	

Growers and trial sites: Anthony De Ieso, Thorndon Park Produce, Waterloo Corner; Day Van Dang, Penfield Gardens.

Composts: Treatment 1: blend 437 compost, trade compost + DAP; Treatment 2: cultured compost (trade compost).

Soil and irrigation water tests were conducted prior to the trial. **De Ieso site** - Soil salinity (sodium and chloride) was a major issue due to the use of saline bore water. The soil was very well supplied with all nutrients; pH in water was 7.6, and 7.4 in calcium chloride. Organic carbon was 0.5% (i.e. low) due to intensive cropping. **Van Dang site** - Electrical conductivity was high, however not due to sodium and chloride but the overall high levels of nutrients in the soil due to intensive cropping and fertiliser inputs. Again, organic carbon levels were low (1.59%) while the pH was ok.

Table 2: Compost application rates

Greenhouse vegetables	Field grown vegetables
11 t (15 m^3) of cultured compost over 144 m^2	4.5 t of blend 437 compost over 1100 m^2
11 t of cow manure, blend 437 compost and gypsum blend, over 144 m^2	4.5 t of blend 437 compost blended with 100 kg of DAP fertiliser over 1100 m^2

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TRIALS AND RESULTS

Anthony De Ieso

Over the dry summer of 2017/18, Anthony recognised a number of issues with crop production at his Waterloo Corner block. In particular, Anthony faced considerable challenges in managing the effects of salinity due to spikes in the electrical conductivity (EC). At the start of the trial, the EC of his bore water ~~of~~ was 3.1 dS/m or 1965 ppm, nearly 5 times the optimum level. Also, the land had become less productive after years of cropping driven by the need as a bunch line grower to continuously crop throughout the year.

The trial (see Figure 1) performed well and led to strong results in considerably improving crop quality such as root growth, plant size, evenness of crop, colour, feel, and marketable yield in the compost treated plots.

Compost treated plots also showed:

- heavily reduced fertiliser use, and irrigation water needs for the trial period
- more even crop growth and quality resulting in a better cut out rate (marketable yield)
- healthier root growth and better uptake of trace elements

Figure 1: De Ieso site - area containing the three trial blocks

- improved crop longevity, longer harvesting period
- time savings from reduced need to apply a fertiliser
- reduced irrigation costs because the compost increased soil water holding capacity.

Introduction of organic matter and targeted irrigation management with reduced water input lead to better management of the effects of salinity on the block and improved soil drainage.

The better, more even plant growth and quality led to a reduction in labour requirements overall. Harvesting and packhouse costs were much lower from the composted area due to less grading and the high percentage of marketable produce with less wastage.

Day Van Dang

Day was keen to trial and adopt compost use on his farm to showcase how compost benefited a commercial greenhouse crop, especially in improving marketable yield and thus business income.

Day prepared a compost treated block in the early stages of the trial phase with one type of compost and low fertiliser inputs to compare with an untreated block with higher fertiliser input on the farm. Both blocks were planted with cucumbers.

The area treated with compost had:

- noticeably better water holding capacity
- stronger growth
- thicker stems
- no fruit abortion
- less pest and disease pressure, and
- more consistent, high-quality fruit.

This provided a strong demonstration of the performance of compost amended soil over conventional soil and nutrition management. Day has also reported strong savings in time and inputs for the areas in which he was using compost on his farm.

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Figure 2: Day Van Dang showcases a crop of cucumbers grown using compost

Figure 3: Dr Doris Blaesing conducting the Soil Masterclass in June 2019

COMMUNICATING LEARNINGS FROM THE TRIALS

AUSVEG SA and RMCG held a Soil and Nutrition Management Masterclass at the end of the project to share key findings from the two trial sites in June 2019 (see Figures 2 and 3).

On the day Doris provided an overview of a number of topics relevant to managing crops and nutrition when using compost in vegetable production before taking attendees on a tour of both trial sites.

An evaluation at the end of the masterclass showed growth in the confidence of attendees to manage a number of issues related to advanced soil and nutrient management with compost use.

As part of this project, podcasts were developed with interviews from key trial participants (growers, AUSVEG SA, Peats Soil, and Measurement Engineering Australia). In addition, trial participant Anthony De Ieso prepared short video case studies of his trial and showing the key benefits (Twitter feed - @arealphoney, Mar 19 2019, Apr 10 2019).

From the podcast – Jarrad O'Reilly, Peats Soil

"...the main reason for using compost is to put carbon and organic matter into the soil, terrific for waterholding capacity, also nutrient retention, promoting good soil structure to grow the crop which is critical not just for this crop but for the crops coming along in the next two, three rotations as well..."

Click here to access the podcast.