Long Term Sustainability of Precision Irrigation

UAD25

NPSI Case study

April 2011

Maximising water and nutrient penetration into root zones using improved irrigation scheduling

Situation

Subject: Wesley Gregg

Location: Sunraysia

Enterprise: Citrus (16ha) and Wine Grapes (56ha)

Size: 72 ha

Irrigation: Precision Drip irrigation

Link with NPSI

The project ***Long Term Sustainability of Precision Irrigation*** aims to establish soil management strategies for drip irrigated vineyards in the Barossa Valley by assessing the impact of drip irrigation on soils and establishing the role of soil type and irrigation water in contributing to soil structure issues.

Although drip irrigation conserves water, the concentrated nature of its application is believed to cause serious soil structural decline directly under drippers. This project aimed to identify the extent of this decline under drippers in Barossa Valley vineyards, to establish the causes of the decline and to suggest management and monitoring strategies to deal with the problem.

Wesley Gregg was approached by a local Department of Agricultural Irrigation Officer who explained the work being conducted by Dr Robert Murray in the area of precision irrigation. Having a keen interest in research and development work, Wesley was interested in improving his knowledge regarding the long term viability of drip irrigation on his property.

Through the NPSI project, trials were carried out on his vineyards to test soil absorption rates. Dr Murray was interested in Wesley's property as a trial location because he had already had mounded soils in place for 10 years. Research conducted included an investigation of the impact of mounded soils on vine growth and how well roots are formed in the topsoil of the mounds. Information gathered was used to understand the absorption rate of soils and how this impacts on water use efficiency.

Mounded soils under dripline

Changes made as a result of NPSI influence

As a result of trial findings, Wesley now tries to irrigate his wine grapes *more frequently and for shorter periods in order to improve water penetration into the root zones.*

He explains that if you supply *short drinks* to the vines, this opens up the soil pores and improves water penetration. The aim is to manipulate the soil to accept water penetration and reduce run off.

Although this trial is not yet complete and future changes are dependent on findings presented by Dr Murray, the changes that Wesley has made to his irrigation scheduling to date, has allowed him to maximise water use efficiency due to minimised water wastage through run-off.

Wesley is currently awaiting the results of a trial being run on another property in the region to determine the most viable strategies to manage under vine growth and weeds. This trial is investigating the use of saltbush under the drip line to further aerate the soil and improve water penetration. *The theory is that more roots improve soil microbes and aerate the soil.*

Costs of making changes

Wesley has incurred very little cost in making changes on his property, which have involved simple scheduling changes and re-programming of his irrigation controller.

For this reason he notes that the gains made in water use efficiency, have made this a worthwhile exercise.

Benefits of making changes

As a result of his involvement in this project and changes made to irrigation scheduling, Wesley notes that he has benefited from potential water and fertiliser savings. He also anticipates that the slight changes made to his management practices will in turn result in environmental benefits.

Based on the project's overall research into precision irrigation and the trial work that has been conducted on his property, he hopes to eventually roll out its recommendations across his entire enterprise, realising a range of water saving benefits and nutrient application efficiencies.

He notes that due to extremely wet weather over the past year, water use and fertiliser inputs have been minimal. Therefore, due to climatic conditions, it has been difficult to implement and measure changes and their benefits with any certainty.

> "Irrigating more frequently and for shorter periods in order to improve water penetration into the root zones."

Vines at trial site, showing mounded soils and cover crop planted in mid row for green mulch

"A greater understanding of how soil particles behave when water is applied."

Impacts of making changes

Participation in this project has highlighted improved soil management practices that Wesley could easily implement on his property. He explains he now has a *greater understanding of how soil particles behave when water is applied as well as strategies to manipulate this response*. In addition there is value in understanding how fertiliser reacts to different soil types. Due to the fact that fertiliser attaches better to clay soils than sandy soils, he can now achieve greater efficiencies in his nutrient application.

Relevance to others

Any irrigated crops would benefit from the findings of this NPSI project. Wesley found it extremely valuable and interesting to learn how irrigation should be set up from the onset. He notes the importance of matching the irrigation design to suit the soil type in order to maximise water use efficiency and reduce runoff. *My soil penetration is 1.8 litres per hour, but because my dripper is 2 litres per hour, the extra water cannot effectively penetrate the soil*. Armed with this information from the start, irrigators can better match their irrigation strategies and reduce run off.

He believes the recommendations and insights from this project are well worth sharing and that it would be beneficial to pass on this type of information to grower groups in the region.

Supporting Material

NPSI website www.npsi.gov.au
UAD25 Milestone 9 Final Report

Further information

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