Long Term Sustainability of Precision Irrigation

UAD25

NPSI Case study

April 2011

Improving water use efficiency and earlier flavour ripeness in the vineyard

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. The impact of drip irrigation on soils was recently assessed along with 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, establish the causes of the decline and suggest management and monitoring strategies to deal with the problem.

Anthony Scholz from Scholz Estate in the Barossa Valley has a keen interest in managing the sustainability of his vineyard, in particular strategies aimed at coping with heatwaves and vine stress. His involvement in the NPSI trial included examining the impacts of drip irrigation and straw mulching as options to achieve improved water use efficiency as well as improved flavour ripeness in his wine grapes at a lower baume.

One of the wineries Anthony sells his fruit to, mentioned that they were looking for flavour ripeness at a lower baume and brought the project to his attention as an option to help remain viable during seasons with low rainfall. On further investigation, Anthony decided to look into the benefits of using straw mulch and an on ground dripper system with closer spacing as an option to achieve more even wetting of the feeder root zone close to the surface. Research shows that a uniformly wetted area where feeder roots grow, allows for easier water uptake. As a result it is possible to preserve fruit quality during extreme weather events and achieve earlier flavour ripeness at a lower baume as vine health and function is maintained without interruption.

Situation

Subject: Anthony Scholz

Location: Barossa Valley

Enterprise: Wine Grapes

Size: 41ha

Irrigation: Precision drip irrigation

On ground dripper system with straw mulch

> "We installed a 1 litre/hr dripper every 50cm (as opposed to the conventional 4 litre/hr dripper every 2 meters), which ensures a wetter feeder root zone. This means vines endure less stress in the uptake of water through more of its feeder roots."

Changes made as a result of NPSI influence

Anthony explains that involvement in this project has changed his mindset about water conservation and understanding of the benefits of allowing volunteer grasses to grow under vines. Grass roots create channels in the soil that allow irrigation water to penetrate the soil surface reducing water runoff into the mid row. He says it has *been* an eye opener for him *to better understand soil health and getting water to the root zones to conserve water instead of losing it to evaporation.*

Anthony is now more focused on wetting up more of the vine feeder root growing area. He has installed a 1 litre per hour dripper every 50cm (as opposed to the conventional 4 litre per hour dripper every 2 meters), which ensures a wetter feeder root zone. This allows vines easier access to water and the ability to cope with periods of extreme heat stress.

In conjunction with the dripper irrigation strategies, he has also made changes by growing winter cover crops in the mid row, and side throwing an annual cover crop (triticale) under vines in the spring to form a mulch layer, in an effort to ensure improved water use efficiency.

Anthony is also applying straw mulch under vine in some blocks to retain soil moisture, reduce evaporation and improve water use and sustainability.

These changes have resulted in better vine balance, less vine stress during heat events and earlier flavour ripeness at a lower baume with reduced water use.

Costs of making changes

The cost of the new dripper line came to a total of $22,000 or $4,150/hectare. $20,000 of this was covered by a government sponsored drought assistance grant. The straw mulch, which Anthony is sourcing from a local farmer, costs $3,000/hectare to purchase and spread.

Anthony believes these costs have been worthwhile. He is not using as much water because there is less runoff into the mid-row and better infiltration into the soil leading to less evaporation.

As a result of the straw mulch, he is using less herbicide and earthworms are more prevalent through the soil. This makes it more porous and allows improved water penetration to the root zone.

Scholz Estate vineyard and dam cover

"Having a cover over the dam has been the answer to water conservation and water sustainability."

Benefits of making changes

Anthony believes his specific mulching practices, moisture monitoring and the investment in a cover over his dam are the keys that help him manage water use effectively.

The covered dam provides the vineyard with a year's water supply 'on hold'. In addition, once the water is in the dam it is not lost to evaporation. It is estimated that without the cover the dam could lose up to 6 ML per year. Anthony explains that *having a cover over the dam has been the answer to water conservation and water sustainability*.

As well as reducing evaporation in the vineyard and conserving valuable natural resources, he is seeing cost savings through lower water use and power pumping costs. In addition, the annual cover crop (triticale) side thrown under vine at the start of the growing season provides a good source of mulch incorporating nutrients back into the soil while preserving soil moisture.

Anthony estimates the changes he has made to his vineyard to reduce run off of irrigation water and improve penetration to the root zones are resulting in 40% water savings as well as better soil health. He has also observed an improvement in general vine health and consistent wine quality from season to season ultimately delivering a more balanced and premium wine product.

As the years go by, Anthony says he is achieving greater consistency in tonnes at a higher premium. Where he used to achieve 5.7 tonnes/hectare, he is now harvesting between 6.7-7.0 tonnes/hectare.

Anthony and Jodie Scholz are innovative 'wine growers' who grow grapes for the specific needs of fruit purchasers. They have been featured in several industry publications for their sustainable water management strategies and Barons of the Barossa recently declared Anthony Vigneron of the year for 2011.

"NPSI is providing good direction in a changing climate, allowing us to develop and grow consistent yields."

Application of straw mulch under vine at Scholz Estate

Impacts of making changes

Anthony believes that NPSI is *providing relevant and timely information in a changing climate,* allowing him *to develop and to grow consistent yields*. Ultimately improved water use and improved soil biology will result in improved vine health and allow vineyards to deliver a sustainable premium product from year to year.

He says that he will continue to monitor soil health, use straw mulch and allow more volunteer grasses to grow under vine, to improve water infiltration. These strategies also ensure he is using less of the natural water resources.

As a result of the straw mulch, Anthony has also been able to reduce his chemical use. He notes in the last two years he has not applied any herbicides to blocks where straw mulch has been applied.

Relevance to others

Anthony explains, water is water, no matter what crop is grown and these strategies and water principles are relevant and transferrable to any industry. Environmental and sustainable practices are the key to a healthy and profitable wine growing industry in challenging times. *I cannot see that it is achievable without the support of our industry bodies in a time of major change. I feel research and education is the key to keeping our industry strong.*

Supporting Material

NPSI website www.npsi.gov.au
UAD25 Milestone 9 Final Report
Scholz Estate website www.scholzestate.com.au

Further information

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