



Reducing vineyard energy use

Fuel and electricity use are both major costs and sources of greenhouse gas (GHG) emissions in vineyards. Pumping irrigation and tractor use are the two largest sources of energy use in vineyards. If energy use is high, it is important to consider whether alternative practices with potential to reduce energy demand can be implemented. This column provides answers to questions about ways to reduce water demand or the need to run tractors; however, it is recommended that growers carry out vineyard trials to evaluate changed practices at the local scale.



Undervine mulching can reduce irrigation and pumping costs.

Can I save water and energy by using mulch in vineyards?

Undervine mulching of vineyards enables vines to withstand extreme heat and drought. It can increase soil moisture levels, lowering the ambient temperature of the vineyard and increasing the ability of vines to maintain evaporative cooling. Mulching also increases soil organic matter and may increase soil carbon sequestration.

Vineyard trials undertaken at Eden Valley, in South Australia, investigated the effects of wheaten straw mulch applied undervine on soil temperature, soil moisture, grape yield and production costs over three seasons. Soil temperature

decreased and soil moisture retention improved, saving an average of 0.5ML/ha. The increased yield offset the cost of purchasing and spreading the straw mulch, resulting in a net financial gain. Results were also analysed to quantify the effect of straw mulch on GHG emissions, with reductions seen from reduced water demand by the vines and therefore less electricity used to pressurise irrigation.

The use of mulch in Australian vineyards has not been widely adopted. It is likely that its use is limited by the cost of purchase and spreading, the requirement for specialised spreading equipment and some of the risks associated with its use. More information about the mulch trial can be found in a case study on the AWRI website.

How can I minimise the number of tractor passes in the vineyard?

Using sheep to control midrow and undervine growth is one option to reduce the need for slashing and spraying and therefore cut vineyard management costs and GHG emissions. In Australia, sheep are typically grazed in vineyards between harvest and budburst. Sheep are generally not used during the growing season because they eat grapevine leaves required for photosynthesis and protecting fruit from sunburn.

In Orange, New South Wales, trials were conducted in a 100-hectare portion of a 508-hectare vineyard to assess the impacts of sheep on vineyard inputs, especially fuel use. Introducing sheep into the vineyard was found to



provide a source of revenue from sheep agistment and reduce expenses associated with slashing and herbicide spraying. These results prompted the vineyard manager to graze sheep across the entire vineyard the following year. The sheep grazing eliminated two passes through the vineyard that would otherwise have occurred (one for slashing and one for spraying herbicide), resulting in fuel savings, lower GHG emissions and less money spent on chemicals.


Before considering the use of sheep in a vineyard, it's important to be aware of the agrochemicals that have been used in that vineyard. Always read the chemical label and be aware of grazing restrictions or withholding periods for grazing. It is also important to inspect the sheep before they enter the vineyard to ensure they do not introduce new weeds. A case study on grazing sheep in vineyards and a previous 'Ask the AWRI' column on this topic (May, 2016) are both available from the AWRI website.

What are the benefits of using variable irrigation strategies?

In some situations, diesel savings can be achieved by reducing the volume of irrigation applied to vines each year. In Padthaway, South Australia, a vineyard trial was conducted to investigate whether a significant portion of a 70-hectare vineyard planted on deep sand with underlying clay and a very high water-holding capacity could be isolated and irrigated separately from the rest of the vineyard. Ten years after they were planted, the vines growing in this part of the vineyard had established a strong, deep root system and were significantly more vigorous than in other areas of the vineyard. Several seasons trialling reduced irrigation volumes showed that these vines can be grown with minimal or, in some years, no irrigation while maintaining good yields and fruit quality. The reduction in irrigation applied to the vineyard coupled with other energy reduction strategies, including the use of sheep in the vineyard, resulted in a significant decrease in the amount of energy used in the vineyard.

How do I know whether these initiatives will work in my vineyard?

Vineyard trials can be an excellent way to refine management practices, improve quality or look for solutions to problems. Critical to the success of a vineyard trial is to identify what is trying to be achieved and to pose a question to answer, for example: can I save energy by only irrigating at night? A next step is to collect information about the topic from reputable sources. This will assist with defining treatments and a trial design to give the experiment the best chance of success. Working with others in the same region can be beneficial, especially when the question is considered a regional priority. Working collaboratively can help to share the work involved in running the trial and may qualify the group to apply for project funding.

The AWRI helpdesk can provide advice to growers on planning and implementing vineyard trials. Contact the helpdesk via helpdesk@awri.com.au or 08 8 313 6600. The Viticare On Farm Trials Manual is also a great resource, available for download from the AWRI website. 



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