



Two Hands Wines vineyard at Seppeltsfield, in South Australia's Barossa Valley — one of six sites in the region where the company has installed sap flow sensors.

Getting a sense of saving water and improving wine quality

In what is believed to be an Australian first, sap flow sensor technology is being used in a commercial vineyard. Installed by Two Hands Wines, based in South Australia's Barossa Valley, viticultural manager Travis Coombe walked journalist **Samuel Squire** through one of its vineyards and explained how the technology would not only save water, but improve the overall quality of their wines.

The Barossa Valley's Two Hands Wines has partnered with French company Fruition Sciences to install sap flow sensors across several of its vineyard sites to measure and monitor the transpiration rate of vines and, in turn, ensure they receive the right amount of water at the optimal time.

Although monitoring sap flow in vineyards is not a new concept, Fruition Sciences has developed a dashboard that enables the data collected by the sensors to be interpreted in a straight-forward manner that Two Hands can readily use in its decision-making process. The on-the-vine sensors monitor vine transpiration, record the data and then send it in real-time to Fruition Science's web interface where it can be analysed by vineyard staff.

Two Hands Wines' viticultural manager Travis Coombe has installed sap flow sensors on vines at six of Two Hands' vineyards. He believes the technology will bring significant water-saving costs and improve overall grape quality.

"Sap flow sensors are essentially a heater system that send a heat pulse into the

vine to measure the amount of sap going up and down the vine — it looks to see if there is enough available water to keep the vine healthy," he said.

"It then records that data for the viticulturist to then see if the vine is working to its full potential as it picks up when the vine is starting to undergo stress. From there, I can then decide to water the vines when they need it rather than when we think they need it, which is how we usually water them.

"We have installed these sensors on vines across six sites, with two vines per site. We picked areas where there is similar soil types and I also have a block as a control, which I water as I otherwise would do before I had the sensors. The reason being is so I can compare the new data with how the control is performing to determine how beneficial the sensors are to monitoring water needs and usage."

Coombe said the main reason for implementing the system is to reduce the amount of water needed to keep their vines healthy and performing optimally. He said it was a necessary measure given the current drought.

"In Australia, growers are heavy irrigators and we need to work out ways to reduce our water usage, especially as we are amid a difficult drought climate," he said.

"Hopefully we will start to use between 20 to 30 per cent less water within the first year thanks to the accurate monitoring ability these sensors provide. With usage savings also comes a cost saving too, which will be beneficial to the winery.

"Although that is our target for the first year, this time is mainly about data collection. The data we get from these sensors allows us to accurately know when the vines need water to keep them healthy, reducing stress on them will, in turn, improve the quality of the grapes when it comes time to harvest."

Benefits outweigh costs

It is believed Two Hands is the first winery in Australia to implement this technology. Coombe admits this has meant the technology has proven to be somewhat expensive. But he believes the benefits far outweigh its costs. He added



Two Hands viticultural manager Travis Coombe checks a sap flow sensor (left) and the relay that sends the data collected by the sensors to a web interface (right).

that the technology has been used for a lot longer in France and the United States.

“I first saw this technology being used in Bordeaux, France. The French irrigate a lot less in their vineyards than Australians do so they made full use of using less water. In California, with their lack of water, they use these sensors to look at how they can grow grapes with consistent yields year in year out with a lot less water,” he said.

“I thought that there was no way I wouldn’t at least attempt to implement that technology in our vineyards back home in the Barossa Valley. It could save so much water during the drought — it was a no brainer.”

Coombe explained that the data recorded by the sensors is sent to Two Hands on-site weather station which in turn is sent to Fruition’s 360viti web interface. It is here that Coombe can effectively ‘talk’ to his vines to determine when they should be more efficiently watered — a process that could save up to 50% of their current water usage in the long run, year in year out.

He said Two Hands had purchased enough sensors to ensure an effective data pool could be maintained. This equated to a total cost of about AUD\$5000 per site, with each sensor priced at roughly AUD\$400 each.

“To actually make use of the sensors, your vineyard must have a weather station for the data to relay to 360viti that you can then see and utilise. Without a weather station, you can’t use the data. If your vineyard doesn’t have a weather station, there are shared ones, at least in the Barossa, that wineries use,” he said.

“Ultimately, it depends on how many hectares of vineyard the winery has in order to justify the expense. However, I can say that these sensors show great promise for future water costs and using a lot less water.

“What wineries in America and France are seeing is an overall improvement in the quality of their winegrapes. In using the data that the sap flow sensors provide, growers are able to water their vines only when they need water. It used to be that we would water our vines when we thought they needed it, which uses more water than necessary. So this data effectively removes all doubt and keeps vines growing optimally and improves grape quality.

“Provided the technology works for our benefit in Australia I hope more wineries start to implement it across their vineyards. Saving water on a large scale will aid drought relief.

“The technology has been working in France and America for years, so I expect the same results here too.”



The weather station in Two Hands’ Seppeltsfield vineyard, which assists in relaying the data collected by the sap flow sensors to a web interface where it can be analysed.