# PIRSA AgTech Growth Fund

**VITICULTURE**
INDUSTRY

## Amanda Mader

# Tracking continuous bunch weight measurement from veraison to harvest

For almost 30 years, Amanda Mader has worked as a technical viticulturalist for large wineries and independently. A typical working day varies from designing spray and vine nutrition programs, to pest and disease monitoring, to soil sampling, irrigation management and everything in between.

She also works alongside her husband Mark managing their own 30-hectare vineyard in the Barossa Valley which produces premium boutique wine.

A critical and labour-intensive job which both viticulturalists and growers tackle every year is yield estimation, which is done by weighing bunches of grapes. This is normally done between veraison – when the grapes start to change colour, indicating the onset of ripening – and harvest.

This is an important task because it allows wineries to finalise set contracts with growers and to plan logistics such as ordering barrels, yeast, bottles, staff requirements for vintage and planning exports.

In an effort to automate bunch weighing, Amanda successfully applied for a grant through the Department of Primary Industries and Regions' (PIRSA) AgTech Growth Fund. This funding enabled Amanda and her business partner Mason Erkelens to set up a small company called Capture Actual Time (CAT) and produce eight in-field loggers for real-time bunch weight sensing.



Government of South Australia
Department of Primary Industries and Regions

# Industry challenge

While it is a critical viticultural task, the traditional form of yield estimation does have its problems. It is labour-intensive because it requires viticulturalists to strip vines, count bunches and weigh bunches from across different varieties and areas.

In some cases, growers are losing up to 10 per cent of their fruit through this process by this destructive method.

“The other problem is that estimations could be out by plus or minus 30 per cent, particularly if there are hot spells, significant rainfall events or if irrigation is mistimed,” Amanda says.

“Our real-time bunch weight sensing technology could help us to understand bunch weight response to climatic conditions such as heatwaves, cool spells and rainfall and, with that unique dataset, we can also help growers to refine their water-use as well.

“More importantly, if we can monitor bunch weight in real-time and how irrigation is influencing the crop, we can then pick an optimal harvest date and therefore improve the quality of the wine.”

# Approach

CAT’s real-time bunch weight measurement devices use load cell technology in conjunction with Internet of Things (IoT) sensors. The newly designed circuit board within the units is powered by a combination of lithium batteries and solar.

The initial eight units have been trialled in the key South Australian winegrape regions of the Barossa Valley, Eden Valley, McLaren Vale and Coonawarra and in different varieties during the 2022-23 season.

The aim of the trials was to get yield estimation using the CAT technology down to within 10 per cent accuracy.

# Outcomes

Data is still inconclusive as Amanda waits for input from all the vineyard and winery collaborators involved in the trial.

However, some samples have been within the 10 per cent range, which is exciting news for Amanda.

But even more exciting is the interest from industry in the fledgling technology, with CAT producing more units and installing them in vineyards across Australia and the world.

“We have some producers who want to install 15 of the sensors across their vineyards for the 2023-24 growing season and others who are looking at installing 10 sensors,” Amanda says.

“We installed 12 units during August 2023 in three vineyards in the Napa Valley, California, which we are really excited about as it gives us the opportunity to trial and refine the technology in the northern hemisphere.

“We are also installing 15 units in New Zealand for a company that manages 20 per cent of the country’s vineyards.”

## Future opportunities

The opportunities for the CAT technology are significant and, depending on how the next batch of trials go, it could be a game-changing tool for the viticultural sector.

“We are currently working with water and nutrient management software providers SWAN Systems and Green Brain to integrate our dataset onto their platforms,” Amanda says.

“That means when someone logs into those platforms to check their soil moisture and schedule irrigation, they can also see bunch weight and use that information to assist in their management decisions.”

CAT is also trialling its technology with other crop types such as citrus, avocado, apples and cherries.

But it is another innovation in the CAT technology for winegrapes which has piqued the interest of even more growers.

“We are going to trial a spectral sugar sensor which will be an add-on to the existing units,” Amanda says.

“If we can measure the sugar content of grapes in conjunction with bunch weight then that will enable us to refine management even further, as well as saving on labour costs.”

## Producer’s view

One of the collaborators in the trials of the real-time bunch weight sensor is Barossa Australia, the peak wine and tourism industry body which initiates and delivers projects for the local community.

Barossa Australia has been using the CAT technology to track the effect of different under-vine and mid-row treatments on bunch weight.

Barossa Australia viticultural development manager Nicki Robins says the technology has been a fantastic addition to their trials.

“When it rained during ripening last season, we could easily see how quickly the bunch of grapes took up the moisture,” she says.

“Our initial thinking was that it took a couple of days, but by using the CAT technology, we could see the moisture was taken up by the berries in only four or five hours. We could also see how quickly the bunch weights dropped when the berries dehydrated.

“These are fantastic learnings for everyone in the supply chain.”

Nicki sees great potential in practical application of the CAT technology across all wine regions.

“For growers, it will be a useful tool for their negotiations with wineries, particularly knowing how much weight bunches might be losing in a heatwave and the effect it has on a crop.”

## Contact

For further information about the PIRSA AgTech program:

Email pirsa.agtechresearchfarms@sa.gov.au

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