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Aussie Wine Group and MOG Removal Trials – Vintage 2021

Background

Grape harvesting mechanisation in the 1960s was a gamechanger for Australian growers and winemakers. But with the benefits of faster, more efficient harvesting came the downside of MOG (matter other than grapes) – an issue that continues to be a headache for the sector more than half a century later.

The past few decades have seen significant innovation for mechanical harvesters. Grape growers now have a range of options for on-board 'selective' harvesting capability. This technology allows growers to remove most of the MOG from their picks through a series of sorting mechanisms, delivering clean fruit to the winery.

There are three distinct advantages in delivering MOG-free picks: wine quality and stylistic uplift, reduced costs in transporting MOG to and from the winery, and winery throughput optimisation. The challenge for many producers, including the larger vertically integrated wine companies, is understanding who in the supply chain pays for this capability. Onboard selective harvesters are expensive, although many contractors and third-party harvesting services now offer these units as part of their fleet capability.

Aussie Wine Group (AWG) are an Adelaide-based company who have developed alternative selective harvesting technologies. AWG's MOG-removal units are stand-alone systems that can be deployed on harvest bin trailers, or retrospectively installed onto the boom arm of harvesters. Both types of installation allow growers to use existing harvesters, but gain the benefits of clean, MOG-free picks. Importantly this technology is an affordable alternative to on-board selective harvesters. AWG have developed two variations of the unit, a Premium unit that is designed to handle smaller quantities of fruit, but focuses on retaining berry integrity, and a high volume unit that allows growers to process large crops without compromising the speed of the harvest.

2021 Trials

As a means of testing, trialling, and understanding the benefits of their technology, Aussie Wine Group undertook a series of technical trials in the season of 2021. These trials were conducted across several wine regions in Australia, harvesting wine grapes for three small wine producers as well as four large vertically integrated wine producers. The objectives of these trials were to:

1. Demonstrate the functionality and deployment options of the AWG equipment in across different harvesting configurations, including:
 - a. Retro-fitted to harvester boom-arm

- b. Premium selective-harvesting – trailer mounted
 - c. High-volume selective-harvesting – trailer mounted
2. Measure and quantify the reduction in MOG using the above methods compared with no MOG removal capability in the vineyard. MOG was measured by weight as recorded at the winery, and then expressed as a percentage of the total harvest weight.
 3. Understand the impact of MOG on winery throughput by recording the speed of processing time at the winery for fruit harvested with no MOG removal, and with MOG removed using the AWG units.
 4. Understand the impact on wine quality by processing side-by-side trials of grapes with MOG removed, and without MOG removed. Wine quality was to be measured with flavour and colour analysis from wine samples from red and white grapes.

Wine Australia and Aussie Wine Group undertook several pre-vintage workshops with growers to understand their specific challenges and set expectations around outcomes and how they would measure success within the trials. Trial partners committed resources, both in the vineyard and at the winery, to support the trials. This was pivotal in gathering not just empirical data from the trials, but in understanding the anecdotal negative impacts of MOG across the supply chain from a people-perspective.

Two of the three smaller producers had trialled the technology previously and were now using this in a commercial capacity. Their outcomes were focused on measuring the speed and efficiency of the AWG MOG removal units, as well as measuring the integrity of the berries post-harvest. These trials were mostly anecdotal, where vineyard managers, winemakers and vineyard operators were consulted to compare these techniques and technologies with previous experiences. The third small producer was primarily interested in understanding the wine quality outcomes of using the AWG MOG removal units, with an understanding that berry integrity was high with this technology, driving optimal wine quality outcomes. Wine sampling to determine variation in colour and flavour profiles was required to understand the effect of MOG in premium wine production.

The larger wine production businesses were evaluating the AWG MOG removal units for the first time. Whilst these producers had previously used other selective harvesting equipment, their primary interest was in comparing the AWG units with alternative technologies, and how best to deploy these to vineyards that might not usually have access to selective harvest equipment. To ensure the homogeneity of the trials, sampling was conducted in the same block with every second row being picked (same block) for the different treatments, or adjacent blocks containing vines of the same age, variety, structure and quality (side-by-side). The fruit from the side-by-side picks were scheduled for the same load and crushed into the same fermenters at the winery.

Data was captured at the winery for five trials, which involved fruit being picked by harvesters without any selective harvesting capabilities. Fruit harvest was split evenly using two methods, one with fruit being picked straight into the grape bins (with no MOG removed) and the second being harvested by the same harvester, but utilising AWG's sorting technologies. Method of transportation (i.e. standard 2.5T polyethylene or steel grape bins loaded onto B-double trucks) and transportation times were consistent for both samples.

Raw samples (containing MOG) and the MOG-free samples were processed separately at the winery. MOG removed at the crusher was weighed for both samples and recorded for each delivery of fruit. Where possible the time taken to crush the loads was recorded. Several processing sites did not have variable speed crushing facilities, and the only means of

analysing throughput was to record the number and approximate time of stoppages caused by MOG. The MOG grade as determined by visual inspection at the winery weighbridge was recorded for each sample.

Results

Trial 1 - Padthaway Riesling	Unsorted	AWG Sorter
Tonnes Picked	87.02	163.92
Tonnes MOG (recorded at winery)	1.98	0.62
% MOG	2.28	0.38
MOG Grade	3	0
= 6 x reduction of MOG		

Trial 2 - Barossa Cabernet Sauvignon	Unsorted	AWG Sorter 1	AWG Sorter 2
Tonnes Picked	10.88	9.38	21.74
Tonnes MOG (recorded at winery)	0.29	0.024	0.042
% MOG	2.66	0.26	0.19
MOG Grade	3	0	0
Winery Throughput (Tonnes per minute)	0.286	0.36	0.51
Reduction of MOG		x 10.2	x 14

Trial 3 - Padthaway Cabernet Sauvignon	Unsorted	AWG Sorter
Tonnes Picked	9.67	9.37
Tonnes MOG (recorded at winery)	0.16	0.005
% MOG	1.65	0.05
MOG Grade	2	0
= 33 x reduction of MOG		

Trial 4 - Padthaway Cabernet Sauvignon	Unsorted	AWG Sorter
Tonnes Picked	8.83	10.08
Tonnes MOG (recorded at winery)	0.12	0.002
% MOG	1.36	0.02
MOG Grade	NA	NA
= 68 x reduction of MOG		

Trial 5 - Padthaway Cabernet Sauvignon	Unsorted	AWG Sorter
Tonnes Picked	36.12	36.12
Tonnes MOG (recorded at winery)	0.561	0.16
% MOG	1.55	0.44
MOG Grade	1	0
= 3.5 x reduction of MOG		

Subjective Observations

Evidence of the value of MOG removal for the small production sites was anecdotal and based on feedback from harvest operators, vineyard managers and the wine makers receiving the fruit.

- Harvesting speeds using the AWG MOG Removal Units were unchanged in most experiences, and slightly slower speeds were experienced (<5%) with the Premium unit to ensure quality and berry integrity. It was widely accepted that slower speeds are common when harvesting premium fruit regardless of equipment selection.
- Berry integrity is a major advantage of these units, compared with other forms of selective harvesting. Harvested berries remain whole (i.e. are not macerated in the process of being sorted in the selective system). Whole berries contribute to wine quality outcomes, reducing contact between juice and split berries - a process that can alter the phenolics of a wine before production has begun.
- Compared to other selective sorting systems, the AWG units retain a high percentage of the fruit harvested from mechanical harvesting methods. The method of destemming fruit and sorting the berries from the MOG is a more controlled and softer process as a result of the three-tier system of sorting on the AWG sorter. Vineyard managers unanimously commented positively on the retention of fruit throughout the harvesting process, where some other systems can "throw" berries out of the sorting mechanism and are not captured.
- Deployment, installation, training and commissioning of the units requires expertise and resourcing from a technical expert. The time taken for training is usually less than an hour, and operators are equipped to operate, adjust and maintain the equipment themselves. Technical issues and mechanical failures do require a trained technical support resource.
- Affordability is a major issue for a lot of growers in accessing selective harvesting capabilities. The compatibility of the AWG cleaning systems allows growers to selectively harvest without having to upgrade their existing equipment. The chute-mounted system can be retrofitted to older harvesting technology, whilst the bin-trailer deployment enables a hyper-mobile and easily deployable fleet of capability that complements a grower / contactor's existing fleet configuration.
- Complementing the advantage of affordability is the enablement of more selective harvesting throughout the vineyard portfolios. The ease-of-deployment and versatility of the AWG equipment allowed all trial growers the opportunity to harvest blocks that would previously not have been selectively harvested. This provides greater flexibility in the wine making process with the delivery of clean fruit.
- There are significant efficiencies to be gained at the winery / processing site by removing MOG from grape receivals. Due to the busy nature of the vintage period a lot of empirical measurement is often overlooked by wineries, although it is commonly acknowledged that processing speeds at the crusher can be significantly compromised due to the slowing of systems to manage MOG through winery crushers. Several instances of grapes being delivered with high MOG contents required crushing speeds to be reduced by over 100% to manage the processing. Alongside the which there were numerous occasions where crushing was halted entirely whilst operators removed excessively large and damaging pieces of wood and vineyard posts from the crusher.

Discussion

The collaborative trials undertaken between AWG, Wine Australia and the various trial partners in vintage 2021 were overwhelmingly successful. Outcomes across both large and smaller producers demonstrated unanimous positive outcomes for winery efficiency and wine quality production. Feedback from all trial partners indicated their support of the AWG systems. Further results from wine analysis will provide insights into the long-term wine quality outcomes of producing wines from MOG-free grape picks.

There are several on-going activities to further validate this technology and provide objective measurements about the value and cost of MOG. Additional trials at wineries to measure the cost of inefficiencies caused by MOG being delivered to processing sites. Recording differences in processing speeds across several days to compare MOG-free and MOG-affected fruit deliveries, and recording the number and temporal impact of downtime caused by MOG-related breakdowns at crusher sites will provide greater insight into the actual cost of MOG for wineries.

What is clear across the industry is that, whilst the challenges of MOG are unanimous, how best to manage this and who pays for the solution remains contentious across the wine supply chain. The value of removing MOG from grape harvesting is varied amongst producers, as the affordability and return on investment for cleaning systems is uncertain for many growers. As a means of providing growers with a cost-effective, reliable and well-supported technology for harvesting the AWG cleaning systems have proven themselves to be one of the leading technologies on the market.

Additional Resources:

Wine Australia Article: [MOG – What is the Impact and Why Should You Care?](#)

Wine Australia Article: [A Spotlight on MOG at the Weighbridge](#)

Wine Australia Article: [Applying Technology to the Question of Grape Quality](#)