

Wine  
Australia

GROWERS & MAKERS

# Grapegrowing and wine production

Updates on research and innovations



# Pests and diseases



A mature scale with eggs. Photo: David Logan

## Scale

Grapevine scale insects can:

- reduce vine health and grape yield through sap feeding
- cause fruit rejection due to honeydew and sooty mould contamination
- spread grapevine viruses, compounding vineyard decline

Currently, scale insect populations are difficult to manage because:

- little is known about the dominant species or their life cycles in Australian vineyards
- existing spray programs may be poorly timed or ineffective against overwintering stages
- export residue limits and resistance management restrict chemical options
- natural enemy populations may be disrupted by current practices

There's currently no shared national understanding of how grapevine scale behaves or the best, sustainable ways to manage it across Australia's wine regions.

### Filling the knowledge gap to save money, time and vines

A three-year project is currently underway by the South Australia Research & Development Institute and partners which will result in the development of more effective and sustainable control strategies for scale.

For growers this means:

- reduced crop losses
- decreased fruit rejection
- improved vine health
- reduced residue risks, protecting market access for export products
- identification of new options to minimise reliance on broad-spectrum insecticides



Stunted shoots and dieback are symptoms of trunk disease. Photo: Mark Sosnowski

## Grapevine trunk disease

Vineyards with grapevine trunk disease may:

- experience reduced vine vigour and early vine decline
- suffer yield loss and reduced grape quality
- face costly replanting and loss of vineyard profitability

Trunk disease management is challenging because:

- pruning wounds are highly susceptible to infection
- biocontrols and alternative treatments have varying levels of efficacy
- there is limited knowledge of infection pathways and infection thresholds
- young vines under stress are more vulnerable

### Project helping growers to avoid unnecessary costs

Thanks to researchers from the South Australian Research and Development Institute and Charles Sturt University, we're learning more about grapevine trunk disease infection pathways, how to detect them early, and how to manage them more effectively. This includes:

- knowing when pruning wounds are most susceptible to infection, meaning growers can better time the application of wound protection products
- new diagnostic tools to ensure a faster, more accurate identification of grapevine trunk disease in both nurseries and vineyards before symptoms appear



Read the final report on the most recent project: Grapevine trunk disease management for vineyard longevity in diverse climates of Australia

Research partners



Charles Sturt  
University

Wine  
Australia



Wine  
Australia



Read more about grapevine scale  
and sooty mould



Phylloxera adults, nymphs and eggs. Photo: Agriculture Victoria

## Phylloxera

Grapevine phylloxera is a highly destructive, soil-borne insect pest that feeds on vine roots and causes vine decline and death.

Currently, phylloxera is:

- spreading beyond historical boundaries in Victoria
- difficult to detect early due to its largely subterranean lifecycle
- challenging to eradicate due to its subterranean lifecycle phase, limiting tools for large-scale surveillance and creating difficulties for enforcing biosecurity measures
- a major risk to vineyards planted on own roots, which remain highly susceptible

### New tools for surveillance and management in the pipeline

Wine Australia has partnered with Agriculture Victoria Research in a three-year project that will deliver new phylloxera diagnostics, surveillance tools and disinfestation protocols for the rapid detection, containment and management of phylloxera outbreaks — protecting phylloxera-free regions and reducing impact in infested areas.

Wine Australia is continuing to invest in a breeding program to produce a range of grapevine rootstocks which have robust resistance to phylloxera, are suited to Australian conditions and meet grower requirements. Read more about this in the Grapevine Planting Material section.



Read a summary of the current project into the development and adoption of new tools for the surveillance and management of grapevine phylloxera

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## Powdery mildew

Powdery mildew is a fungal disease that damages leaves, shoots and fruit, reducing vine vigour, sugar production and wine quality.

If not controlled, it can:

- cause leaf loss, leaf damage, stunted growth and reduced sugar production
- cause off flavours in wine
- result in downgraded or rejected fruit

### New control method being trialled

One way to control powdery mildew is to plant resistant grapevine varieties which have been developed over many years by the CSIRO in partnership with Wine Australia (read more about these varieties in the Grapevine Planting Material section).

Traditionally, powdery mildew is usually controlled with fungicides. But a two-year trial supported by Wine Australia and Agri Automation is testing a chemical-free alternative.

The system combines:

- UVEX – a UV-C (form of ultraviolet light) light unit that damages fungal cells at night
- Burro – an autonomous electric vehicle that carries the light unit

In its first season (2024-25) at Best's Wines Great Western, in Victoria, UVEX largely suppressed powdery mildew. Year two results are expected to be even better.



Read more about the UVEX/Burro trial at Best's Wines Great Western.



## Virus diagnostics

Grapevine virus infections in commercial vineyards and propagation material can:

- reduce vine vigour and grape quality
- lower yields and vineyard profitability
- cost the sector millions annually in lost production

Currently, virus management is constrained by:

- a lack of best practice guidelines for virus sampling and diagnostics in propagation assets
- no national consensus on which viruses should be excluded from certified planting material
- varying diagnostic methods between labs, reducing confidence in test results

There is currently no nationally consistent framework for reliable sampling, testing and management of grapevine viruses in commercial vineyards and propagation material.

Agriculture Victoria Research has embarked on a three-year project that will deliver science-based virus sampling and diagnostic protocols to ensure reliable detection of proscribed viruses in propagation material. This will underpin growers' access to clean planting material, protecting the health and productivity of Australia's vineyards.



[Read the project summary](#)

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## Fungicide resistance

Managing grapevine diseases, particularly powdery and downy mildew and botrytis bunch rot, is getting harder because of resistance in some pathogen populations to the fungicides growers use to control them. When these diseases stop responding to sprays, growers can face increased production costs and spray program failure.

Although lab tests have shown resistance to fungicides, just how widespread this resistance is and how well different fungicides work in vineyards against various pathogen populations hasn't been clear. There has also been a lack of certainty around how lab test results relate to whether a spray will fail out in the field.

### The solution

A Wine Australia-funded project set out to better understand how fungicide resistance is affecting vineyards in Australia. All three major grapevine diseases showed signs that they're becoming less sensitive to many of the sprays tested. In some cases, full resistance was confirmed. For example:

- powdery mildew: resistance has been detected in three groups of fungicides (Group 3, 11 and 13)
- botrytis bunch rot: resistance has been detected in three groups (Groups 9, 12, and 17)
- downy mildew: resistance has been detected in two groups (Groups 4 and 11)

When resistance is found, it's recommended that those fungicides no longer be used, and that growers keep a close eye on any signs of reduced sensitivity to others.

The project also refined several tools and techniques to help monitor resistance more effectively. For example, the South Australian Research & Development Institute (SARDI) developed in-field spore traps and DNA-based testing methods that enable rapid detection of fungicide resistance in key grapevine pathogens, allowing growers to adjust spray programs before resistance causes crop loss or spray failure.



[Read more about this project](#)

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# Smoke taint



## Taking the guesswork out of smoke taint risk

Developed by Victoria's La Trobe University and supported with funding from Wine Australia, a smoke sensor system that provides a real-time assessment of smoke taint risk in vineyards is close to being ready for roll-out across the sector with the help of commercial partner Goanna Ag.

Prototypes of the Wine Industry Smoke Detectors (WISDs) – colloquially known as ‘wizards’ – have been trialled in vineyards in north-east Victoria in recent years. They work by measuring the smoke dose in the vineyard, which is used to calculate a risk rating for smoke taint, drawn from 10 years of smoke, grape and wine data collected by La Trobe.

This data links smoke dose to smoke composition, phenol levels in grapes and wine and their sensory outcomes in wines. It also incorporates the critical risk factors for smoke taint, including burn conditions, distance from the burn, grapevine variety and the timing of exposure during the season – and delivers an overall risk rating as a traffic light indicator.

In this way the WISDs give vineyard managers an immediate heads-up about whether smoke in their area is a threat to their vineyards. This information can be used to make informed decisions regarding grape testing, vineyard management and winemaking strategies to minimise the risk of smoke taint in wine.



Find out more about WISDs



Simon Tolley and Hugh Holds

## Alternative income stream from smoke-affected fruit

The ability for wine producers to turn smoke-tainted fruit into a commercially-viable brandy product has been demonstrated through PhD research funded by Wine Australia.

Distiller Hugh Holds used smoke-tainted fruit from the vineyard of Simon Tolley Wines at Woodside, in the Adelaide Hills, to make a ‘smoked’ brandy. The fruit was deemed unsuitable for wine production after it was impacted by the 2019 Cudlee Creek bushfires.

The aroma compounds that lead to smoke taint in wine – principally phenol, guaiacol, eugenol and m-/o-/p- cresol – are the same ones that typically drive the smoky characteristic in premium whiskies, especially those produced with peat smoked malts, such as the famous malt whiskies of Islay in Scotland.



Find out more about the smoked brandy project

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# Grapevine planting material



## Breeding for disease resistance

Since the 1990s, Wine Australia has co-invested with Australia's national science agency, CSIRO, to breed new grapevine varieties with resistance to powdery mildew and downy mildew.

These new varieties significantly reduce the need for fungicide application which lowers chemical use and vineyard emissions, reduces the costs of production and crop loss, and improves the sustainability of the Australian wine sector.

The first-generation vines (Gen1), which contain one gene each for powdery and downy mildew resistance, are currently undergoing evaluation by industry partners under agreements with CSIRO and several have commercial potential.

Second generation vines, which have two genes each for downy and powdery mildew resistance, have also been bred by the team at CSIRO. Wine Australia is currently working with the NSW Department Primary Industries & Regional Development to evaluate over 500 Gen2 mildew-resistant selections across two field sites.

As for the Gen1 varieties, the 20 'best' reds and whites will be selected for evaluation in subsequent projects, with the best-performing lines progressed to commercial release as potentially 'no spray' vines.



Read more about the grapevine breeding program

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## Rootstocks

Rootstocks are currently Australia's only defence against the soil-borne insect phylloxera. With many imported rootstocks unsuited to Australian conditions, CSIRO began in 1967 to tailor breeding and selection of rootstocks for Australia.

What followed was a long-term, significant investment between Wine Australia and CSIRO to breed new winegrape rootstocks with increased tolerance to a range of stressors, such as drought, heat, salinity, phylloxera and nematodes.

Following the release of three rootstocks in 2005, another four were delivered in 2023. These have improved resistance to phylloxera and nematodes and offer a range of vine performance, fruit composition and grafting characteristics. All seven rootstocks are commercially available from a number of grapevine nurseries.

A second generation of durable resistance rootstocks is currently being developed. These have two genes each for resistance to phylloxera and root knot nematodes, combined with the introduction of traits for resilience to a changing climate.

Wine Australia's Grapevine Rootstock Selector ([grapevinerootstock.com](http://grapevinerootstock.com)) helps growers determine the rootstocks that will best suit their vineyard characteristics and variety selections. The tool is currently being updated to bring together the most recent knowledge from Australian and international research about the specific characteristics of different rootstocks. Your local grapevine nursery is another excellent source of advice.



Read more about the rootstock breeding program

## National Grapevine Collection Program

With the backing of Wine Australia, the National Grapevine Collection (NGC) program is establishing a nationally coordinated system to support the management of the sector's valuable genetic grapevine resources and ensure the quality of grapevine propagation material.

Ongoing activities within the program include:

- establishing mothervines for a high integrity and security collection
- supporting the nuclear collections of the Western Australian Vine Improvement and South Australian Vine Improvement Associations
- identifying and virus testing unique priority varieties and clones in the collections of CSIRO and the South Australian Research & Development Institute
- virus testing the Australian Vine Improvement Association collection
- co-investing in virus elimination projects
- establishing a centrally maintained, publicly available, national database of grapevine varieties, clones, rootstocks and propagation assets
- contributing to the development of the grapevine certification program and associated propagation standard (see below for further details)
- addressing clone identification challenges.

This program will ensure the grape and wine sector has long-term access to diverse, identity-verified planting material of high health status.



Read an initial report from the NGC coordinator



Read how this work is already benefiting the sector in a related project

## Confirming the identity of Australia's vines

Until recently, grapevine identification:

- relied heavily on documentation and record-keeping, which may be inaccurate or missing
- could not consistently distinguish between clones using traditional genetic markers
- did not capture the full genetic diversity present in Australian vineyards, especially heritage plantings
- did not provide Australia's growers, winemakers and propagators with confidence on the identity and provenance of their grapevine varieties and clones

Wine Australia has been funding work at the AWRI for over a decade to allow clonal identification of vines based on DNA analysis. This database provides robust identification of the majority of grapevine varieties and clones of economic importance in Australia, including Shiraz, Chardonnay, Riesling, Pinot Noir and Cabernet Sauvignon.

The AWRI has recently launched a commercial service for clonal identification of grapevine material after a successful beta-testing phase with samples of known or suspected identity from the propagation sector.

The technique is also being applied to heritage vines from vineyards planted before 1900. More than 300 individual vine samples have been obtained from 53 sites across eight different GIs in South Australia, Victoria and New South Wales and covering seven varieties, namely Shiraz, Semillon, Grenache, Cabernet Sauvignon, Riesling, Chardonnay and Sauvignon Blanc. This will provide insights into the origins of Australia's unique plantings and an indication of how these relate to current commercially available planting material.



Read more about the project



Find out more about the clonal identification service

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# CCA posts

## Addressing our stockpiles of CCA posts



- 89 million treated-timber posts are installed in vineyards throughout Australia — 80% are CCA-treated, with the remainder mostly creosote
- 17 million posts — or 124,000 tonnes — have been taken out of service over the past 15 years and stored onsite (not sent to landfill or given away)
- It would cost \$42 million (excluding transport) to send the posts stockpiled over past 15 years to landfill
- It costs between \$1.09–\$3.04 (excluding transport) to put one post in landfill; landfill fees vary across regions — National average landfill cost \$2.45 per post
- Each year, another 1.7 million (12,500 tonnes) posts are removed due to breakages — this excludes posts involved in vineyard removals

Wine Australia is working with the several partners to provide viable alternatives for the disposal of CCA and creosote-treated posts.

### Timber Circularity Project

- a three-year nationally funded project that commenced in 2023 under the leadership of the National Centre for Timber Durability and Design Life at the University of the Sunshine Coast.
- focused on identifying circular pathways for preservative-treated timber and engineered wood products to keep timber out of landfill.
- the project has already gathered foundational data (post volumes, locations, composition, mechanical strength) that have been used for several solutions being investigated; it will also deliver at least one pilot to examine the reuse of CCA posts.

### Timber Circularity Resource Map

- another outcome of the Timber Circularity Project
- an online tool designed to help repurpose unused and end-of-life treated timber and engineered wood products and optimise timber repurposing.
- provides location, type and volumes of unused timber resources available, as well as strategies, solutions and regulatory details for integrating these materials into a circular economy framework.



Read more about the  
Timber Circularity Project



View the Timber Circularity Resource Map

## Regional collection points for end-of-life CCA posts

- a study, commissioned by Wine Australia, was recently completed on the feasibility of establishing regional collection sites for discarded treated timber vineyard posts
- using South Australia as a test case, the study found such sites were both viable and beneficial and offered a safer and more sustainable way to manage unwanted CCA- or creosote-treated posts than current practices
- such sites could also act as known stockpiles for entrepreneurs interested in providing a solution to the waste stream.
- study findings will help inform state and local governments and the wine sector on this option



Read the report on the feasibility study

## Removing the CCA from vineyard posts

- Wine Australia is co-funding research at the University of Adelaide to develop a novel process to recover the toxic metals from CCA-treated posts. This would enable the wood pulp to be reused.



Read more about this project

## In the meantime

While solutions to repurpose end-of-life CCA and creosote posts are being explored, growers and vineyard managers are reminded they should continue to safely store unwanted CCA and creosote-treated posts or deliver them to a licensed landfill.



How to stockpile your posts



# Let's keep doing the right thing

Rest assured, a sustainable disposal solution for CCA-treated posts is coming. Until then, let's keep working together to protect our community and the environment by stockpiling them safely.

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## Introducing aeration to fermentation

Recent Wine Australia-funded research at the Australian Wine Research Institute (AWRI) has shown several benefits from adding air or oxygen to wine ferments, such as decreasing the duration of ferments and reducing reductive characters.

The AWRI has a range of practical 'best practice' and 'how to' resources on its website to help winemakers adopt aeration of red ferments, including fact sheets, a webinar, podcast and case studies.



Visit the AWRI website to learn more about aerating ferments

## Boosting tropical thiols

Characters such as passionfruit, grapefruit, pineapple, mango or guava are desirable features in many white wines, particularly Sauvignon Blanc, where they are driven by the presence of thiols. These tropical qualities have also been shown to significantly contribute to Australian Chardonnays.

Research carried out by the AWRI and supported with funding from Wine Australia has shown that concentrations of thiols can be manipulated in vineyards through the application of foliar sprays, specifically urea (nitrogen) and sulfur.

This work also showed that the foliar applications had the added benefit of boosting yeast assimilable nitrogen (YAN) which could aid fermentation performance.

An additional insight from this research was that red wines are also affected by the foliar applications of sulfur and nitrogen, which could lead to unwanted tropical characters.



Explore a fact sheet, case studies and podcasts on this work

## Achieving a successful malolactic fermentation

A sluggish or unsuccessful malolactic fermentation (MLF) can be a result of the sulfur dioxide generated during alcoholic fermentation.

One solution is to co-inoculate ferments with a MLF bacteria.



Watch this AWRI webinar for best practices for MLF success in Chardonnay



Explore this AWRI fact sheet to explore how these considerations related to red wine

## Navigating the challenges of producing no- and low-alcohol (NOLO) wine

NOLO wines are a developing market that is gaining increasing interest among Australian winemakers.

There are many options for producing NOLO products, as well as production challenges and considerations not encountered in traditional winemaking.



Watch this AWRI webinar to begin or increase your understanding of NOLO products



Read this Wine Australia report of the technical and sensory-related challenges and opportunities



# Other useful resources

## Report and communicate your sustainability initiatives

Wine Australia has developed two guides primarily aimed at small to medium sized grape and wine business to assist them to effectively report and communicate their sustainability initiatives

*Sustainability Strategy and Reporting Guide* – provides a structured approach to sustainability reporting, helping businesses meet regulatory requirements, respond to retailer requests for information and enhance business transparency.

*Sustainability Communications Guide* – helps grape and wine businesses convey their sustainability achievements, targets and actions.



Explore the guides

## EcoVineyards



The EcoVineyards program – founded and delivered by Retallack Ecology and funded by Wine Australia – supports winegrape growers to enhance the soil health and functional biodiversity in their vineyards as well as establish ground covers.

Four free best practice management guides have been developed through the program which provide step-by-step, easy-to-apply advice across the three focus areas of the program – soil health, ground covers and functional biodiversity.

The guides are suitable for growers already using ecological techniques or looking to adopt new practices.



Visit the EcoVineyards website to learn more about the program, download the guides, fact sheets, videos and podcasts

## Keep up to date with the latest research and innovations

Are you on our mailing list? Sign up to receive Wine Australia's monthly e-newsletter 'Research & Innovation News' and keep up-to-date with the latest research, innovations, events and more being supported by Wine Australia.



Sign up

## Smoke and fire resources

A quick reference guide to support growers and winemakers who are unfortunate enough to be impacted by fire or smoke can be found on the Wine Australia website.

The guide includes:

- advice on how to prepare for fire seasons
- a carefully collated and updated series of easy-to-read, step-by-step guides on what producers can or should do at various key stages before and during harvest, as well as in the vineyard and winery post-harvest, if their vineyards are exposed to fire or smoke
- guidance on how to manage vines that are burnt in the weeks and months following fire to ensure vineyards are back up to full production as quickly as possible
- a range of vineyard and winery management options for minimising the effect of smoke damage on wine are also outlined.



View the Smoke and fire resources

## Tools to keep you in the know as you grow

Visit the Wine Australia website to take advantage of the following tools:

**Grape Price Indicators Dashboard** – provides an up-to-date summary of the key drivers of inland winegrape prices in Australia and an indication of the forecast direction for grape prices ahead of the next vintage.

**Grape Growing Cost Calculator** – provides an estimate of the costs of grape production specifically for growers in the inland regions.



Grape Price Indicators Dashboard



Grape Growing Cost Calculator

