Australian Government

Wine Australia

# Development of a national grape-industry strategy for the implementation of a national standard for grapevine certification - Phase 1



FINAL REPORT TO WINE AUSTRALIA

Project Number: **WAC 2101**

Principal Investigator: **Nick Dry**

Research Organisation: **Foundation Viticulture**

Date: **3 April 2022**

## Contents

Acknowledgements 3

Definitions 3

1. Background 5

2. The Australian grapevine propagation supply chain 6

3. Why do we need investment in the propagation sector? 8

4. Project goals and quality assurance objectives for the development of grapevine propagation standards in Australia 9

5. The way forward: discussion and recommendations 13

6. Implementation plan 15

7. The governance structure for implementation 17

8. Summary of proposed projects to underpin the development of an Australian grapevine pre-propagation certified standard and guidelines for source block management and cutting supply. 20

References and background reading 27

## Acknowledgements

The author gratefully acknowledges the input of respondents from the review of the Australian and international certification programs, the participants in the stakeholder consultation process and the participants of the quality assurance objectives workshop. Thanks also to Chris Bennett and Sharon Harvey.

## Definitions

**Accreditation-** in grapevine propagation, accreditation refers to an audit of production processes (not products) and is given on providing evidence of following and adhering to minimum standard operating procedures, controls and documentation.

**Certification-** in grapevine propagation, certification refers to an audit process which verifies and provides assurance that grapevine cuttings or planting material (i.e. the product) adheres to a set standard.

**Standard-** science based documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions, to ensure that materials, products, processes and services are fit for their purpose (adapted from Dankers, 2003).

**Certification label**- a label or symbol indicating that compliance with specific standards has been verified. Use of the label is usually controlled by the standard-setting body (Dankers, 2003).

**Cuttings**- the production units of grapevine propagation.

**Pre-propagation material-** cuttings used for the establishment of collections, multiplication rows and source blocks.

**Propagation material-** includes both cuttings of scion and rootstock used in the commercial propagation process.

**Planting material-** the planting product outcomes from grapevine propagation. Includes field grown rootlings, callused cuttings and potted vines; all of which may be grafted or ungrafted.

**National Grapevine Collection (NGC)-** an inter-related system of grapevine collections that encompasses a 'high-security' Vine Integrity Collection, 'high-health' Nuclear Collections and genetically diverse Germplasm Collections.

**Grapevine collections-** a general term for any collection of grapevine varieties, rootstocks and clones. May be part of the National Grapevine Collection or a private collection managed by grapevine nurseries or vineyard owners.

**Multiplication row-** a block of clonal planting material originating directly from a 'high-health' collection that provides the cuttings for the establishment of source blocks.

**Source block-** a group of vines that is used to supply cuttings for commercial propagation.

**A-grade source block**- a source block established with cuttings from multiplication rows. A-grade source blocks produce A-class cuttings.

**B-grade source block**- a source block established with cuttings from A-grade source blocks. B-grade source blocks produce B-class cuttings.

**Pathogen**- any species, strain or biotype, or pathogenic agent, injurious to grapevine, grape or grape product, or capable of vectoring a grapevine pathogen.

**Off-type-** a vine or vines in a propagation batch or vineyard planting that is of the wrong variety, clone or rootstock.

**AVIA-** Australian Vine Improvement Association.

**MIAVIS-** Murrumbidgee Irrigated Area Vine Improvement Association.

**SAVIA-** South Australian Vine Improvement Association.

**VAMVVIA-** Victoria and Murray Valley Vine Improvement Association.

**WAVIA-** Western Australia Vine Improvement Association.

**VINA-** Vine Industry Nursery Association.

**CSIRO-** Commonwealth Scientific Research Organisation

**SARDI-** South Australian Research and Development Institute

# 1. Background

This implementation plan is the major output of the project *WAC2101: Development of a national grape-industry strategy for the implementation of a national standard for grapevine certification.* The project is phase 1 of a program of work to develop a national certified standard for grapevine propagation material.

The objectives of project WAC2101 were to set the over-arching quality assurance objective(s) and the organisational and regulatory framework for a new national standard for grapevine certification. This includes developing a common language, developing a strategy and business model for acceptance and adoption across the entire sector and setting out a roadmap for implementation.

The development of a national certified standard for grapevine propagation material will ensure the integrity and health status of planting material throughout the propagation supply chain and into vineyards and will specifically address the following:

- Grapevine viruses
- Grapevine trunk diseases
- Guidelines on evidence of traceability
- Trueness to type (i.e., identity verification)
- Physical specifications of cuttings, rootlings, and potted vines
- Secure, rapid propagation for source block establishment
- Protocols for the management of the National Grapevine Collection.

It is recognised that the delivery of a national certified standard will need to address two broad challenges. Firstly, the challenges associated with the complexity of the operating environment (i.e., multiple stakeholders representing different interests) and secondly the technical challenges associated with delivering a science-based quality assurance system that covers the entire supply chain.

This plan was developed with input from sector stakeholders through a direct consultation period and a facilitated workshop. Additional concepts and detail were derived from findings from a review of viticulture and horticulture certification programs from Australia and overseas.

## 2. The Australian grapevine propagation supply chain

The Australian grapevine propagation supply chain can be separated into two distinct but connected phases, a foundation phase and a commercial phase. Both phases are critical in ensuring that the vineyard end-use customer is able to access genetic, pathogen and performance assured cuttings or planting material.

The **foundation phase** begins with the introduction of varieties and clones via importation or through local selection or breeding programs and ends with the establishment of a source block. Cuttings produced in the foundation phase are referred to as pre-propagation cuttings i.e. cuttings used for the establishment of collections, multiplication blocks and source blocks as opposed to cuttings used for commercial propagation purposes. Production volumes in the foundation phase are lower compared to the commercial phase, however the foundation phase is highly significant as mistakes and compromises in this phase have negative flow-on effects into the commercial phase.

The **commercial phase** includes the management of source blocks, supply of cuttings from source blocks and the propagation of vines by nurseries (potted or field grown) for distribution to vineyard end-users. This phase also includes the distribution of cuttings from source blocks directly to vineyard end-users for their own use, generally for top-grafting and occasionally for their own non-commercial propagation purposes.

There are many participants within the grapevine propagation supply-chain including breeding and clone selection programs, post-entry quarantine facilities, virus elimination service providers, collection owners, vine improvement groups, private cutting suppliers and nurseries. Each of these participants has an important role to play in the maintenance of genetic, pathogen and performance assurance.

A simplified summary of the grapevine cutting and planting material supply chain in Australia is outlined in figure 1 and it should be viewed in-conjunction with the following important notes:

1. There are three grapevine collections in Australia associated with vine improvement groups; the SAVIA collection at Monash, the WAVIA collection in Manjimup and the AVIA collection which is managed by VAMVVIA and located in Dareton.
2. The two other significant grapevine collections are the CSIRO collection in Merbein and the SARDI collection in Nuriootpa.
3. The nine active vine improvement groups (Adelaide Hills, Barossa, Clare Valley, Langhorne Creek, McLaren Vale, Murrumbidgee Irrigation Area, Riverland, Victoria and Murray Valley and Western Australia) manage the majority of the multiplication rows and source blocks

and supply the majority of scion and rootstock cuttings in Australia; (author's conservative estimate is 75% of total cuttings supplied in Australia).

4. Vine improvement groups rely on nurseries for the production of planting material for the establishment of collections, multiplication rows and source blocks.
5. The majority of nurseries are reliant on vine improvement groups for the supply of scion and rootstock cuttings to meet their customer's needs.
6. Many nurseries access a proportion of their cuttings from their own source blocks.
7. Nurseries that actively import new clones and varieties or develop their own clones will also often have their own collections in which to maintain these varieties and clones.

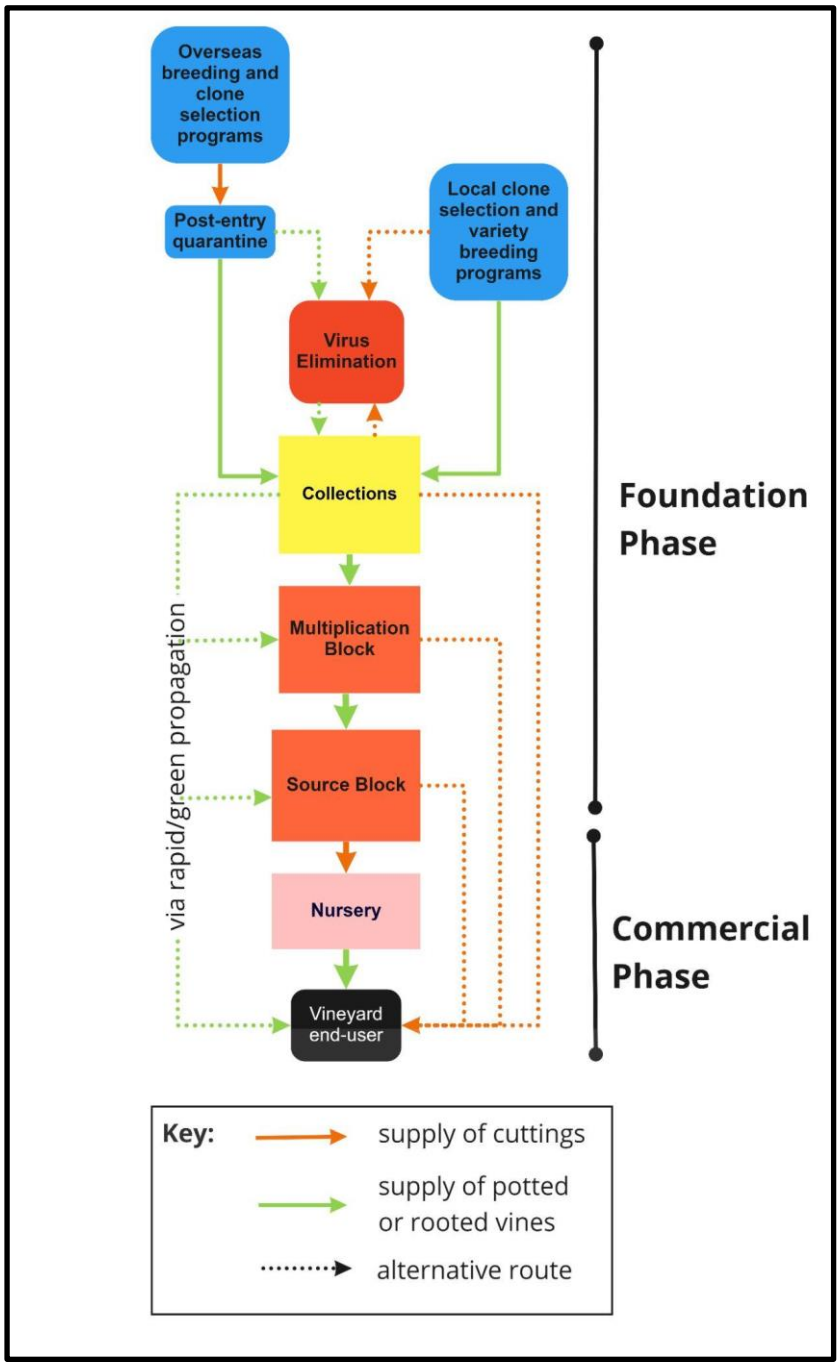



***Figure 1. A summary of the supply chain for the production of grapevine cuttings and planting material in Australia.***

## 3. Why do we need investment in the propagation sector?

- The impacts of propagation and planting material related problems (virus, trunk disease, off-types and poor performance of cuttings and planting material) is a significant cost-burden to not only vineyard end-users but also grapevine nurseries (GWR08/04; Gramaje et al., 2018; Hansen, 2014 and Whitelaw-Weckert et al. 2013).

- The cutting suppliers (primarily vine improvement groups) have the substantial responsibility of supplying pathogen, genetic and performance assured cuttings but are limited in their abilities to fulfil their responsibilities because of the absence of a science based grapevine propagation standard. (Bennett, 2021).

- Cuttings and planting material have minimal to zero external or physical attributes indicating that they carry pathogen, genetic or performance risks which creates 'quality uncertainty' for both customers and suppliers.



***Figure 2. Without testing individual vines or cuttings, how can organisations have assurance that the cuttings or planting material they are supplying or receiving are not going to negatively impact their business?***

- The development of robust and well managed grapevine propagation certification programs that are built on defendable best science will provide pathogen, genetic and performance assurance to suppliers and customers.
- Before a grapevine propagation certification program can be delivered for the Australian grape-growing sector there are critical gaps in knowledge and capabilities that must be acknowledged and addressed through research and capability projects (Bennett, 2021 and Tassie, 2020).

# 4. Project goals and quality assurance objectives for the development of grapevine propagation standards in Australia

## 4.1 Goals

It is proposed that the long-term goals for Australian grapevine propagation certified standards should be the following:

1. To ensure that grapevine growers have access to planting material (including cuttings) that have performance, pathogen and genetic assurance based on the objectives set-out in 4.2.
2. That collection owners, cutting suppliers and nurseries are provided with technical, training, and administrative support to meet the challenges associated with goal 1.

## 4.2 Quality assurance objectives

These quality assurance objectives were developed based on the outcomes of a facilitated workshop with key experts including propagators, vine improvement, viticulturists, researchers and regulators. These objectives were developed to inform and guide further research and provide the basis for the development of any standards or guidelines.

### Performance assurance

For determining the minimum physical specifications for Australian grapevine propagation standards, the following was recommended:

- The currently accepted best practice standards, as documented in the VINAS manual and NZ Grafted Grapevine Standard (NZGGS) will form the basis for developing minimum physical specifications. The specifications will address planting material and cuttings and must also take into consideration the rootstocks and growing conditions in Australia as well as customer requirements.
- Certification of a batch is based on providing evidence of less than 2% deviation and that the '2% deviation is over the range of physical specifications- i.e. not 2% for each category' (adapted from the NZGGS)

- Evidence of conformation will be based on following internal production management processes for cuttings and planting material with evidence provided to the auditor.

## Pathogen assurance

Pathogen assurance includes but is not limited to grapevine virus and pathogens associated with grapevine trunk disease.

### *Grapevine Trunk Disease*

The following statement will form the basis for the inclusion of Grapevine Trunk Disease (GTD) in Australian grapevine propagation certified standards. It is adapted from the 'New Zealand Grafted Grapevine Standard' statement on grapevine trunk disease and young vine decline.

*It is recognised that pathogens with the potential to cause grapevine trunk disease or young vine decline are primarily introduced into the nursery propagation process via infected cuttings with also secondary but less significant introduction via nursery processes. There is also the potential for these pathogens to spread during nursery processes. While the research is not currently clear on the incidence and absolute effects of these pathogens, adopting source block management and nursery propagation practices to minimise the introduction and further spread of these pathogens is a sensible precaution and with the direct input from pathologists these management practices will be included in Australian grapevine propagation standards.*

*The propagation sector will work closely with pathologists to identify research gaps and opportunities to improve the understanding of GTD in the source block and propagation process under Australian conditions. Findings from this research will be integrated into the development and subsequent reviews of standards and best-practice guidelines.*

### *Grapevine Virus*

It is recognised that there is still significant work required in determining best practice for surveillance, sampling and diagnostics of grapevine virus in the propagation supply chain. Also, because sampling and diagnostic methods cannot provide an absolute guarantee that no virus is present in cuttings or planting material, a definition of the 'accepted level' and its relation to the sampling and diagnostic methods must be determined and then effectively communicated to customers.

Evidence for virus conformance will include:

- Inspections of source blocks by trained inspectors and camera-based technology when/if the technology becomes commercially available.
- Virus testing of source blocks.

- Visual inspections and removal of symptomatic vines from source blocks and field nurseries.
- Vector inspections.
- Field/grow house management of risks (vector control, rotations, partitioning/isolation).

Specifically for scion source blocks the following guidelines are recommended:

- That freedom to an accepted level of the following viruses is a conformance requirement: LR1, LR3, GVA.
- The inclusion of GPGV is likely but still to be debated- if freedom from GPGV is not included as a conformance requirement then reporting of the presence of GPGV would be a conformance requirement.
- That transparency and reporting of the presence of the following virus (Fleck, LR2, LR4, LR4_6, LR4_9, GVB) would be beneficial for customers and that this concept could be integrated into Australian grapevine propagation standards.
- That there will be no exceptions for 'clones of significance' that carry LR1, LR3 or GVA.

Specifically for rootstock source blocks the following guidelines are recommended:

- That freedom to an accepted level of the following viruses is a conformance requirement: LR1, LR3, LR4, LR4_6, LR4_9, GPGV, GVA, GVB.
- That freedom from non-vector spread viruses Fleck and LR2 is a requirement but once freedom has been proven via a number of tests over consecutive years it would not be a continuing requirement.

## Genetic assurance

### *Trueness to type*

- Variety- the focus is on using DNA testing of a % of vines in multiplication rows, source blocks and collections to verify variety, with trained inspectors employed to identify off-types.
- Clone- a traceability passport will be used as evidence until DNA testing of vines in multiplication rows, source blocks and collections becomes commercially available.
- Nursery- the focus is on providing evidence of process that mitigates risks of varietal and clone mixing during the nursery portion of the supply chain, rather than identification of off-types through inspections of field nurseries and grow-houses.

### *Traceability*

Traceability to confirm origin from collection to source block will be a conformance requirement based on an identity passport built on organisational records. The following records have been identified as suitable evidence:

- Sales records
- Source block summaries/information pertaining to origin
- Contractual arrangements with the land-holder
- Virus testing records
- Nursery propagation records (batch records)
- Verbal testimony (but requires DNA confirmation preferably to clone level)
- DNA testing (variety and clone)

Traceability through the nursery propagation and planting material supply process will be a conformance requirement based on the current VINAS conformance requirements i.e. cuttings in/out, batch and supply records.

## Material classification

Sitting outside of but related to performance, pathogen and genetic assurance are the concepts of material classification.

- Planting material will be classified as either certified or uncertified.
- A and B-class material will remain as an internal classification for cuttings within source block management systems.
- Uncertified material may still be supplied by accredited nurseries, but this material must still meet specific conformance requirements around traceability and variety identity.

The development of these objectives was a critical step in addressing and gaining collective agreement on a range of key issues that have been discussed and debated in the propagation sector and amongst relevant experts. In no way is this output the end of that discussion. Further additions and alterations to these quality assurance objectives will occur through the committee structures outlined in section 7.

# 5. The way forward: discussion and recommendations

## 5.1 Discussion

One of the major outcomes and challenges of this project was to work closely with key stakeholders to identify and promote a collaborative approach, create alignment and ultimately gain acceptance and adoption by the key stakeholders of a collective implementation strategy and model for delivering a single certification program that addresses the entire supply chain. This has not been achieved.

The Vine Industry Nursery Association (VINA) is strongly of the view that it wants to remain independent and continue to run its own accreditation system (which has been running for 20 years) and develop and administer its own certification standard. However, VINA has stated that *'we want to keep working with all parties to ensure that the VINA standard reflects best practice in a practicable and cost-effective manner'.* VINA has confirmed the following details around the VINA certified standard development:

- The scope of the VINA certified standard would cover only the commercial phase of the supply chain i.e. would not include the production of pre-propagation cuttings in the foundation phase (see figure 1).
- The VINA certified standard will be based on existing research with new research and technologies included in updated versions based on a VINA managed 'review mechanism'.
- The first version of the VINA certified standard will be delivered in mid-2022.

While VINA's current determination to develop its own certification standard independent of the rest of the sector does not fit the initial ideals of the project – it must be noted and integrated into the strategy.

VINA's proposed development of a standard for the commercial phase obviously leaves a gap and a requirement for the development of a pre-propagation standard and related system that covers the foundation phase (see figure 1). This pre-propagation standard will be built on the work that has already been completed by the South Australia Vine Improvement Association (SAVIA) in their review of *Part 1: National Vine Accreditation Scheme Procedures Manual-Vine Improvement Group*.

The pre-propagation standard is essential for the National Grapevine Collection project and will also support the establishment of new source blocks with genetic, pathogen and performance assured material. For the successful delivery and adoption of the pre-propagation standard and related program it must be built on the best available science, be supported by oversight, technical and

administrative functions, be financially resilient and be developed in such a way that it can incorporate new findings and technologies.

An additional requirement and critical document that is recommended for development is 'best practice guidelines for the management of source blocks and supply of cuttings'. This best practice guideline would become the benchmark document for the production of cuttings used in commercial propagation. All organisations involved in the production of cuttings used for commercial propagation (including nurseries) should aspire to meet these guidelines whether they are involved in a formal certification program, such as the proposed VINA certified standard, or developing their own internal quality assurance program.

With the proposed development of two standards administered by two authorities within the single supply chain there is obviously the potential for administrative and technical non-alignment leading to customer confusion, loss of efficiency and most importantly the inability to meet the goal of ensuring that growers have access to planting material that has genetic, pathogen and performance assurance based on the objectives set-out in section 4.2. Ongoing dialogue between parties will be vital in ensuring that the standards are aligned, effective, explicit, provide value to both customers and participants and ultimately achieve the intended goal. If the two-system approach is unable to achieve the intended goal, then it will be necessary to consider an alternative approach.

## 5.2 Recommendations

While these recommendations fall short of the initial goal for a single Australian grapevine propagation standard that covers the whole of the supply chain, they still provide significant long-term benefits to the grape sector and still ensure that there will be certification standards in place across the whole of the grapevine propagation supply chain.

**Recommendation 1:** Undertake projects to develop the critical knowledge and capabilities that will underpin the development of grapevine propagation standards (see section 8).

**Recommendation 2:** Integrate outputs from the knowledge and capability projects into:

1. an Australian grapevine pre-propagation standard and
2. a best practice guideline document for the management of source blocks and supply of cuttings.

**Recommendation 3:** That the quality assurance objectives outlined in section 4 be used as the basis for the projects and subsequent development of an Australian grapevine pre-propagation standard and the best practice guidelines for the management of source blocks and supply of cuttings.

**Recommendation 4:** Establish oversight structures to:

1. Oversee the development and completion of the knowledge and capability projects and associated pre-propagation standard and best practice guidelines.
2. Establish the supporting framework associated with developing and maintaining a pre-propagation certification program.

**Recommendation 5:** Develop and implement a communication strategy directed at all levels of the grape-growing sector to clearly convey the project objectives, and outcomes and the benefits and value proposition of using certified cuttings and planting material.

**Recommendation 6:** Facilitation of ongoing dialogue with VINA to ensure that the two standards and certification programs are aligned, effective, explicit, provide the best value to both customers and participants and ultimately achieve the intended goal.

# 6. Implementation plan

It is recommended that the implementation of an Australian grapevine pre-propagation certification program and the development and extension of the best-practice guidelines for source block management and cutting supply will require five phases (see figure 3).

The development of the implementation strategy has taken into consideration the key findings from WAC2101, specifically the stakeholder requirements as determined by consultation and the identification of the key governance functions from the review of viticulture and horticulture certification programs from Australia and overseas. Completion dates are indicative only and further detailed planning is required to identify opportunities to run the phases in parallel to maximise efficiency and accelerate completion.

## Phase 1: Strategy development

This report describes the activities and outputs of phase 1. The major output of phase 1 is the development of the broad implementation strategy and the project summaries for phase 2a.

| PHASE 1: Strategy development | PHASE 2a: The immediate priorities | PHASE 2b: Developing the written standard and supporting structures | PHASE 2c: Delivery and adoption | Phase 3: Review |
|---|---|---|---|---|
| Key activities: review of grapevine planting material standards, stakeholder engagement, quality assurance principles workshop.<br><br>Key output: an implementation strategy for a Australian grapevine propagation certification programs. | Establish the oversight structures.<br><br>Develop and complete projects that will underpin the development of the pre-propagation standard and best practice guidelines for source block management and cutting supply.<br><br>Establish the certification program framework.<br><br>Develop a communication strategy. | Integrate the new knowledge and capabilities into the pre-propagation standard and best practice guidelines for source block management and cutting supply.<br><br>Develop an accounting system for tracking and tracing of labelling.<br><br>Engage third-party auditors.<br><br>Develop a delivery and adoption strategy. | Strategic activities to maximise the uptake of the pre-propagation standard and best practice guidelines for source block management and cutting supply. | An initial review will be required after the Standard and guidelines have been used for a full season.<br><br>Subsequent reviews should then be scheduled and budgeted for every 3 years. |
| Complete by April 2022 | Complete by December 2024 | Complete by June 2025 | Ongoing | Ongoing |

***Figure 3. Implementation model for an Australian grapevine pre-propagation certified standard and best practice guidelines for source block management and cutting supply.***

## Phase 2a: The immediate priorities

Before the pre-propagation standard and guidelines for source block management and cutting supply can be developed there are gaps in research and capability development, oversight, funding and customer communication that must be addressed:

1. Establish an Industry Advisory Committee to oversee the knowledge and capability projects
2. Establish a Technical Reference Committee to provide technical input into the knowledge and capability projects.
3. Initiate and carry out the proposed projects.
4. Develop a certification program framework for the pre-propagation standard including an appropriate funding model.
5. Develop a communication strategy to keep the broader sector informed throughout the project.

## Phase 2b: Developing the written materials and supporting structures

1. Establish a Standards Board to oversee the development of the pre-propagation certification program including the development of a labelling system and engagement of auditors.
2. Integrate outputs from the knowledge and capability projects into:
    a. an Australian grapevine pre-propagation certified standard and
    b. a best practice guidelines document for the management of source blocks and supply of cuttings.
3. Develop a delivery and adoption strategy for phase 2c.

### Phase 2c: Delivery and adoption

The success of an Australian grapevine pre-propagation certified standard and best practice guidelines is based on its adoption by the sector and so dedicated funds and resources must be allocated for delivery and adoption. Delivery and adoption activities will be developed during phase 2b and are expected to include active promotion, training as well as technical and administrative support to participants.

### Phase 3: Review

It is essential that the standard is put through a review process (phase 3) after the first season of use to identify any procedural or other issues. There should then be contingencies (funding and resource allocation) for further reviews as new knowledge or technology for best practice becomes available.

# 7. The governance structure for implementation

## 7.1 The governance structure for phase 2a

The following structure is proposed for phase 2a of this project. The structure places the role of the Industry Advisory Committee in the central position and aims to streamline the committees that are required for the development of the standards and guidelines and the National Grapevine Collection. Specific Terms of Reference will be developed to guide the membership appointments, responsibilities and operations of each Committee.

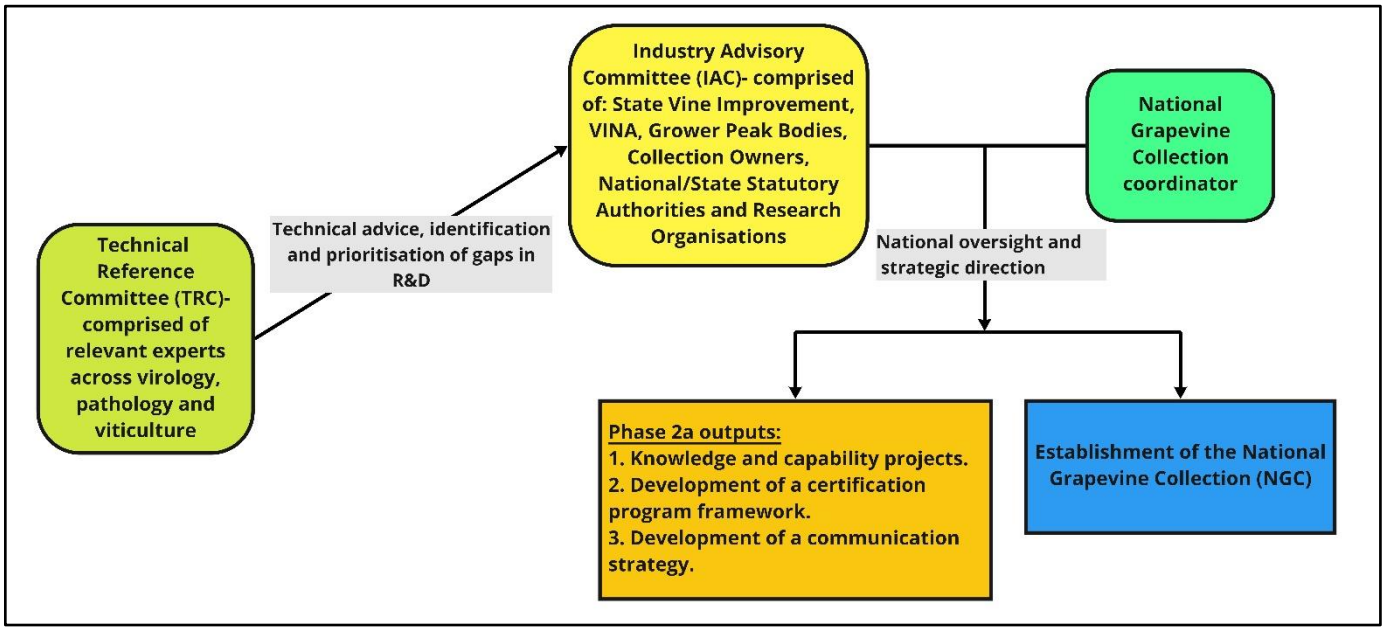



***Figure 4. Governance structure for phase 2a (2022-late 2024).***

**Role of the Industry Advisory Committee (IAC)**

Membership will be drawn from: state vine improvement groups, VINA, collection owners, research organisations, national/state statutory authorities and peak grower bodies (including table grapes and dried fruit). Apart from its role in the establishment and management of the National Grapevine Collection, the role of the IAC will be to oversee the implementation of phase 2a as outlined in this document. IAC responsibilities and activities include:

- Ensuring that the research and capability projects are aligned with the goals and quality assurance objectives outlined in section 4.
- Providing input and advice to Wine Australia on project brief development and procurement.
- Providing advice and feedback to project managers through the project implementation phase.
- Delegation of duties to appropriate parties (Technical Reference Committee and National Grapevine Collection coordinator).
- Guiding and facilitating the communication strategy.
- Developing a certification program framework for the pre-propagation standard including an appropriate funding model.

**Role of the Technical Reference Committee (TRC)**

Membership will be comprised of relevant experts across virology, pathology and viticulture. The committee is responsible for:

- Providing technical advice to Wine Australia on the development of project briefs.
- Providing technical advice to the Industry Advisory Committee.
- Providing advice and feedback to Wine Australia and the Industry Advisory Committee during the project implementation phase.
- Identifying opportunities to build Australian technical expertise in grapevine propagation processes.

**Role of the National Grapevine Collection coordinator**

The grapevine pre-propagation standard and national asset register of grapevine varieties and clones are two pillars of the National Grapevine Collection, managed by the coordinator, Nick Dry (Wine Australia project FOV 2201). He will be responsible for:

- Providing administrative and technical support for the Industry Advisory Committee and Technical Reference Committee.
- Communicating and marketing the messages developed by the Industry Advisory Committee.

**Project development and procurement**

Project briefs will be developed by Wine Australia with input and advice coming from the Industry Advisory Committee, the Technical Reference Committee, the National Grapevine Collection coordinator and taking into account the findings and recommendations from previous relevant reports. Procurement will be through Wine Australia's existing pipeline. Advice will be sought from the committees during the procurement process and a reporting mechanism to the committees will be built into the projects. To ensure good governance, it will also be necessary to be aware of, and appropriately address any potential issues of conflict of interest between project participation and committee membership.

## 7.2 The governance structure for phases 2b, 2c and 3

Upon completion (or just prior to the completion) of phase 2a the project activities will shift to standard and certification program development. As such the governance requirements will also need to change. It is recommended that at this point the Industry Advisory Committee will revert to being responsible for only the oversight of the National Grapevine Collection and that a separate Standards Board is established for the pre-propagation certification program. The Technical Reference Committee will remain in place and will provide advice to both the Industry Advisory Committee and the Standards Board. The National Grapevine Collection coordinator will become the pivot point between the two committees providing administrative and technical support as well as a communication channel.

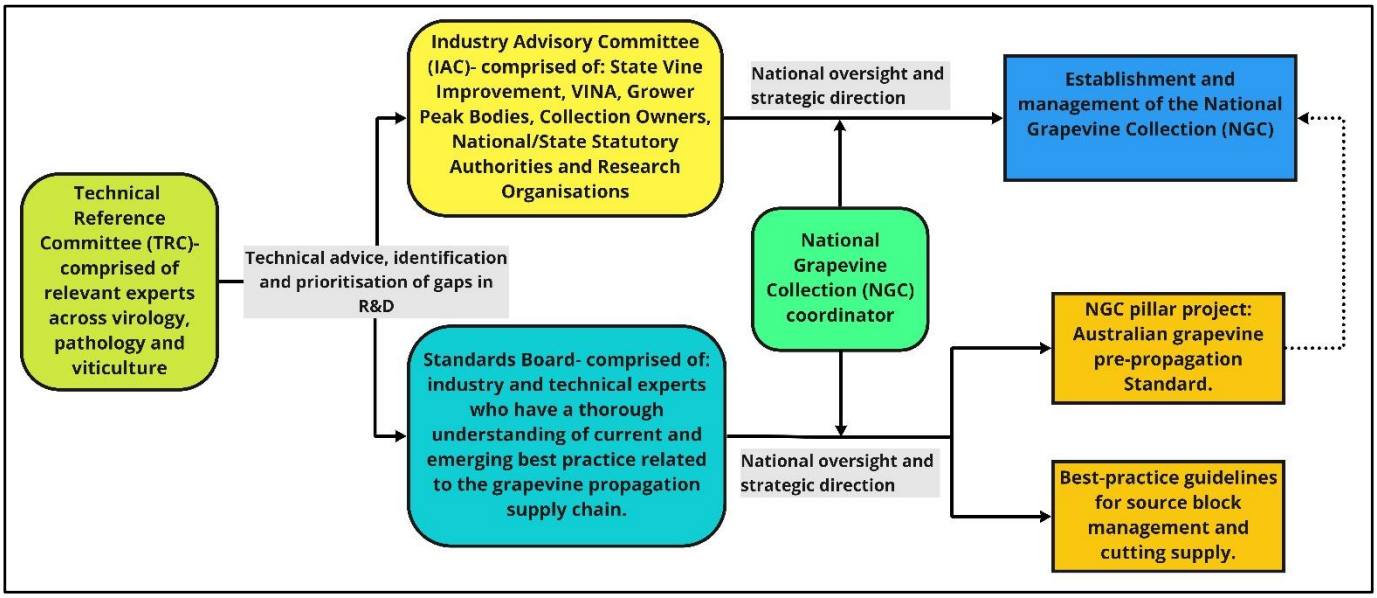



***Figure 5. Governance structure for phase 2b, 2c and 3 (late 2024- ongoing).***

The Standards Board will be made up of industry and technical experts who have a thorough understanding of current and emerging best practice related to the relevant aspects of the grapevine propagation supply chain.

**The Standards Board** will be responsible for:

- Overseeing the development of the written pre-propagation standard, the best practice guidelines.
- Driving the strategic direction of the pre-propagation certification program.
- Ensuring that the standard(s) in operation across grapevine propagation meet the sector's requirements.
- Selecting pathogen diagnostic services based on reliability and accuracy of testing.
- Reviewing and maintaining the written pre-propagation standard and initiating the pre-propagation standard reviews.
- Appointing auditors and ensuring that they are properly trained.
- Arbitrating in the case of any instance of conflict of interest or product non-conformance as a result of implementing and managing the standard.
- Approving businesses to supply certified material that conforms with the pre-propagation standard requirements.
- Ensuring that plant material conforms with the pre-propagation standard requirements.
- Delegation of duties to appropriate parties (Technical Reference Committee and National Grapevine Collection coordinator).
- Achieving intended results and using performance information to drive ongoing improvements.

# 8. Summary of proposed projects to underpin the development of an Australian grapevine pre-propagation certified standard and guidelines for source block management and cutting supply.

The project proposal summaries outlined in this section provide an initial starting point only. Project prioritisation as well as full project briefs (including scope, activities, outputs and timelines) will need to be developed. Furthermore, the outputs from the recently completed 'Grapevine Virus Best Practice Management Guide' will need to be integrated into each of the relevant virus projects.

## 8.1 Major research and capability investment projects

These are the significant projects in terms of funding and resource requirements as well as providing the critical knowledge and capabilities on which an Australian grapevine pre-propagation standard and guidelines for the management of source blocks and supply of cuttings will be developed.

## Project 1. Developing a comprehensive Grapevine Asset Register

The development of a comprehensive asset register of the National Grapevine Collections and Vine Improvement multiplication rows and source blocks will ensure that the key identification and management factors relating to the quality of each planting, and therefore potential for Certification is documented and can be regularly updated as required.

This asset register is aligned and will be co-developed with the National Grapevine Collection pillar project 'The National Register of Grapevine Varieties, Clones and Rootstocks'.

## Project 2. Develop sampling protocols for grapevine collections, multiplication rows and source blocks

The development of scientifically and biometrically defensible sampling protocols for virus testing are required to ensure that the relevant material quality standards are valid, achieved and maintained. While the required level of statistical confidence in the testing results has yet to be decided, this project will also provide the fundamental analysis upon which the optimal and sustainable balance between confidence and cost of compliance can be determined. This confidence level will then be incorporated into the pre-propagation standard and best-practice guidelines.

## Project 3. Establish and/or confirm the viral status of the collections, multiplication rows and source blocks

The current viral status of many of the Vine Improvement assets is not well defined. While the virus status of the grapevine collections is arguably relatively well known, the level of confidence steadily reduces from that point with successive generations and increasing age of plantings. It is imperative that the current status for these assets is reliably determined to enable informed decisions regarding the statistical validity of the sampling protocols which should be used as well as the future management of these assets.

## Project 4. Review, categorise and make final recommendations on the conformance requirements for the endemic and novel grapevine viruses for an Australian grapevine pre-propagation standard and best practice guidelines for source block management and cutting supply

This project will review and categorise all endemic and novel grapevine viruses likely to have a commercial impact on the Australian grape growing sector over the long-term. It will additionally provide a gap analysis and recommendations to identify where infections by viruses or combinations of viruses may prove to be of commercial viticultural significance and/or have implications for the management of collections, multiplication rows and source blocks.

## 8.2 Alignment with existing projects

There are a number of projects currently in progress or soon to be started that have outputs aligned with the technical and capability requirements for the development of an Australian grapevine pre-propagation certified standard and guidelines for source block management and cutting supply.

### Project 5. Managing Grapevine Trunk Disease in nurseries, grapevine collections, multiplication rows and source blocks

It is acknowledged that trunk disease infected planting material will establish inconsistently and can even lead to vine death (Gramaje et al. 2018 and Whitelaw-Weckert et al. 2013). Because of the insidious nature of trunk disease, most of the problems related to infected planting material goes unnoticed or is attributed to other vineyard issues such as soil problems or poor irrigation management (Smart, 2022).

As part of a broader Wine Australia-funded project on 'Management and diagnosis of grapevine trunk disease in vineyards and nurseries', pathologists Mark Sosnowski, Sandra Savocchia and Regina Billones-Baaijens will work closely with the propagation sector on activities that aim to address some of the questions surrounding GTDs in propagation and young vine decline. The outputs of these projects are intended to provide evidence-based recommendations for national standards and guidelines. Project proposals are still in development but the broad topics to be addressed include optimisation of diagnostic capability, sustainable disease management and incidence of GTD in collections, multiplication rows and source blocks.

### Project 6. Hyperspectral surveillance of asymptomatic virus infected grapevines in source blocks

Research by Vinay Pagay (University of Adelaide) has identified the potential for asymptomatic detection of virus infected vines (including white cultivars) using hyper-spectral technologies. Asymptomatic detection using hyperspectral surveillance would not replace lab testing but would become a tool to assist in better identifying where to sample and would therefore provide significant opportunities to increase the confidence and efficiency of virus surveillance. The long-term goal of this project is to facilitate the availability of commercial hyperspectral surveillance services.

### Project 7. Clone identification using DNA methods

The Australian Wine Research Institute (AWRI) has established a robust methodology for clonal identification that harnesses the detailed information provided by whole-genome DNA sequencing (Roach *et al*., 2018). They currently have a project underway to map over 1600 accessions with a

view to offering a commercial typing service by 2023. Accessibility to a commercial service that can identify grapevine clones would be a vital tool in an Australian grapevine pre-propagation standard, best practice guidelines for source block management and cutting supply as well as in the management of the National Grapevine Collection and private grapevine collections.

## 8.3 Biosecurity matters

It is acknowledged that there are biosecurity influences and risks associated with the Australian grapevine propagation supply chain that must be addressed.

### Project 8. Determining which viruses and other pathogens be tested for and excluded under post-entry quarantine

This project will identify the novel viruses which pose a threat if imported into Australia. In identifying these viruses, the project will take into consideration the viruses as currently listed in BICON https://bicon.agriculture.gov.au/BiconWeb4.0/ViewElement/Element/Index?elementPk=935818&caseElementPk=957677 but will also consider current international publications.

### Project 9. Develop common scientifically and commercially sound biosecurity protocols and policy to guide the implementation and subsequent outcomes of emerging (and more sensitive) virus testing technologies

The introduction of more sensitive virus testing techniques (eg. High Throughput Sequencing) has identified viruses which were previously unidentified in Australia. Under current Federal and State Biosecurity laws, the testing laboratory is obligated to report their findings to the state jurisdiction the laboratory is located in. The virus is initially treated as a new incursion and potentially can be categorised as a "declared pest", whether it has an impact on production or not. It is illegal to sell or move material containing or infected with "declared pests" and typically such infected material is destroyed. The legal implications in such cases are uncertain as the relevant Acts were not designed to deal with the discovery of novel endemic viruses. Proactive development of policy and related communications with Federal and State biosecurity departments will help to establish a pathway for the classification of new detections based on their impact and reduce the compliance burden on the sector whilst still allowing pathogens of significance to be regulated.

## 8.4 Protocol, best-practice and capability development

Developing the protocols, best practice and capabilities that have been previously identified as either gaps and/or that would add significant value to the sector while increasing levels of pathogen, genetic and performance assurance.

### Project 10. Develop a method that accommodates multiple evidence types for use in demonstrating an audit trail from source blocks to collections

Supply records as evidence provide the greatest level of assurance for demonstrating an audit trail, however there are known gaps in the availability of supply records within organisations that manage source blocks. Because of this gap there is a need to develop a method that takes into consideration a broader range of evidence types than just supply records while still maintaining genetic, quality and biosecurity assurance. An identity passport based on organisational records (like the Australian Passport identity check or State government 100-point proof of identity checks) has been identified in the October 2021 Quality Assurance workshop as the preferred option to confirm origin and identity of source blocks based on traceability to a collection.

### Project 11. Definitions and conformance evidence for minimum physical specifications

There is a need to define the detail of the minimum physical specifications for cuttings and planting material. A principle from the Quality Assurance workshop was to base the written definitions on the New Zealand Grafted Grapevine Standard and the VINAS manual and that there would be an allowance for 2% deviation.

### Project 12. Facilitating best-practice scion and rootstock source block management: pruning, trellising, nutrition, water relations and post-harvest handling of cuttings.

Given the important influence that scion and rootstock cutting quality has on nursery economic returns and the health of the planting material (vineyard economic returns) there is only very limited information on best-practice pruning, trellising, irrigation, nutrition regimes and post-harvest handling for cutting production (Waite et al. 2014). Furthermore, there are no qualitative measures for determining cutting health related to probable impact on propagation success rate.

This suggests that there is a significant opportunity to drive high value benefits to the grape and propagation sector through the development of research outcomes, practical management advice and investment in change of practice.

### Project 13. Development of protocols for vector management in collections, multiplication rows, source blocks, field nurseries and grow-houses.

Managing virus vectors is a critical practice in minimising the risk of spread of virus in collections, source blocks, field nurseries and grow-houses. As such it is requirement that protocols for best-practice vector identification and management be developed and included in Australian grapevine propagation standards.

### Project 14. Development of protocols for the production of planting material for collections, multiplication and source blocks including rapid or green propagation

Grapevine collections, multiplication rows and source blocks form the foundation of the grapevine propagation supply chain. The introduction of pathogens and or genetic anomalies at any of these points via compromised planting material will have significant flow-on effects. As a result, it is necessary to develop specific and more stringent propagation protocols for the production of planting materials destined for these supply chain points.

Furthermore, the requirement for the capacity and capability to rapidly multiply quality assured planting material using green propagation techniques was identified in WAC2009 'A national germplasm discussion paper'. This requirement has a dual purpose;

1. To help facilitate the timely introduction of planting material for establishment of new source blocks from planting material derived from collections thereby reducing the risks associated with older source blocks (as source blocks age they have higher risks associated with transmission of virus and grapevine trunk disease).
2. To ensure rapid replanting following a catastrophic pest or pathogen incursions.

Green propagation can take the form of tissue culture or mist propagation. Both propagation methods require the development of protocols to ensure genetic, pathogenic and performance assurance.

## 8.5 Planning

### Project 15. Develop a certification program framework for the pre-propagation standard including an appropriate funding model

The detail for this project will be developed through consultation with the Standards Board and the Technical Reference Committee and will be developed taking into consideration the outcomes of earlier projects. The goals of this project are to:

1. Define and implement the mechanism for the integration of the information from phase 2a into an Australian grapevine pre-propagation standard.
2. Establish an appropriate and sustainable funding model.
3. Develop and implement an appropriate system for the labelling and auditing of certified planting material.
4. Deliver an Australian grapevine pre-propagation standard in a manner that will ensure that there is maximum adoption.
5. Develop an effective review process.

This plan will also draw upon the findings from phase 1, specifically the key governance functions for a certification program, factors driving participant and customer uptake, stakeholder requirements and the resource and capability requirements for administration of a certification program.

## References and background reading:


Akerlof, G. A. (1970) "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism". The Quarterly Journal of Economics. 84 (3): 488-500.

Bennett, C. (2021) Protecting the high-health status of Australia's grapevine propagation assets. The business case for developing a science and standards-based management system. South Australian Vine Improvement Association.

Bennett, C. (2019) Part 1: National Vine Accreditation Scheme Procedures Manual-Vine Improvement Groups. South Australian Vine Improvement Association.

Dry, N. (2021) National germplasm discussion paper. Wine Australia report: WAC2009.

Dankers, C. (2003) Environmental and social standards, certification and labelling for cash crops. Food and Agriculture Organization of the United Nations. Rome. https://www.fao.org/3/Y5136E/Y5136E00.pdf

Gramaje, D., Úrbez-Torres, J. R., and Sosnowski, M. R. (2018). Managing grapevine trunk diseases with respect to etiology and epidemiology: current strategies and future prospects. *Plant Dis.* 102, 12–39.

Gramaje, D. & Armengol, J. (2011). Fungal Trunk Pathogens in the Grapevine Propagation Process: Potential Inoculum Sources, Detection, Identification, and Management Strategies. Plant Disease. 95. 1040-1055. 10.1094/PDIS-01-11-0025.

GWRDC Project: GWR 08/04. Assessment of Economic Cost of Endemic Pests and Diseases on the Australian Grape and Wine Industry. (2010)

Habili N., Wu Q., Pagay V. Virus-associated Shiraz Disease may lead Shiraz to become an endangered variety in Australia. *Wine Vitic. J.* 2016;31:47–50.

Hansen, M. (2014) 'Leafroll virus is costly'. *Good Fruit Grower*. June 2014 issue.

Matus, K. J. (2009) Standardization, Certification and Labelling: Lessons from Theory and Practice. Working Paper No. 37. Centre for International Development at Harvard University.

Smart, R. (2022) Healthy rootstock cuttings are essential for the Australian wine industry. Grapegrower and Winemaker. Issue 696.

Tassie, L. (2020) Grapevine virus protocols project report: Desktop survey to develop a set of interim virus protocols for Vine Improvement and identify gaps and recommendations to achieve high health grapevine planting material. South Australian Vine Improvement Association.

Waite, Helen & Weckert, Melanie & Torley, Peter. (2014). Grapevine propagation: principles and methods for the production of high-quality grapevine planting material. New Zealand Journal of Crop and Horticultural Science. 43. 10.1080/01140671.2014.978340.

Weckert-Whitelaw, M.L., Rahman, L, Appleby, A, Clark, H., Waite, H. and Hardie, W. (2013) Co-infection by Botrophaeriacae and Ilyonectra spp fungi during the propagation process causes decline of young, grafted vines grapevines. *Plant Pathology.* 1-13

**Certification Programs:**

California Grapevine and Registration program CDFA - Grapevine Registration & Certification Program)

New Zealand Grafted Grapevine Standard: Version 4.0. New Zealand Winegrowers inc. https://www.nzwine.com/media/19640/grafted-grapevine-standard_2021v4interactive.pdf

Plant Certification Scheme of South Africa https://plantsa.co.za/wp-content/uploads/2021/03/VIA-SCHEME.pdf

The Australian Plant Production Standard APPS and NIASA accreditation https://nurseryproductionfms.com.au/niasa-accreditation/

https://nurseryproductionfms.com.au/wp-content/uploads/2020/06/Avocado-Nursery-Stock-Specificiation-PREVIEW-DRAFT.pdf