Australian Government

Wine Australia

The implementation of a national standard for grapevine certification - Phase 2a



FINAL REPORT TO WINE AUSTRALIA

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Principal Investigator: **Nick Dry**

Research Organisation: **Foundation Viticulture**

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Abbreviations

AGW- Australian Grape and Wine

ATGA- Australian Tablegrape Association

AVIA- Australian Vine Improvement Association

AWRI- Australian Wine Research Institute

CSIRO- Commonwealth Scientific Research Organisation

CSU- Charles Sturt University

DFA- Dried Fruit Association

GIA- Greenlife Industry Australia

NIASA- Nursery Industry Association Accreditation Scheme Australia

GRBaV- Grapevine red blotch virus

GLRaV- Grapevine leafroll virus

GFKV- Grapevine fleck virus

GPGV- Grapevine pinot gris virus

RSPaV-Rupestris stem-pitting virus

MIAVIS- Murrumbidgee Irrigated Area Vine Improvement Association

RFP- Request for proposal

SARDI- South Australian Research and Development Institute

SAVIA- South Australian Vine Improvement Association

VAMVVIA- Victoria and Murray Valley Vine Improvement Association

VHA- Vinehealth Australia

VINA- Vine Industry Nursery Association

VISC- Vine Integrity and Security Collection

WA DPIRD- Western Australia Department of Primary Industry and Regional Development

WAVIA- Western Australia Vine Improvement Association

Definitions

Accreditation- in grapevine propagation, accreditation refers to an audit of production processes not products.

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).

Cuttings- the production units of grapevine propagation.

Cultivar- a distinct genetic identity whose origin or selection is primarily due to the intentional actions of humans. In viticulture a cultivar is a variety/clone combination for example Merlot/D3V14. This term is often used interchangeably with 'Accession'.

Grapevine collections- a general term for any collection of grapevine varieties, rootstocks and clones. Collections are established with varieties and clones via importation, through local selection or breeding. Collections have a dual role as repositories for the maintenance of genetic diversity and the initial source for the establishment of larger propagation assets (multiplication rows and source blocks). Cuttings produced in collections are referred to as pre-propagation cuttings.

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 Blocks- A group of vines that is used to supply cuttings for propagation. Source blocks are established from cuttings taken from multiplication blocks or directly from collections via green propagation. Source blocks supply cuttings for commercial use to either propagation nurseries or directly to vineyard end-users for their own use (for top-grafting and occasionally for their own non-commercial propagation purposes).

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

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.

Propagation asset- general term that covers collections, multiplication rows and source blocks.

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

1. Abstract

The Australian grape and wine sector currently lacks a national certification standard that covers the whole of the propagation supply chain. This project is the second of five phases of work aiming to address that gap and deliver one of the two pillars of the National Grapevine Collection (NGC) program. Agreement between key stakeholders to establish a Standards Committee was reached, and Greenlife Industries Australia was identified as the preferred delivery partner for management of the certification program. Discussions with the propagation sector on this governance model are ongoing. Comprehensive best practice guidelines for the entire propagation supply chain were developed, to serve as the basis for propagation standards within the certification program. Research was conducted to quantify the cost of conforming to certification requirements, and a tool was developed to calculate the likely impact on the cost of planting material, as the first step in developing a value proposition for both suppliers and purchasers of certified grapevine planting material. In addition, a number of R&D projects which will fill knowledge gaps required to underpin the standards were developed and initiated.

2. Executive summary

This project was the second phase of a program to develop a national certification standard that covers the whole of the propagation supply chain. The project aimed to address immediate priorities for the standard through the following activities:

1. Quantifying the value proposition for certified planting material
2. Developing protocols for the production of planting material for collections, multiplication and source blocks including rapid or green propagation and the movement of grapevine material between collections
3. Setting up for success: establishing a governance and funding model
4. Developing and implementing a communication strategy.

Significant challenges in establishing a collaborative oversight structure were encountered. Despite best efforts, a unified approach with major stakeholders Vine Industry Nursery Association (VINA) and South Australia Vine Improvement Association (SAVIA) was only partially achieved, with agreement to establish a Standards Committee. Agreement on the governance structure for the certification program was not achieved within the project timeframe.

Based on a review of local and international certification programs as part of a previous project (WAC 2101), and following further exploration, Greenlife Industry Australia (GIA) was identified as the preferred and recommended option for the delivery of a grapevine certification program. GIA Greenlife Industry Australia (GIA) is the national peak industry body representing Australia's greenlife sector, which encompasses the production, supply, and retail of plants, as well as the promotion of their benefits to the community. It already administers sector sub-programs for propagators of avocado, banana, landscape tree stock, macadamia and strawberry.

Because an agreed approach to governance of the Standard could not be reached, priorities shifted away from the communications strategy. Instead, resources were reallocated to focus on developing

comprehensive best practice guidelines for the production of planting material across the entire propagation supply chain, which will provide the foundation for a grapevine propagation standard. The guidelines incorporate quality assurance objectives identified by key stakeholders in a workshop held in October 2021 and cover grapevine pre-propagation (management of grapevine collections), management of source blocks, supply of cuttings and certification requirements for the production of planting material.

In addition, cost of conformance research was conducted as a first step in determining the value proposition (benefits) of certified planting material to the grape and wine sector. A tool was developed to calculate the likely impact of conformance activities on the cost of producing certified grapevine planting material, which considers a number of variables. The calculator can also be used to determine the impact of certification on cost of planting material for customers. Based on the current version of the best practice guidelines, it is estimated that direct cost of conformance will be between 40-75c per grafted vine, with much of the variation dependant on the density of virus sampling (i.e. % of vines sampled per block) decided upon. Added to this will be any indirect costs and a price premium that a nursery or cutting supplier might add to the product.

A number of R&D projects to provide knowledge required to underpin the Standard were developed or initiated. These include:

- a partnership initiated between Wine Australia and Agriculture Victoria Research to address key gaps in monitoring, sampling and diagnostic protocols for viruses in propagation vineyards
- a proposal with the Adelaide University Biometry Hub for the development of a virus sampling decision matrix
- investigation of funding opportunities to further develop novel remote sensing technology for large-scale surveillance of virus in winegrape vineyards.

The discovery of Grapevine Red Blotch Virus in Australia in 2023 and the occurrence of crown gall-like symptoms in commercial and propagation winegrape vineyards in 2023-24 both required responses by industry, which took resources away from all parties involved and impeded progress. The incidents did, however, demonstrate the value of efforts to develop a propagation standard and the associated governance structures. Having both in place would have provided a framework for a response, including identification of risk points in the production chain and a direct link to best practices requiring revision.

Key outputs:

- Agreement from key propagation stakeholders to establish a Standards Committee
- Identification of Greenlife Industry Australia (GIA) as a suitable service provider for delivering an Australian grapevine certification program
- Development of best practice guidelines to underpin an Australian grapevine propagation standard
- A calculator to estimate the costs associated with meeting certification requirements, as a basis for demonstrating the value proposition (benefits) of certified planting material to the grape and wine sector

Recommended course of action:

1. Support the establishment of the Standards Committee: work with the propagation sector and grape and wine industry bodies to establish a Standards Committee
2. Build the case for engaging Greenlife Industry Australia (GIA) as the delivery partner for the certification program: collaborate with GIA to develop a business case, based on Appendix 1, for consideration by sector stakeholders.
3. Establish governance structure: Work with GIA, the Standards Committee and other stakeholders to develop a robust governance structure for the certification program.
4. Complete Grapevine Nursery Stock Specification: with direction and input from the Standards Committee, finalise the written propagation standard, incorporating new knowledge from research, additional expertise and updated best practices.
5. Implement communication plan: Develop and execute a comprehensive communication plan to promote the benefits of certified planting material to vineyard owners, nurseries, and source block managers.
6. Support research and capability development: Continue to invest in research and capability projects which address known gaps**.**

Implementing these recommendations will allow the sector to work towards a more robust and sustainable grapevine propagation system, ultimately benefiting the entire grape and wine supply chain.

3. Background

The Australian wine sector currently lacks a quality assurance system which covers the entire propagation supply chain, from collections through to customers. There are also critical gaps in knowledge related to pathogen surveillance and diagnostics. This means that there can be only limited assurance that the material being supplied for vineyard plantings is 'disease-free' or of a certain provenance, creating uncertainty for buyers.

This project was the second phase (2a) of a program of work which aims to develop a national standard and certification program for grapevine propagation material and relates to the implementation model (Figure 1) developed in project WAC 2101: '*Development of a national grape-industry strategy for the implementation of a national standard for grapevine certification - Phase 1*', completed in April 2022.

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. Key output: an implementation strategy for a Australian grapevine propagation certification programs.	Establish the oversight structures. 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. Establish the certification program framework. 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. Develop an accounting system for tracking and tracing of labelling. Engage third-party auditors. 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. 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 1. *Implementation model for an Australian grapevine pre-propagation certified standard and best practice guidelines for source block management and cutting supply.*

There were two broad challenges to overcome:

- Developing an accepted oversight structure and certification program framework within a complex operating environment (i.e. multiple stakeholders representing different interests)
- The technical challenges associated with delivering a science-based quality assurance system that covers the entire supply chain.

These are complex issues that have prevented a solution for many years.

Nonetheless, the primary goal from the beginning of the process in 2020, through project WAC 2101 and continuing into this project, was 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. Despite significant effort in the previous project, WAC 2101, to engage the major stakeholders (Vine Industry Nursery Association (VINA) and South Australia Vine Improvement Association (SAVIA), this goal was not achieved.

Briefly, VINA was strongly of the view that it wanted to remain independent, continue with its own accreditation system (which had been running for 20 years) and develop and administer its own certification standard. SAVIA, which had already completed a review of vine improvement procedures to underpin a propagation standard, was willing to consider a collaborative oversight model. Under this model, VINA and SAVIA (as the two major stakeholders) would drive the development of the certification program with support from Wine Australia. With VINA acknowledging 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'*, a compromise position was reached (WAC 2101 final report, March 2022).

The intention was that VINA would continue in its process of establishing a certification program for source blocks (due to be implemented by June 2022) and that the NGC coordinator, in collaboration with the propagation sector and research organisations, would focus on:

a) developing information that would fill the acknowledged gaps in the science and ultimately be used to develop 'best practice guidelines for source block management' which 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'* (from WAC 2101 final report)

b) implementation of a pre-propagation certification program for grapevine collections to fill the gap in the VINA accreditation and certification program (which is focussed on the Source blocks and nursery production end of the propagation supply chain). With this proposal it was acknowledged that:

'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 (Quality Assurance objectives). 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.' (from WAC 2101 final report)

The following recommendations were made in WAC 2101:

Recommendation 1: Undertake projects to develop the critical knowledge and capabilities that will underpin the development of grapevine propagation standards

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

1. an Australian grapevine pre-propagation standard (i.e. management of grapevine collections) 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 developed in October 2021 workshop 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 goals.

The National Grapevine Collection project (FOV 2201), which supports the role of Nick Dry as co-ordinator of the program as a whole, ran concurrently with projects WAC 2101 and FOV 2202. Activities to address recommendations 1, 4 and 6 were initiated under the National Grapevine Collection project, through the establishment of a Stakeholder Reference Committee (SRC) and Program Working Group (PWG) to help oversee the development of the knowledge and capability projects and facilitate dialogue between key stakeholders. Recommendation 2 was to be completed as part of Phase 3 of Standard implementation (as per the timeline in Figure 1).

4. Project aims

The purpose of this project was to address the recommendations that were not covered by the National Grapevine Collection project. Specifically, the project aimed to continue to refine the structure of the certification program, gain alignment with VINA, quantify cost of conformance, get a head-start on communication, complete a discrete high priority project and map the pathway ahead.

1. Set up for success: governance and funding model

A certification program set up with sector input and with the long game in mind provides the best chance for success and will ultimately drive user uptake. This output will draw heavily on the findings from WAC 2101, specifically the identification of the key governance functions for a certification program, factors driving uptake and adoption, stakeholder requirements, participatory scope and the capability and resource requirements for a certification program.

2. Quantify the value proposition for certified planting material

Understanding and addressing the factors driving uptake by the vineyard end-user is critical to the success of implementing a successful certification program. If customers are not demanding certified planting material, then there will be limited commercial imperative to drive uptake within the propagation supply chain. The first questions always asked when discussing certified planting material is ‘how much will it cost?’ and ‘what is the benefit, value or return on investment?’. Confidence in the value proposition of a certification scheme will underpin all other activities and increase the likelihood of its acceptance and uptake.

3. Develop and implement a communication strategy

Using the knowledge generated in Output 2, develop and begin implementation of a communication strategy directed at all levels of the grape-growing sector to clearly convey the objectives of the certification program and the related benefits and value proposition of using certified cuttings and

planting material. This output will draw upon existing expertise within Wine Australia and leverage its existing communication channels.

4. Develop protocols for the production of planting material for collections, multiplication and source blocks.

Grapevine collections, multiplication and source blocks form the foundation of the Australian grapevine propagation supply chain, with the introduction of pathogens and/or genetic anomalies at this point of the supply chain having significant flow-on effects. As a result, it is necessary to develop specific and more stringent propagation protocols for the production of dormant and green planting materials destined for collections, multiplication blocks and source blocks. These protocols are required immediately for the National Grapevine Collection and will eventually be integrated into the pre-propagation certified standards.

5. Develop plan for Phase 2b of implementation

The details for the next Phase of the project will be developed through consultation within the National Grapevine Collection program, using the recommendations in Section 6 as a starting point and taking into consideration the findings and deliverables from this and earlier projects.

5. Outputs and achievements

This project (FOV 2202) aimed to address key priorities for developing a grapevine propagation certification program, as per the outputs set out above. However, due to ongoing challenges with stakeholder collaboration and the interaction with the umbrella National Grapevine Collection program, the project shifted focus. Four clear outputs emerged, summarised below:

5.1 Agreement from key stakeholders on the establishment of a Standards Committee

While there has been general consensus on the scientific gaps that need addressing in the development of a propagation standard, the key propagation stakeholders (SAVIA and VINA) have differed in their views on how to best manage a certification program. For context:

- VINA has been running an accreditation scheme for nurseries and source block managers since 2004 and has been rewriting their manual with a view to offering its members the opportunity to certify planting material that meets the VINA standard and associated verification process.
- SAVIA has been actively pushing for the delivery of a certification program, has revised their 'National Vine Accreditation Scheme' manual and been actively pursuing R&D outcomes to fill the acknowledged gaps in the science.

One of the key drivers for initiating the Program Working Group (PWG) as part of the management structure for the National Grapevine Collection was to provide the opportunity for SAVIA and VINA representatives to meet on a regular basis and progress the standard. Through discussions within

the PWG the two organisations acknowledged that they needed to develop an agreed structure for a cost-effective certification program which encompasses the whole of the propagation supply chain. These discussions have resulted in agreement to establish a Standards Committee, as a first step towards a decision making process on how a certification program will be managed. VINA, SAVIA and their representatives should be commended and recognised for their role in achieving this important output.

5.2 Identification and estimation of costs associated with conformance to certification requirements

The cost of certification can be divided into two areas: the costs associated with the governance and administration of the certification program itself, and the direct costs associated with conformance to the requirements in the certification standard - including testing and inspections. This activity focussed on identifying and understanding the likely costs associated with producing certified grapevine planting material. The result was a spreadsheet-based calculator which can estimate each cost component and determine the impact of certification on cost of planting material for customers.

The calculator includes genetic assurance, virus assurance, trunk disease management and performance assurance for scion and rootstock cuttings, own roots and grafted vines based on the input of production variables (cuttings per vine, % harvested, buds per cutting and take rates) and the input of sampling variables (% of vines sampled, number of vines pooled per sample, diagnostic cost per sample, cost of sampling and frequency of testing). Key findings were:

- Virus surveillance (including sampling costs, diagnostics and visual inspections) is the major contributor to certification cost of conformance, accounting for as much as 70% of the total costs associated with the production of a certified grafted vine
- Based on the current version of the best practice guidelines, it is estimated that the direct cost of conformance associated with sampling, diagnostics and inspections will be between 40-75c per grafted vine. Added to this will be any indirect costs and a price premium that a nursery or cutting supplier might add to the product
- Virus sampling rates contribute significantly to the final cost of conformance, with an estimated 24c difference in the cost of a grafted vine when comparing 5% annual source block sampling with 33% annual source block sampling (Table 1)
- The impact of cost of conformance on cuttings and own-rooted vines is more significant than grafted vines because in grafted vine production the cost of scion is divided by the number of buds per cutting.

Table 1. Contribution of virus sampling rate to cost of propagation and planting materials

Virus sampling rate	Cost per rootstock cutting	Cost per scion cutting	Cost per own rooted vine	Cost per grafted* vine
0.5%	0.04 c	0.6c	0.8c	0.4c
5%	0.4c	6c	8c	4c

10%	0.8c	13c	17c	8c
33%	3c	42c	56c	28c
100%	8c	$1.27	$1.69	84c

*includes the cost contribution of both the scion and the rootstock for one off sampling and testing

Virus Sampling Cost estimation assumptions:

Sample pooling: 5 vines
Diagnostic costs for four virus types (LR1, LR3, GVA, GPGV): $100 per sample
Administration and sampling: $35 per sample
Nursery take rates: 75% own roots and 60% grafted
Cutting production per vine: 25 cuttings-scion and 350 cuttings- rootstock

Figures in Table 1 do not include any costs associated with resampling of positive pooled samples to individual vine level or testing of vines adjacent to positive vines.

These findings highlight the importance of investing in virus management R&D and specifically methods and technology which can reduce the cost of virus surveillance and diagnostics.

5.3 Recommendation to engage Greenlife Industry Australia as the service provider for delivering Australian grapevine certification program (see Appendix 1)

While agreement was reached between key stakeholders to establish a Standards Committee, alignment on a governance structure for the certification program was not achieved. Project activities shifted towards further investigation of governance structure options that were identified in a review of local and international certification programs completed previously (project WAC 2101).

Appendix 1 sets out the background and supportive reasoning on which conclusions and recommendations were based. The recommendation is that Greenlife Industries Australia (GIA) be engaged to deliver and manage the certification program as a sector sub-program of their internationally recognised Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice (BMP) program.

5.4 *The development of best practice guidelines to underpin an Australian grapevine propagation certification program* (see Appendix 2)

Appendix 2 sets out guidelines for the establishment of best practice grapevine propagation, addressing genetic integrity, virus assurance, trunk and bacterial disease management and product specifications. The requirements were developed based on quality assurance objectives established during an October 2021 workshop with grape, wine, and propagation stakeholders (part of WAC

2101), as well as a review of international grapevine certification standards. The objectives were further refined using a Hazard Analysis Critical Control Point (HACCP) approach, identifying critical control points, associated risks, and necessary control measures.

While the guidelines require further refinement through additional research and input from sector stakeholders and technical experts, they serve as an incredibly valuable resource for the grape and wine sector, laying a solid foundation for the development of a Grapevine Nursery Stock specification within the Greenlife Industry Australia (GIA)/ Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice (BMP) certification program.

Other planned activities associated with Outputs 3 and 4 were partially completed or deferred due to the challenging stakeholder environment and a revision of priorities. Activities related to the incomplete or partially completed outputs have been included in recommendations for future work listed in Section 6.

Despite the challenges, the project's outputs provide a robust foundation for the future of grapevine propagation certification. Once adopted, the recommended governance framework and best practice guidelines will facilitate the production of high-quality and high integrity planting material, mitigate risks and help to ensure the long-term health and sustainability of Australian vineyards.

6. Recommendations for future activities

Future activities for development of a national standard and certification program for grapevine propagation material will be included in the scope of work for the second phase of the National Grapevine Collection project. These are:

1. Develop a business case for the engagement of Greenlife Industry Australia (GIA) as the service provider to develop and administer the Australian Grapevine propagation certification program as a sector sub-program of the Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice (BMP) program
2. Work with stakeholders and ideally GIA to develop the governance structure for delivering the grapevine certification program
3. Work with stakeholders to complete the development of the grapevine propagation standard, including the integration of new knowledge.
4. Develop a formal communication plan that targets vineyard owners, nurseries and source block managers and promotes the use of certified planting material
5. Support existing and planned research and capability development projects:
    - Best practice sampling and virus detection in Australian grapevine propagation assets
    - Identification of cause and origin of crown gall-like symptoms in Australian vineyards
    - Management and diagnosis of grapevine trunk diseases in vineyards and nurseries
    - Development of a statistically based virus sampling regime
    - Virus detection in vineyards using remote sensing and machine learning
    - The establishment of an ‘Australian Grapevine Germplasm and Propagation Asset Register’

6. Specific to the written standard the following protocols need to be developed:
    - Best practice protocol for propagation of vines for collections, multiplication rows and source blocks: managing risk of introduction of Virus, GTD and off-types.
    - Sampling and inspection requirements for collections, multiplication rows and source blocks: Virus surveillance, vector surveillance, Trunk disease, and Variety/clone proof of identity'.
    - Best practice protocol for vector management in collections, source blocks, grow areas (grow houses and field nurseries).
    - Training guide for inspectors
    - List of 'prime' clones that have been 'fingerprinted' and confirmed using genomic sequencing methods
    - List of recognised collections, selection and breeding programs.

Appendix 1

Engagement of Greenlife Industry Australia (GIA) to develop and deliver an Australian grapevine certification program

After extensive reviews and consultation across the past five years as part of Wine Australia-funded projects WAC 2009, WAC 2101, FOV 2201 and FOV 2202, it is recommended that the grape, wine and propagation sector engage Greenlife Industry Australia (GIA) as the service provider to develop and administer the grapevine propagation standard (known as the Grapevine Nursery Stock specification), as a sector sub-program of the Nursery Industry Accreditation Scheme Australia (NIASA) Best Management Practice (BMP) program.

Not only is this a cost-effective option, it would ensure that we are meeting stakeholder expectations of what a grapevine certification program should deliver in terms of strong governance, independence, transparency, promotion of best practice based on science and long-term sustainability.

The process of transitioning to the NIASA BMP program would be supported by a Standards Committee which would ensure that the Grapevine Nursery Stock Specifications meet the requirements of the propagation sector.

Who is Greenlife Industry Australia (GIA)?

Greenlife Industry Australia (GIA) is the peak industry body for businesses and organisations that are involved in nursery production. Greenlife Industry Australia owns and administers the Australian Plant Production Standards (APPS) which is the over-arching framework for the Australian nursery industry's Best Management Practice (BMP) programs. GIA administers sector sub-programs for propagators of Avocado, Banana, Landscape tree stock, Macadamia and Strawberry.

Why Greenlife Industry Australia?

Industry leaders in nursery best practice- Greenlife Industry Australia (GIA) is dedicated to promoting best practices within the nursery and horticulture industry to ensure sustainable growth, environmental stewardship, and operational efficiency. Its focus on best practices is embedded in its programs, standards, and guidelines, which support members in achieving high standards of quality, safety, and sustainability.

Governance- the GIA governance structure is designed to ensure industry representation, effective decision-making, and alignment with its mission of advancing sustainable and profitable horticulture. The structure is made up of a Board of Directors, Executive team, committees and working groups.

Biosecurity- GIA are signatories to the Emergency Plant Pest Response Deed (EPPRD) representing nursery production and are members of the Consultative Committee on Emergency Plant Pests (CCEPP). Including grapevine propagation as a sector sub-program would mean that as signatories to the EPPRD and members of the CCEPP, GIA would have greater understanding of the grapevine

propagation process and therefore would be better equipped to help the grape, wine and propagation sector respond to exotic incursions.

Auditing- GIA's audits are conducted in alignment with national and industry standards, ensuring consistency and credibility.

Technical Support- The GIA system supports nurseries with research and extension and GIA employs technical officers to assist nurseries to become compliant. Furthermore, access to technical support from GIA's nursery industry experts would assist in dealing with endemic outbreaks such as the Crown Gall/bacterial pathogen issues.

Economies of scale- GIA has systems in place and economies of scale to rapidly and in relative terms, inexpensively implement a Grapevine Nursery Stock Specification into the NIASA BMP program.

Research and Innovation- GIA collaborates with research organisations to develop new technologies and techniques that enhance productivity and sustainability in the nursery industry.

The governance of delivering the Grapevine Propagation Standard through the NIASA BMP program of GIA

As with existing sector sub-programs within GIA, the decision-making on technical content/production requirements for the Grapevine Nursery Stock Specification (the name given to propagation standards in NIASA) would be provided through GIA and a nominated representative of the grape and wine sector, as part of an Authorised Oversight Committee (AOC). Where specialist technical advice is required, it will be provided through a supporting Technical Advisory Group, made up of four nominated technical experts from the propagation, research and biosecurity sectors. The Authorised Oversight Committee will provide the final 'signoff' of the Grapevine Nursery Stock Specifications in consideration of advice (where sought) from the Technical Advisory Group. If the Technical Advisory Group is deadlocked on an issue, the AOC has the final say.

As a first step, it is recommended that the Standards Committee use the best-practice guidelines that were an output of Wine Australia-funded project FOV 2202 to complete a grapevine propagation standard. This should be carried out with:

- input and direction from the Standards Committee
- integration of new knowledge from current and recently completed relevant R&D projects
- consideration of previous work on written standards undertaken by VINA and SAVIA
- consideration of the requirements of the grape and wine sector (including where vineyard owners have developed their own internal standards for grapevine propagation material - such as is the case with tablegrape breeders Bloom Fresh).

As this activity will precede development of the 'Grapevine Nursery Stock Specifications' with GIA, key propagation sector stakeholders will have direct input into the standard from the outset, helping to ensure acceptance and buy-in, and clear expectations of the requirements within the standard prior to integration into the NIASA BMP guidelines. In addition, completing the majority of the work associated with developing the standards/specifications prior to consultation with GIA will limit the delivery timeframe and associated costs.

Proposed role of the Standards Committee

The Committee will have specific roles and responsibilities associated with delivering and maintaining the grapevine certification program including:

- Developing and refining the written standard
- Identifying and addressing propagation issues
- Providing input into active research activities to underpin the standard
- Identifying gaps in research and potential new technologies or techniques that would contribute to best practice
- As a conduit to providing information and updates to the member organisations to which they represent
- Reviewing the written standard on an agreed cycle or as critical new information or technology becomes available.

Committee membership should include an independent chair and consist 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 Accreditation and Certification process

In order for a nursery or source block manager to be eligible to be certified for the production of cuttings or planting material based on the Grapevine Nursery Stock Specification, the business must first be NIASA accredited and have been found at audit to have implemented mandatory procedures to a satisfactory standard.

The Grapevine Nursery Stock Specification would include:

- *Part. 1. The management of field-based collections (including multiplication rows) for the production of certified pre-propagation cuttings*
- *Part 2. The management of source blocks for the production of certified propagation cuttings*
- *Part 3. Certification requirements for nurseries*

For **the production of certified pre-propagation cuttings**, a collection manager must meet the requirements of *Part 1. The management of field based, collections (including multiplication rows) for the production of certified pre-propagation cuttings.* It is the intention that within seven years of implementation, newly established source blocks registered for the production of certified cuttings would be derived from certified pre-propagation cuttings.

For **the production of certified cuttings**, a source block manager must meet the requirements outlined in *Part 2. The management of source blocks for the production of certified propagation cuttings.*

For **the production of certified planting material**, a nursery must use certified cuttings produced using the requirements outlined in Part 2 and meet the requirements in *Part 3. Certification requirements for grapevine nurseries.*

Funding, fees and impact on cost of planting material

The funding requirement for the grape and wine (and propagation) sector would be a one-off investment of a maximum $80,000 to develop the existing best-practice requirements into the Grapevine Nursery Stock Specification for inclusion into the NIASA BMP program. This funding would include the development of online training modules for inspectors (virus, vectors, off-types). Additional funding may be required to support the establishment and maintenance of the Standards Committee, and it is recommended that funding be allocated to drive a communication strategy to promote the use of certified propagation material to growers. The grape and wine (and propagation) sector would be responsible for funding a review of the standards on an agreed cycle (between 3 and 5 years) or to integrate major advancements in science or technology. Considering that the maximum cost for integrating the new standards is $80,000 then it is estimated that revisions will be in the order of $10,000-$20,000 every 3-5 years (depending on the extent of revisions required).

Nurseries and source block managers (i.e. Vine Improvement groups) would each pay around $2000 per year to GIA for membership and auditing, and also be responsible for any costs related to operational conformance. These conformance costs are associated with:

- Conducting various tests and analyses on grapevine planting material.
- Vine Inspections- ampelography and off types, virus symptom surveillance and pest and disease monitoring.
- Implementing quality assurance systems, including documentation, traceability, and record-keeping,
- Providing ongoing training to staff.

It is difficult to put an absolute figure on the cost of conformance as there are a number of variables, but based on the current version of the best practice guidelines, it is estimated that total cost of conformance will be between 30c-75c per grafted vine, with much of this variation in cost dependent on the % of vines sampled per block for virus testing (yet to be determined) and the number of resulting positive composite samples that require testing to individual vine level plus the number of adjacent vines (both dependent on individual blocks).

It is fully expected that certified cuttings and planting material will be offered for sale at a premium compared with non-certified cuttings and planting material. Source block managers and propagators/nurseries would be encouraged to consider return on investment from the cost of conformance, when coming up with supply price for certified cuttings and planting material.

Risk management

As the GIA model has been previously discounted as an option by the two major stakeholders in VINA and SAVIA, there is a risk that initial uptake of the certification program by the propagation sector will be low. However, by actively leveraging the support of the grape and wine sector and

implementing a strategic communications campaign to promote benefits of certified planting material and the benefits of GIA as the providers, it is anticipated that this risk can be managed and overcome.

Benefits to the propagation sector

- Outsourcing the certification program to a third-party would allow VINA and Vine Improvement groups to focus on advocating for their members and achieving best practice rather than allocating resources to the establishment and maintenance of a certification program.
- Nurseries currently already contribute to GIA via the 'Pot Levy' - involvement with GIA provides a return on this investment.
- Nurseries will gain recognition for excellence from a known and respected quality control program.
- Direct engagement with nursery experts from outside the vine nursery industry.
- Members gain access to best-practice resources developed by GIA through long-term investments in research.
- Access to workshops, training programs, and resources offered by GIA to support continuous learning and implementation of best practices in areas like plant health, irrigation, and workplace safety.
- Access to tools and resources for business improvement offered by GIA, including digital tools for data tracking, financial management, and customer engagement.
- Advocacy and representation for nurseries at a national level through GIA's engagement with government agencies, policymakers, and industry stakeholders to advocate for:
    - Improved biosecurity measures.
    - Better trade conditions and market access.
    - Supportive environmental and water management policies.

Certification uptake goal

The 10-year goal should be to work towards having the equivalent of 20,000 source block vines registered for the production of certified cuttings. With a split of 30% rootstock and 70% scion, this would lead to the annual production of around 1 million certified grafted vines, which would account for between 15-25% of the total grafted vine market in Australia. To achieve this goal, there are two clear areas that need to be addressed to drive uptake: promotion to the vineyard end-users and engagement with key nurseries and cutting suppliers.

Driving uptake

Understanding the factors driving uptake by nurseries and cutting suppliers and also the role and the engagement of the end-user is critical to the success of implementing a successful voluntary certification program. Based on the review of overseas and local systems and consultation with stakeholders, the following factors have been identified as critical in driving participant and customer uptake:

- That there are clear, definable, and justifiable quality assurance objectives.

- That participants (nurseries and source block managers) see value in the system and that it contributes to increased quality and efficiency.
- The certification program is well managed and administered and viewed by the grape and wine sector as independent.
- There is technical and administrative support for participants to assist in meeting conformance requirements.
- The certification program is actively promoted by peak bodies.
- There is active involvement and support from the research community.

Customer needs will be explored more fully through the next phase of the project with the Wine Australia Extension and Adoption team. Initial thoughts for the approach are that promotion to vineyard owners will consist of three key areas:

1. **Direct targeting of key decision-makers:**
    - Target Chief Finance Officers and Group/National Vineyard Managers in large vineyards and wineries.
    - Highlight the long-term value and ROI of certified planting material.
2. **Leveraging industry networks:**
    - Utilise industry and communication networks such as those of Australian Grape and Wine, Wine Australia, and regional organisations to promote the benefits of certified planting material.
3. **Engaging table grape breeding programs:**
    - Ensure that standards meet their expectations and are aligned with their own internal propagation standards.
    - Collaborate with table grape breeding programs to encourage or mandate the use of certified vines.
    - Emphasise the importance of protecting the intellectual property and value of their breeding programs.

Promotion to nurseries and cutting suppliers

Promotion will initially target better-resourced, technically proficient nurseries and cutting suppliers with extensive propagation assets. These businesses, which are already well-equipped to comply with grapevine propagation standards, are seeking a system to validate their adherence to best practices.

It is not expected that all propagation and planting material will be certified. Businesses will be encouraged to take a staged and strategic approach to certification, with initial efforts focused on certification activities in source blocks that are in high demand but lower risk (which will inevitably have lower inputs in terms of meeting conformance requirements and more consistent income). Over time the range of source blocks (in terms of demand and/or risk) can be expanded, aided by increased confidence in the system, increased customer demand, potential new technologies (eg. hyperspectral and remote sensing for virus detection) or findings from the research (eg. increased composite pooling for virus testing).

To facilitate virus surveillance compliance and achieve the source block certification goal of 20,000 vines, government grants or other externa funding could be sought by industry bodies and individual businesses to offset compliance costs.

Alternative option to the GIA model

An alternative model, previously identified in project WAC 2101 and favoured by SAVIA is to establish and maintain a grapevine certification program through a collective approach involving sector stakeholders VINA, State vine improvement groups (SAVIA, WAVIA, VAMVVIA), AGW, ATGA and DFA.

This model is based on the South African grapevine certification program. A Standards Board comprising the above stakeholders would be responsible for providing management and administrative services in support of vine certification, including licensing and auditing. It would become the critical instrument in driving a grapevine propagation standard.

This is seen as unviable option for the following reasons:

- This option would require significant resources from all stakeholders involved and ongoing financial and administrative support to manage it into the future (including the employment of an Executive Officer)
- Given that the stakeholders involved have limited financial resources, external funding would need to be sourced, with likely investment from Wine Australia. It is unclear whether Wine Australia is willing to underwrite the annual costs of the program in perpetuity or whether this is eligible expenditure under the Wine Australia Act (2013).
- VINA and the Vine Improvement groups are reliant on volunteers which may limit their ability to commit resources to maintaining a certification program into the future.
- In the South African model, the certification program is supported by government legislation which is not a likely scenario in Australia.
- A board comprising largely of propagation sector members may be perceived as lacking independent authority by end-users, undermining confidence in the value of certified material and uptake by the grape and wine sector.

Ultimately, the significant responsibility of managing the day-day activities of a certification program should not be left to what would essentially be a board run mostly by volunteers - this would be unfair on the board members and place significant strain on their representative organisations.

In summary, it seems far more logical that the responsibility for certification should lie with an organisation that runs certification programs and facilitates nursery best practice as their core business. Engaging Greenlife Industry Australia (GIA) as the service provider for managing a grapevine propagation standard and associated certification program offers a compelling and cost-effective solution. By leveraging GIA's expertise, governance structure, and economies of scale, we can establish a robust certification program that meets the industry expectations of providing strong governance, independence, transparency, promoting best practice based on science and long-term sustainability.

Appendix 2

Australian Grapevine Propagation Best Practice Guidelines

> ***'Start clean and true, stay clean and true'****
>
> **'Start clean and true'** through the investment in the National Grapevine Collection program and adherence to part 1 of the guidelines
>
> ***Collections play a critical role in setting the tone or potential for a sector in terms of the identity status, health status and diversity of commercial plantings.***
>
> **'Stay and clean true'** through investment in the certification program
>
> ***The certification program plays a central role in establishing and maintaining the integrity of propagation and planting material from collections through to supply to the vineyard end-user.***
>
> **The concept of 'clean and true' in relation to propagation and planting material is defined by adherence to the requirements of the Standard.*

Underpinning this statement is ongoing investment in research and development, to ensure that the requirements within the program are based on best science - which in turn will increase assurance and maintain or reduce cost of conformance.

Introduction

Certification purpose and intent

These best practice guidelines are focussed on providing the vineyard end user with viral, genetic, trunk disease, bacterial disease and performance assurance.

Viral assurance is based on visual inspections and a risk-based approach to sampling and diagnostic testing that takes into account those virus types that will significantly impact nursery and vineyard performance, as determined by Australian grapevine virology and viticulture experts. As technology progresses it is expected that remote/hyperspectral sensing will be integrated into the guidelines to allow surveillance at scale and provide even higher levels of assurance. The viruses of concern will differ depending on whether it is a scion or rootstock source block and the propagation asset type.

Schedule 1.

Virus of concern for scion source blocks[1]*:* Leaf-roll 1 (LR1), Leaf-roll 3 (LR3), Grapevine Virus A (GVA), Grapevine Pinot Gris Virus (GPGV) and Grapevine Red Blotch associated Virus (GRBaV).

Schedule 2.

Virus of concern for rootstock source blocks, collections and multiplication rows: Leaf-roll 1(LR1), Leaf-roll 2 (LR2), Leaf-roll 3 (LR3), Leaf-roll 4 (LR4), Leaf-roll 4_6 (LR4_6), Leaf-roll 4_ 9 (LR4_9), Grapevine Fleck (GFLK), Grapevine Virus A (GVA), Grapevine Virus B (GVB), Grapevine Pinot Gris Virus (GPGV) and Grapevine Red Blotch associated Virus (GRBaV).

Genetic assurance is based on traceability back to a known source, use of genetic verification methods and implementation of protocols, related training and documentation to limit risk of introduction of off-types during cutting harvest and the propagation process.

Trunk and bacterial disease assurance is based on providing evidence of adherence to processes that demonstrate a cumulative reduction in risk focussed on protecting and treating wounds created during the propagation process.

Performance assurance is based on quality control processes and minimum specifications. 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'. Conformation will be based on providing evidence to the auditor that internal production management processes for cuttings and planting material have been followed.

Certification process

For the production of certified pre-propagation cuttings, a collection manager must meet the requirements of *Part 1. The management of field-based collections (including multiplication rows) for the production of certified pre-propagation cuttings*.

For the production of certified cuttings, a source block manager must meet the requirements outlined in *Part 2 The management of source blocks for the production of certified propagation cuttings.*

[1] GPGV's ongoing inclusion in schedule 1 will be dependent on the findings from current supporting R&D to define commercial impact of virus types and provide recommendations on viruses to be precluded

For the production of certified planting material, a nursery must use certified cuttings produced using the requirements outlined in Part 2 and meet the requirements in Part *3 Certification requirements for grapevine nurseries.*

The requirements in Parts 1 and 3 are more focussed on operators having developed their own procedures, records and evidence of training to demonstrate best practice. Part 2 is more prescriptive and outlines specific requirements associated with inspections, sampling and testing.

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.

Cutting Consignment- harvested cuttings submitted for certification. The consignment must be from a single source block and the consignment bundles must also be clearly identifiable in terms of both physical identification through tags and in the source block manager's records.

Cultivar- a distinct genetic identity whose origin or selection is primarily due to the intentional actions of humankind. In viticulture a cultivar is a variety/clone combination for example Merlot/D3V14.

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.

Grapevine collections- a general term for any collection of grapevine varieties, rootstocks and clones. Collections are established with varieties and clones via importation, through local selection or breeding. Collections have a dual role as repositories for the maintenance of genetic diversity and the initial source for the establishment of larger propagation assets (multiplication rows and source blocks). Cuttings produced in collections are referred to as pre-propagation cuttings.

Multiplication rows- a group of clonal planting material originating directly from a collection that provides the cuttings for the establishment of source blocks. Multiplication rows act as an intermediary step between the collections and the source block. Typically, multiplication rows have between 10-50 vines. Many source block managers and nurseries skip this step in the propagation supply chain by using rapid/green propagation facilities to multiply enough vines to go straight from collections to source blocks.

Source Blocks- A group of vines that is used to supply vine material for propagation. Source blocks are established from cuttings taken from multiplication blocks or directly from collections via green propagation. Source blocks supply cuttings for commercial use to either propagation nurseries or directly to vineyard end-users for their own use (for top-grafting and occasionally for their own non-commercial propagation purposes).

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.

Documents required to underpin parts 1, 2 and 3 of the guidelines

Please note that there are a number of documents cited in the guidelines that will need to be developed. This list provides an indication of the gaps that need addressing in developing these Standards.

- Best practice protocol for propagation of vines for collections, multiplication rows and source blocks: managing risk of introduction of Virus, GTD and off-types.

- Sampling and inspection requirements for collections, multiplication rows and source blocks: Virus surveillance, vector surveillance, Trunk disease, and Variety/clone proof of identity.
- Best practice protocol for vector management in collections, source blocks, grow areas (grow houses and field nurseries) including recommendations on frequency of monitoring and thresholds for intervention.
- Training guide for inspectors
- List of 'prime' clones that have been 'fingerprinted' and confirmed using genomic sequencing methods[2]
- List of recognised collections, selection and breeding programs[3].

[2] List of clones (which we have confidence in verifying using clonal markers) to be developed

[3] List to be developed, but would include VCR, MAT, FPS, CSIRO, ENTAV, ITACYL, Bloom fresh, ITUM, Sheehan, Mercier

Part 1. The management of field-based collections and multiplication rows for the production of certified pre-propagation cuttings

Note: any sections highlighted in yellow require further research and or discussion/validation with standards/technical committee

There are two parts to the supply of certified cuttings from collections and multiplication rows.

- **Part 1A: Site Registration**
- **Part 1B: Cutting Certification**

Part 1A: Site Registration is required as proof that the collection:

1. Is being managed in a way that takes into consideration the germplasm principles of ensuring security, ensuring availability, maintaining genetic integrity and diversity, providing information and acquisition and introduction of new accessions.
2. Has systems and control measures in place that reduce external risks and hazards to an acceptable level.

Part 1B: Cutting Certification outlines the specific conformance requirements that must be met for a consignment of cuttings to be deemed 'certified'

1A. Site registration

For a collection to be registered the collection managers must provide evidence that the following requirements have been met:

Requirement 1.1 Entry of personnel

I. Entry into the collection is limited to key staff (except the use of labour hire/contract staff during fruit removal or pruning activities).

II. All staff who enter the site are trained on the importance of hygiene protocols and why adherence to these protocols will keep the collection safe.

III. Entry into the collection is on the basis that personnel:

   A. Are wearing clean clothing and hats (i.e. clothes and hats have not been worn into a vineyard or have been cleaned following entry into a vineyard).

B. Foot-wear has been disinfected in a chlorine bath or alternative footwear has been supplied

C. Equipment has been appropriately sanitised.

IV. A visitor register must be maintained which records vineyard regions each visitor has visited for at least 29 [4]days prior and whether any of these visits have been in Phylloxera infested zones or phylloxera restricted zones.

V. There must be clear signage that advises on entry restriction into the collection.

VI. No unauthorised vehicles are to enter the collection.

Evidence requirements: protocols, training, records.

Requirement 1.2 Entry of equipment and machinery

Each collection must develop and adhere to protocols that limit risk of transmission of viruliferous vectors and other unwanted pests (phylloxera, nematodes) on machinery and equipment. These protocols must include the development of auditable records for proof of origin of equipment and disinfestation and inspection of machinery and equipment. **Evidence requirements:** protocols, training, records.

Requirement 1.3 Security

Collection managers must take into consideration and put in place risk management protocols and contingencies that minimise the opportunity for trespassing into the collection and deliberate damage to the vines in the collection by limiting the number of entry points, use of fencing and lockable gates. **Evidence requirements:** Site security risk analysis [5]and evidence of activities to minimise risk based on the hazard analysis.

Requirement 1.4 Hazard management

Collection managers must take into consideration and put in place risk management protocols and contingencies that minimise the potential impacts of environmental hazards (fire, flood hail, long-term drought) and other hazards such as deliberate property damage and off-target spray drift from neighbouring properties (e.g. phenoxy herbicides 2,4-D). **Evidence requirements:** Hazard risk analysis and evidence of activities to minimise risk based on the hazard analysis.

[4]reference: https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/grapevine-phylloxera#:~:text=Crawlers%20can%20also%20naturally%20spread,days%20without%20a%20food%20source.

[5] Develop a template/example as a guide

Requirement 1.5 Data management

There must be an appropriate data management system in place that:

I. Allows for vines to be identified within the collection (panel tags).

II. Records and manages customer orders.

III. Maintains records for each vine that pertains to its location in the collection, origin, history, treatments, description (white, red, table-grape, rootstock), availability, registration status, virus testing history, cutting yield by season.

All records must be stored securely and backed-up appropriately to minimise the opportunity for data theft and data loss. **Evidence requirements:** a working and explicit data management system.

Requirement 1.6 Germplasm review

To ensure that the collection maintains its relevance there must be evidence that collection management has regularly[6] undertaken a process for the review of the varieties and clones within the collection. **Evidence requirements:** review documents and related meeting minutes.

1B. Cutting certification

For consignment of cuttings to be deemed 'pre-propagation certified', the management practices applied to the vines that constitute the consignment must meet the following requirements:

Requirement 1.7 Variety and clone identity verification

In the first year that certification is sought, the collection manager must make a variety and clone identity claim and provide evidence that verifies this identity claim. Three pathways for verification have been developed recognising that not all clones that are in commercial use in Australia have been 'fingerprinted' and confirmed using genomic sequencing methods. Clones that have been fingerprinted and confirmed are listed in Schedule x and are covered by requirement 1.7.1. The non-inclusion of a clone in schedule x is generally a result of it being a 'new import' or an 'emerging' variety and therefore there has not been the opportunity to access the requisite number of clustered samples to provide confirmation of clone identity. In this situation collection managers must refer to requirement 1.7.2 and schedule y. If a collection manager has a variety and clone

[6] 12 or 24 months?

identity claim that falls outside requirements 1.7.1 and 1.7.2 then they may make a petition to the Standards Board with evidence that supports their claim as outlined in requirement 1.7.3

Schedule x. List of clones that must be tested to clone level through DNA methods[7].

Schedule y. List of recognised collections[8]

I. For clones listed in schedule x there are two verification options available:

Option 1. The collection manager must be able to provide a 'clear and complete' chain of evidence linking the source block to mother vines that have been DNA verified to clone level. The Standards board retains the authority to decline identity claims where evidence is deemed to be incomplete. In these circumstances, source block managers must comply with the requirements outlined in option 2.

OR

Option 2. The clonal identity of a sub-set of vines in the source block must be confirmed through DNA methods using the DNA sampling rate outlined below.

Evidence requirements: DNA verification record, import records, sales/supply records, nursery propagation records (batch records), planting records, source block information which include information pertaining to origin, contractual arrangements with the land-holder.

II. For clones that are not listed in Schedule x., identity claim verification is through the provision of a:
   A. 'clear and complete' chain of evidence linking the source block to mothervines in a recognised collection (as per schedule y) **and**
   B. DNA verification test to variety level. This may be from the mother vines, or from a sub-set of vines in the source block using the DNA sampling rate outlined below.

[7] i.e. a list of clones of which we have confidence in using clonal markers as a form of verification.

[8] This list would include VCR, MAT, FPS, CSIRO, ENTAV, ITACYL, Bloom fresh, ITUM, Sheehan, Mercier.

Evidence requirements: Import records, sales/supply records, nursery propagation records (batch records), planting records, source block information which include information pertaining to origin, contractual arrangements with the landholder, verbal verification. DNA verification records.

Collection DNA verification sampling: All vines related to the variety/clone identity claim must be included for testing. Samples may be pooled up to a maximum of 5 vines. Where the result from the genomic testing does not match the identity claim then……

Requirement 1.8 Ampelographic inspection

In the first two years that certification is sought, collection managers must provide evidence that 100% of the vines in the block have been inspected and that any off-types have been removed:

I. Rootstock- inspections must occur between October-December

II. Scion- inspections must occur after 100% veraison and prior to harvest bunches (i.e. at least 3[9] bunches per vine must be visible as a part of the inspection). Inspections can occur concurrently with virus surveillance visual inspections and or virus sampling.

Evidence requirement: training and inspection records, records of off-type removal.

Requirement 1.9 Virus surveillance

I. Annual visual inspections must be conducted on all vines in the collection to identify vines with symptoms. Follow-up testing must be conducted on any vine exhibiting virus-like symptoms.

II. Every vine in the collection must be tested on a minimum 3 year cycle using PCR at a NATA accredited laboratory, testing includes virus types outlined in schedule 2 (GVLRaV1, GVLRaV-3, GVA, GVB, the GVLRaV-4 complex, GVFK, GPGV and Red Blotch).

[9] Stating a minimum number of bunches per vine recognises that bunch removal is a management practice used to reduce risk of vectors and can also hasten development of vine architecture. The final number of bunches per vine could be guided by Plant Breeders Rights assessments.

III. Sampling must comply with sampling guidelines outlined in *'Sampling and inspection requirements for collections, multiplication rows and source source blocks'*[10]

IV. All activities related to virus surveillance (inspections and identification of symptomatic vines, test results, vine removal) must be recorded and maintained in an appropriate data management system.

Evidence requirements: training records, annual inspection results, virus testing results.

Requirement 1.10 Management of virus infected vines[11]

In the event of an initial positive virus test:

I. Vines tested as composite samples may be re-analysed as single vines to identify which vine(s) is infected. If a composite sample is not re-analysed to single vines all the vines in the composite sample must be further managed and treated as positive vines.

II. Vines that test positive must be:

a) Removed within x days to minimise risk of spread and be quarantined from cutting harvest until they are removed. Adjacent vines must be managed as per ***requirement 1.11.***

OR

b) Re-sampled and re-tested (secondary test) within x days of receiving the initial positive result.

i) A vine that tests positive on a secondary test (either from the same or different lab) must be removed and quarantined from cutting harvest until they are removed. Adjacent vines must be treated as per ***requirement 1.11.***

ii) A vine that tests negative on a secondary must be quarantined from cutting harvest until a tertiary test is completed. If the tertiary test is positive then then vine must be removed and the adjacent vines treated as per ***requirement 1.11.*** If the tertiary test is negative then the vine may be considered to be 'virus' free.

[10] This document could potentially be based on the concepts outlined in the sampling guidelines of the Canadian Standard: page 16/appendix 5 www.cgcn-rccv.ca/files/CGCN-RCCV-Interim-Verification-Program-Version2.1.pdf

[11] Requires validation from experts

iii) Secondary and tertiary testing must follow the sampling guidelines outlined in *'Sampling and inspection requirements for collections, multiplication rows and source source blocks'*

III. When removing infected vines, every attempt should be made to remove all roots down to a minimum of 30 cm to reduce the risk of maintaining a viruliferous mealybug population on the remnant roots.

Requirement 1.11 Management of vines *adjacent* to vines that test positive for virus[12].

In the event of a positive virus test (initial, secondary or tertiary)

I. All adjacent vines *(see breakout box below 'Definition of Adjacent Vines'*) must be quarantined from cutting harvest until such time that each adjacent vine has tested negative ***as per requirement 1.10***

OR

II. All adjacent vines *(see breakout box below 'Definition of Adjacent Vines'*) must be quarantined from cutting harvest until such time that the positive test vine has been through the 're-testing' process and recorded two negative virus tests (secondary and tertiary) ***as per requirement 1.10.***

III. Any virus detections in adjacent vines must be treated as per **Requirement 1.10 and Requirement 1.11**

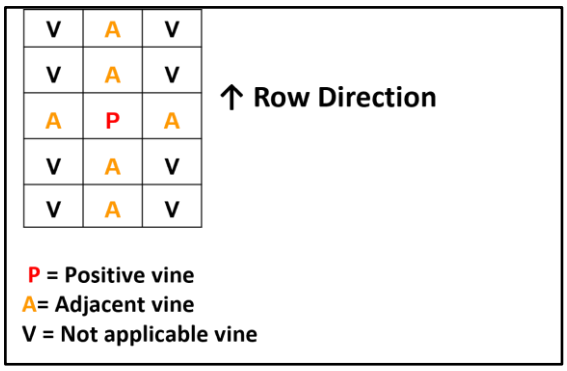
Evidence requirements: procedures, training records, appropriate record keeping system, up-to-date record keeping.

Definition of Adjacent Vines

For the purposes of this requirement an adjacent vine is defined as the vines that are:

1. *Directly opposite across the row from a positive vine*
2. *Two vines either side of a positive vine down the row.*

[12] Requires validation



Requirement 1.12 Monitoring and control of viruliferous vectors

As per '*Best practice protocols for vector management in collections, source blocks, grow areas'*[13] collection managers must:

I. Develop protocols for the regular monitoring of vectors by trained personnel
II. Use Integrated Pest Management strategies which include cultural practices ,biological and chemical control to limit vector populations.
III. Maintain monitoring and management records for auditing purposes.

Evidence requirements: training records, annual inspection results, management records

Requirement 1.13 Managing grapevine trunk disease

Collection managers must have procedures and records in place as evidence of compliance to the following requirements:

Managing Contamination

I. All cuttings (rootstocks and scion) must not come into contact with the ground regardless of whether they are managed as trellised or sprawled vines.
II. Measures must be taken to avoid contamination of harvested material through contact with contaminated tools/equipment including secateurs, baskets, bags and bins.

Reducing Inoculum levels in Source Blocks

[13] This document would be informed by report PFR2001.

III. Vines must be inspected annually to identify and remove infected/deadwood on vines.

Infected wood can be removed from vines at any time during the year and should be burnt, buried or removed from the collection. Any discoloured cordon/trunk wood should be cut out plus an additional 20 cm for complete removal. Protecting these wounds with paint, paste, or fungicide prevents new infections (see section: Wound Protection). Replacing missing vine parts can be achieved using shoots from the cordon or trunk water shoots the following spring. Layering can replace affected vines, utilising mature root systems for successful establishment.

Wound Protection

IV. After post-harvest pruning or dead wood removal has been completed:

a. All large wounds must be treated with a paint or paste applied with a paint brush or applicator to provide a physical barrier for maximum protection. The incorporation of fungicide provides extra protection in case the barrier is compromised. ***Applying paints or pastes within a week of normal spur/cane pruning provides up to three weeks of protection, covering the vulnerable two-week post-pruning period.***

b. Smaller wounds must be treated within one week of pruning and should be completed within the following parameters:

Fungicides with the following active ingredients Tebuconazole or Fluazinam

a) Spray Volume Rates must be set at a minimum of 600L/Ha
b) Spray carts must be set-up with low pressure and nozzles with large droplet size.

Recycle Sprayers are ideal for applications as they are able to employ high spray volumes which maximise coverage and while minimise off-target losses.

Evidence requirements: training records, protocols, management records.

Requirement 1.14 General vine health

I. Nutrition, fungicide and pest management practices must be based on industry best practice and regularly reviewed and updated.

II. All nutrition, fungicide and pesticide applications must be recorded.

III. All vines must be regularly monitored and contingencies developed to ensure that vines are re-generated prior to the onset of vine decline.

Evidence requirements: training records, inspection records, protocols, management records.

Requirement 1.15 Establishment of new collection vines

I. There must be evidence that the cuttings for vines have been sourced directly from mothervines of an internationally recognised clone selection or breeding programme OR from a locally significant collection.

II. Reference vines must be propagated using the *'Best practice protocol for propagation of vines for collections, multiplication rows and source blocks: managing risk of introduction of Virus, GTD and off-types'*.

III. 100% of all vines must be tested and found free from schedule 2 virus types (GVLRaV-1, GVLRaV-2, GVLRaV-3, GVA, GVB, the GVLRaV-4 complex, GVFLK, GPGV, GRBV) using PCR at a NATA accredited laboratory.

IV. Vines are planted based on the results of an assessment to identify potential risks associated with introduction of off-types at planting.

Evidence requirements: Traceability/supply records, procedures/protocols and training records.

Requirement 1.16 Harvesting of reference vines

Collection managers must be able to demonstrate that they have protocols and related training records that ensure that cutting harvest occurs under the following conditions:

I. A vine must be virus tested and found to be free of virus within 6 months prior to harvesting.

II. All vines to be harvested must not be considered to be 'adjacent vines' as per the definition outlined in ***requirement 1.11***

III. Vines for harvesting are identified and must be cross-checked against field maps, row tags, panel tags and individual vine reference tags.

IV. Strictly cut, bundle and label one vine at a time. Harvest of each vine must be fully completed and bundled before moving onto the next vine. ***It is recommended that cutting collection starts with the terminal positions on cordons and works towards the trunk to avoid contamination from adjacent vines.***

V. Bundles must be labelled with at least one label on the outside of the bundle and at least one label attached to one of the cuttings inside the bundle. Labels should display; variety, clone, vine reference number and number of cuttings.

VI. Details should be recorded on a cutting summary sheet and then data transferred to a maintained database.

VII. Minimum cutting specifications to maximise cutting yield without impacting on nursery propagation success:

- 250 mm in length
- 3 buds per cutting
- 5mm in diameter below the top bud
- Bottom cut 5-8mm below bottom bud and 45° cut above the top bud

Requirement x. Labelling and documentation

Statements outlining the use of labels and certification claims to be developed

Part 2. The management of source blocks for the production of certified propagation cuttings

Note any sections highlighted in yellow require further research and or discussion/validation with standards/technical committee

For cuttings to be deemed as 'certified', the source block from which they are harvested must meet all of the following requirements (2.1 to 2.8):

Requirement 2.1 Source block registration

I. Source block size is limited to a maximum 500 vines[14].

II. Source blocks may only be registered once they have reached their third growing season.

III. Scion source blocks must have at least 3 [15]bunches per vine available for viewing to maintain validity of ampelographic inspections and identification of off-types.

IV. As a condition of registration, source block managers must supply the following records:

- Source block planting details (number of vines, year of planting, grafted or own rooted).
- Source block map including adjacent/abutting blocks
- Traceability records
- Variety and clone identity claims
- Virus surveillance records
- Vector surveillance records.
- Protocols and related records to manage risks associated with entry of personnel and entry of machines/equipment into the source blocks.

Requirement 2.2 Variety and clone identity verification

In the first year that certification is sought, the source block manager must make a variety and clone identity claim and provide evidence that verifies this identity claim. Three pathways for verification have been developed recognising that not all clones that are in commercial use in Australia have been 'fingerprinted' and confirmed using genomic sequencing methods. Clones that have been fingerprinted and confirmed are listed in Schedule x and are covered by requirement 2.2.1. The non-

[14] This is proposed based on limiting cost barriers to entry i.e. smaller source blocks require less surveillance. 500 vines can still produce 12,500 cuttings or 20-30k grafted vines.
[15] See footnote 9

inclusion of a clone in schedule x is generally a result of it being a 'new import' or an 'emerging' variety and therefore there has not been the opportunity to access the requisite number of clustered samples to provide confirmation of clone identity. In this situation source block managers must refer to requirement 2.2.2 and schedule y. If a source block manager has a variety and clone identity claim that falls outside requirements 2.2.1 and 2.2.2 then they may make a petition to the Standards Board with evidence that supports their claim as outlined in requirement 2.2.3

Schedule x. List of clones that must be tested to clone level through DNA methods[16].

Schedule y. List of recognised collections[17].

III. For clones listed in schedule x there are two verification options available:

Option 1. The source block manager must be able to provide a 'clear and complete' chain of evidence linking the source block to mother vines that have been DNA verified to clone level. The Standards board retains the authority to decline identity claims where evidence is deemed to be incomplete. In these circumstances, source block managers must comply with the requirements outlined in option 2.

OR

Option 2. The clonal identity of a sub-set of vines in the source block must be confirmed through DNA methods using the DNA sampling rate outlined below.

Evidence requirements: DNA verification record, import records, sales/supply records, nursery propagation records (batch records), planting records, source block information which include information pertaining to origin, contractual arrangements with the land-holder.

[16] See footnote 7
[17] See footnote 8

IV. For clones that are not listed in Schedule x., identity claim verification is through the provision of a:

A. 'clear and complete' chain of evidence linking the source block to mothervines in a recognised collection (as per schedule y) **and**

B. DNA verification test to variety level. This may be from the mother vines, or from a sub-set of vines in the source block using the DNA sampling rate outlined below.

Evidence requirements: Import records, sales/supply records, nursery propagation records (batch records), planting records, source block information which include information pertaining to origin, contractual arrangements with the land-holder, verbal verification. DNA verification records.

V. For clones that are not covered in the previous conditions, the source block manager may petition the Standards Board with evidence that provides……[18]The Standards board retains the authority to decline identity claims where evidence is deemed to be incomplete.

Source block DNA verification sampling: The purpose of DNA verification and the related sampling strategy is to SUPPORT the variety/clone identity claim. The purpose is NOT to confirm the identity of ALL the vines in the block. Minimum of 5% of vines within a source block to a maximum of 25 vines per source block[19]. Samples may be pooled as 5 vine composites. Where the result from the genomic testing does not match the identity claim then……[20]

Requirement 2.3 Ampelographic inspection

In the first two years that certification is sought source block managers must provide evidence that 100% of the vines in the block have been inspected and that any off-types have been removed:

I. Rootstock- inspections must occur between October-December

II. Scion- inspections must occur after 100% veraison and prior to harvest bunches (i.e. at least 3 bunches per vine must be visible as a part of the

[18] Requires consideration and input from Standards Committee

[19] This statement needs biometric validation with the context that we are verifying the identity claim not looking for off-types.

[20] Requires consideration and input from the Standards Committee

inspection). Inspections can occur concurrently with virus surveillance visual inspections and or virus sampling.

Evidence requirement: training and inspection records, records of off-type removal.

Requirement 2.4 Annual virus surveillance

In every season that certification of cuttings is sought source block managers must comply with the following requirements:

I. All source blocks must be subjected to an annual visual inspection[21] which must take place within x weeks of grape harvest to maximise opportunities for identification of virus symptoms. These inspections can be conducted in conjunction with vector monitoring

II. Source black managers must develop a sampling plan for each source block in accordance with best practice sampling requirements[22].

III. Sampling must comply with sampling guidelines outlined in *'Sampling and inspection requirements for collections, multiplication rows and source source blocks[23]'*

IV. All activities related to virus surveillance (inspections and identification of symptomatic vines, test results, vine removal) must be recorded and maintained in an appropriate system

Evidence requirements: Source block details and maps, Virus testing results, Evidence of vine removal based on testing results

Requirement 2.5 Management of vines that test positive to virus

In the event of an initial positive virus test:

I. Vines tested as composite samples may be re-analysed as single vines to identify which vine(s) is infected. If a composite sample is not re-analysed to single vines all the vines in the composite sample must be further managed and treated as positive vines.

II. Vines that test positive must be:

   c) Removed within x days to minimise risk of spread and be quarantined from cutting harvest until they are removed. Adjacent vines must be managed as per ***requirement 2.6.***

[21] This could/should also include vector monitoring and development of management plans for the following season.
[22] A proposed sampling method is outlined on page 46
[23] Requires development

OR

d) Re-sampled and re-tested (secondary test) within x days of receiving the positive result.

i) A vine that tests positive on a secondary test (either from the same or different lab) must be removed and quarantined from cutting harvest until they are removed. Adjacent vines must be treated as per ***requirement 2.6.***

ii) A vine that tests negative on a re-test must be quarantined from cutting harvest until a tertiary test is completed. If the tertiary test is positive then then vine must be removed and the adjacent vines treated as per ***requirement 2.6***

iii) Secondary and tertiary testing must follow the sampling guidelines outlined in *'Sampling and inspection requirements for collections, multiplication rows and source source blocks'*

III. When removing infected vines, every attempt should be made to remove all roots down to a minimum of 30 cm to reduce the risk of maintaining a viruliferous mealybug population on the remnant roots.

Requirement 2.6 Management of vines *adjacent* to vines that test positive for virus[24].

I. In the event of a positive virus test (initial, secondary or tertiary), all adjacent vines (*see breakout box below 'Definition of Adjacent Vines'*) must be quarantined from cutting harvest until such time that they have tested negative.

II. In the event of a secondary negative virus test all adjacent vines must remain quarantined from cutting harvest until completion of the tertiary test[25].

III. Any virus detections in adjacent vines must be treated as per ***requirement 2.5*** **and** ***requirement 2.6***

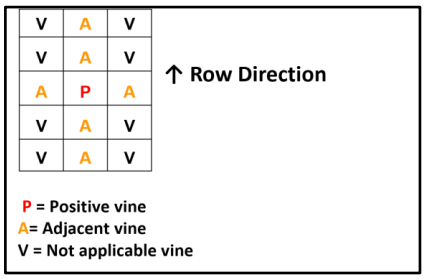
Evidence requirements: procedures, training records, appropriate record keeping system, up-to-date record keeping.

Definition of Adjacent Vines

[24] Needs expert input and validation
[25] Needs expert input and validation

An adjacent vine is defined as the vines that are:

1. *Directly opposite across the row from a positive vine*
2. *Two vines either side of a positive vine down the row.*



Requirement 2.7 Monitoring and control of viruliferous vectors

As per '*Best practice protocols for vector management in collections, source blocks, grow areas*[26]' collection managers must:

I. Develop protocols for the regular monitoring of vectors by trained personnel
II. Use Integrated Pest Management strategies which include cultural practices ,biological and chemical control to limit vector populations.
III. Maintain monitoring and management records for auditing purposes.

Evidence requirements: training records, annual inspection results, management records

Requirement 2.8 Maintaining genetic integrity

2.6.1 Managing risk of introduction of off-types during cutting harvest

The source block manager must be able to provide evidence of the following:

I. A risk assessment specific to managing off-types at harvest, highlighting critical control points, associated risks and control measures.
II. That identified control measures are embedded in cutting harvest procedures and that staff have been appropriately trained.
III. Evidence that these control measures are being followed (training records etc)

Risk assessments are not required on individual source blocks unless there are specific circumstances

[26] See footnote 13

related to that source block that introduces risk, for example a separate risk assessment is required that covers each of the following circumstances:

- Managing single variety/clone combination within a row or block
- Managing multiple variety/clone combinations within a row
- Managing multiple variety/clone combinations within a block
- Managing different categories of worker (eg. internal labour vs. labour-hire or where there are varying levels of experience or supervision).

Evidence requirement: risk assessments, vineyard maps, source block details, procedures and training records

2.6.2 Replacing vines in source blocks

Source block managers must provide evidence that:

1) Any replacement vines are genetically identical to the rest of the vines in the source block.
2) In the case of source blocks not owned by the source block manager, a condition must be included in contracts that stipulates that no replacement of vines within the source block can occur without involvement of the source block manager.

Evidence requirement: supply records and source block management records.

Requirement 2.9 Managing grapevine trunk disease (and bacterial disease[27])[28]

Source block managers must have procedures and records in place as evidence of compliance to the following requirements:

Managing Contamination

I. All cuttings (rootstocks and scion) must not come into contact with the ground regardless of whether they are managed as trellised or sprawled vines.

[27] Will need additions and or separate requirements for bacterial disease. Also need to consider value of annual inspections, supporting resources (i.e. images of symptomatic vines) and what actions are implemented in the event of finding symptomatic vines.

[28] Will need to develop a schedule for trunk disease and bacteria i.e. what specific pathogens are we looking to manage?

II. Measures must be taken to avoid contamination of harvested material through contact with contaminated tools/equipment including secateurs, baskets, bags and bins.

Reducing Inoculum levels in Source Blocks

III. Vines must be inspected annually to identify and remove infected/deadwood on vines.

Infected wood can be removed from vines at any time during the year and should be burnt, buried or removed from the source block. Any discoloured cordon/trunk wood should be cut out plus an additional 20 cm for complete removal. Protecting these wounds with paint, paste, or fungicide prevents new infections (see section: Wound Protection). Replacing missing vine parts can be achieved using shoots from the cordon or trunk water shoots the following spring. Layering can replace affected vines, utilising mature root systems for successful establishment.

Wound Protection

IV. After post-harvest pruning or dead wood removal has been completed:

a. All large wounds must be treated with a paint or paste applied with a paint brush or applicator to provide a physical barrier for maximum protection. The incorporation of fungicide provides extra protection in case the barrier is compromised. ***Applying paints or pastes within a week of normal spur/cane pruning provides up to three weeks of protection, covering the vulnerable two-week post-pruning period.***

b. Smaller wounds must be treated within one week of pruning and should be completed within the following parameters:

Fungicides with the following active ingredients Tebuconazole or Fluazinam

c) Spray Volume Rates must be set at a minimum of 600L/Ha
d) Spraycarts must be set-up with low pressure and nozzles with large droplet size.

Recycle Sprayers are ideal for applications as they are able to employ high spray volumes which maximise coverage and while minimise off-target losses.

Evidence requirement: Procedures, training records, inspection records, pruning records and fungicide spray records.

Requirement 2.10 Physical specifications for certified cuttings

Source block managers must use the following guidelines for the collection of scion and rootstock cuttings:

Rootstock

Minimum diameter at the top node 5mm

Maximum diameter at the bottom node 12mm

Minimum length 300mm, maximum length 450mm

Maximum curvature x°

Scion

Minimum 3 buds

Minimum diameter at the top node 5mm

Maximum diameter at the bottom node 12mm

Minimum length 300mm, maximum length 450mm

It is recognised that on occasions a customer may request specifications that fall outside the those listed above. In these cases the source block manager must have a system in place that clearly documents customer requests.

Requirement 2.11 Storage of cuttings

Needs development

Requirement 2.12 Labelling and documentation

Only bundles of cutting harvested from source blocks that comply with all of the requirements may be labelled with….

All orders for certified cuttings must be documented in a manner that allows for auditing.

Proposed method for annual virus surveillance for source blocks (scion and rootstock)[29]

Based on a review of international certification programs the typical virus surveillance programs are based on 100% testing in the first year with ongoing testing of between 10-100% required in

[29] This approach requires verification with virus and biometry experts.

subsequent years depending on the results of testing. While 100% testing is the ideal, given that current practice in Australia is to test 0.5% of vines in a source block it must be accepted that 100% testing (via diagnostics) is unlikely to be accepted by the propagation sector. A compromise solution is outlined below whereby sampling rate is calculated with a risk based approach that takes into account vine age, history of testing and proximity to commercial vineyards. Sampling inputs are then focussed on the highest risk areas i.e vines adjacent high risk transmission areas, areas where positive vines have been detected, symptomatic vines and areas with the presence of viruliferous vectors.

To further limit costs, it is proposed that we integrate into the standards the ability to make an annual nomination (based on orders/demand) on the number of vines within a source block from which cuttings will be harvested (to a maximum of 500 vines and a minimum of 51). In this approach annual virus surveillance is focussed on the actual number of vines being harvested not the whole of the source block which has the dual benefit of minimising costs and maximising opportunities to identify virus infected vines within the population of actual harvested vines.

Schedule 1.

Virus of concern for scion source blocks: Leaf-roll 1 (LR1), Leaf-roll 3 (LR3), Grapevine Virus A (GVA), Grapevine Pinot Gris Virus (GPGV)[30] and Grapevine Red Blotch associated Virus (GRBaV).

Schedule 2.

Virus of concern for rootstock source blocks: Leaf-roll 1(LR1), Leaf-roll 2 (LR2), Leaf-roll 3 (LR3), Leaf-roll 4 (LR4), Leaf-roll 4_6 (LR4_6), Leaf-roll 4_ 9 (LR4_9), Grapevine Fleck (GFLK), Grapevine Virus A (GVA), Grapevine Virus B (GVB) Grapevine Pinot Gris Virus (GPGV) and Grapevine Red Blotch associated Virus (GRBaV).

[30] Inclusion of GPGV is dependant on results of economic analysis.

Proposed Risk Based Methodology for Calculation of initial sampling rate

Step 1. Use table A. to calculate a 'total risk score' based on source block attribute

Table A

Source Block Attribute	Risk Parameter	Score	Evidence requirement
Age	< 10 years old	**1**	**Planting records, order forms**
	>10 -20 years old	**3**	
	20+ years old	**5**	
Provenance	Sourced from mother vines (mist propagation), a collection or multiplication row with proof of virus freedom	**1**	**traceability records**
	sourced from a source block with history of testing (once in three years prior to collection of cuttings @ minimum 0.5%)	**3**	
	neither of above	**5**	
Virus testing	History of virus testing (at least 1 test every three years and minimum of 0.5%/block per sampling year) and no positive results or that there is evidence that roguing of infected vines has taken place.	**1**	**virus sampling records**
	History of virus testing (at least 1 test every five years and minimum of 0.5%/block per sampling year) and no positive results or that there is evidence that roguing of infected vines has taken place.	**3**	
	neither of above	**5**	
Risk of spread	Managed as a commercial vineyard	**5**	**Maps, planting details**
	Directly adjacent (<30m) of commercial vineyard	**3**	
	>30m	**2**	
	>200m	**1**	

Step 2. Use the 'total risk score' calculated from table A to determine source block risk in table B

Table B

Source Block Risk classification	**'total risk score'**
Low Risk	< =9
Medium Risk	10-14
High Risk	>=15

Step 3. Determine year 1 sampling rate in table C. based on source block risk classification identified in table B. Virus types to be included in diagnostic testing are listed in schedules 1 and 2 below.

Table C. Year 1 sampling rates

Risk Level	**Sampling Rate**
Low Risk	10%
Medium Risk	30%
High Risk	100%

Sampling rates for Year 2 and subsequent years

In year 2 and all subsequent years of a source blocks involvement in the program, sampling will be required at a minimum of 10% of the source block. In the case where the percentage of positives continues to equal or exceed the acceptable level of 0.1%, the sample size for 2nd and subsequent years (if necessary) shall be calculated based on the Table D listed below.

Table D.

Virus Infection in current year of testing (% of total vines infected)	**Virus testing in subsequent year for source blocks exceeding allowable limit of 0.1%**
0.1%-1%	**30%**
1%-2%	**40%**
2.1%-5%	**60%**
>5%	**100%**

Part 3. Certification requirements for nurseries

Note any sections highlighted in yellow require further research and or discussion/validation with standards/technical committee

For planting material to be considered as a certified product, the nursery must use certified cuttings and meet the following requirements:

Requirement 3.1 Traceability through the nursery process

The nursery must demonstrate that they have a system in place that is suitable for the size and complexity of the business that traces the movement of certified material from the point of certified cutting receival through to the dispatch of the certified product. At a minimum records must include:

- Cuttings in/out recording
- Propagation batch details
- Planting records
- Field nursery maps
- Lifting/sorting records
- Customer order and fulfilment records

Requirement 3.2 Storage of rootstock and scion cuttings

TBD

Requirement 3.3 Management of non-virus pathogens- Grapevine trunk disease and bacteria[31] disease management[32]

With the management of fungal and bacterial pathogens nursery management must show that the practices and protocols which contribute to a cumulative reduction in risk.

Nursery management must:

[31] Further work required on bacterial disesae

[32] Will need to develop a schedule for trunk disease and bacteria i.e. what specific pathogens are we looking to manage?

I. Provide a protocol outlining how risk of both bacteria (including crown gall) and trunk disease is being managed through the nursery process. At a minimum the protocol must cover:
    A. Cleaning and disinfection of nursery tools (grafting, cutting and disbudding tools), bench tops/tables and other related propagation equipment (bins, buckets and bags)
    B. Management of cuttings through hot-water treatment and or chemical sanitation
    C. Use callusing media that complies with 'industry accepted standards'

II. Provide a protocol outlining how risk of both bacteria and trunk disease is being managed in the grow area (field nursery/growhouse).

III. Provide evidence through training records that protocols are being followed through training.

Evidence requirement: risk assessments, procedures and training records

Requirement 3.4 Maintaining genetic integrity

Nursery management must:

I. Ensure that labels and signage are used to clearly distinguish between batches throughout all the stages of the nursery process including grow area sites.

II. Provide a protocol outlining how genetic integrity is maintained throughout the nursery process. The protocol should be based on a risk analysis of each stage of the process and must be backed up by evidence of training.

III. Provide evidence that each certified batch is inspected for off-types prior to lifting (field grown vines) or packing (container grown vines). Inspections must occur prior to trimming or at a point in time after trimming that 10cm of new shoot tips are visible.

Evidence requirement: risk assessments, nursery maps, procedures and training records

Requirement 3.5 Grow area management including growhouses

Field nursery site selection

Nursery management must ensure that:

I. There is a minimum of three years between the removal of commercial vineyards and the establishment of field nursery sites.

II. Field nursery sites must not be used for two consecutive seasons and should have a minimum two seasons rest (fallowing) prior to being re-planted.

Pest and Disease

Nursery management must:

I. Maintain a program of pest and disease monitoring in field nurseries and grow houses. All monitoring results must be recorded.

II. Maintain a program of pest and disease control in field nurseries and grow areas All treatments must be recorded including, date of application, chemical, rate and volume applied. Any chemical use must comply with any State or Federal regulations.

Requirement 3.6 Plant material quality control[33]

A proportion[34] of batches will be selected and subjected to end of process inspections. Maximum allowable deviation over the total range of specifications is 2%.

Grafted, field grown vines

Grafted, field grown vines (bare rooted/dormant) must comply with the following specifications to be certified:

1. Graft unions must be well-healed with no evidence of fungi or bacteria.
2. Graft unions must be able to withstand a pressure test.
3. Minimum acceptable diameter of the rootstock measured below the graft union is xmm
4. Minimum shoot diameter at the first node of x
5. Vines should have a minimum 3 evenly spaced roots
6. There shall be at least one visible, dormant scion bud
7. Rootstock curvature should be less than an angle beyond 10 and 2 'o'clock
8. Desuckering wounds must be less than 10mm in diameter.

Own rooted field grown vines

Own rooted, field grown vines (bare rooted/dormant) must comply with the following specifications to be certified:

1. Minimum shoot diameter at the first node of x
2. Vines must have a minimum 3 evenly spaced roots
3. There must be at least one visible, dormant scion bud
4. Curvature should be less than an angle beyond 10 and 2 'o'clock

[33] Requires further work in consultation with nursery sector
[34] We need to develop a system based around NZGGS i.e. that outlines sampling requirements.

Potted/Green-top/Container grown vines

Own rooted and grafted potted vines must must comply with the following specifications to be certified:

1. Vines must be grown in media that complies with 'accepted industry standards'
2. Graft unions must be well-healed with no evidence of fungi or bacteria.
3. Height of scion growth should be minimum 100mm
4. Root mass should be visible at the base of the pot

Requirement 3.7 Labelling and documentation

Only bundles of cutting harvested from source blocks that comply with all of the requirements may be labelled with….

All orders for certified cuttings must be documented in a manner that allows for auditing.