

## **Final Report**

# **Review of the biosecurity plan for the nursery industry**

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Review of the biosecurity plan for the nursery industry (NY19003)

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## Public summary

Australia's biosecurity system works in a dynamic environment with major challenges growing and evolving rapidly. Through this project, Plant Health Australia (PHA), with Horticulture Innovation levy investment, has developed a Biosecurity Plan for the Australian Production Nursery industry. This Biosecurity Plan (the Plan) recognises that the operating environments affecting the biosecurity of the Australian production nursery industry is vastly different today to that of the past, and that the industry's response capabilities need to keep pace if they are to remain relevant and effective into the future.

This Plan lays the foundation for a stronger biosecurity system and more resilient nursery production by identifying and prioritising the growing number of exotic pests and pathogens that could, if introduced, impact on their plant production and trade. The Plan also analyses the various preparedness resources needed to manage these risks and provides a program of current and future activities that will strengthen its biosecurity responses preparedness.

These Plans were developed with valuable input from stakeholders including Greenlife Industry Australia (GIA) along with biosecurity and crop protection experts from state, territory and commonwealth governments.

There are three major components to a Biosecurity Plan. The first is a review of all known exotic pest and disease species that are known to infect the target plant species. This review highlighted 293 different exotic pest and disease species that, if introduced, could impact the Australian nursery production sector. These species' reviews informed the development of risk ratings for each of the identified exotic pests and diseases. The risk ratings focus on the potential of each species to enter, establish and spread within Australia and an estimate of their potential economic impact. Of those species reviewed, 24 species were deemed High Priority Pests (HPPs) of the production nursery industry.

The second component was an analysis of the preparedness resources that are currently available to each HPP. The resources included contingency plans, fact sheets, diagnostic and surveillance protocols and taxonomic reference specimens.

The third and final component of a Biosecurity Plan is the development of a Biosecurity Implementation Plan that describes the critical activities that, if implemented, will improve the industries' biosecurity preparedness and response capabilities. The Implementation Plan, was developed and reviewed annually through a Biosecurity Reference Panel (BRP), comprising of industry and government representatives. The Implementation Plan outlines strategies, communication and engagement activities specific to the production nursery industries, as well as activities and resources utilised by other industries that share the same exotic pest and disease threats and identifies potential international and domestic collaboration opportunities.

## Keywords

Biosecurity Plan, High Priority Pests, Biosecurity Implementation Plan, pests, diseases

## Introduction

The Australian production nursery industry is highly diverse, growing a wide variety of ornamental, fruit, vegetable, trees and shrubs for landscaping, revegetation, and commercial production of fruit, vegetables and forestry. Nursery production occurs in all Australian states and territories, with majority of production occurring in Victoria (28%), Queensland (30%) and New South Wales (30%).<sup>1</sup> Production occurs year-round, with the industry's peak sales period occurring during the spring season for ornamental retail product lines.

In 2022/23, the nursery industry produced an estimated 2.26 billion plants with an total production value of \$3.54 B and employed an estimated 23,500 people.<sup>2</sup> However, these statistics fail to account for the value of production generated by non-retail end users within commercial horticulture (i.e., vegetables, forestry etc.) to whom they also supply, or the environmental and social benefits amenities horticulture provides.<sup>3</sup> Protecting this diverse industry from the threat of exotic pests and diseases is critical to the future growth, sustainability and profitability of not just the nurseries themselves but also the commercial and amenities horticultural sectors they support. To limit the impact of exotic pest and disease incursions, the industry has developed programs such as BioSecure HACCP, which have significantly improved the nursery industry's biosecurity preparedness. Despite this effort, 66% of the nursery industry currently believe biosecurity challenges are impacting on their businesses<sup>2</sup> indicating greater effort is needed to protect the nursery sector from extant biosecurity threats.

Biosecurity planning provides industries with knowledge of the exotic pests and diseases that pose the greatest threat to their production and trade and describes strategies and actions that improve their biosecurity preparedness and response capability. It also provides a mechanism for industry, governments and other stakeholders to assess current biosecurity practices and future biosecurity needs. The identification, prioritisation and management of key biosecurity risks, through the development and implementation of a Biosecurity Plan is a critical industry preparedness activity.

In collaboration with Greenlife Industry Australia (GIA) and Commonwealth and State Governments, Plant Health Australia (PHA) has developed Biosecurity Plan for the production nursery industry. These Plan will provide a framework for improved biosecurity preparedness and practice through increasing industry awareness and risk mitigation relating to exotic pest incursions.

There are three major components to the Biosecurity Plan. The first is the review of exotic pest species that are known hosts of the chosen industry. This species' review informs the development of risk ratings for each of the exotic pests identified. These risk ratings focus on the potential of each pest to enter, establish and spread within Australia and an estimate of their potential economic impact. The species that receive high risk ratings are given 'High Priority Pest' (HPP) status.

The second component is an analysis of the available preparedness resources in relation to the HPPs including contingency and continuity plans, fact sheets, diagnostic protocols and reference specimens.

The third and final component is the development of an Implementation Plan that describes the critical activities that are designed to improve biosecurity preparedness and response capability. The Implementation Plan, developed through consultation with industry and government stakeholders, outlines the strategies and activities that are the most important for the exotic pests of greatest concern to the chosen industry. The activities outlined in the Implementation Plan include any required communication and engagement activities, activities and resources currently utilised by other industries that share some of the same exotic pest threats, potential international and domestic collaboration opportunities and RD&E needs that may be addressed in the future.

The Biosecurity Plan for the production nursery industry was first published in 2013. Since then, the status of some important exotic pests of these industries have changed. The primary purpose of this 5-year project was to review of the production nursery industry's Biosecurity Plan thereby improving its biosecurity preparedness and response capability.

## Methodology

### Results

The development of the Biosecurity Plan for the Nursery Industry (version 4.0) commenced with an extensive literature review and tabulation of exotic pests and diseases of the plant species produced by the sector. The review utilised a range of resources, including their previous Biosecurity Plan (version 3.0), available peer-reviewed scientific literature and other noted sources such as the Centre for Agriculture and Biosciences International (CABI). With the assistance of GIA, a

Technical Expert Group (TEG) was then formed to review the literature gathered and to characterise each species based on its risk profile. The risk ratings were based on an assessment for their potential to enter, establish and spread in Australia and their potential economic impact on the nursery industry. The TEG was coordinated by PHA and included representatives from GIA and state and territory agriculture agencies (Table 1). The TEG met on the 8<sup>th</sup> of December 2020.

Through this process, the information was compiled into several tables of important exotic and endemic pest species. These included:

- **Threat Summary Tables (TST).** An overview including risk assessments of all known exotic pests and diseases known to impact on the plant species produced by the nursery industry.
- **High priority Pest lists (HPP).** These species based on the risk assessment process have the potential to cause substantial economic impact on the production nursery industry, either through production losses or market access issues.
- **Other Pests of Biosecurity Significance.** These species are economically important to the nursery industry and are considered in the prioritisation of RD&E investment but do not undergo a formal pest risk assessment. They are economically important in least one of the following ways:
  - currently under quarantine arrangements or restricted to regions within Australia,
  - notifiable by law,
  - have market access implications,
  - able to be prevented from entering a farm through good biosecurity practice.

**Table 1.** Members of the Technical Experts Group (TEG) and Biosecurity Implementation Group (BIG).

NAME	ORGANISATION	AREA OF EXPERTISE	MEMBER OF TEG	MEMBER OF BIG
John McDonald	GIA	Industry RDE & Biosecurity	✓	✓
Christine Horlock	DPIQ	Plant Pathology/Biosecurity	✓	✓
Andrew Manners	DPIQ	Entomology/Biosecurity	✓	✓
Leonie Martin	DPIRD NSW	Biosecurity		✓
David Lovelock	Agriculture Victoria	Plant Pathology		✓
John Nielsen	NT DAF	Entomology/Biosecurity		✓
Monique Sakalidis	DPIRD WA	Plant Pathology		✓
Shannon Mulholland	NSW DPIRD	Plant Pathology	✓	✓
Mary Finlay-Doney	NT DAF	Entomology	✓	
Sharl Mintoff	NT DAF	Plant Pathology	✓	
Fiona Constable	Agriculture Victoria	Plant Pathology	✓	
Mike Hodda	CSIRO	Nematology	✓	
Marc Poole	DPIRD WA	Entomology	✓	✓
Vincent Lanoiselet	DPIRD WA	Plant Pathology	✓	
Kylie Ireland	DPIRD WA	Plant Pathology		✓
Leonard Tesoriero	Consultant	Plant Pathology	✓	
Nathan Luke	DAFF	Malacology/Surveillance		
Andrew Vossen	PHA	Biosecurity	✓	
Evie Kielnhofer	PHA	Biosecurity		✓

<b>Victoria Ludowici</b>	PHA	Biosecurity	✓	
<b>Rebecca Powderly</b>	PHA	Biosecurity		✓
<b>Trevor Dunmall</b>	PHA	Biosecurity		✓
<b>Stephen Quarrell</b>	PHA	Entomology/ Biosecurity		✓

Once compiled, these lists formed the basis for the Biosecurity Plan. An Implementation Plan was then developed with the assistance of a Biosecurity Implementation Group (BIG). The BIG was convened by PHA and again comprised of representatives from each industry and the relevant state authorities (Table 1).

Implementation Plans are a critical component of the Biosecurity Plan. The Implementation Plan highlights HPP-focussed biosecurity activities including RD&E activities that are underway and those activities that may be addressed in the future. It is developed in accordance with industry priorities and resource availability and aims to improve preparedness and response capability. A number of these priorities are still being addressed by industry.

The Implementation Plans describe the activities within the five strategic priority areas of the [National Biosecurity Strategy](#) and provides industry with a plan with agreed activities and timeframes. The five strategic areas include:

1. Preparedness and Response
2. Capacity and Capability
3. Communications and Engagement
4. Innovation, Research Development and Extension
5. Collaboration and Partnerships

The BIG met in a hybrid meeting in Brisbane on the 8<sup>th</sup> February 2023 to finalise the draft Biosecurity Implementation Plan. Once the Implementation Plan was completed, the Biosecurity Plan was compiled and provided to GIA for endorsement followed by endorsement by the Plant Health Committee (PHC) in June 2024. PHC is comprised of the Chief Plant Health Managers from each State/Territory and a representative from the office of the Australian Chief Plant Protection Officer. Aspects of the endorsed Biosecurity Plan including the HPP list, Pests to Monitor and progress towards fulfilment of the Implementation Plan's activity schedule were then reviewed on the 16<sup>th</sup> April 2024 and 13<sup>th</sup> December 2024 by the Biosecurity Reference Group that was comprised of available members of the BIG. See Appendix B for minutes from December 2024 meeting.

## Results and discussion

The revised nursery industry's Biosecurity Plan (version 4.0) has been completed and endorsed by both industry and PHC. It has since undergone two revisions the Biosecurity Reference Group meetings leading to the development of the *Biosecurity Plan for the Australian Nursery Industry (version 4.2)*. A copy of this revision of the Plan can be found in Appendix A. The Plan features an analysis of all known exotic pests and diseases of the Australian production nursery industry. These reviews highlighted and reviewed 293 different exotic pests and diseases species that could impact Australian nursery production. These species' reviews informed the development of risk ratings for each of the identified exotic pests and diseases. The risk ratings focus on the potential of each species to enter, establish and spread within Australia and an estimate of their potential economic impact. The risk analysis of the species listed within the TST subsequently identified 24 HPPs for the production nursery industry (see Appendix 1, page 10). The HPPs identified are those deemed to have a high likelihood of entry, establishment and spread in Australia and the potential to cause substantial economic impact to nursery production or create market access issues if introduced.

A further suite of pests and diseases were identified as Other Pests of Biosecurity Significance (see Appendix A, page 20). These pests are economically important to the production nursery and are considered in an effort to prioritise RD&E investment but do not undergo a formal pest risk assessment due to their already being found in Australia but are geographically restricted. The pests listed in these tables include species such as Tomato Potato Psyllid (*Bactericera cockerelli*), which was restricted to Western Australia until November 2024 when it was discovered in Victoria<sup>4</sup> and Papaya

mealybug (*Paracoccus marginatus*), which was first reported in the Northern Territory in 2023 and detected in Queensland in 2024<sup>5</sup>.

The Implementation Plan (see Appendix A, page 26) was created in consultation with the BIG to provide guidance into future biosecurity related activities that aim to improve industry preparedness and response capability. The Implementation Plan describes the activities aligned to the strategic priority areas of the National Biosecurity Strategy<sup>6</sup> and provides industry with an overarching plan with agreed activities and timeframes. The Implementation Plan can be found in the Biosecurity Plan in Appendix 1. Many of the activities highlighted within the Implementation Plan are ongoing activities that will continue after this project's completion.

## Outputs

**Table 2. Output summary**

<b>Output</b>	<b>Description</b>	<b>Detail</b>
Industry and government endorsed Biosecurity Plan	Technical review of exotic invertebrate and pathogens that pose a threat to the Australian production nursery industry, an implementation plan describing critical activities that are designed to improve the production nursery industry's biosecurity preparedness and response capability	Biosecurity Plans are high level planning documents and have been provided to GIA and Hort Innovation and uploaded onto the Biosecurity Portal. The Portal has access restricted to the relevant peak body(s), RDCs and State and Federal Government agencies. The Plan will be further disseminated further at GIA's discretion. See Appendix A.
Disinfection guide for Glasshouses and Polytunnels	An extension output that provides the production nursery industry with guidance on how to disinfect glasshouses and polytunnels to prevent the spread of disease in professional production nurseries.	This extension document will be disseminated to industry stakeholders via GIA's website. See Appendix C.
Disinfection guide for Seeders and Transplanter	An extension output that provides the production nursery industry with guidance on how to disinfect seeding equipment and growing media to prevent the spread of disease in professional production nurseries.	This extension document will be disseminated to industry stakeholders via GIA's website. See Appendix D.
Milestone Reports	Progress reports on Biosecurity Plan's development and the implementation of critical activities that aim to improve the	Milestone reports are submitted to Hort Innovation and disseminated at their discretion.

	production nursery industry's biosecurity preparedness and response capability	
Final Report	Final report reviewing the outcomes of project NY19003.	Final reports are submitted to Hort Innovation and disseminated at on the Hort Innovation website.

## Outcomes

Table 3. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Industry supply, productivity and sustainability	<p><b>SIP Outcome 2:</b> <i>“The Australian nursery industry has increased profitability, efficiency and sustainability through innovative R&amp;D, biosecurity and sustainable BMPs”</i></p> <p><b>Strategy:</b> <i>“Improve industry biosecurity preparedness and resilience, including prevention, protection and recovery from exotic and endemic plant pest incursions and responses.”</i></p> <p><b>KPIs:</b></p> <ul style="list-style-type: none"> <li>• Maintenance/tracking of the implementation of an industry biosecurity plan</li> <li>• Improved biosecurity preparedness</li> <li>• Development of risk analyses of high priority pests including entry pathways, establishment and spread potential</li> </ul>	Enhanced industry understanding of exotic pest threats (invertebrate pests and pathogens) that may, if introduced, have a significant impact on Australian production nursery industry's production and trade.	Development in consultation with and subsequent endorsement and review of Threat Summary Tables, High Priority Pest list and the Biosecurity Implementation Plan by Greenlife Industries Australia (GIA) and the Plant Health Committee (PHC).

## Monitoring and evaluation

This project had three key objectives:

1. Support the Australian Production Nursery Industry in satisfying their biosecurity obligations.
2. Ensure that the Australian Production Nursery Industry and stakeholders have identified exotic pest risks and mitigation actions necessary to managing risks effectively.
3. Establish a valid base for decisions on future investment in biosecurity-related RD&E.

**Table 4. Key Evaluation Questions**

Key Evaluation Question	Project performance	Continuous improvement opportunities
To what extent has the project achieved its expected outcomes?	This project improved biosecurity preparedness of the nursery industry against exotic pests and diseases through the development of a industry and PHC endorsed Biosecurity Plan (Objective 2). The planning process also involved the development of a Biosecurity Implementation table, which provides insight and a gap analysis into nursery industry's biosecurity preparedness and their future RD&E needs (Objectives 2 & 3).	This project provided in sights regarding the biosecurity planning process namely the development of Threat Summary Tables (TST) and Biosecurity Implementation tables. This has led to improvements in the format of the TST, which are currently being implemented in new Hort Innovation funded projects.
How relevant was the project to the needs of intended beneficiaries?	<p>The representative of GIA interviewed at the end of the project believed that the project met industry need in improving their biosecurity preparedness through the generation of a Biosecurity Plan including the development of the TST, HPP, Other pests of biosecurity significance and Implementation tables and therefore improved their biosecurity preparedness. This project also addressed their biosecurity obligations as signatories of the Emergency Plant Pest Response Deed (EPPRD) as outlined in the project's objectives.</p> <p>This project was required to generate 4 factsheets. However, the Production Nursery industry is well resourced due in part to other Hort Innovation-funded projects such as NT20000 and NY20001. After consultation with industry, it was evident that other forms of extension resources would have better serviced industry need, which led to the development of two Disinfection Guides.</p>	It is recommended that the future projects be less prescriptive regarding extension outputs and/or be required to liaise with other extension projects to ensure future biosecurity projects meet industry need.
How well have intended beneficiaries been engaged in the	As Biosecurity Plans are a high level, peak-body facing documents therefore	As stated above, the industry partners were adequately engaged

project?	industry engagement was monitored through attendance of key industry stakeholders at the TEG and BIG meetings.	throughout the project through both TEG (year 1) and BIG/BRG meetings (years 2-5).
To what extent were engagement processes appropriate to the target audience/s of the project?	The project's key industry stakeholders (GIA) were engaged throughout the project including during the TEG (2 times in year 1) and during the annual BIG meetings.	As stated above, the industry partners were adequately engaged throughout the project through both TEG (year 1) and BIG/BRG meetings (years 2-5).  It was noted by GIA that the annual BRG review process gave an opportunity to provide time to consider the findings of the Plan and resources that facilitated its continual improvement. It was suggested that this annual review process continue to allow the continued updating of the Plan outside the traditional 5-year planning project cycle to ensure the Plan remains fit for purpose.
What efforts did the project make to improve efficiency?	Efficiencies were largely borne through reducing the PHA salary component and meeting costs via the adoption of online meetings formats, which reduced travel and the drafting of documents (i.e., Implementation Plan) prior to stakeholder meetings to speed up this the development of the components of the Biosecurity Plan.	These learnings - including improvements in the TST format (see above) - are already being implemented in new Horticulture Innovation-funded projects.

## Recommendations

During the development of the Biosecurity Plan and throughout the associated consultation processes there were several issues identified. The following recommendations have been developed improve the outcomes for future production nursery biosecurity planning projects:

- Alternative format for future Production Nursery Threat Summary Tables. The production nursery industry is diverse as are the exotic pests reviewed in the revised Biosecurity Plan. The current Plan aggregates all effected plants, exotic pest threats and their related risk ratings into unified TST and HPP lists. This data aggregation has led to a loss of data granularity as the risk rating for some pests is high for some plant-pest combinations but not others. For this reason, several of the HPP's do have an overall high-risk rating (see Appendix A, page 10) as they do not posse a high risk to all plant species grown by the production nursery sector. It is therefore recommended that future revisions of the Biosecurity Plan for the Production Nursery Industry adopt a format like other Biosecurity Plans with that encompass multiple plant industries or crops i.e., grains, berries or cut flowers by segregating the TST and HPP lists into specific crop or plant types i.e., vegetables, fruit, ornamentals, forestry etc. This format would provide greater understanding of the impacted crops if/when an incursion occurs.
- Stocktake of Nursery Industry extension resources. This project required the generation of four biosecurity-related factsheets. However, after consultation with GIA regarding the factsheet's content it was clear that due to the extensive suite of extension resources already available to industry that alternative extension resources would better service industry need. Indeed, the current Tomato Brown Rugose Fruit Virus (ToBRFV) outbreak highlighted the absence of extension resources related to the disinfection of nursery equipment which led to the

production two 8-page Disinfection Guides. It is therefore recommended that any future projects be less prescriptive regarding extension outputs with resources generated based on the gaps highlighted during a stocktake of extant resources and industry consultation.

- Support an annual review of the list of exotic pests and pathogens (Threat Summary Tables) to account for changes in taxonomy, hosts, geographic distribution and/or economic impact which may change the threat posed by each pest. These annual 'mini reviews' would ensure the Threat Summary Tables remains current and would lessen the need for full review each time a new version of the Biosecurity Plan was developed. This review would be undertaken with the opportunity for continued collaboration with Commonwealth, State and Territory jurisdictions. The development of a new Biosecurity Plan on a five yearly basis could then be undertaken expeditiously with a focus on an assessment of preparedness and the review and development of the Biosecurity Strategy and Implementation Plan and be undertaken under the guidance of GIA's National Biosecurity and Sustainable Production Team.
- Undertake an assessment of the prioritised pests (high priority pests and pests of potential high economic impact) from a nursery trade/market access/movement of perspective. Following this analysis, pests which have the potential to have significant impact on trade would be identified, industry Continuity Plans developed which would identify options and where possible, develop protocols that would allow safe and cost-effective nursery plant stock movement in the event of a pest detection/incursion.

## Refereed scientific publications

None to report

## References

- <sup>1</sup> Horticulture Innovation Australia (2024). Australian Horticulture Statistics Handbook 2022/23 <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook>
- <sup>2</sup> Horticulture Innovation Australia (2024). 2022-23 Production Nursery Data Capture Report. <https://www.greenlifeindustry.com.au/static/uploads/files/2022-23-nursery-industry-statistics-survey-report-wfpfijnzevvr.pdf>
- <sup>3</sup> Greenlife Industry Australia (2019). Australia's Urban Greenlife. <https://www.greenlifeindustry.com.au/static/uploads/files/infograph-australias-urban-greenlife-final-wfepqestgxcd.pdf>
- <sup>4</sup> Agriculture Victoria (2025). Tomato Potato Psyllid. <https://agriculture.vic.gov.au/biosecurity/pest-insects-and-mites/priority-pest-insects-and-mites/tomato-potato-psyllid> viewed 17<sup>th</sup> January 2025.
- <sup>5</sup> Queensland Government (2024). Papaya mealybug <https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/biosecurity/plants/priority-pest-disease/papaya-mealybug> viewed 6<sup>th</sup> January 2025.
- <sup>6</sup> Commonwealth of Australia. National Biosecurity Strategy 2022-2032. Department of Agriculture, Fisheries and Forestry, Canberra, ACT. <https://www.biosecurity.gov.au/sites/default/files/2024-02/national-biosecurity-strategy.pdf>

## Intellectual property

No project IP or commercialisation to report.

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