Final report

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Citrus Industry Biosecurity Preparedness Strategy

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Delivery partner:

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Contents

Contents 3

Public summary 4

Keywords 5

Introduction 5

Methodology 5

Results and discussion 7

Outputs 13

Outcomes 17

Monitoring and evaluation 23

Recommendations 26

Refereed scientific publications 27

References 27

Intellectual property 27

Acknowledgements 27

Appendices 28

Public summary

This project, which operated from June 2021 to July 2026, was established to improve the Australian citrus industry's preparedness for key exotic pest threats through activities delivered under the CitrusWatch banner.

Coordinated nationally by Plant Health Australia and delivered in collaboration with Citrus Australia, the Northern Territory Government and Cesar Australia, the project significantly strengthened surveillance, preparedness and biosecurity awareness.

Activities spanned commercial production regions and high-risk urban and peri-urban environments, improving surveillance coverage, enhancing early detection capability, increasing stakeholder awareness, and establishing systems and tools to protect the Australian citrus industry.

Key achievements included:

- Targeted surveillance activities at 124 locations across commercial citrus orchards as well as urban and peri-urban environments.
- Deployment of 6,670 yellow sticky traps across mainland Australia to survey for exotic citrus psyllids that vector Huanglongbing (HLB).
- Collection of 1,222 citrus budsticks to survey for graft transmissible pathogens including HLB and citrus variegated chlorosis.
- Generation of more than 20,700 surveillance records with data used to support market access claims.
- Creation of a Citrus Pathway Risk Assessment model to determine which locations have the highest risk of exotic pests entering and establishing in Australia.
- Expansion of the Early Detector Network to 400 members to support trapping and budstick surveillance activities.
- Review and update of the Citrus Biosecurity Plan, which assessed over 300 pests to determine the industry's 29 High Priority Pests (HPPs).
- Development of 15 HPP host lists to support decision making during Emergency Plant Pest Responses.
- Creation of four National Surveillance Protocols to support nationally consistent surveillance activities.
- Development of factsheets, training material, traditional and social media as well as the delivery of presentations, workshops and webinars designed to improve industry and community awareness of citrus pests and biosecurity practices.
- Organisation of two study tours for growers and government staff to provide firsthand experience and knowledge of the impacts of HLB and psyllids.
- Completion of a PhD project to improve our understanding of psyllid diversity and ecology in eastern Australia.

The project built on the success of previous Hort Innovation funded biosecurity projects, including CT12022: *Protecting Australian citrus industry from biosecurity threats* and CT17001*: Improving biosecurity preparedness of the Australian citrus industry*, further strengthening the industry's surveillance capability, preparedness and biosecurity awareness.

Some key recommendations to build on the achievements delivered through the project include:

- Maintain and expand national early detection surveillance for exotic citrus pests through a risk-based surveillance program.
- Expand extension, training and engagement activities to improve biosecurity awareness and participation rates in urban, peri-urban and commercial production areas.
- Further strengthen industry preparedness and build business resilience for exotic citrus pests.

Keywords

Citrus; Biosecurity; Surveillance; Exotic pests; Huánglóngbìng; Psyllids; CitrusWatch; Biosecurity preparedness; Horticulture; Australia

Introduction

The Australian citrus industry is one of Australia's largest horticulture sectors producing oranges, mandarins, grapefruit, lemons and limes across approximately 33,000 hectares[1]. The industry provides substantial value to rural communities and the national economy and is currently experiencing strong growth, reaching an estimated production value of $1,235 million in 2024-25, including export value of $570 million.

Despite this strong performance, the industry remains vulnerable to exotic pest and disease threats. The *Biosecurity Plan for the Australian Citrus Industry*[2] identifies 29 exotic HPPs that have the potential to significantly impact Australian citrus production and potentially impact market access. The most serious of these is the Asian citrus psyllid (ACP)-huanglongbing (HLB) complex, which has devastated citrus industries internationally. However, there are also other exotic pests such as African citrus psyllid, citrus canker, citrus variegated chlorosis, and glassy winged sharpshooter that could threaten the industry, and should also be prepared for.

In response to these threats, the Australian citrus industry has been actively engaged in biosecurity for many years. This has included investment through Hort Innovation funded biosecurity projects including CT12022: *Protecting Australian citrus industry from biosecurity threats* and CT17001*: Improving biosecurity preparedness of the Australian citrus industry.* The CitrusWatch program was established to build from and expand the work of these previous investments and included an increased focus on urban and northern Australia which had been identified through previous projects as high-risk areas for the entry and establishment of exotic citrus pests.

The project aligns with the Citrus Strategic Investment Plan 2021–2026 and contributes to long-term protection of Australia's citrus industry through strengthened surveillance systems, improved preparedness resources, and increased national biosecurity awareness.

Methodology

Coordinated nationally by Plant Health Australia and delivered in collaboration with Citrus Australia, the Northern Territory Government and Cesar Australia the project delivered a Citrus Pathway Risk Assessment model, as well as surveillance, capacity building, stakeholder engagement, biosecurity planning and preparedness activities. To build program recognition and support stakeholder engagement public facing activities have been delivered under the 'CitrusWatch' banner.

National surveillance for citrus pests

A volunteer Early Detector Network (EDN) was maintained and expanded during this project to support surveillance activities especially in urban areas and across northern Australia. The EDN has enabled the deployment of 6,670 sticky traps and retrieval of 4,388 yellow sticky traps across citrus production regions, northern Australia, and high-risk urban areas to support surveillance for ACP, African citrus psyllid and glassy winged sharpshooter. The EDN also facilitated the collection of citrus budstick samples from a wide geographic area through three blitzes. Collected budstick material was sent to the Elizabeth Macarthur Agricultural Institute (EMAI) for diagnostic testing to support surveillance for graft

[1] Horticulture Innovation (2026) Australian Horticulture statistics Handbook. https://www.horticulture.com.au/about-hort-innovation/what-we-do/data-and-insights/australian-horticulture-statistics-handbook

[2] Plant Health Australia (2025) Biosecurity Plan for the Australian Citrus Industry (Version 4.1 – 2025). Plant Health Australia, Canberra, ACT. https://citrusaustralia.com.au/wp-content/uploads/2025/08/Citrus-BP-V4.1.pdf

transmissible pathogens including HLB and citrus variegated chlorosis. Budstick samples were also used to provide material to support *CT21005: Improving Australia's ability to respond to graft transmissible citrus diseases*.

Targeted surveillance activities were undertaken at urban, peri-urban and commercial locations across southern and northern Australia to complement EDN-based surveillance activities. Multiple properties in the surveyed areas were visited and host plants assessed following standardised surveillance procedures that incorporated visual inspections, tap sampling, and the collection of budsticks for diagnostic testing. Surveillance locations were informed by known risk factors, including proximity to ports of entry, host availability, and human movement pathways. Since mid-2024, results of the Citrus Pathway Risk Assessment model[3] have informed the choice of surveillance locations.

Surveillance data and diagnostic results have been recorded and uploaded into AUSPest*Check*®, to support pest status reporting and provide long-term data storage and accessibility.

Citrus pathway risk assessment model

Statistical modellers at Cesar Australia were engaged to develop a Citrus Pathway Risk Assessment model designed to understand the entry risk and likelihood of establishment of ACP. The team used information about the pest's biology and publicly available data on citrus orchard locations, climatic datasets, commodity import data and demographic data to populate the model which was further refined through expert elicitation before being published as a web-based application.

Improved capacity and capability for citrus biosecurity and surveillance

To support improved capacity and capability within the citrus industry and wider biosecurity community the program has worked to establish linkages with other projects and provided input to related activities.

This has included the Citrus Biosecurity Manager's active participation in the ACIAR funded HORT/2019/164: *Preparedness and management of huánglóngbìng (citrus greening disease) to safeguard the future of citrus industry in Australia, China and Indonesia, w*hich resulted in improved knowledge of ACP management and surveillance techniques. As well as the provision of budsticks to support *CT21005: Improving Australia's ability to respond to graft transmissible citrus diseases*.

The project supported a PhD project investigating psyllid diversity within citrus orchards and led two study tours to the United States allowing growers and government staff to gain knowledge about the management and impacts of ACP and HLB. These activities were designed to embed knowledge within the research, industry and government sectors. Funding for these activities was provided through the Biosecurity Activity component of the citrus levy.

Development of communication material and delivery of workshops

Engagement and communication activities were delivered under the CitrusWatch banner to support surveillance and increase industry and community awareness of exotic citrus pests. The program created a Communication Plan to guide the delivery of communication outputs which included workshops, webinars, presentations, development of educational materials, factsheets (including translation to Thai, Mandarin, Khmer, Vietnamese and Indonesian) and media articles published in industry magazines, e-newsletters and other publications. An Annual Activity Report summarising the programs achievements and plans was also produced and published on the Citrus Australia website to support communication with stakeholders.

Enhanced industry biosecurity preparedness

The Biosecurity Plan for the citrus industry was reviewed and updated at the beginning of this project to ensure risk assessments remained current given the previous Biosecurity Plan had been developed in 2015. The reviewed Biosecurity Plan identified HPPs that became the focus of other preparedness activities such as the development of HPP host lists.

[3] Cesar Australia (2024) Citrus Pathway Risk Assessment. https://cesaraustralia.com/resources/citrus-pathway-risk-assessment/

Fifteen host lists were developed by Plant Health Australia (PHA) over the course of the project. Host lists were created through extensive literature reviews and sought to understand how host plants are utilised by HPPs (e.g., plants may be used for reproduction, as food sources, or as a refuge) helping inform necessary response actions should the pest be detected in Australia.

National Surveillance Protocols (recently renamed Technical Reference Guides) were developed through a review of scientific literature and feedback from operational staff to support a nationally consistent approach to surveillance. Information gained through these documents were embedded into the programs standardised surveillance procedures used when conducting targeted surveys.

Project management and reporting

PHA led and coordinated the project and was responsible for managing subcontractors and the development of project planning documents such as the Monitoring and Evaluation Plan, Communications Plan and Project Risk Register.

Fortnightly team meetings were organised to ensure all project partners understood the overall program and ensured issues were addressed early to support the delivery of activities.

The Citrus Pest and Disease Prevention Committee acted as the steering committee for this project and provided input and guidance into various activities to ensure the program would meet the needs of the citrus industry.

Due to the scale of the program a mid-term evaluation of the program was undertaken in 2023 by a third-party funded by Hort Innovation (under CT23001). Recommendations from the mid-term review were incorporated into the remainder of the project, helping ensure its successful delivery.

Results and discussion

National surveillance for citrus pests

The project successfully established and implemented a national surveillance network. During the project 400 EDN volunteers (70% in Southern Australia and 30% in Northern Australia) deployed 6,670 traps with 4,388 traps returned resulting in a trap return rate of approximately 65% Australia wide (61% in Southern Australia and 71% in Northern Australia) (Figure 1). The EDN also supported the collection of 219 budsticks through three surveillance blitzes. Together with budsticks collected as part of targeted surveys this resulted in the collection of 1,222 budsticks over the 5-year program which were screened by EMAI for graft transmissible pathogens (Table 1).

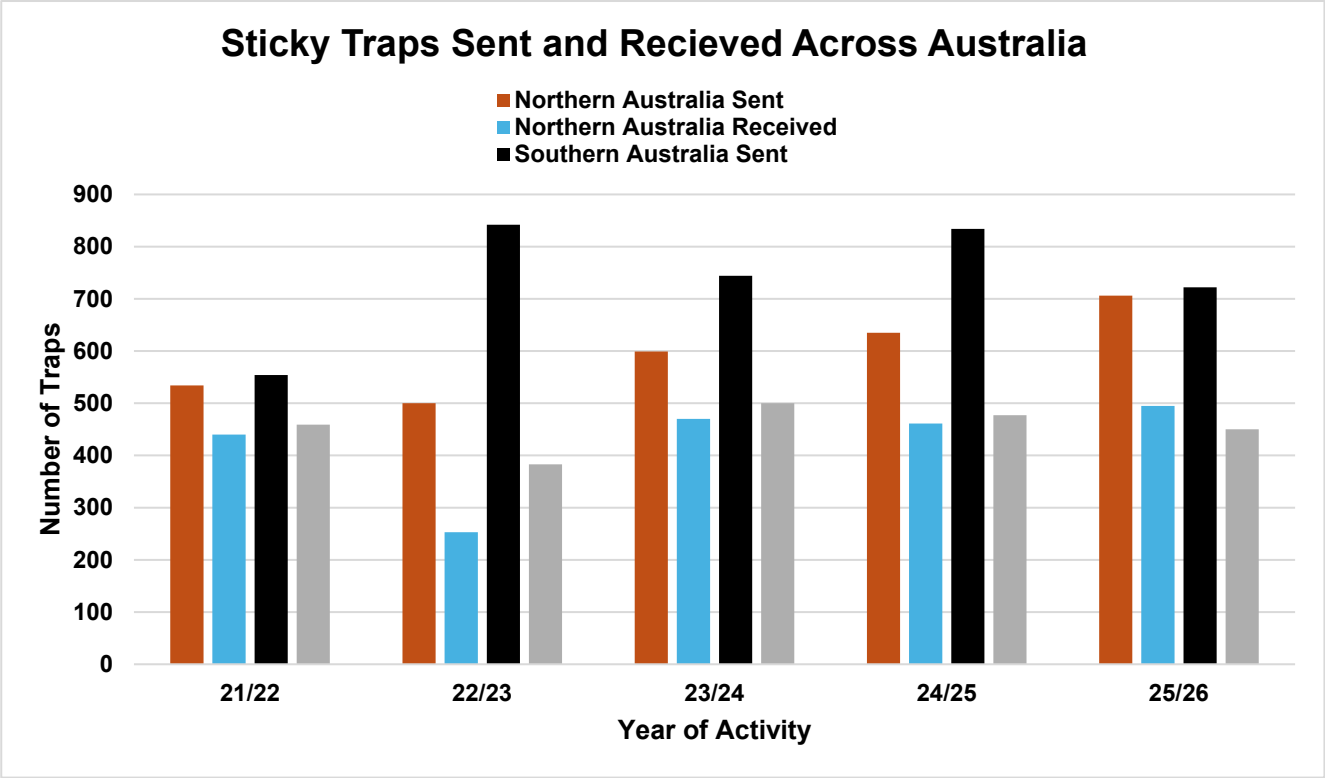

Figure 1 *Number of traps deployed per year as part of CitrusWatch in Northern (2,974) and Southern Australia (3,696) and received (2,119 Northern Australia; 2,269 Southern Australia).*

Table 1 *Total number of budsticks collected during CitrusWatch in Northern and Southern Australia.*

	Northern Australia		Southern Australia	
Financial Year	**Budstick Collections**	**Budstick Blitz**	**Budstick Collections**	**Budstick Blitz**
2021–22	60	N/A	70	N/A
2022–23	78	N/A	40	N/A
2023–24	77	0	37	67
2024–25	195	49	179	35
2025–26	131	37	59	31
Sub-Total	**618**	**86**	**385**	**133**
Total	**704**		**518**	

Surveillance activities were guided by the Cesar Australia developed Citrus Pathway Risk Assessment model, which identified priority locations for exotic citrus pest entry and establishment based on pest biology, trade pathways, and human movement. This risk-based approach enabled efficient allocation of surveillance effort, ensuring resources were targeted towards the highest-risk areas improving the likelihood of early pest detection.

To complement EDN-based activities, targeted surveillance was undertaken at locations identified as high-risk, including major urban centres and northern production regions. To ensure consistency of surveillance methodology and data collection across the program standardised surveillance procedures and AUSPest*Check*® Data Standard Specifications were created. Throughout the program incremental improvements were made to trap deployment, sample processing, and diagnostic triage processes resulting in increased efficiency and more effective use of resources.

Encouragingly, across all surveillance activities, no exotic citrus pests were detected, however, a number of native psyllid species were detected showing the effectiveness of the program's surveillance methods (Figure 2).

Data collected by the program has been successfully used to support Australia's pest-free status and market access, highlighting the importance the program plays in Australia's national surveillance systems.

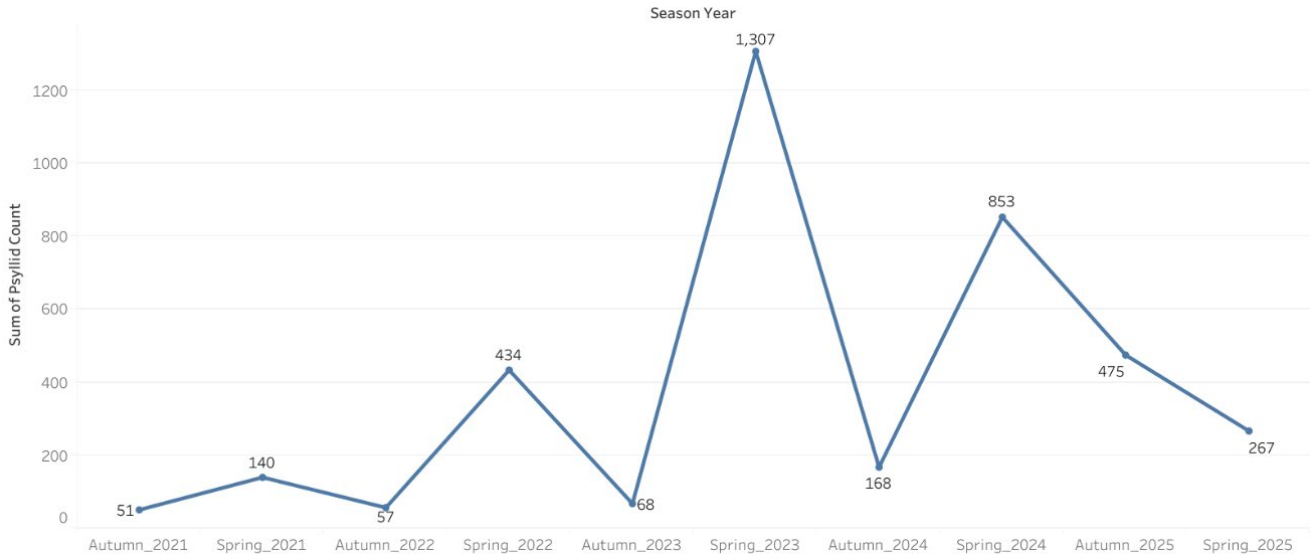

Figure 2 *Seasonal native psyllids counts obtained from sticky trap returns in Southern Australia.*

Citrus Pathway Risk Assessment

Statistical modellers at Cesar Australia were engaged to develop a Citrus Pathway Risk Assessment model designed to understand the entry risk and likelihood of establishment of ACP. The model used pest biology, expert elicitation and publicly available data on citrus orchard locations, climate, commodity and demographics to model incursion and establishment risks.

The model was completed in January 2024 and identified that mainland capital cities, northern Queensland and major citrus producing areas pose a higher incursion risk. Model outputs are provided through the online tool and can provide outputs down to a Statistical Level 2 resolution. This allows the project team to use the model to target surveillance, engagement and EDN recruitment activities towards higher risk areas across southern and northern Australia.

Improved capacity and capability for citrus biosecurity and surveillance

To improve knowledge and capacity within the citrus industry the CitrusWatch program has maintained connections with related projects, created an online training course, delivered study tours and supported postgraduate research helping build knowledge about exotic citrus pests that can be shared with industry or drawn on to support future response activities.

Since the commencement of this project the Citrus Biosecurity Manager has worked closely with researchers on the ACIAR funded project HORT/2019/164: *Preparedness and management of huánglóngbìng (citrus greening disease) to safeguard the future of citrus industry in Australia, China and Indonesia.* This has included trialling traps and lures used by the CitrusWatch program in Australia in areas of Indonesia known to have ACP to confirm their effectiveness as surveillance methods. This collaboration has helped improve our knowledge of ACP management and the effectiveness of surveillance techniques.

PHA with support from Citrus Australia and the NT Government also developed a CitrusWatch online training module designed to support psyllid monitoring, insect triage and raise awareness of exotic citrus pests. The course is available on the PHA Biosecurity Online Training (BOLT) Platform and has been accessed and completed by 234 users since its launch in 2023 (Table 2).

Table 2: *CitrusWatch BOLT training course metrics 2023-2026.*

	Year of Activity				
	2023	**2024**	**2025**	**2026**	**Total**
Completions	60	87	69	18	**234**
Total enrolments	87	133	97	28	**345**

The Citrus Biosecurity Manager led two study tours for growers and government staff to the United States of America where participants were able to learn first-hand how the ACP-HLB complex has impacted citrus production in the United States. Grower attendees spoke about their experiences at subsequent grower updates helping increase wider industry awareness of the pest and the importance of biosecurity.

CitrusWatch also supported a PhD project (Figure 3) investigating psyllid diversity within citrus orchards and their associated microbiome to understand the potential for Australian psyllid species to vector pathogens. Findings from this research are being finalised for publication and will help improve our understanding of psyllid diversity. Importantly the research has confirmed the usefulness of sticky trap-based surveillance, supported by hand sampling, to detect psyllids and found no evidence that native psyllids actively feed on citrus.

Together these activities have helped build knowledge and capacity within the biosecurity system helping the industry prepare for future pest incursions.

Figure 3 *PhD candidate Micheal Edwards trapping for psyllids.*

Development of communication material and delivery of workshops

The project achieved strong engagement across industry, government, and community stakeholders. As demonstrated by the expansion of the EDN and their increasing levels of active participation in surveillance activities over the course of the project.

CitrusWatch team members delivered a range of training and education activities throughout the project (Table 3). These included the delivery of face to face workshops, webinars, grower presentations (Table 4; Figure 4), and the development of a suite of online and printed resources designed to communicate the program's achievements and raise awareness of exotic citrus pests and citrus biosecurity helping increase capacity for pest identification and reporting.

Table 3: *Examples of engagement and extension activities delivered through CitrusWatch*

Activity	Description	Audience	Outcomes
CitrusWatch grower and stakeholder training workshops	Face-to-face training workshops delivered across citrus production regions covering pest identification, surveillance participation, and biosecurity awareness.	Growers, consultants, government staff and industry representatives across mainland Australia.	Improved awareness of exotic citrus pests and increased participation in surveillance activities.
Urban biosecurity outreach events (schools and community groups)	Engagement activities delivered through schools, community groups, and urban awareness campaigns in high-risk urban and peri-urban areas.	Urban communities, schools, local government and community participants.	Increased awareness of citrus biosecurity risks and supported recruitment to the EDN.
Industry presentations at citrus grower meetings and regional forums	Delivery of project updates and biosecurity presentations through grower meetings, regional forums, and industry events including an interview on ABC's Gardening Australia and interview on the Podcast All the Dirt.	Citrus growers, peak industry bodies, agronomists and supply-chain stakeholders.	Increased awareness of surveillance activities, reporting pathways and preparedness initiatives.
National conference presentations	Presentation of surveillance and research findings at national biosecurity conferences including the Plant Biosecurity Research Initiative Symposium 2024 and Citrus Biosecurity Symposium 2026.	Researchers, government agencies and biosecurity stakeholders.	Improved knowledge sharing and strengthened collaboration across the biosecurity sector.
Scientific conference presentation	Presentation of psyllid ecology and microbiome research findings at scientific conferences including Entomology 2025.	Research and scientific community.	Increased technical understanding of psyllid diversity and surveillance implications.
Delivery of online training modules via the PHA BOLT platform	Development and delivery of online training resources through the PHA BOLT platform and digital communication channels.	Industry, government staff and community participants nationally.	Improved accessibility of training resources and ongoing capability development.
Early Detector Network engagement activities	Ongoing communication, trap distribution, onboarding and support activities for EDN participants.	400 EDN members across northern and southern Australia.	Supported deployment of 6,670 and return of 4,388 sticky traps and the collection of 219 budsticks through three surveillance

Activity	Description	Audience	Outcomes
			blitzes strengthening national surveillance capability.

Table 4: *Engagement events attended by the CitrusWatch team 2021-2026.*

	Engagement Events	
Financial Year	**Northern Australia**	**Southern Australia**
2021–22	6	7
2022–23	9	10
2023–24	11	13
2024–25	13	15
2025–26	15	23
TOTAL	**54**	**68**

Figure 4: *Engagement activities include A CitrusWatch awareness booth at the 2025 South Australia Autumn Garden Festival, (**top left**); CitrusWatch booth at the Kimberley Kununurra Agricultural Show 2024 (**bottom left**) and; The Urban Biosecurity Coordinator – Citrus running a Bunnings workshop in Perth (**right**). Maintaining a presence at key festivals has aided EDN recruitment.*

Enhanced industry biosecurity preparedness

The project strengthened industry biosecurity planning through review of the Citrus Biosecurity Plan, which resulted in the review and assessment of the entry, establishment, spread and economic impact of over 300 exotic citrus pests and the identification of 29 HPPs. The Biosecurity Plan also incorporated a Biosecurity Implementation Plan which has been

aligned with the National Biosecurity Strategy 2022-2032 and Citrus Industry Biosecurity Strategy 2023-28 to guide the industry's biosecurity activities.

Host lists have been developed by PHA for 15 HPPs identified through the Biosecurity Plan review. These documents have been designed to provide commentary on how pests utilise different plants and are intended to provide an important resource during an emergency response, helping inform surveillance activities and movement controls.

Host lists developed through the project are listed below:

- African citrus psyllid (*Trioza erytreae*)
- African strain of Huanglongbing ('*Ca*. L. *africanus*')
- American strain of Huanglongbing ('*Ca*. L. *americanus*')
- Asian citrus psyllid (*Diaphorina citri*)
- Asian strain of Huanglongbing (Ca. L. asiaticus')
- Bean thrips (*Caliothrips fasciatus)*
- Brown marmorated sting bug (*Halyomorpha halys*)
- Citrus fruit borer (*Citripestis sagittiferella*)
- Citrus leprosis virus
- Citrus stubborn disease (*Spiroplasma citri*)
- Citrus variegated chlorosis (*Xylella fastidiosa* subsp. *pauca*)
- False codling moth (*Thaumatotibia leucotreta*)
- Glassy-winged sharpshooter (*Homalodisca vitripennis*)
- Mal secco (*Plenodomus tracheiphilus*)
- Rind boring orange moth (*Cryptoblabes gnidiella*)

Program management and reporting

The project team has worked collaboratively to coordinate and deliver activities across southern and northern Australia helping improve the Australian citrus industry's biosecurity preparedness, surveillance capacity and raise industry and community awareness of exotic citrus pests.

The Citrus Pest and Disease Prevention Committee has acted as the project's steering committee meeting three to four times per year to provide guidance and support for the delivery and targeting of program activities to help ensure the program is fit for purpose and meets the needs of industry.

To support the promotion of the program, four Annual Activity Reports have been developed and published on the Citrus Australia website to provide industry with an up to date understanding of the program's achievements and planned activities.

Outputs

Output	Description	Detail
Deployment of 1,000 sticky traps per annum	Deployment of 1,000 sticky traps (600 in southern Australia and 400 in northern Australia) per annum.	Traps were deployed in Spring and Autumn by the EDN and crop scouts across southern and northern Australia. Over the five-year program 6,670 traps were deployed with 4,388 returned for diagnostic assessment. No exotic citrus psyllids were identified through this surveillance however native Trioza and other psyllid genera were regularly collected,

Output	Description	Detail
		demonstrating the effectiveness of the methods for psyllid surveillance.
Surveillance blitz activities (x2)	Surveillance blitzes will be conducted during the project to promote surveillance and collect surveillance data from urban areas.	Three surveillance blitzes were delivered: • September to October 2023, with 67 samples collected. • September to October 2024, with 84 samples collected. • September to October 2025, with 68 samples collected. Samples were sent to EMAI for diagnostics and no exotic pests of significance were identified. Data from this activity was shared with the Australian government to support market access for nursery material into the European Union, highlighting the importance of this data to support trade and showing the national recognition of the program's datasets.
Targeted surveys in urban and commercial areas.	Conduct targeted visual surveillance and budstick surveillance in urban, peri-urban, and commercial citrus production areas.	Targeted surveys were undertaken at 124 locations in urban, peri-urban areas and commercial orchards across mainland Australia (**Appendix 1**). Host plants were visually inspected for signs of exotic pests including ACP, African citrus psyllid, glassy winged sharpshooter, and citrus canker. Budstick samples were also collected to screen for graft transmissible pathogens including citrus variegated chlorosis and HLB. No exotic citrus pests were identified. However, new detections of non-citrus pests and native psyllids were made highlighting the effectiveness of surveillance methods.
Data collection and input into AUSPest*Check*®	Surveillance data from targeted and trapping surveillance collected will be uploaded into AUSPest*Check*®	Data from trapping, blitz and targeted surveillance activities has been uploaded to AUSPest*Check*®. This has resulted in more than 20,700 surveillance records. A summary is provided in **Appendix 2**.
Develop grower and community resources	Develop resources for growers and community members to raise awareness of key pests and the CitrusWatch program.	The program has developed factsheets and instructional documents designed to raise community and industry awareness of citrus pests. To further support this the program has created an Instagram account (@CitrusWatchProgram) (which currently has 53 posts and 160 followers) and a YouTube channel (which currently has 13 videos, 848 views, and 21 subscribers) to expand the program's reach.

Output	Description	Detail
		Monthly e-newsletters are also created during Spring and Autumn to support surveillance activities and maintain engagement with the EDN.
Translated educational materials	Translation of communication material (e.g., factsheets, instructions, etc.) into languages other than English.	Five factsheets have been translated into Thai, Vietnamese, Khmer, Indonesian and Mandarin to help raise awareness of exotic pests and citrus biosecurity within linguistically diverse stakeholders. Copies of factsheets are available on the Citrus Australia website.
Provide program updates to industry	Provide regular updates on the CitrusWatch program and its achievements to industry.	The Citrus Biosecurity Manager regularly presents information about the program to industry. This includes publications in Australian Citrus News, presentations at Grower Forums, organisation of two citrus Biosecurity Symposia, and interviews on the Full Bottle Podcast. Annual Activity Reports (produced in 2022, 2023, 2024 and 2025) have also been published to provide regular updates to surveillance participants and the wider industry about the program and its achievements.
Deliver presentations to schools and community groups	Develop and deliver educational material to agriculture students to improve their awareness of exotic pests, surveillance, and pest reporting procedures.	This project has developed and delivered training and annual lectures to agriculture students at high school, TAFE, and University levels.
Web app to model ACP establishment and spread	Web based application developed to model ACP establishment and spread.	Cesar Australia developed a Pathway Risk Assessment model with a web interface/application that can be used to identify high-risk areas helping target surveillance activities in areas posing the greatest risk of pest incursions. A copy of the model is available from: https://cesaraustralia.com/resources/citrus-pathway-risk-assessment/.
Host lists for HPPs	Develop detailed host lists for 15 citrus HPPs. These host lists can be used to guide response activities (e.g., plants to target surveillance, plants requiring treatment or plants that require movement restrictions) in the event of future pest incursions.	Fifteen host lists have been developed through this project for the following HPPs: • African citrus psyllid (*Trioza erytreae*) • African strain of huanglongbing (‘*Ca*. L. africanus’) • American strain of huanglongbing (‘*Ca*. L. americanus’) • Asian citrus psyllid (*Diaphorina citri*) • Asian strain of huanglongbing (*Ca. L. asiaticus’*) • Bean thrips (*Caliothrips fasciatus)* • Brown marmorated sting bug

Output	Description	Detail
		(*Halyomorpha halys*) • Citrus fruit borer (*Citripestis sagittiferella*) • Citrus leprosis virus • Citrus stubborn disease (*Spiroplasma citri*) • Citrus Variegated Chlorosis (*Xylella fastidiosa* subsp. *pauca*) • False Codling Moth (*Thaumatotibia leucotreta*) • Glassy-winged sharpshooter (*Homalodisca vitripennis*) • Mal secco (*Plenodomus tracheiphilus*) • Rind boring orange moth (*Cryptoblabes gnidiella*)
National surveillance protocols	Develop national surveillance protocols to support nationally consistent surveillance for citrus HPPs.	A National Surveillance Protocol (NSP) (recently renamed Technical Reference Guides) for Citrus canker was endorsed by the Subcommittee on National Plant Health Surveillance (SNPHS) in November 2022. Three additional NSPs (covering huanglongbing (*Ca.* L. asiaticus'; '*Ca.* L. africanus' and '*Ca.* L. americanus'), Asian citrus psyllid (*Diaphorina citri*) and African citrus psyllid (*Trioza erytreae*)) have been developed and each underwent three separate expert technical reviews. Documents were finalised but are yet to be formally endorsed by SNPHS pending changes to the Reference Standard that guides the structure of the documents.
Industry Biosecurity Plan review	Undertake a review of the 2015 Citrus Biosecurity Plan to ensure it is up to date and reflects the most recent knowledge of pest threats to the Australian citrus industry.	The Biosecurity Plan was endorsed by Citrus Australia in July 2024 prior to endorsement by the Plant Health Committee in March 2025. A copy of the Biosecurity Plan is available on the Citrus Australia website.
PhD project on HLB vectoring potential of native psyllids	Completion of a PhD project to improve our understanding of psyllid diversity within Australia's citrus orchards.	A PhD project developed in partnership with Agriculture Victoria. The project commenced in April 2023 and was designed to better understand the range of psyllids that are found in Australian citrus orchards and to explore the microbiome of psyllids to understand the potential for Australian psyllid species to vector and transmit exotic pathogens that can cause HLB in citrus. Findings from this project will be published in a thesis and relevant scientific journals. Funding for this activity was supported by the

Output	Description	Detail
		Biosecurity Activity component of the citrus levy.
Study tours	Two study tours will be organised to increase knowledge, capacity, and capability of the industry.	A study tour to the United States was held in May 2023. Twelve citrus growers, agronomists and entomologists attended the tour where they visited Florida and California to learn about the impact and management of the ACP-HLB complex in the United States. A second study tour to attend the Seventh International Research Conference on HLB was held on 25-29 March 2024. This tour was attended by Commonwealth and state government surveillance and diagnostic personnel as well as representatives from the Greenlife industry. As part of the study tour meetings were organised with the California Department of Food and Agriculture to discuss the ACP-HLB situation and regulations in California. Funding for this activity was supported by the Biosecurity Activity component of the citrus levy.
Industry training workshop	Training workshop delivered to support surveillance activities.	Project Team has delivered presentations, webinars and one-on-one training focusing on surveillance and raising awareness of exotic citrus pest threats. Recordings of webinars are available on the CitrusWatch YouTube channel.
Develop online training resources for trappers and diagnosticians	Training material developed to support surveillance activities.	An online course was developed and launched in 2023to provide standardised training in psyllid surveillance and diagnostics. The course is available on the PHA BOLT platform.

Outcomes

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
Intermediate outcomes			
Improved collection of annual surveillance data for key HPPs.	Outcome: 1 Strategy: 1 KPI: 4	Increased scale and consistency of surveillance data.	Since the project commenced in June 2021, 6,670 traps have been deployed and 4,388 retrieved, 1,222 budsticks collected and targeted surveys have been undertaken at 124 locations to support early detection surveillance targeting citrus HPPs across urban, peri-urban, and commercial areas. Data collected through this surveillance

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
			has been uploaded to AUSPest*Check*® resulting in more than 20,700 surveillance records. Importantly, data from the program has been used to support Xylella pest freedom claims helping maintain access to European markets.
Development of educational and awareness material for citrus HPPs ready for distribution when needed.	Outcome: 3 Strategy: 2 KPI: 1	Develop and deliver educational materials and engagement activities to increase awareness of citrus HPPs, improve understanding of citrus biosecurity risks, and encourage surveillance participation and pest reporting across industry and the broader community.	A suite of online training, factsheets, flyers, videos and social media content has been developed to promote engagement in surveillance activities and raise awareness of citrus pests. Copies of these documents are available on the Citrus Australia website. Several factsheets have also been translated Thai, Mandarin, Khmer, Vietnamese and Indonesian to promote biosecurity to diverse stakeholders. The project established YouTube and Instagram channels and delivered both face-to-face and online training sessions to improve awareness of citrus pests and reporting requirements. These resources improve industry and community awareness of citrus biosecurity and reporting requirements and can be drawn upon during future pest outbreaks supporting a rapid communication response from industry.
Improved awareness of the general public, iindustry and community about citrus biosecurity and the need to report suspect pests.	Outcome: 3 Strategy: 1 KPI: 1	Improve the understanding of citrus growers and the community about the risks posed by exotic citrus pests and promote the need to report suspect pests through appropriate channels	
Implementation of risk-based surveillance design for citrus HPPs.	Outcome: 1 Strategy: 1 KPI: 2 and 4	Integration of risk-based approaches into surveillance planning.	Cesar Australia developed a Citrus Pathway Risk Assessment model which is being used by the program to identify high-risk areas to better target surveillance, awareness and engagement activities.
Increased number of industry personnel trained in HPP trapping and identification.	Outcome: 3 Strategy: 2 KPI: 1	Training provided to industry and EDN members in citrus HPP awareness and surveillance methods	A CitrusWatch online training module was created to support psyllid monitoring, triage and raise awareness of exotic citrus pests. The course is available on the PHA BOLT platform and has been completed by 234 users since 2023. Additional training and information (newsletters, surveillance instructions) is also provided to the 400 EDN volunteers during the Spring and Autumn trapping seasons to support the trapping program.

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
			These activities help maintain high levels of EDN engagement and support acceptable trap return rates of 65%.
Increased coverage of trap-based surveillance and improved return rates and processing efficiency.	Outcome: 1 Strategy: 1 KPI: 4	Steps taken to improve surveillance coverage (especially in high-risk and urban areas) and more efficient use of surveillance resources.	The coverage of trap-based surveillance is determined by the spread of volunteers involved in the EDN. The CitrusWatch team worked to improve coverage by targeting recruitment in areas identified by the Cesar Australia Citrus Pathway Risk Assessment model as being of high-risk. Targeted surveys were an efficient way of boosting EDN recruitment in these areas, as was attendance at local events and working with local councils. Throughout the project significant effort was focused towards maintaining engagement with the EDN to ensure acceptable trap return rates and minimise waste of trap resources.
Improved confidence of industry diagnosticians to detect citrus HPPs.	Outcome: 1 Strategy: 1 KPI: 3 and 4	Strengthen diagnostic capability and confidence to detect citrus HPPs.	Surveillance activities undertaken through this program utilised industry diagnosticians for preliminary pest identification with follow up diagnostics conducted by government laboratories for any suspect pests. This approach has helped keep costs manageable and built psyllid diagnostic capacity within the industry and government systems. Additionally, an online surveillance and diagnostic course has been developed to support training of industry diagnosticians and surveillance personnel. The course is available on the PHA BOLT platform.
Improved grower confidence and awareness in detecting and managing ACP-HLB.	Outcome: 3 Strategy: 2 KPI: 1	Increased grower confidence and awareness in biosecurity practices that safeguard the industry.	The project created the CitrusWatch banner to help build awareness and visibility of the project. Brand recognition together with regular communication and engagement with growers (e.g. through presentations at Grower Forums) has helped build industry confidence in the program and awareness about how to detect, report and manage exotic pests.
Greater collaboration between industry and	Outcome: 3	Strengthen collaboration across	Collaboration has been key to the success

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
supporting organisations.	Strategy: 1 KPI: 1	industry, government and community.	of this project. Since the project commenced in June 2021, project collaborators have included PHA, Citrus Australia, NT DAF, Cesar Australia, citrus growers, DPIRD, NAQS, café's, nurseries, agricultural consultants, state, territory and commonwealth government, and members of the public. Many are members of the EDN which has grown from 130 at the start of the project to 400 members as of July 2026.
End-of-project outcomes			
Improved ability to distinguish native psyllid and HPPs during delimiting surveillance.	Outcome: 1 Strategy: 1 KPI: 1,3 and 4	Undertake activities that improve psyllid surveillance and diagnostic capacity within Australia.	Surveillance activities undertaken through this project have supported improvements in trap triage, psyllid diagnostic skills and embedded capability within industry and governments.
Improved understanding of the risks posed by native psyllids for vectoring HLB.	Outcome: 1 Strategy: 1 KPI: 1 and 2	Undertake activities to improve our understanding of native psyllids in citrus orchards.	The program has supported a PhD project investigating psyllid diversity and associated microbiome (delivered in partnership with Agriculture Victoria and supported by funding through the Biosecurity Activity component of the citrus levy). This work has improved Australia's knowledge of psyllid diversity in eastern Australia. The CitrusWatch program has deployed 6,670 sticky traps and supported targeted surveys at 124 locations to survey for exotic citrus psyllids and other pests. These activities have identified a diversity of native psyllids that may be found in and around citrus plantings. But found no evidence of native psyllids feeding on citrus.
Improved methodology for HPP surveillance to improve the likelihood of pest detection.	Outcome: 1 Strategy: 1 KPI: 1 and 4	Develop and refine methods for undertaking citrus surveillance	Standardised surveillance procedures and AUSPest*Check*® Data Standard Specifications have been developed and refined through this project to support citrus surveillance activities. Additionally, the project has supported the development of National Surveillance Protocols for citrus canker, ACP, African citrus psyllid and HLB. These documents ensure that the

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
			program undertakes surveillance using the most appropriate methods improving the chance of early pest detection.
Additional research expertise embedded in the research community.	Outcome: 1 Strategy: 1 KPI: 3 and 4	Create and embed biosecurity expertise within the citrus industry and research community.	The Citrus Biosecurity Manager supported a PhD project investigating psyllid diversity in citrus orchards and their microbiome. The project was undertaken in partnership with Agriculture Victoria and the student, Micheal Edwards, is finalising his thesis. Initial findings have been presented at national and international conferences including the 2024 Plant Biosecurity Research Initiative Symposium in Cairns and the Entomology 2025 conference held in Portland, USA, in November 2025. This PhD project has helped develop and embed expertise within the citrus industry and wider research community. Funding for this activity was supported by the Biosecurity Activity component of the citrus levy.
Improved ability of citrus growers and the supply chain to respond to a HPP incursion and manage HLB/ACP	Outcome: 1 Strategy: 1 KPI: 4 Outcome: 3 Strategy: 1 KPI: 1 Outcome: 3 Strategy: 2 KPI: 1	Strengthened preparedness and response readiness across the citrus industry and supply chain.	The project has developed a suite of educational resources; detailed host lists for 15 citrus HPPs; developed National Surveillance Protocols; and created a Citrus Pathway Risk Assessment model to more effectively target surveillance activities. These activities have helped the industry and wider supply chain more effectively detect and respond to exotic pest incursions.
Improved chance of detecting ACP in urban/peri-urban areas at an early stage of the incursion	Outcome: 1 Strategy: 1 KPI: 4	Higher likelihood of detecting exotic pests in high-risk urban and peri-urban areas, while building long-term biosecurity expertise across industry and	Through presentations, webinars, online training, factsheets, and flyers the project has helped promote engagement in surveillance activities, expanded the EDN, increased knowledge of pests and pest reporting requirements helping improve the chance of early detection of exotic

Outcome	Alignment to citrus fund outcome, strategy and KPI	Description	Evidence
		research.	citrus pests. Targeted surveillance, EDN recruitment and sticky trapping activity has been directed towards higher risk areas identified by the Citrus Pathway Risk Assessment model. This approach helps target activity and should improve the likelihood of detecting exotic pests at the early stages of an incursion, providing the best chance of eradication success.
Robust surveillance dataset across urban and citrus growing areas ready for use by the citrus industry	Outcome: 1 Strategy: 1 KPI: 4	Surveillance dataset developed over multiple years that can be used by the citrus industry to support analysis.	Since the project commenced in 2021 more than 20,700 surveillance records have been collected and stored in AUSPest*Check*®. Data collected by the program has already been shared with the Australian government to support pest freedom claims and maintain access to international markets highlighting the value of industry surveillance datasets.

Monitoring and evaluation

Project performance was assessed against the Key Evaluation Questions defined in the Monitoring and Evaluation Plan.

The project achieved its intended outcomes through establishment of a national surveillance network, delivery of targeted engagement activities, and development of biosecurity tools and resources. These activities have seen surveillance coverage increase significantly and collected data to support pest-free status claims.

The project was highly relevant to industry needs, addressing key gaps in surveillance, preparedness, and awareness. Engagement activities were effectively delivered across a range of audiences, including growers, government, and urban communities.

Efficiency improvements were achieved through continuous refinement of surveillance methodologies, triage and diagnostic processes, and establishment of AUSPest*Check*® Data Standard Specifications for the program.

Strong legacy arrangements are in place, including ongoing access to surveillance data, the Citrus Pathway Risk Assessment model, and established professional and volunteer networks to support continued biosecurity preparedness, awareness and response activities.

Table 5 *Key Evaluation Questions*

Key Evaluation Question	**Project performance**	**Continuous improvement opportunities**
To what extent has the project achieved its expected outcomes?	The project has successfully achieved its outcomes through the delivery of a nationally coordinated surveillance program operating in high-risk urban and commercial production areas. Complementing this, the program has also delivered a Citrus Pathway Risk Assessment model, a suite of engagement and awareness materials and various preparedness documents including a Biosecurity Plan, host lists and National Surveillance Protocols, and created additional psyllid expertise within the biosecurity system.	Refine risk-based surveillance design and surveillance procedures guided by risk assessments and operational experience. Work with stakeholders to understand how to best target communication activities.
How relevant was the project to the needs of intended beneficiaries?	Project activities aligned strongly with industry needs, addressing surveillance gaps, improving preparedness, and increasing awareness of exotic pest risks. Resources and tools developed were consistent with identified knowledge gaps helping improve industry biosecurity preparedness.	Undertake consultation to assess ongoing industry needs and refine future program focus. Consultation with the industry's Citrus Pest and Disease Prevention Committee in 2025 identified an interest in building on the achievements of the current program to support surveillance, preparedness and capacity building initiatives. There was also support for building business resilience and readiness to support growers prepare for and recover from exotic pest incursions.

Key Evaluation Question	Project performance	Continuous improvement opportunities
How well have intended beneficiaries been engaged in the project?	Strong engagement was achieved through the close collaboration with the Citrus Pest and Disease Prevention Committee (acting as a project steering committee), regular engagement with members of the EDN and regular presentations to growers through attendance and presentations at Grower Forums, podcasts and various communication outputs including Annual Activity Reports, newsletters and articles in Australian Citrus News. These activities have ensured that growers and other beneficiaries are aware of the project and its achievements.	Monitor engagement metrics (e.g. participation numbers, repeat engagement) and adapt activity over time to maintain participant interest and engagement. Expand engagement activities to target underrepresented groups and regions.
To what extent were engagement processes appropriate to the target audience/s of the project?	A range of engagement methods (workshops, presentations, factsheets, online training and other educational materials) ensured accessibility across diverse audiences. Where possible different approaches were used to target different audiences (e.g. attendance at Grower Forums and articles in industry magazines were used to reach growers, while attendance at garden festivals and articles in council newsletters were used to reach urban audiences) This diverse and targeted approach has ensured the program has engaged appropriately with target audiences and stakeholder groups.	Review and further tailor engagement approaches to audience preferences, including increased use of digital delivery, communication in languages other than English, and targeted communication and engagement activities.
What efforts did the project make to improve efficiency?	Surveillance methodologies and engagement activities were refined over time to more efficiently deliver the project. A key achievement was the use of the Citrus Pathway Risk Assessment model to identify high-risk areas to better focus surveillance activities. Improved and more frequent engagement with the EDN and improved trap triage processes also saw improvements in trap return	Further refine risk-based surveillance to optimise resource use. Regularly review the effectiveness of EDN engagement activities to ensure EDN members remain actively engaged in the program.

Key Evaluation Question	Project performance	Continuous improvement opportunities
	rates and diagnostic processing helping the program minimise waste and operate more efficiently.	
What legacy arrangements are in place?	The project established enduring resources including a suite of awareness materials delivered under the CitrusWatch banner, a Biosecurity Plan, National Surveillance Protocols, host lists, and a Citrus Pathway Risk Assessment model. The EDN has expanded significantly during this project with 400 members now actively engaged in supporting surveillance activities. The project team has also developed relationships with key players across the biosecurity sector to ensure the program is well integrated into the national biosecurity landscape. The networks and materials developed through CitrusWatch provide a foundation for ongoing surveillance, preparedness and engagement activities for the industry.	Formalise long-term ownership and maintenance of tools, documents, websites, data, and networks. Seek ongoing funding sources or integration into existing programs to sustain project activities.

Recommendations

Based on the outcomes and findings of this project, the following recommendations are made to continue strengthening Australia's citrus biosecurity preparedness.

1. **Maintain and expand national early detection surveillance for exotic citrus pests through a risk-based surveillance program.**

CitrusWatch has established a nationally coordinated surveillance system that provides strong baseline coverage across urban, peri-urban and commercial citrus production areas. Activities have been targeted towards high-risk areas using findings of the Citrus Pathway Risk Assessment model developed through this project.

To build off this success future programs should maintain the EDN and progressively expand surveillance in high-risk areas. Maintaining the sticky trapping, budstick collection and targeted survey procedures developed through this project will support the early detection of a range of citrus HPPs. To ensure currency, surveillance procedures should be periodically reviewed to ensure potential enhancements are considered and incorporated where required. Similarly, due to the changing nature of trade and global pest distributions the Citrus Pathway Risk Assessment model should also be periodically reviewed to ensure surveillance remains targeted towards the highest risk environments.

2. **Expand extension, training and engagement activities to improve biosecurity awareness and participation rates in urban, peri-urban and commercial production areas.**

Strong stakeholder engagement has been central to the success of CitrusWatch, particularly engagement with the EDN. Future program development should expand on existing training, extension and communication material to ensure growers, industry advisors, urban communities and government personnel are aware of pest threats and best practices. Improved access to resources will support broader reach, faster knowledge exchange, and stronger long-term participation in surveillance and biosecurity activities supporting the industry's biosecurity efforts.

3. **Further strengthen industry preparedness and build business resilience for exotic citrus pests.**

While the project substantially improved preparedness through updated planning documents and protocols, future programs should maintain and expand these documents as well as work closely with citrus businesses to help them build the knowledge and tools needed to recover from pest incursions.

Priority areas include the completion of host lists for remaining citrus HPPs and the development of pest management guides to help industry identify potential management and surveillance options for citrus HPPs to assist with decision making during an emergency response. To complement these industry level preparedness activities, greater emphasis should also be placed on developing practical business resilience tools that support growers and supply-chain participants to recover rapidly following pest detections or emergency responses. This could include the development of record keeping templates, on-farm surveillance plans, and targeted awareness materials that help businesses maintain continuity during pest incursions. Strengthening preparedness at a business level will complement national response capability and reduce disruption at the farm level.

Refereed scientific publications

Michael L Edwards, Mark J Blacket, Brendan C Rodoni, Jessica C Lye, Francesco Martoni, Assessing collection and trapping methods for diagnostics and surveillance of psyllids (Hemiptera: Psylloidea) in and around citrus orchards, *Journal of Economic Entomology*, 2026; .https://doi.org/10.1093/jee/toag066.

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Intellectual property

No project IP or commercialisation to report.

Acknowledgements

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Appendices

Appendix 1 Summary of targeted surveys undertaken by the program

Over the course of the five-year program targeted surveys were undertaken at 124 locations across Australia. At each location multiple properties were visited and host plants assessed following standardised surveillance procedures that incorporated visual inspections, tap sampling, and the collection of budsticks for diagnostic testing. These locations included commercial orchards and urban and peri-urban centres. A summary is provided in Table 6 and Table 7.

Table 6 *Summary of targeted surveillance activities undertaken in urban and peri-urban areas June 2021-July 2026*

Activity date	**Region**	**Location surveyed**
June 2021-January 2022	Northern Territory	Darwin
June 2021-January 2022	Victoria	Port Phillip St Kilda Botanic Garden University of Melbourne Burnley Campus Port Melbourne Primary School
January 2022-July 2022	Victoria	Port Melbourne Melbourne Zoo Collingwood Children's Farm CERES Environment Park
January 2022-July 2022	South Australia	Adelaide Murray Bridge
January 2022-July 2022	Northern Territory	Darwin
July 2022 – January 2023	Northern Territory	Darwin region
July 2022 – January 2023	New South Wales	Darling Harbour Port Botany Hawkesbury
July 2022 – January 2023	Victoria	Burnley public gardens
January 2023-July 2023	Southern Western Australia	Perth Wannaroo
January 2023-July 2023	Northern Territory	Darwin
July 2023-January 2024	Northern Territory	Darwin Katherine
July 2023-January 2024	North Queensland	Townsville
July 2023-January 2024	Victoria	Melbourne CBD Outer eastern suburbs Yarra Valley

Activity date	Region	Location surveyed
July 2023-January 2024	Regional Victoria	Sites along major transportation corridors in northern Victoria
January 2024-July 2024	Northern Territory	Palmerston Darwin Alice Springs
January 2024-July 2024	Victoria	southeastern suburbs of Melbourne
January 2024-July 2024	Regional Victoria	Sites along major highways between Melbourne and Shepparton Victoria
July 2024-January 2025	Southern Queensland	Sunshine coast
July 2024-January 2025	North Queensland	Walkamin Cairns Innisfail
July 2024-January 2025	Northern Territory	Darwin Middle Point Alice Springs
July 2024-January 2025	Northern Western Australia	Kununurra
July 2024-January 2025	Southern Western Australia	Perth Swan River
January 2025-July 2025	Northern Territory	Katherine Darwin Jingili East Arm Humpty Doo
January 2025-July 2025	Southern New South Wales	South eastern highlands South Coast
January 2025-July 2025	Victoria	Dandenong Box Hill Glen Waverley
July 2025-January 2026	Northern Territory	Katherine Darwin Jingili Humpty Doo
July 2025-January 2026	North Queensland	Townsville Ayr
July 2025-January 2026	New South Wales	Hyde Park

Activity date	Region	Location surveyed
		Royal Botanic Gardens public gardens
July 2025-January 2026	Victoria	University of Melbourne Melbourne CBD Royal Botanical Gardens
190 January 2026-July 2026	New South Wales	Ryde Redfern Marrickville Rhodes Darlington
January 2026-July 2026	Southern Western Australia	Bayswater Northbridge Mt Lawley Atwell
January 2026-July 2026	North Queensland	Walkamin
January 2026-July 2026	Northern Territory	Middle Point Alice Springs Darwin Botanic Gardens Darwin East Arm Mataranka Katherine
January 2026-July 2026	Northern Western Australia	Broome

Table 6 *Summary of targeted surveillance activities undertaken in commercial orchards June 2021-July 2026*

Activity date	Region	Location surveyed
June 2021-January 2022	Northern Territory	Jingili
June 2021-January 2022	Victoria	Templestowe
January 2022-July 2023	Northern Territory	Lambells Lagoon Bees Creek Acacia Hills Humpty Doo Douglas Daly
July 2022 – January 2023	Northern Territory	Darwin

Activity date	Region	Location surveyed
January 2023-July 2023	Northern Territory	Humpty Doo Katherine Daly River
January 2023-July 2023	North Queensland	Dimbulah
January 2023-July 2023	Northern Western Australia	Kununurra
January 2023-July 2023	Southern Western Australia	Bindoon Busselton Wanerie
July 2023-January 2024	Victoria	Cobram Myrtleford
July 2023-January 2024	Northern Territory	Douglas Daly Greater Darwin Katherine
January 2024-July 2024	Northern Territory	Ti Tree Katherine Ali Curung Bees Creek
July 2024-January 2025	North Queensland	Dimbulah
July 2024-January 2025	Northern Territory	Howard Springs Humpty Doo Ti Tree
January 2025-July 2025	Northern Territory	Katherine Acacia Hills Howard Springs Douglas Daly Ali Curung
January 2025-July 2025	Northern Western Australia	Kununurra region
July 2025-January 2026	Northern Territory	Katherine Howard Springs Ali Curung
January 2026-July 2026	North Queensland	Dimbulah Mareeba
January 2026-July 2026	Northern Territory	Acacia Hills Katherine

Appendix 2 Surveillance data collected by the CitrusWatch program

Data from trapping, blitz and targeted surveillance activities has been uploaded to AUSPest*Check*®. This has resulted in more than 20,700 surveillance records to date covering all production and most major urban areas across mainland Australia (Figure 5).

These surveillance activities have been guided in part by the Citrus Pathway Risk Assessment model developed by Cesar Australia which identified capital cities, northern Queensland and major citrus producing areas as posing higher incursion risk (Figure 6). The model outputs can be viewed at a Statistical Area 2 resolution allowing surveillance staff to accurately target surveillance activity, community engagement and EDN recruitment towards high-risk areas (Figure 7).

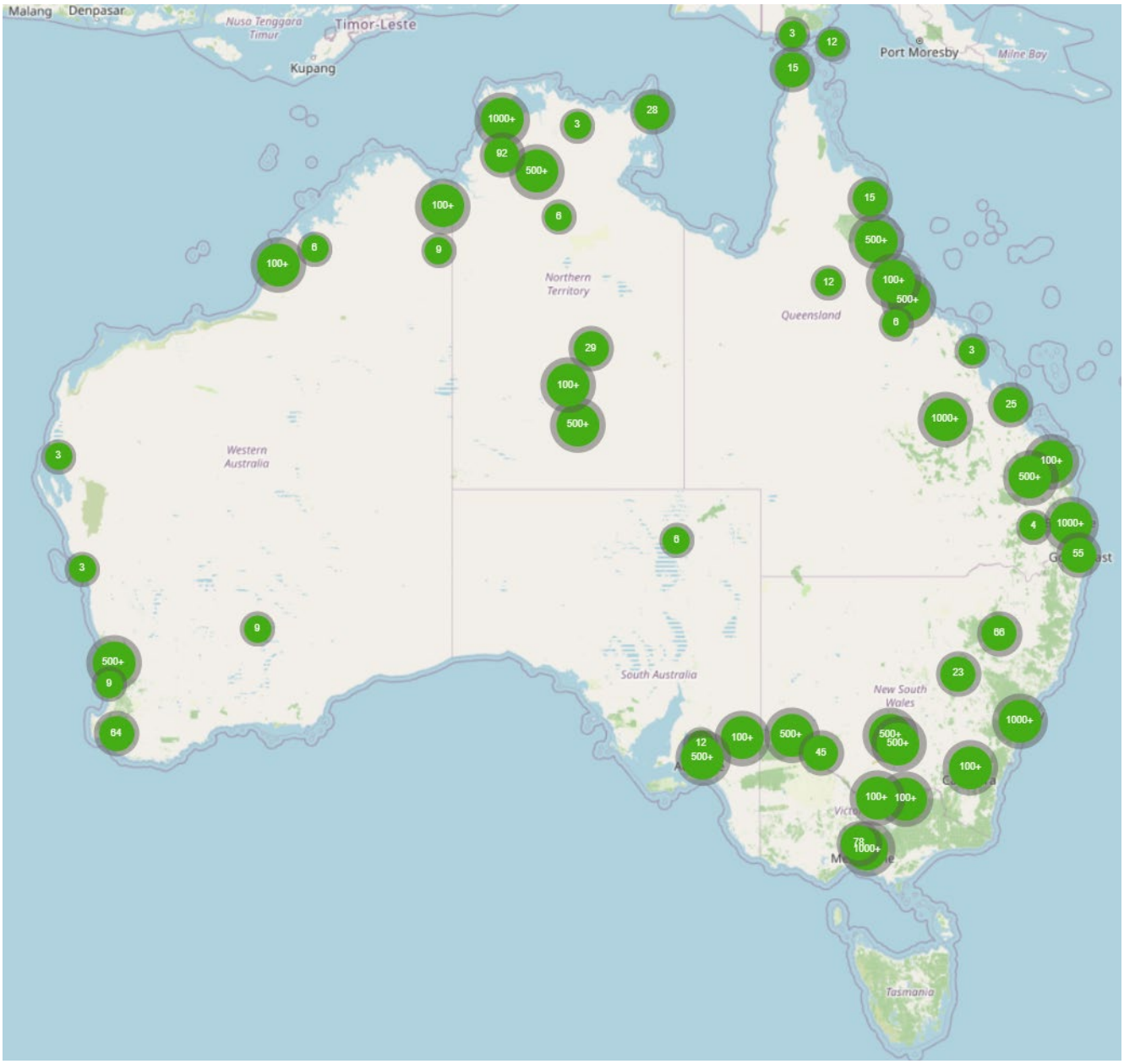

Figure 5 *Snapshot of surveillance records collected by the program*

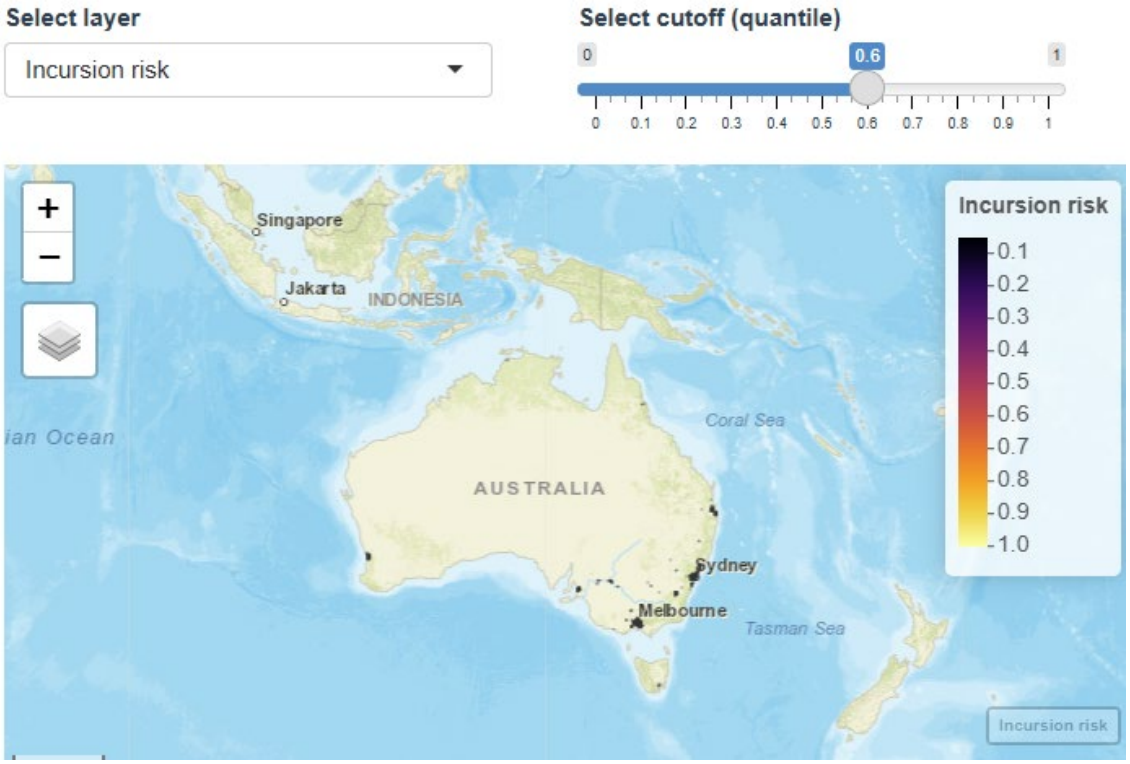

Figure 6 *Snapshot of the Citrus Pathway Risk Assessment model's incursion risk layer highlighting higher risk areas across Australia*

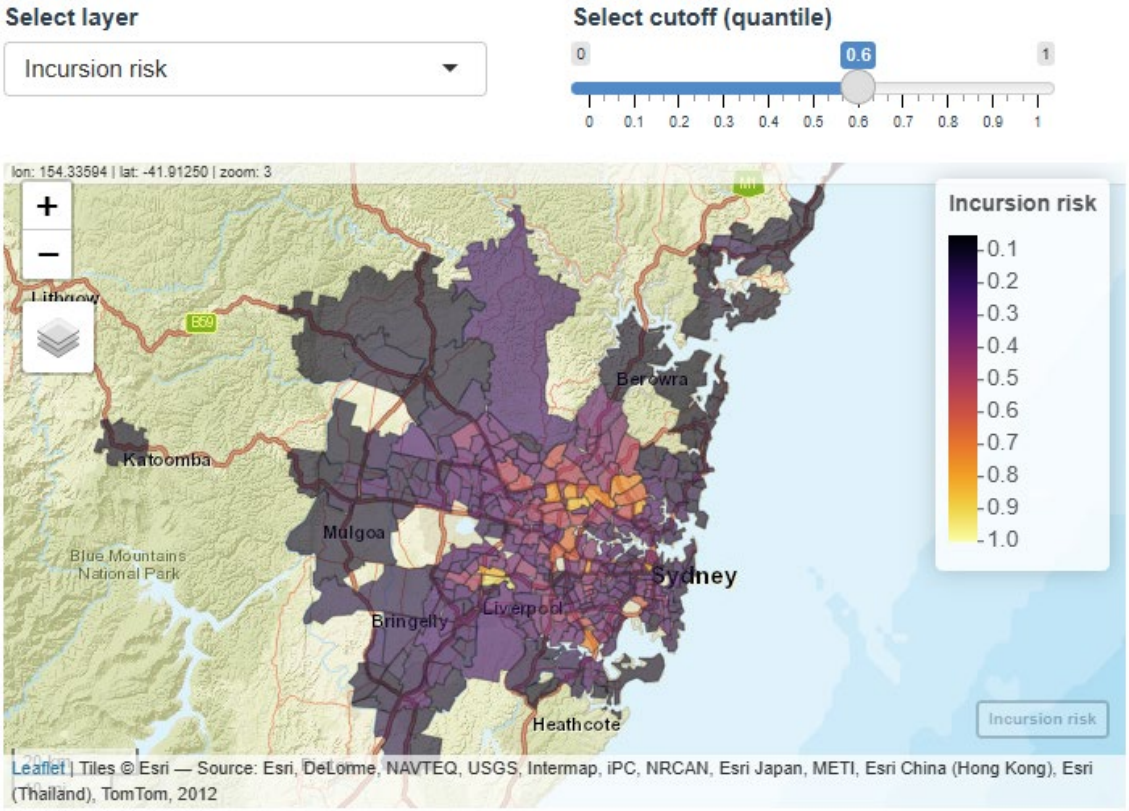

Figure 7 *The Citrus Pathway Risk Assessment model's incursion risk layer presents maps to a Statistical Area 2 resolution to assist in accurately targeting surveillance activity*