



CITRUSWATCH

Protecting Australian Citrus



ANNUAL
ACTIVITY REPORT

2022-23

The background of the page is a photograph of orange trees. The left side shows a close-up of branches with many ripe, orange-colored fruits and green leaves. The right side shows a wider view of an orange grove with rows of trees stretching into the distance under a clear blue sky. The trees are covered in ripe oranges, and the overall scene is bright and sunny.

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Acknowledgments

CitrusWatch is a collaborative, national program that aims to protect the Australian citrus industry from harmful exotic pests. CitrusWatch has been funded by Hort Innovation, using the citrus research and development levy and contributions from the Australian Government. Hort Innovation is the grower owned, not-for-profit research and development corporation for Australian horticulture. Funding is also supplied by Plant Health Australia using the citrus plant health levy. Project partners are Plant Health Australia, Citrus Australia, the Northern Territory Department of Industry Tourism and Trade and Cesar Australia.

The CitrusWatch team gratefully acknowledge the work of the CitrusWatch Steering Committee in guiding this program, as well as our Early Detector Network volunteers, Luke Halling Entomology, Citrus Monitoring Services, CitriCare, and NSW DPI for diagnostic expertise and support through the 'Improving diagnostics and biosecurity for graft-transmissible diseases in citrus (CT17007)' project, as well as members of the Northern Australia Quarantine Strategy, and jurisdictional and federal biosecurity agency staff who have supported program activities.

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Overview

CitrusWatch (2021-2026) is a collaborative, national citrus biosecurity and surveillance program that extends across commercial production zones, to high-density, urban and peri-urban regions. The program commenced in June 2021 and supports an exotic pest early detector network that links the citrus industry with biosecurity agencies, biosecurity programs in other industries, and research and extension programs.

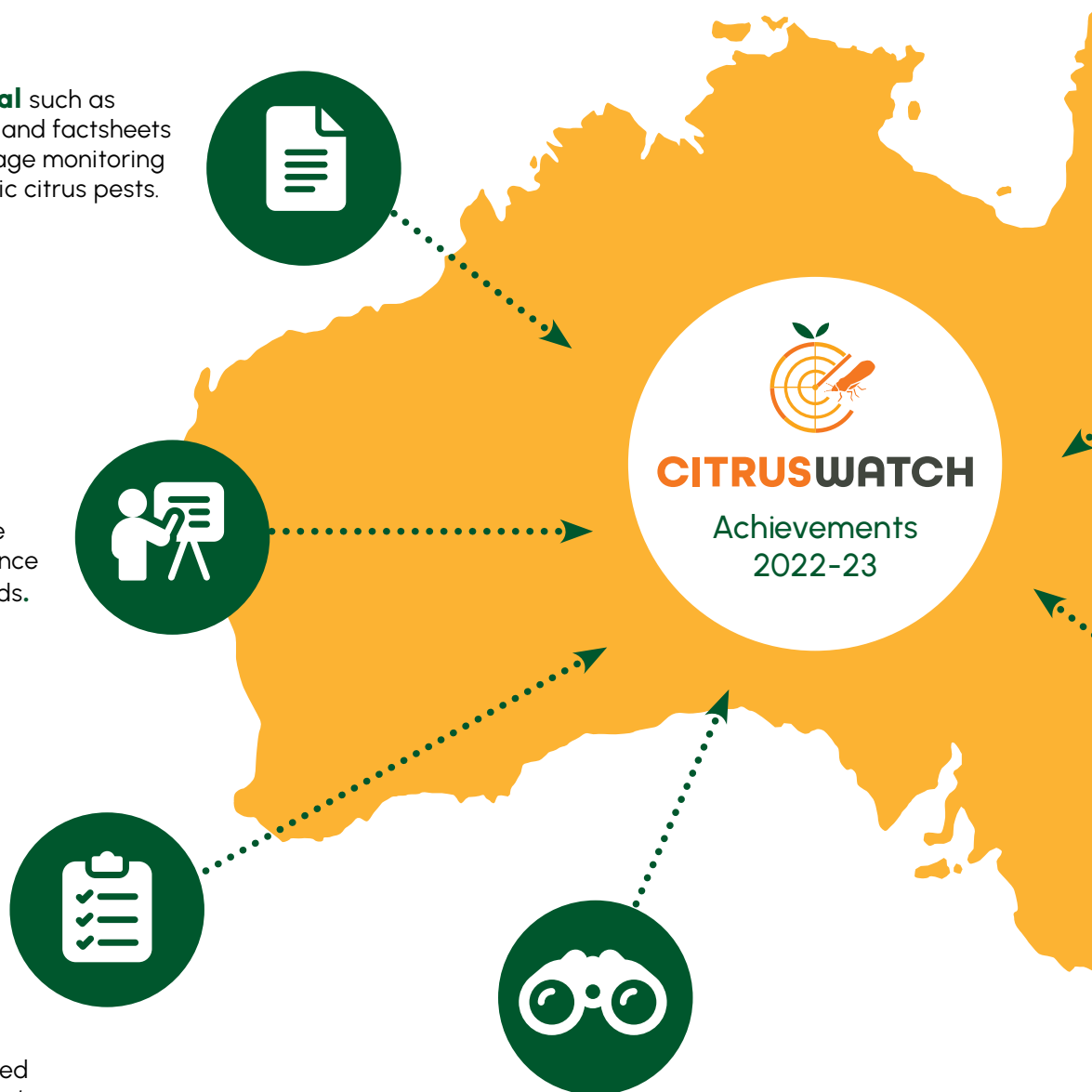
Awareness material such as newsletters, mascots and factsheets developed to encourage monitoring and reporting of exotic citrus pests.

Training course developed to improve nation-wide surveillance for exotic citrus psyllids.

Preparedness documents developed to support the industry's ability to respond to pest threats.

Targeted surveillance undertaken in commercial, urban and peri-urban areas:

- 18 commercial orchards in New South Wales, Northern Territory, Queensland and Western Australia.
- 30 urban and peri-urban locations in Darwin, Melbourne, Perth and Sydney.



Early Detector Network

expanded by 56% to aid in deployment of sticky traps across Australia.



1,252 sticky traps

deployed across mainland Australia for early detection of exotic citrus psyllids.

HIGHLIGHTS 2022-2023

- CitrusWatch Biosecurity Online Training (BOLT) Course developed and circulated to Early Detector Network volunteers and citrus businesses.
- Development of an Exotic Citrus Psyllid Information Guide.
- Hosting of a two-week industry study tour to California and Florida and participation in a study tour to citrus orchards in Indonesia.
- Development of Data Standards to support data collection and development of a rigorous dataset for CitrusWatch surveillance activities. This activity included development of data specifications to ensure consistent data upload to a central database – AUSPestCheck®.
- Deployed over 1,252 Asian citrus psyllid traps nationally across urban and regional areas using a volunteer and collaborator network.
- Five Industry Liaison Officers trained to provide support during a pest incursion.
- Development and in-field testing of an application for data collection during Citrus Australia targeted surveillance.
- Collaboration with the iMapPESTS program to test new technologies for exotic citrus pest surveillance.
- Continued collaboration with the Citrus Pathology Laboratory at the Elizabeth MacArthur Agricultural Institute for screening of budsticks for exotic pathogens.
- Conducted targeted exotic pest surveys across urban, peri-urban, and commercial citrus production areas including areas in Darwin, Sydney, Melbourne, Perth as well as commercial orchards in the Northern Territory, Queensland, New South Wales, and Northern and Southern Western Australia.
- Development and distribution of exotic pest awareness material for urban engagement.
- Update of the industry biosecurity plan, and development of a biosecurity Implementation Plan to support the Citrus Industry Biosecurity Strategy 2023-2038.
- Development of three detailed host lists for high priority pests of citrus.
- Commencement of a PhD on Australian psyllids associated with citrus orchards, through LaTrobe University and Agriculture Victoria Research.

Next Steps

Consolidate the Early Detector Network through continued engagement with volunteers and improve effectiveness of surveillance through introduction of improved technologies, systems and training of trappers.

Completion of a prediction analysis to identify high-risk sites for targeted surveys and completion of surveys across Australia.

Launch of the inaugural Citrus Biosecurity Symposium at the 2024 Australian Citrus Congress.

Hosting of a second biosecurity study tour to California in 2024.

Development of further resources for the citrus industry to improve awareness of exotic species and potential for early detection.

Planning and delivery of a national surveillance blitz involving the collection of budstick samples to test for causal agents of huánglóngbing (HLB) and citrus variegated chlorosis.

Completion of the citrus industry Biosecurity Plan review and publication of the plan.

Planning and holding of pest incursion wargames for citrus industry members and biosecurity agencies.

Completion of additional National Surveillance Protocols for citrus pests.

Completion of additional host lists for high priority pests of citrus.





Background

With 1,500 businesses directly involved in citrus production, and many associated businesses providing support services to production, harvest and supply, the Australian citrus industry is a crucial contributor to the sustainability of many regional areas and a supplier of high-quality citrus produce and products for both domestic and international markets.

While Australian citrus is free of many significant pests that are found overseas, the introduction of new pest threats is a constant challenge to the biosecurity system. Steadily increasing sea and air freight, and high numbers of incoming air and sea passengers, all play a part in increasing the risk of introducing new pests. In 2021, a report by the Auditor General estimated that approximately 38,000 people entered Australia with undetected high risk biosecurity material in the first nine months of 2020. In 2017, citrus made up 5.5 percent of biosecurity risk material intercepted at the Australian border.

The emergence of new pest threats is becoming a frequent occurrence, with expanding global species distributions resulting from increasing trade, growing development of insecticide resistance, changing regional climates, and continuing limitations on pesticide usage. These factors, coupled with new trade pathways, make it increasingly difficult for biosecurity professionals to accurately predict entry risks, establishment, spread, and impact of pest threats.

In this Annual Activity Report, the term pest covers all pathogens (diseases), mites and insects that adversely impact citrus. Exotic pests are those not currently present in Australia. Established pests are those currently present in Australia.

CitrusWatch

The Australian citrus industry is a horticultural industry leader in biosecurity preparedness and response, supported over the last ten years by several projects funded by Hort Innovation¹ and through the citrus Plant Health Australia (PHA) levy.

In recognition of biosecurity threats such as HLB, and building on previous biosecurity projects, a new five-year (2021-2026) biosecurity program, CitrusWatch was launched. This program is funded by Hort Innovation through the citrus R&D levy, in partnership with Citrus Australia and PHA using the citrus plant health levy. The program is led by PHA, with Citrus Australia, the Northern Territory Department of Industry Tourism and Trade (NT DITT) and research group Cesar Australia, providing surveillance, communication, and research support.

CitrusWatch is a collaborative, national program that extends across commercial production zones, to high-density, high-risk, high traffic urban and peri-urban regions. The program activities support an exotic pest Early Detector Network (EDN) undertaking surveillance (exotic pest monitoring) both within the industry and throughout urban and regional communities. It links with biosecurity agencies, biosecurity programs in other industries, and research and extension programs.

The program aims to ensure that the Australian citrus industry is better equipped to minimise the establishment and spread of high priority pests, such as Asian citrus psyllid, African citrus psyllid, and diseases such as HLB.

In the first year of the program CitrusWatch activities focussed on setting up the program for success, by developing surveillance protocols, data storage methodology, prioritisation of industry preparedness activities, and attracting volunteers to the EDN. The second year of the program has had an increase in activities related to education, raising awareness, and expanding the EDN. During the second year of the program the CitrusWatch team have been focussing on:

- Prioritising further preparedness activities, with support from the Citrus Pest & Disease Prevention Committee (CPDPC).
- Completing targeted surveillance activities across commercial citrus orchards, peri-urban, and urban locations.
- Continuing the deployment of 1,252 yellow sticky traps annually across northern and southern Australia, data uploaded to AUSPestCheck®.
- Reviewing and updating the Citrus Industry Biosecurity Plan including development of a Biosecurity Implementation Plan in line with the Citrus Industry Biosecurity Strategy.
- Developing draft National Surveillance Protocols for Asian citrus psyllid and HLB.
- Filling gaps in the Early Detector Network (EDN) to ensure that high risk locations receive appropriate sticky trapping.
- Increasing the level of communication to EDN volunteers to evolve the network into an educational platform, improve volunteer retention and increase the number of deployed traps that are collected and sent to diagnostics.
- Exploring options for sharing of surveillance data with other organisations for surveillance planning and market access purposes.
- Developing detailed host lists for three citrus high priority pests.
- Increasing the number of industry participants that have been trained to work in an Emergency Response as surveillance personnel and Industry Liaison Officers.
- Forming connections with citrus industry participants overseas to strengthen our access to good quality pest information and create opportunities for collaboration.
- Creating opportunities for citrus industry participants to improve their knowledge of exotic pests and diseases through study tours and development of online educational resources.

CITRUSWATCH'S VISION

The Australian citrus industry remains free of harmful exotic pests, retains access to key markets through provision of robust surveillance data, and long-term industry health is supported by the actions of informed, aware, and engaged industry members and general public.

Governance and collaboration

The Citrus Pest and Disease Prevention Committee (CPDPC), and a representative from Hort Innovation, function as the Steering Group for CitrusWatch. The Steering Group oversees the program direction and progress. A list of CPDPC members can be viewed on the Citrus Australia website at <https://citrusaustralia.com.au/about/our-committees/>.

Eighteen CPDPC meetings have been held as of July 2023, with five of those held in the second year of the program. During these meetings the CPDPC discussed:

- Developing the Biosecurity Plan.
- Developing the Citrus Industry Biosecurity Strategy (<https://citrusaustralia.com.au/biosecurity-strategy/>)
- Developing the industry Biosecurity Implementation Plan.
- Updating the industry Owner Reimbursement Costs (ORC) framework to guide how reimbursements are calculated during a pest incursion response.
- Training that currently exists within the industry and who should be encouraged to complete training.
- Developing a citrus nursery stock standard and traceability scheme.
- Auscitrus and NSW DPI that partner on a project to reduce citrus smuggling into Australia and has enabled exploration of the factors contributing to smuggling⁴.
- Riverina IPM, Citricare, Citrus Monitoring Services, and Luke Halling entomology have supported the program through seasonal deployment and screening of sticky traps.
- Agriculture Victoria Research has launched a citrus biosecurity PhD project and training of CitrusWatch officers in psyllid identification⁵.
- The Northern Australian Quarantine Strategy (NAQS) in the Department of Agriculture, Fisheries and Forestry (DAFF) is undertaking surveillance for citrus pests across the northern Australia coastline, with an expanded focus on Asian citrus psyllid trapping in the Torres Strait.
- Australian state and territory government entomology departments provide diagnostics for suspect samples of exotic pests.
- The Citrus Pest and Disease Prevention Committee is comprised of representatives from Queensland Department of Agriculture and Fisheries, NSW DPI, Auscitrus, Citrus Australia, Hort Innovation, PHA, Golden Grove Citrus, Pyap Produce, Agreva, WA Citrus, and Cottrell Farms.
- Citrus Australia and AgKonec have collaborated to develop a field surveillance app for targeted surveys. The app has now been integrated into CitrusWatch activities.

Partnerships

During the second year of operation the CitrusWatch program has been supported by the following collaborators:

- New South Wales Department of Primary Industries (NSW DPI) and the Universitas Gadjah Mada in Indonesia, partner on a project² that supports HLB preparedness activities for Australia, and improved HLB management in Indonesia.
- NSW DPI's citrus pathology team at the Elizabeth McArthur Agricultural Institute (EMAI) that provides valuable advice and disease testing of budsticks that are collected during CitrusWatch surveillance activities³.

² The project 'Preparedness and management of huánglóngbīng (Citrus greening disease) to safeguard the future of citrus industry in Australia, China and Indonesia' is led by NSW DPI and is funded by the Australian Centre of International Agricultural Research (ACIAR) and Hort Innovation.

³ The project 'Improving diagnostics and biosecurity for graft-transmissible diseases in citrus' is led by NSW DPI and funded by Hort Innovation.

⁴ The project 'Reducing the risk of illegally imported citrus budwood' is led by Auscitrus and is funded by Hort Innovation.

⁵ The PhD project 'Native psyllids associated with citrus orchards in Australia' is funded by Agriculture Victoria Research, Plant Health Australia, and Citrus Australia.

Surveillance



While Australian pre-border surveillance activities are stringent, not all pests are intercepted, and some will survive transportation, thrive in a new environment and spread.

Successful containment or eradication of new incursions strongly relies on early detection when the pest population is small, confined and not well established. One of CitrusWatch's major aims is the design and execution of surveillance activities for early detection of exotic citrus pests that may have managed to elude pre-border and border detection activities. This includes priority exotic pests identified in the Australian Citrus Industry Biosecurity Plan. Over 20 species have been identified with threat levels of High or Extreme and six of them are key targets of the surveillance activities.

Key pests and diseases are targeted using a range of CitrusWatch surveillance activities. These pests include citrus canker, HLB, exotic citrus psyllids, and the glassy-winged sharpshooter (a vector of the pathogen *Xylella fastidiosa* – causal agent of Citrus variegated chlorosis).

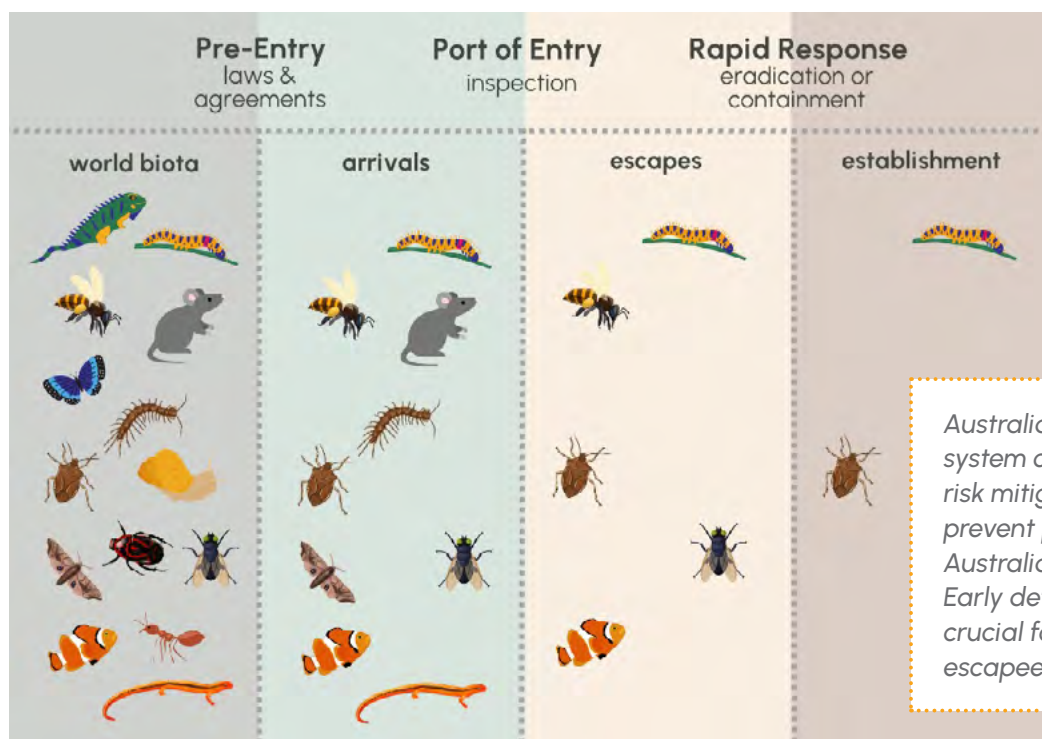
Early detector network

Public reporting has proven to be a valuable safeguard against pest establishment. Citrus, and hosts of citrus pests such as orange jessamine (*Murraya paniculata*), are grown

in backyards, on balconies and as landscape plantings across Australia. Urban environments therefore represent a particular risk for exotic citrus pest entry and establishment, but they also provide an opportunity by reaching out to the public to extend the reach of CitrusWatch. As the team have raised awareness of the program, interest in contributing to insect sticky trapping (EDN) activities has grown. CitrusWatch has developed an opt-in avenue via an online form (<https://citrusaustralia.com.au/about/advocacy/biosecurity-policy/early-detector-network-form/>) with volunteers receiving a trapping kit up to twice a year. As of June 2023, EDN operations had over 235 individuals and organisations involved in the sticky trap deployment across the country. In 2022-23 volunteers deployed 1,252 traps across Australia.

Thanks to EDN volunteers, the program has deployed traps across Australia in residential gardens, commercial premises, school and community gardens, nurseries, research stations, citrus orchards, municipal facilities, zoos, wildlife parks, and public parks and gardens. Volunteers include teachers, students, waste transfer station staff, community garden co-ordinators, citrus growers, industry development officers, government staff (local, state, and federal), crop scouts, and home gardeners.

Traps have been deployed across Alice Springs, Atherton, Brisbane, Cairns, Darwin, Douglas-Daly, Dimbulah, Emerald, Greater Adelaide, Greater



Melbourne, Greater Sydney, Goulburn Valley, Innisfail, Katherine, Kununurra, Mareeba, Mission Beach, Mundubbera, Nhulunbuy, Palmerston, Perth, Riverina, Riverland, Sunraysia, Tenant Creek and, Townsville. In the second year, trap return rates remained between 60 – 80% depending on the region. Trap return rates declined in the southern region during autumn 2023, in comparison to spring 2022. In part this can be attributed to the high number of new volunteers in the program and the need to provide a higher level of communication aside from the usual trapping season email updates. Program work will continue to build support and increase the return rate of traps.

Pest surveys are also carried out by NAQS in the Torres Strait, and by state and territory governments through the National Plant Health Survey. CitrusWatch's early detection surveillance complements these ongoing exotic pest surveillance programs conducted nation-wide.

Targeted surveys

Targeted surveillance is one of CitrusWatch's key activities and includes the high intensity surveying of citrus trees, and other Rutaceous species, for evidence of exotic citrus pests over a defined period. Choosing sites for targeted surveys has involved a review of global early detection scenarios to identify where early detections of high priority exotic citrus species are often made. This has included the development of selection criteria such as proximity to a major port of entry, sites with high visitor volumes, organisations that have an education role in the community and areas with citrus.

The program continues to receive strong support from many businesses, community groups and schools and has continued maintaining as well as building new networks of survey sites visited each year. Surveys involve setting up sticky traps, visually assessing citrus trees, performing tap sampling (a method of tapping citrus branches and catching falling insects on a whiteboard for inspection) and taking budstick samples for disease testing. Interest at the survey sites has been high, with people commonly keen to learn about the program and provide support by collecting and mailing the sticky traps to entomologists.

Southern Australia

In Southern Australia, targeted surveys conducted during the 2022–2023 financial year. This included surveys of urban and peri-urban areas of greater Sydney (15 sites across the

THE EDN IN YEAR 2:

- 1,252 sticky traps with Asian citrus psyllid lures deployed in 20 regions.
- There has been an increase in volunteer numbers since Autumn 2021 – with now over 235 individuals and organisations across Australia involved in the EDN.
- There is now a broader geographic distribution of volunteers across Australia.
- There is a greater number of volunteers located in major Port of Entry cities, such as Brisbane, Sydney, and Melbourne, giving the EDN a stronger presence in urban areas as well as production areas.
- Overall, trap return rates have improved since the outset of the program, which means there is a greater chance of traps being deployed on receipt, collected and mailed to entomologists (38% in Autumn 2021 vs. 59% in Spring 2022). However, there remains room to improve return rates.
- Quality of data is improving (e.g. coordinates accurately recorded, appropriate host and site descriptions, correct use of MyPestGuide Reporter™ app).

Darling Harbour, Port Botany and Hawkesbury regions including community gardens and small citrus orchards during October 2023), urban and production sites around Perth (7 sites across the Perth CBD and peri-urban citrus farms). Future targeted surveys planned include Southeast Queensland, as well as Swan Valley in Western Australia, and the Yarra Valley in Victoria.

Targeted surveys in Southern Australia continue to be conducted at tourism sites near major ports, such as zoos, botanical gardens, and historic estates. In year 2, surveys have had a higher focus on peri-urban agritourism regions that have a concentration of you-pick and café orchards. In the first year of the program waste transfer stations were investigated as surveillance sites, as they often have large green waste piles that stay warm throughout the year, providing a refuge for overwintering insects. The program now has relationships with one to two waste transfer

stations in each major city of Southern Australia, which act as sticky trapping sites each autumn and spring.

Northern Australia

In Northern Australia, targeted surveys were conducted at several commercial orchards. These orchards are located in Humpty Doo, Katherine, Daly River (Northern Territory), Kununurra (Western Australia), and Dimbulah (Queensland). Orchards constituted trees of Kaffir lime, lemon, lime, pomelo, and grapefruit. Trees were inspected for exotic citrus pests and a number of budsticks were collected from each site to assess for graft transmissible pathogens.

A new form for the government software tool 'MAX' (Maximum Disease and Pest Management) has been developed by the NT DITT for efficient data collection and management. This was trialled in the field during orchard inspections and continues to undergo refinement prior to going live.

Surveillance tools and models

To aid in targeted surveys, Citrus Australia has worked with AgKonect to develop an application for data capture and future survey planning.

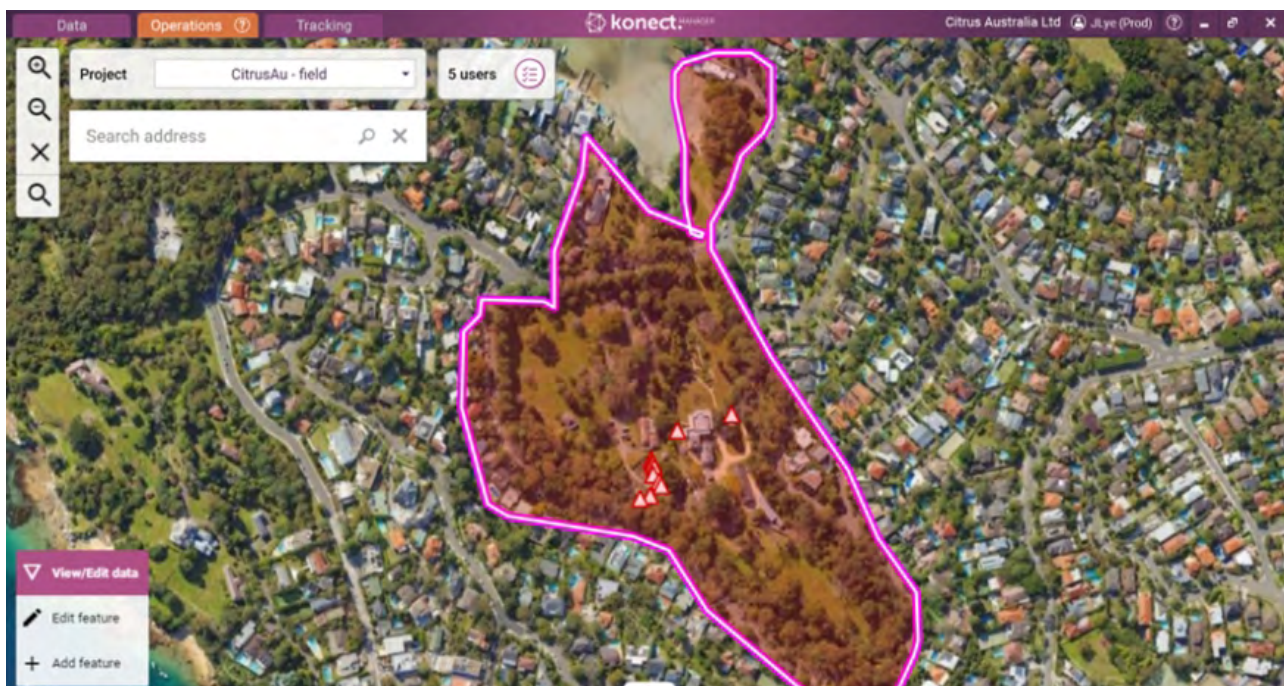
This application has been tested in the field and is now integrated into normal Citrus Australia targeted survey operations.

An entry risk map for Asian citrus psyllid (ACP) is being developed by Cesar Australia using high-risk pathway, biotic and abiotic suitability data. Once completed in early 2024, this prediction map will allow surveillance to be better targeted and resources more efficiently deployed.

SUMMARY OF TARGETED SURVEYS:

- 18 citrus orchards surveyed (including 5 in Northern Territory, 1 in Queensland, 5 in Western Australia and 7 in New South Wales).
- 30 urban and peri-urban locations surveys (including sites in Darwin, Sydney, Melbourne, and Perth)
- 103 budstick samples collected.
- 250+ trees surveyed across Australia.

The new field surveillance app was developed by AgKonect during the 22-23 financial year and is now used by Citrus Australia for CitrusWatch surveillance operations



Education and awareness raising





Tour participants visited the Citrus Clonal Protection Program in Riverside, California, to learn about the benefits of having an industry standard for use of disease tested nursery stock

EDN and urban communities

This year, the program focussed on increasing its level of engagement with EDN volunteers and to evolve the network into a community and source of education. Several activities were undertaken through the 2023-2024 financial year to boost engagement, including continued distribution of trapping updates and the release of the first EDN newsletter.

In general, engagement with urban community groups has increased. In this period the focus was on forming relationships with local government councils, schools, community groups and attendance at a range of agricultural shows and events. Attendance and stands at these events, together with attractive collateral have in turn resulted in recruitment of additional EDN volunteers and improved awareness of exotic citrus pests. Similarly, collaborating with state and territory government departments and councils to publish CitrusWatch information in their e-newsletters has been a great way to raise awareness and recruit volunteers for the EDN.

Education and awareness among citrus industry participants

Another major focus during the year was to improve opportunities for industry participants to learn about key exotic pest and disease species. To support this, the program has developed an online CitrusWatch course, which

is housed on the PHA BOLT platform (<https://www.planthealthaustralia.com.au/resources/training/biosecurity-online-training/>). The course is designed to provide training in citrus psyllid surveillance and identification.

The program also hosted the first of several overseas biosecurity study tours. In May 2023, 12 citrus growers, citrus agronomists, entomologists, and citrus industry project managers travelled to California and Florida in the United States (US) for two weeks to find out how much Asian citrus psyllid and HLB have impacted overseas industries, and how to safeguard the Australian citrus industry from this pest-pathogen complex. More specifically, the tour allowed participants to better understand how citrus industries in the US manage these impactful exotic species, to learn how US governments regulate these species, how to detect species in the field, and to gain appreciation of the impact of these pests and diseases overseas.

The Californian leg of the tour was split into three learning areas: production of high health nursery stock; the biology of citrus pest insects and state containment activities; and management of pests within citrus businesses. The group visited United States Department of Agriculture National Clonal Germ Plasm Repository, Citrus Clonal Protection Program, the Centre for Invasive Species, the California Department of Food and Agriculture, a citrus nursery, and a large citrus producer and packer.

The Florida leg of the tour focused on understanding government and industry decisions and actions that have led to Asian citrus psyllid and HLB becoming endemic throughout the state, and what the resulting impact has been at a grower and industry level. During this leg of the tour, the group also spent time in the field learning how to identify the Asian citrus psyllid, and symptoms of HLB and citrus canker. Several citrus growers, the University of Florida, and the Florida Department of Consumer Services hosted the group.

Following the tour, participants contributed by sharing their new knowledge in a variety of ways, including participating in a Citrus Australia Full Bottle podcast episode, development, and distribution of tour reports to fellow industry members, and presenting at grower forums.

General communications

Articles were developed for the Australian Citrus News Magazine on the program structure, the global status of exotic pest spread, and how surveillance is carried out within CitrusWatch.

Through CitrusWatch, updates on nationally important current pest incursions, such as Polyphagous shot hole borer and Varroa mite, have been developed and distributed through the citrus industry communication program.

The CitrusWatch team has attended and presented at several conferences and national meetings, raising awareness of the program with biosecurity personnel and the citrus industry. This has included presenting at the Annual Citrus Australia grower forums in Loxton, Leeton, Mildura, and Gayndah, attending at the Far North Queensland Regional Forum, Kununurra Agricultural Show and the Darwin Caladium Festival. CitrusWatch presentations were also delivered at the Fourth International Congress of Biological Invasions, and the 2023 Annual Diagnostics and Surveillance Workshop (ADSW).

The Citrus Australia biosecurity webpage has been updated with new resources, and will continue to be expanded to become a go-to central resource hub for biosecurity information for citrus producers.

An online course has been developed to support CitrusWatch surveillance activities.

EXOTIC CITRUS PSYLLIDS

Surveillance and identification

The course was supported through the Plant Surveillance Network Australasia-Pacific that is funded by the Department of Agriculture, Fisheries and Forestry.

CitrusWatch has been funded by Hort Innovation, using the citrus research and development levy and contributions from the Australian Government. Hort Innovation is the grower owned, not-for-profit research and development corporation for Australian horticulture. Funding is also supplied by Plant Health Australia using the citrus plant health levy.

Plant Surveillance
Network Australasia-Pacific



Australian Government
Department of Agriculture,
Fisheries and Forestry

Citrus
Australia

Hort
Innovation
Strategic levy investment

CITRUS
FUND

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Partnering Australian Citrus

Incursion preparedness



There are many exotic pests that could affect citrus production if they were to enter and establish in Australia. CitrusWatch is undertaking activities that will help the industry identify and prepare for potential exotic pest threats, improving the chance of eradicating, containing, or managing them.

The Biosecurity Plan for the Citrus Industry identifies and ranks potential exotic pests allowing preparedness efforts to be prioritised. The most significant pest threats are termed High Priority Pests (HPPs). The review of the 2015 Citrus Biosecurity Plan underway including updating host lists, known impacts and the known geographic distribution of each exotic pest. The Biosecurity Plan also includes an extensive Biosecurity Implementation Plan to guide the citrus industry in priority preparedness activities over the next five years.

To help the industry prepare for potential incursions of exotic pests, more detailed host lists have been developed. In addition to Asian citrus psyllid (*Diaphorina citri*), African citrus psyllid (*Trioza erytreae*) and HLB ('*Candidatus Liberibacter asiaticus*') developed last year, host lists for '*Ca. L. africanus*' and '*Ca. L. americanus*',

Mal secco (*Phoma tracheiphila*) as well as draft host lists for Citrus fruit borer (*Citripestis sagittiferella*), and Citrus pyralid (*Cryptoblabes gnidiella*) have been developed this year. This information will assist governments and industry in the event of a pest incursion by identifying the plant hosts that pests can reproduce on as well as plants that may assist in spreading the pest. These lists are intended to help support rapid response to pest incursions by guiding which plants require surveillance or movement controls.

To assist with improving the effectiveness of surveillance, Cesar Australia is developing a risk model for mapping high risk pathways and likelihood of establishment for Asian citrus psyllid in Australia. The likelihood of Asian citrus psyllid establishment can be predicted based on high-risk pathway data and an assessment of biotic and abiotic suitability of Australia for Asian citrus psyllid. High risk pathway data was derived from the Bureau of Infrastructure and Transport Research Economics (BITRE) and included air passengers as well as the distribution of international visitors and returning residents stratified by port of entry across Australia. Draft entry and establishment likelihood maps have been created based on the available data. These will be adjusted over the coming months.

Citrus Australia and PHA also partnered with Agriculture Victoria Research to co-fund a PhD project to assess psyllid diversity in citrus orchards, psyllid microbiome and assess the potential of native psyllids to vector bacterium that can cause HLB. This initiative will further support entomology and biosecurity capability in the citrus industry. The PhD candidate began in March 2023 and will proceed with psyllid surveys across several citrus production regions until the end of 2023.



Michael Edwards - PhD student





Who is in the CitrusWatch team?

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**Hort
Innovation** **CITRUS
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