CITRUSWATCH

Protecting Australian Citrus

ANNUAL ACTIVITY REPORT

2021-22

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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.

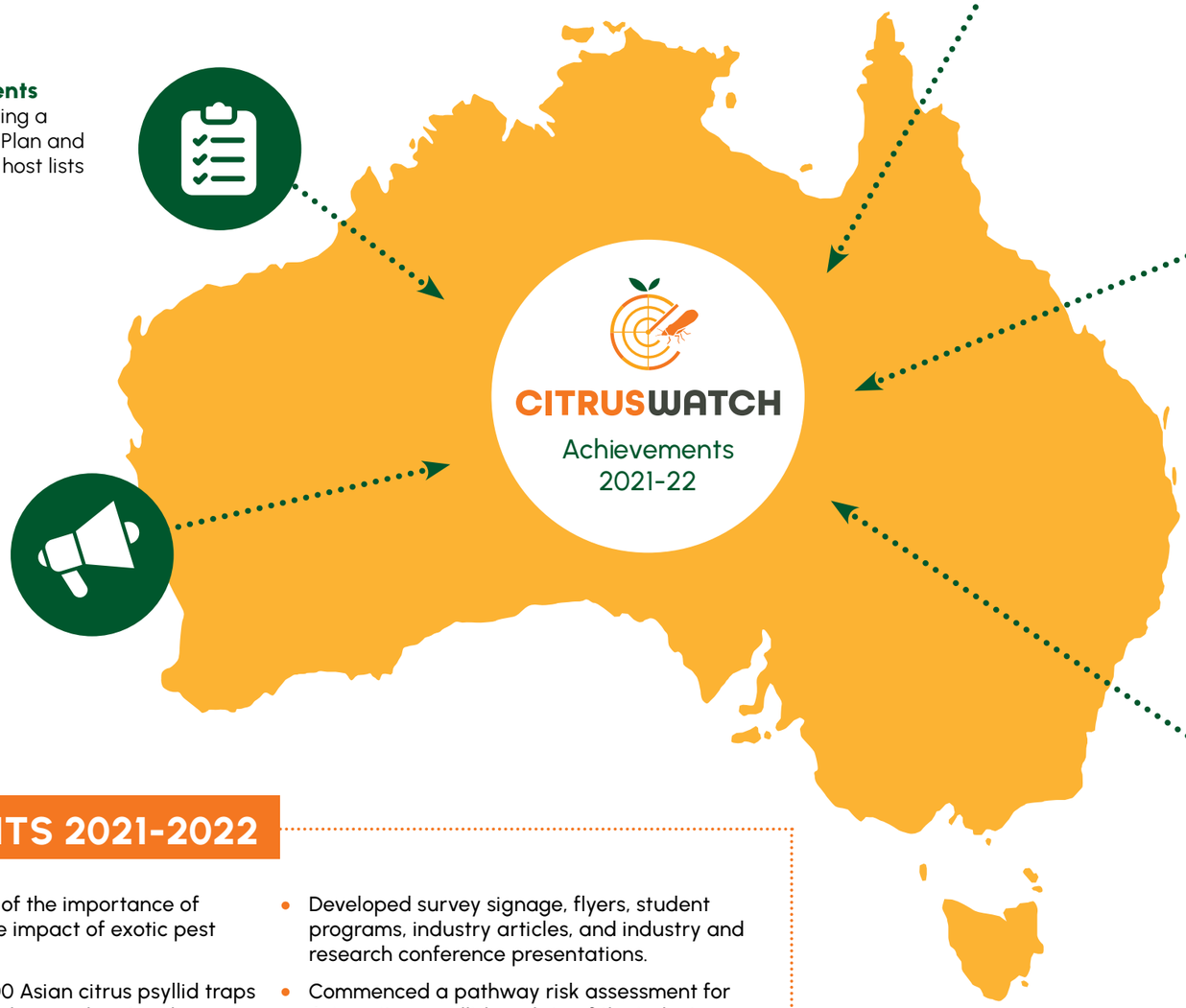
The CitrusWatch team gratefully acknowledge the work of the CitrusWatch Steering Committee in guiding this program, as well as our early detector volunteers, CitrusWA, the Department of Primary Industries and Regional Development, NSW Local Land Services, SuniTAFE, Riverina IPM, Bugs for Bugs, Luke Halling Entomology, Citrus Monitoring Services, CitriCare, and NSW Department of Primary Industries 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 in supporting activities in this project.

Contents

Overview

CitrusWatch (2021-2026) is a collaborative, national citrus biosecurity and surveillance program that extends across commercial production zones, to high-density, high traffic 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.

Preparedness documents
under devlopment including a review of the Biosecurity Plan and development of detailed host lists for High Priority Pests.



Developed communication
material and raised awareness of citrus biosecurtiy and surveillance

Targeted surveillance
- 5 citrus orchards surveyed
- 46 urban site visits across 35 sites
- 404 trees inspections
- 66 budstick samples collected

Developed volunteer
and collaboration networks to support surveillance activities

Deployed 1,000+
Asian citrus psyllid lures and traps throughout Australia

HIGHLIGHTS 2021-2022

- Raised awareness of the importance of biosecurity and the impact of exotic pest threats.
- Deployed over 1,000 Asian citrus psyllid traps nationally across urban and regional areas using a volunteer and collaborator network.
- Conducted five targeted exotic pest surveys across urban and commercial citrus production areas.
- Developed survey signage, flyers, student programs, industry articles, and industry and research conference presentations.
- Commenced a pathway risk assessment for Asian citrus psyllid, update of the industry biosecurity plan, and development of host lists for three priority exotic pests of citrus.

Next Steps

Continued expansion of the Early Detector Network and growth of citrus industry exotic pest surveillance capability through introduction of improved technologies, systems and training of trappers.

Continued identification of high-risk sites for targeted surveys and completion of surveys across Australia.

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

Identification of a PhD student and start of a psyllid research project in partnership with Agriculture Victoria.

Completion of the citrus industry Biosecurity Plan review.

Development of national surveillance protocols for citrus pests.

Completion of high priority pest host lists to assist assessment of risk pathways and inform best movement control options in the case of an incursion.

Background

With 1,500 businesses directly involved in citrus production, and many associated businesses providing support services to its 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 for 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 introduction of new pests. In 2021, a report by the Auditor General estimated that approximately 38,000 people entered Australia with undetected high biosecurity risk material in the first nine months of 2020. In 2017, citrus made up 5.5% 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 the risk of entry, establishment, spread, and impact of pest threats.

For the Australian citrus industry, we only need to look at overseas examples to see the impact of the incursion and establishment of pests such as the exotic citrus psyllid- huánglóngbìng/citrus greening complexes. In Florida, a thriving citrus industry has been decimated following the spread of huánglóngbìng, with a 74% reduction in production since 2005.

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 leading horticultural industry in biosecurity preparedness and response, supported over the last ten years by several projects funded by Hort Innovation[1] and through the citrus Plant Health levy.

In recognition of biosecurity threats such as huánglóngbìng, 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 Plant Health Australia (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.

Citrus Watch 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 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.

Ultimately, 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 huánglóngbìng.

Volunteer trapper, Jeff Milne, setting his trap amongst a stand of *Murraya paniculata* (orange jessamine)

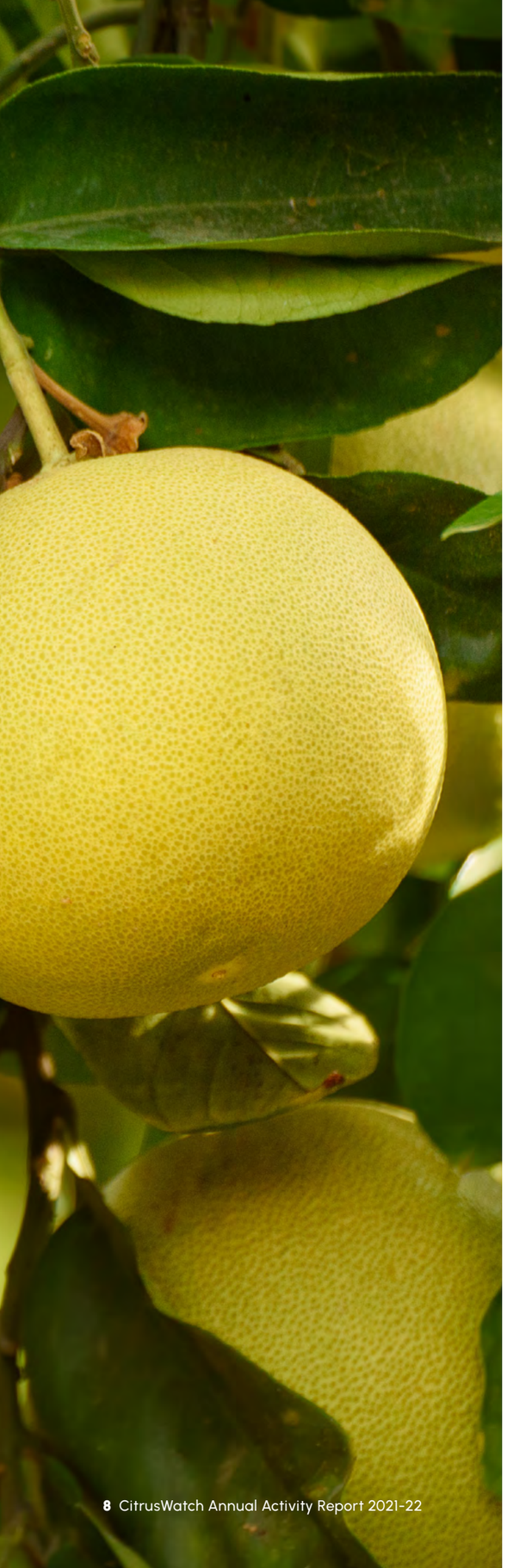
During this first year of the program the CitrusWatch team have been focussing on key foundational activities, including:

- Building the program brand through development of a suite of communication materials;
- Putting in place a steering group to guide and monitor activities;
- Commencing review of the Biosecurity Plan for the Citrus Industry;
- Raising awareness of the program among potential partners and volunteers;
- Expanding the volunteer trapping network and expanding the entomology network associated with the program;
- Developing and testing rigorous surveillance operating procedures and data guidelines; and
- Updating instructions for volunteer trappers and developing a method of trap tracking.

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.

[1] *These include the following Hort Innovation projects: Protecting Australia's citrus industry from biosecurity threats (CT12022) and Improving diagnostics and biosecurity for graft-transmissible diseases in citrus (CT17007)*



Governance and collaboration

During the first year of the project team members focussed on setting up supporting mechanisms critical for the success of the program, including formation of an oversight committee and developing key collaborations.

The Citrus Pest and Disease Prevention Committee (CPDPC), and a representative from Hort Innovation, act as the Steering Group for CitrusWatch. It plays a role in overseeing the program direction and progress. A list of CPDPC members can be viewed on the Citrus Australia website at citrusaustralia.com.au/about-us/our-committees

During the first year of operation the CitrusWatch team have established the following partnerships:

- New South Wales Department of Primary Industries and the Universitas Gadjah Mada in Indonesia to test improved methods of monitoring for Asian citrus psyllid and to run a training campaign about huánglóngbìng preparedness for Australian citrus growers.
- New South Wales Department of Primary Industries project 'Improving diagnostics and biosecurity for graft-transmissible diseases in citrus', to provides valuable advice and disease testing of budsticks collected during CitrusWatch surveillance activities.
- WACitrus and the WA Department of Primary Industries and Regional Development to expand the trapping network and provide diagnostics in Western Australia.
- Riverina IPM, Citricare, Citrus Monitoring Services, Luke Halling Entomology, and Bugs For Bugs to provide diagnostic services.
- The Northern Australian Quarantine Strategy (NAQS) in the Department of Agriculture and Fisheries, to undertake surveillance for citrus pests across the northern Australia coastline, with an expanded focus on Asian citrus psyllid trapping in the Torres Strait.
- State and territory government departments for supporting diagnostics of any suspect samples of exotic pests.

Surveillance

While Australian pre-border surveillance activities are stringent, not all new pests are intercepted, and some will survive transportation, thrive in the new environment and then spread. Successful containment or eradication of new incursions is strongly reliant on early detection when the pest population is small, confined and not well established. A major aim of the CitrusWatch program is the design and execution of surveillance activities for early detection of exotic citrus pest species that have managed to elude pre-border detection activities.

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

Early detector network

Reporting from the public 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 general public to extend the reach of CitrusWatch. As the team have raised awareness of the program, interest in contributing to insect sticky trapping (early detector network) activities has grown. CitrusWatch has developed an 'opt in' avenue via an online form (**citrusaustralia.com.au/biosecurity/earlydetectornetworkform**), with volunteers receiving a trapping kit one to two times each year. As of July 2022, Early Detector Network operations had over 150 individuals and organisations involved in the sticky trap deployment across the country.

Thanks to Early Detector Network volunteers, the program has deployed traps across Australia in residential gardens, commercial premises, school and community gardens, research stations and citrus orchards. Volunteers include teachers, students, waste transfer station staff, citrus growers, industry development officers, government staff (local, state and federal), crop scouts, and home gardeners.

Deployment of traps has occurred across Alice Springs, Darwin, Katherine, Nhulunbuy, Tenant Creek; Kununurra, Cairns, Innisfail, Mareeba, Townsville, Greater Melbourne, Sunraysia, Brisbane, Perth, Greater Adelaide, Greater Sydney, the Goulburn Valley, the Riverland, the Riverina, and Mundubbera (with trapping also carried out by the Northern Australian Quarantine Strategy (NAQS) in the Torres Strait).

Of traps deployed in the first year, 60-80% have made it to entomologists who are working with the program to look for suspect exotic pests. Work will continue in the program to build support and increase the return rate of these traps.

Early Detector Network progress to date:

- 1019 sticky traps with Asian citrus psyllid lures deployed in 20 regions
- 200+ volunteer trappers (this includes individuals and organisations)

Trap signage.

Waste transfer station where traps were deployed.

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 species over a defined time period (these are termed 'targeted surveys'). 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 has received strong support from many businesses, community groups and schools and has begun building a network of survey sites that will be 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.

Sites have been set up in Melbourne (two surveys), Adelaide (one survey), Darwin/Greater Darwin (one survey) and Katherine (one survey) and include café gardens, high school and primary school farms and gardens, community gardens, retail plant nurseries, urban community farms, botanic gardens, research stations, historic houses and a zoo.

Waste transfer stations are being investigated as ideal sites for targeted surveys as they often have large green waste piles that stay warm throughout the year, providing a refuge for overwintering insects.

In Southern Australia, the first targeted survey was undertaken in December 2022 near the Port of Melbourne and in the outer east of Melbourne, close to the entry to the Yarra Valley.

In April 2022 this survey loop was repeated, with more sites including the Melbourne Zoo, which maintains a citrus nursery for husbandry of (Papilio sp.) caterpillars, the Collingwood Children's Farm, which maintains a small citrus orchard, and CERES Environment Park, which runs a retail plant nursery adjacent to a community garden.

During May 2022, surveys were conducted in South Australia in Murray Bridge, Greater Adelaide, and the Adelaide CBD.

In Northern Australia targeted surveys were carried out with the assistance of Northern Territory Plant Biosecurity Officers to ensure that all accessible commercial growing regions in the Northern Territory were covered. Regions included Acacia Hills, Bees Creek, Lambell's Lagoon, Humpty Doo, and Douglas Daly/Katherine.

Visual inspections for high priority citrus pests were also conducted in three urban/peri-urban communities in the Northern Territory. Areas chosen were in close proximity to points of entry (Darwin Airport and Fort Hill Wharf), or in citrus growing regions and contained citrus and other rutaceous plants. Community and tourist sites likely to have high foot traffic were selected as well as community garden sites in the grounds of Darwin Government House and the George Brown Darwin Botanic gardens.

A new form for the government software tool 'MAX' (Maximum Disease and Pest Management) is being developed by the NT DITT for efficient data collection and management. This was trialled in the field during orchard inspections.

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

SUMMARY OF TARGETED SURVEYS:

- 5 citrus orchards surveyed
- 46 urban site visits across 35 sites
- 404 trees inspections (approximately 50 trees inspected twice)
- 66 budstick samples collected

Education and awareness raising

The first year of the program has focussed on raising awareness of program activities, engaging with volunteers in the Early Detector Network, and building the foundation for an education component.

Engagement with urban groups

During early 2022, CitrusWatch partnered with the Urban Plant Health Network (UPHN), a national communication program run by Agriculture Victoria. Activities included linking with the UPHN at the International Flower and Garden Show as well as development of a podcast episode of the The Good, The Bad and The Bugly, on the risk that Asian citrus psyllid and Huánglóngbìng poses to the industry. In field awareness activities in Southern Australia have also included community engagement at a horticulture field day and a plant fair, which were held in the Yarra Valley on the outskirts of Melbourne.

In northern Australia, program partners in the Northern Territory Department of Industry, Tourism and Trade engaged with local residents at the Darwin EcoFair.

The surveillance component of the program initiated an education component to develop and trial a pest surveillance lecture series and student practical activity for TAFE and university agricultural science courses. This work was aimed at improving student understanding of the citrus industry, the importance of biosecurity, and how to monitor for pests. CitrusWatch worked with the University of Melbourne and the Box Hill Institute in this trial, and engagement will continue in 2022 to assess their continued involvement with the

CitrusWatch employee, Andie Wong, will work to increase the level of trapping, engagement and education in urban areas around Australia

program, and to encourage other institutes to engage with CitrusWatch. As an early outcome of this work, Citrus Australia has attracted an intern focussed on biosecurity in agriculture.

Citrus Australia and Plant Health Australia also partnered with Agriculture Victoria to co-fund a PhD project to assess the potential of native psyllids to vector bacterium that can cause Huánglóngbìng. This initiative will further support entomology and biosecurity capability in the citrus industry, and work is currently underway to identify a PhD candidate.

In northern Australia, the development and delivery of program awareness material such as program flyers, articles, radio interviews, and trapping updates to Early Detector Network participants has been supported by the NT DITT communications team. Face to face engagement has been important in building relationships, and many meetings and discussions have taken place, particularly with members of community and educational organisations. Staff from James Cook University, Charles Darwin University, Darwin Botanic Gardens and Darwin Government House have participated enthusiastically in surveillance activities and expressed willingness for continued engagement in the program.

In July 2022, CitrusWatch welcomed a new team member, Andie Wong, who will work to increase the level of trapping, engagement and education in urban areas around Australia, further improving chances of early exotic pest detection and reducing the risk of illegal smuggling of citrus material in passenger luggage.

Engagement with industry

Articles have been developed for the Citrus Magazine on the program structure, the global status of exotic pest spread, and how surveillance is carried out within CitrusWatch. With each article, the team will delve deeper into the kinds of exotic species that the industry should be aware of and prepare for. Through CitrusWatch, updates on nationally important current pest incursions, Polyphagous shot hole borer and Varroa mite, have been developed and distributed through the citrus industry communication program.

The CitrusWatch team have attended and spoken at several conferences and national meetings, raising awareness of the program with biosecurity personnel and the citrus industry.

The Citrus Australia biosecurity webpage has also been updated as resources have been developed, and this webpage will continue to be expanded to become a 'go to' central resource for biosecurity information for citrus producers.

In northern Australia, CitrusWatch has engaged with individuals and organisations such as NT Farmers, grower groups and the Department of Agriculture, Fisheries and Forestry through NAQS to raise awareness of the program, and find opportunities for collaboration and information sharing. Links with NT DITT, the Western Australian Department of Primary Industry and Regional Development and Queensland Department of Agriculture and Fisheries has increased communication reach across northern Australia. Face to face engagement with growers has helped to generate interest and participation in the program, and also provided opportunities to identify priorities and concerns of commercial growers in the north.

The CitrusWatch Survey Information Flyer.

Incursion preparation

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). A review of the 2015 Citrus Biosecurity Plan has commenced including updating host lists, known impacts and the known geographic distribution of each exotic pest. This review will ensure up to date information about pests is available for activities such as identifying and deploying surveillance targets and tools and improving our diagnostic capability.

To help the industry prepare for potential incursions of exotic pests, detailed host lists have been developed for Asian citrus psyllid (*Diaphorina citri*), African citrus psyllid (*Trioza erytreae*) and Huánglóngbìng (*Candidatus* Liberibacter asiaticus). This information will assist governments and industry in the event of a pest incursion by identifying plant hosts 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.

Next steps

- Continued expansion of the Early Detector Network and growth of citrus industry exotic pest surveillance capability through introduction of improved technologies, systems and training of trappers.
- Identification of additional high-risk sites that may be added to targeted surveys, development of relationships with site personnel and completion of additional multi-day targeted surveys in locations across Australia.
- Development of educational resources for the citrus industry that improve awareness of exotic species and potential for early detection.
- Identification of a PhD student and start of a psyllid research project in partnership with Agriculture Victoria.
- Completion of the citrus industry Biosecurity Plan review.
- Development of national surveillance protocols for citrus pests.
- Completion of additional high priority pest host lists (this activity will aid in assessment of risk pathways and gaining an understanding of best movement control options in the case of an incursion).

Want to know more?

For more information contact RBurgess@phau.com.au

Read about CitrusWatch at citrusaustralia.com.au/biosecurity

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