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Exercise Report

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EXERCISE FASTIDIOUS

Hort Innovation Strategic levy investment | NURSERY FUND

Queensland Government

Plant Health AUSTRALIA

ABOUT THE REPORT

The *Exercise Fastidious Report* was authored by Plant Health Australia (PHA) in consultation with the Exercise Planning Committee. The purpose of this report is to provide a summary of activities and a critical analysis of the outcomes and learnings. The information presented was informed by the activity evaluations, debriefings conducted, exercise outputs and the observations of the Exercise Planning Committee.

Any feedback or questions in relation to the report, or the Exercise Fastidious activities and outcomes can be directed to PHA through the details below.

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EXECUTIVE SUMMARY

Xylella fastidiosa is an exotic bacterial plant pathogen that impacts on a wide range of commercial and ornamental plant species. It has the potential to cause significant environmental and economic impacts should it establish in Australia and is number one on the National Priority Plant Pest list[1]. Infection by *Xylella* results in a blockage of the xylem vessels resulting in plants developing severe water stress symptoms. There are at least four subspecies of *X. fastidiosa* (subsp. *fastidiosa*, subsp. *multiplex*, subsp. *pauca* and subsp. *sandyi*) with differing, but overlapping, host ranges.

Xylella is vectored by a range of xylem feeding insects. Like the host ranges, each subspecies of *X. fastidiosa* has a different set of insect vectors. Australia is currently free of all *X. fastidiosa* subspecies and known vectors found overseas.

To improve preparedness for responding to a detection of *X. fastidiosa*, Exercise Fastidious brought together a broad range of relevant stakeholders to investigate aspects of decision making and response strategy development. Under the response scenario where *X. fastidiosa* was detected in production horticulture and nursery settings, across two days of activities participants investigated the feasibility of conducting eradication, together with the development of a response strategy.

Exercise Fastidious identified the following key findings against the objectives:

- The *Technical Feasibility of Eradication Decision Making Support Tool* provided transparency to decision making and identified areas of focus for the response strategy
- Consensus on the destruction and disposal of *Xylella*-infected plants, together with appropriate movement conditions, was reached by participants
- Where no vector has been detected, the assumed level of confidence in the presence, absence, or identity, of a yet undetected vector impacted the intensity of response actions and challenged the ability to agree on a response strategy
- The potential for native or naturalised insects to vector *Xylella* is unknown and challenged the development of the response strategy
- Proving area and property freedom was difficult where the pest can be asymptomatic, has a wide host range and have a reservoir in its vectors

As a direct outcome of the exercise activities, 18 outstanding research questions have been identified. Addressing these questions will support a more effective eradication response should *X. fastidiosa* be detected in Australia.

This simulation exercise was funded by Hort Innovation through its nursery fund (*NY15002 Building the resilience and on-farm biosecurity capacity of the Australian production nursery industry*) and was designed to build on the outcomes of several recent workshops, symposium and projects focused on improving *X. fastidiosa* preparedness.

[1] **www.agriculture.gov.au/pests-diseases-weeds/plant/national-priority-plant-pests-2016**

OVERVIEW OF THE EXERCISE

Aim and objectives

The exercise was planned and delivered to address the aim and objectives in the context of an emergency response to a detection of *X. fastidiosa* in Australia, within the confines of the exercise scope (see below).

Aim: To improve the appreciation of critical determining factors for technical feasibility decision making and effective response strategies implemented for *X. fastidiosa* under the EPPRD framework

Objective 1: Investigate Affected Parties' capability to determine technical feasibility of eradication for *X. fastidiosa* in the absence of a known vector utilising the newly developed technical feasibility of eradication decision making tool

Objective 2: Examine potential strategies for responding to *X. fastidiosa* in a plant production setting and understand the consequent impacts to industry

Objective 3: Increase the understanding of the implementation of relevant agreed-in-principle EPPRD elements relating to complexes[2]

By delivering activities that address the aim and objectives, the exercise also achieved the following outcomes:

- The response preparedness of participating EPPRD Party representatives enhanced
- Research and development opportunities identified around the response strategy, current capability limitations and pest knowledge

In scope:

- Subspecies of the pathogen – particularly for response strategies
- Potential vectoring of *Xylella* by native insects and the resultant impacts on decision making and the response strategy
- Utilisation of the technical feasibility of eradication decision making support tool
- Owner Reimbursement Cost (ORC) elements to the level included in a Response Plan
- Implementation of the agreed in principle EPPRD policy on responding to vector-pathogen complexes

Out of scope:

- ORC considerations beyond those related to the development of the Response Plan for the agreed scenario
- Response operations and elements managed at the Coordination/Control Centre levels
- Cost Sharing elements of the EPPRD

Participating organisations

All PHA members were invited to participate in Exercise Fastidious, as the potential host list of *Xylella* is very wide, with twenty PHA member organisations attending. External organisations also expressed interest in attending the exercise and were invited when participant capacity was not reached from the initial invitations. The participant list included government personnel, peak industry body representatives, growers, pathologists, entomologists, and other individuals from Australia and New Zealand that could provide

[2] Parties to the EPPRD had agreed in principle (in November 2017) to variations to the EPPRD that relate to decision making and cost sharing where a pathogen-vector complex, or part thereof, is detected in Australia and may be considered under the EPPRD framework.

relevant input into discussion (Appendix 1). The broad range of representatives added value to the exercise activities, together with enabling the sharing of knowledge.

Planning

Exercise Fastidious planning was undertaken in a manner consistent with the Biosecurity Emergency Management – Exercise Management Guide[3]. An Exercise Planning Committee provided strategic guidance to PHA, together with input into exercise activities, development of inputs and supported facilitating activities. The Exercise Planning Committee had representation from the following organisations:

- Plant Health Australia
- Nursery and Garden Industry Australia
- Fleming's Nurseries
- Department of Agriculture and Fisheries, Queensland
- Department of Jobs, Precincts and Regions, Victoria
- Department of Agriculture and Water Resources, Australian Government
- Hort Innovation
- Australian Nut Industry Council

[3] **www.agriculture.gov.au/SiteCollectionDocuments/biosecurity/committees-partnerships/nbc/exercise-management-guide.pdf**

Scenario

The scenario for Exercise Fastidious covered the fictional detection of *X. fastidiosa* subsp. *multiplex* in blueberry plants on a farm in Queensland. Trace back from this farm went through a production nursery, also in Queensland, and then onto a range of additional properties.

Only the pathogen was detected, with no evidence of any known exotic vectors.

To investigate different aspects of technical feasibility analysis and response strategy development, the exercise utilised two timepoints in the scenario (Table 1).

Table 1. Summary of scenario elements at the two timepoints utilised in the exercise

TIMEPOINT	STATUS SUMMARY

Day 10	• Detection of *X. fastidiosa* (subspecies unknown) on a blueberry farm
	  ○ Confirmed by PCR testing
	  ○ Quarantine orders placed on the property
	  ○ No detection of exotic vectors
	• Trace back of infected plants to a production nursery
	  ○ No *Xylella* infection symptoms or positive PCR tests returned
	• Trace forward of blueberry plants from the production nursery implicated an additional blueberry farm and a retail nursery
	  ○ No *Xylella* infection symptoms or positive PCR tests returned from any linked properties
	• Trace back of blueberry plants from the production nursery implicated two additional blueberry farms
	  ○ No *Xylella* infection symptoms or positive PCR tests returned from any linked properties

Day 23	• Pathogen identified to the subspecies level: *X. fastidiosa* subsp. *multiplex* • Destruction of blueberry plants in the infected block on the farm with the initial detection completed • Detection of *X. fastidiosa* subsp. *multiplex* in peach trees on the production nursery • Trace back of peach trees from the production nursery implicated two stonefruit orchards ○ One of the source stonefruit orchards found to be significantly infected with *X. fastidiosa* subsp. *multiplex* • A peach tree in residential backyard in close proximity to the production nursery found to be infected with *X. fastidiosa* subsp. *multiplex* • No exotic vectors detected on any property under investigation • Quarantine orders placed on all infected/suspect properties

Delivery

Exercise was delivered as a combination of discussion and functional elements over two days (Table 2), with each day utilising different timepoint in the scenario. All activities were undertaken as table groups with a member of the Exercise Planning Committee facilitating.

Table 2. Overview of activities delivered in Exercise Fastidious

<table>
<tr><th colspan="2">WEDNESDAY 14 NOVEMBER 2018</th></tr>
<tr><td rowspan="2">Morning</td><td>Introduction
Welcome and exercise introduction
Activity: Symptom recognition – determination of which plants are infected in Xylella
Background presentation: Xylella and vectors
Technical Feasibility of Eradication Decision Making Support Tool (TFE tool) introduction
Presentation of the exercise scenario (to day 10 in the response)</td></tr>
<tr><td>Utilisation of the TFE tool for Xylella
Completion of the TFE tool for X. fastidiosa (subspecies unknown) and analysis of the outcomes
Completed using information known at day 10 in the scenario</td></tr>
<tr><td rowspan="3">Afternoon</td><td>National policy relating to complexes
Introduction to pathogen-vector complexes
Agreed-in-principle changes to the EPPRD in relation to complexes</td></tr>
<tr><td>Utilisation of the TFE tool for exotic vectors of Xylella
Completion of the TFE tool for a group of exotic Xylella vectors and analysis of the outcomes
Completed using information known at day 10 in the scenario</td></tr>
<tr><td>Response strategy determination
Development of response objectives
Development of the response strategy utilising the appreciation methodology</td></tr>
<tr><th colspan="2">THURSDAY 15 NOVEMBER 2018</th></tr>
<tr><td rowspan="2">Morning</td><td>Update on day 1 outcomes
Progression of the exercise scenario to day 23 in the response
Review of TFE tool analysis on consideration of updated exercise scenario
Review of response strategies on consideration of updated exercise scenario</td></tr>
<tr><td>Response plan development
Completion of relevant sections of a Response Plan in alignment to the agreed response objectives and strategy</td></tr>
<tr><td rowspan="2">Afternoon</td><td>Response plan development (continued)</td></tr>
<tr><td>Exercise debrief and evaluation
Review of activities and consolidation of learnings
Participant feedback</td></tr>
</table>

EXERCISE OUTCOMES AND FINDINGS

Technical feasibility of eradication considerations

Objective 1	Investigate Affected Parties' capability to determine technical feasibility of eradication for *X. fastidiosa* in the absence of a known vector utilising the newly developed technical feasibility of eradication decision making tool

A critical analysis of factors that contribute to the technical feasibility of eradication under the exercise scenario, at both day 10 and day 23 timepoints, was undertaken by participants using the technical feasibility of eradication decision making support tool (TFE tool). The TFE tool was developed by Biosecurity Queensland as part of a Plant Biosecurity Cooperative Research Centre research project, and it compels users to analyse the pest and situation in a structured manner to improve the consistency and transparency of technical feasibility determinations. Investigation is conducted in the following areas, each with underpinning elements:

- Ability to identify/diagnose the pest
- Ability to detect the pest
- Species biology leaves pest susceptible to eradication
- Current circumstances of infestation leave the pest susceptible to eradication
- Control method effective
- Effective control methods acceptable
- Able to close pest entry pathway

At the conclusion of the exercise, participants recognised the value of using the TFE tool to drive informed decision making on the specific elements in isolation, before coming back to consider the entire picture. As a result, there was strong support for the TFE tool's utilisation to assist in EPP response decision making.

The compiled TFE tool outputs (compilation of the seven group's individual inputs) demonstrated the diversity of responses across most areas listed above. For example, outputs from the pathogen analysis for the day 10 scenario resulted in six of the seven areas showing no consistency across the seven groups. In addition, for the same analysis 25% of the underpinning elements were classified as being an impediment to eradication. Notwithstanding this outcome, participants were still able to agree the response had the potential to be technical feasible as they were able to critically analyse the potential roadblock elements and determine whether they could be overcome as part of the response strategy.

While the TFE tool successfully analysed the situation and pest, together with informing technical feasibility or eradication decision making, the TFE tool was noted as complex and difficult to use in the first instance. This primarily relates to the clarity of the underpinning elements and the guidance provided to users. This situation improved through repeat use and familiarity.

Analysis of the technical feasibility of eradication for *X. fastidiosa* vectors, even though none had been detected in the scenario, was possible. The utilisation of the TFE tool for pests that are not known to be present guided participants as to whether eradication would be feasible should they be detected, and mainly provided insight into the response strategy needs. Completion of the tool for a group of vectors, as was undertaken in the exercise (all known exotic vectors of *X. fastidiosa* were considered as a group), was difficult for participants and suggested to be not as informative as repeating the TFE tool for each vector individually. Participants also noted a potential for modifying the TFE tool to allow the terminology and questions utilised to be targeted to a pathogen or invertebrate pest.

Response strategy

Objective 2	Examine potential strategies for responding to *X. fastidiosa* in a plant production setting and understand the consequent impacts to industry

Key outcomes

The development of a strategy for the eradication of *X. fastidiosa* was a key element of the exercise. This included the determination of the response intent through setting of response objectives and key elements of the response strategy, followed by development of additional detail through drafting a Response Plan. A summary of the response strategy developed by participants is identified in Table 3.

In the development of a detailed response strategy, participants focused on surveillance, movement controls and destruction, disposal and decontamination activities. Participants were able to generate the appropriately detailed response strategy across all of these areas, noting that several challenges were identified through these activities (see *Challenges* on page 11 for details).

Table 3. Agreed response strategy generated as part of the exercise activities[4]

ELEMENT	AGREED POINTS
Objectives	• Determine the extent of the Incident • Determine the role of a vector • Enhance the communication effort • Continue to contain and eradicate, where found • Provide appropriate support to impacted growers
Intent	• Implementation of measures to limit the risk of establishment and spread of *Xylella fastidiosa* and determine presence/absence of vectors
Assumptions	• *Xylella* is not widespread • *Xylella* delimitation is unknown • A vector is present in Australia • Movement of *Xylella* is through traceable material and is possibly vector-mediated

Surveillance, tracing and testing	• Target hosts – All known *Xylella* hosts on property inspected, including crops and other vegetation
	• Sampling and testing
	  o Visual inspection for leaf scorch symptoms
	  o PCR testing of all symptomatic leaves
	  o Where no symptoms present, random leaf sampling of known host species for PCR analysis
	  o PCR analysis of all exotic and native planthoppers, leafhoppers and spittlebugs
	• Surveillance of potential vectors – both established and known exotic
	• Delimitation includes surveillance around Infected Premises (IPs) and Suspect Premises (SPs)
	• Delimitation undertaken where risk material moved in trace forward and trace back
	• Tracing not limited to symptomatic plant species, with resources being put towards tracing all potential host plants from IPs

Destruction	• Destroy infected plants

[4] Additional details on the response strategy were incorporated as part of the Response Plan development session, which is not presented in this report.

ELEMENT	AGREED POINTS
Zoning, quarantine and movement controls	• Quarantine implemented at each IP • Restricted Area (RA) – 5 km radius • Movement controls related to the RA – No movement in/out, or within, of any plants or plant products of all potential host species, farm/orchard machinery and equipment
Vector suppression	• Active spraying of potential vectors on IPs and SPs in a manner that allows for surveillance of sap-sucking insects to be undertaken prior to suppression
Communications and engagement	• Proactive industry and community engagement with key messages identifying the pest and seeking support (e.g. to report symptoms)

Challenges identified

A variety of challenges were identified in responding to a detection of *X. fastidiosa* in a production nursery and production horticulture setting without the detection of a known vector. The following sections articulate the specific areas where challenges were identified in the generation of the response strategy, linked with a list of the identified research needs from the participants that would address the challenges.

Pathogen transmission and vectors

Under the scenario presented, participants identified two potential transmission pathways – an insect vector (native or exotic) or mechanical transmission. No consensus on whether *X. fastidiosa* could potentially be transmitted via mechanical means was reached at the exercise, given that there was conflicting evidence presented in available research papers and expert knowledge. Further, where mechanical transmission was considered a potential, the comparative risk compared to insect vectoring was unknown.

Based on the available information presented in respect of the detection, in developing the response strategy participants made the initial assumption that the pathogen was being transmitted by a native or established insect vector. There is a large variety of planthoppers, leafhoppers and spittlebugs native or established in Australia that have the potential to vector *Xylella*, many of which are not well described. This raised questions around likely spread distances of the pathogen through vector flight, understanding targets for surveillance and control, and potential reservoirs of the pathogen in the environment.

Identified research need 1: Determine the risk and likelihood of the transmission of *Xylella* infection between host plants via mechanical means (e.g. secateurs)

Identified research need 2: Using a risk-based approach, determine the relative priority of tracing potentially contaminated equipment in a response situation relative to undertaking tracing on plant material and insect vectors

Identified research need 3: Determine which Australian and New Zealand native and established insects are likely to have the ability to effectively vector *Xylella*

Identified research need 4: When potential native insect vectors are identified, determine their plant production and environmental host species to inform surveillance and treatment programs

Identified research need 5: When potential native insect vectors are identified, determine the relevant biological aspects for each species that will impact on the potential response strategies (e.g. flight distance, and available chemical controls)

Surveillance and proof of freedom

The delivery of effective surveillance for *Xylella* that results in confidence in pest presence/absence outcomes was a significant challenge for participants. This was largely due to the biology of the bacteria, including the broad host range, the potential for many hosts to be asymptomatic, confusion of symptoms with other pathogen infections and abiotic stress, and an uneven distribution of the bacteria throughout the host. Nonetheless, surveillance, tracing and proof of freedom strategies were developed by participants, noting that there was a lack of surveillance practitioners and biometricians at the exercise.

Participants identified the need for additional pre-emptive work to be conducted on developing robust surveillance frameworks that can be applied in a response situation. These would provide guidance on appropriate sampling strategies, surveillance zone distances, and surveillance prioritisation with and without a vector present. Through the development of these frameworks, statistical analysis of surveillance confidence could be undertaken, allowing the rapid contextualisation when developing a surveillance strategy in a response situation. This framework will also need to consider property and area freedom determination.

The potential contribution of surveillance data by growers and other stakeholders was considered by participants. However, the difficulty in confidently identifying *Xylella* infection via plant symptomology is a significant issue, as demonstrated by abiotic stress and other pathogen symptoms being mis-identified as part of one of the activities. If grower and stakeholder surveillance data was to be used, there is a need for improved support tools to be developed. This includes the development of awareness material that clearly articulates *Xylella*-infection symptoms and how to differentiate them from other disease symptoms or abiotic stresses, together with the availability of easy-to-use in-field tests that can be deployed to growers.

Identified research need 6:	Develop a protocol for sampling host plants that provides confidence in the site presence/absence of *Xylella*, even when the pathogen is not spread systemically throughout the whole plant
Identified research need 7:	Develop a surveillance strategy that articulates required surveillance zones and sampling rates to develop an appropriate level of confidence in a *Xylella* response, with consideration of zone and rate values where different vectors are present or absent
Identified research need 8:	Determine what surveillance and response activities are required to establish property freedom from *Xylella*, where the property is linked with a known IP or located within a risk zone during an emergency response
Identified research need 9:	Develop a surveillance and sampling protocol for asymptomatic plants that provides confidence in *Xylella* absence from a defined site or area
Identified research need 10:	Develop a surveillance and sampling protocol for native insects that could potentially act as a vector that provides confidence in *Xylella* absence from a defined site or area
Identified research need 11:	Develop statistical models for *Xylella* complexes to ensure surveillance rigour and the basis for area freedom claims in areas/states with no prior detections of the pathogen
Identified research need 12:	Develop tools for growers and industry stakeholders that articulate features and triggers to distinguish *Xylella* symptoms from other pathogen and abiotic stress symptoms, for the purpose of specifying when it is appropriate to report
Identified research need 13:	Develop robust and easy-to-use in-field tests for *Xylella*, which can be made available to growers and other stakeholders to enhance confidence in surveillance program data

Other response considerations

To support the development of an informed and effective response strategy, participants identified a lack of documented detailed guidance and learnings from international experiences. The *Contingency plan for Pierce's disease and other diseases caused by Xylella fastidiosa* was developed in November 2016 and was utilised in conjunction with a range of other information available from a range of sources, however the available resources failed to provide specific details for the response strategy across several areas. It was also noted that there is a continued increase in the amount of information about the pathogen and its vectors. Information regarding the response strategies implemented internationally, including articulation of what worked and what didn't, was highlighted as a potential resource to inform response strategy development.

A consistent challenge identified was understanding the likely host list of *Xylella* in the Australian context. This provided challenges to most aspects of the response strategy and was amplified by the significant lack of knowledge around the potential for Australian native and established vector species to host the pathogen. Inconsistencies in published hosts lists for the pathogen were also identified.

Identified research need 14:	Collect, analyse and disseminate the response approaches implemented to *Xylella* detections overseas, including articulation of key lessons and recommendations to improve the likelihood of successful eradication
Identified research need 15:	Generate a trusted and complete host list for *Xylella* that identifies the natural (i.e. not experimental) production and environmental hosts, which is separated by the *Xylella* subspecies
Identified research need 16:	Determine which Australian native plant species can, or are likely to, host *Xylella*
Identified research need 17:	Cross-reference the *Xylella* and known vector host lists to develop a comprehensive complex host list

Complexes under the EPPRD

Objective 3	Increase the understanding of the implementation of relevant agreed-in-principle EPPRD elements relating to complexes

Parties to the EPPRD have agreed that an Incident relating to a complex, comprised of a specific vector and known pathogen, or either part thereof, should be able to be responded to and equitably funded under the EPPRD with certainty, where it is in Australia's interest to be free of the complex. A key point of agreement by the Parties was that where a pathogen or a vector is discovered, and either is part of a potential complex, the response under the EPPRD will initially be as if the complex was present until it is determined by the NMG that the complex is not present. At the time of the exercise, the EPPRD variations to realise this agreement were agreed-in-principle, but not yet formally incorporated in the EPPRD.

To increase awareness of how the agreed-in-principle variations would be implemented, all exercise activities were conducted as if the variations were in place. Given the structure of the exercise, this predominantly related to the identification of Affected Industry Parties for the Incident and the operational considerations when developing the response strategy. A broader demonstration of the variations was provided through a presentation on all relevant aspects by Felicity Andriunas (Manager, EPPRD at PHA).

The use of *X. fastidiosa*, which is not the typical one-to-one pathogen-vector complex, challenged many participants comprehension of the EPPRD principles relating to complexes. There are 17 known vectors of *X. fastidiosa*, and this is increasing as the pathogen establishes in new regions and countries. This was amplified by the evolving specificity of pathogen identification, where the subspecies was unknown until two weeks after the initial detection. Nonetheless, the agreed-in-principle EPPRD variations were implemented appropriately throughout the exercise.

There was some apprehension by participants regarding the equity and value of identifying Industry Parties as Affected solely based on a potential vector where there was no evidence of its presence under the scenario. This situation was accentuated by the response strategy assumptions that the likely vector in the exercise was a native or established insect.

Identified research need 18:	Determine the potentially Affected Industry Parties for all known *Xylella* complexes (subspecies of the pathogen and alternate insect vectors) as a preparedness activity

ADDITIONAL ASPECTS CAPTURED

Participants had the opportunity throughout the exercise to identify issues relevant to *Xylella* preparedness and response without constraint. At times matters raised did not relate directly to the exercise aim/objectives, though were of value to capture and consider further.

These have been collated and revised into the research questions presented in Table 4. PHA notes that there is current research that addresses many of these questions, but in the interest of transparency all ideas captured during the exercise have been represented in this report.

Table 4. Related preparedness and response research questions identified by exercise participants

Response approaches
Investigate the potential of implementing a response strategy that targets an interference with the virulence of the vector, for the purpose of breaking the infection cycle and remove a pathway of transmission
Investigate the potential of using "trap crops" to attract vectors during a response, to allow for more effective and targeted chemical treatments
Investigate the risk profile and likely timeframes for the replanting of susceptible species back into a known infected area following the completion of destruction activities, with consideration of potential pathogen reservoirs, such as native vectors
Determine the requirement for, and the potential length of, a fallow period following destruction of plants in a *Xylella* response
Awareness and symptom expression
Develop information and tools that will improve grower awareness of the *Xylella*, potential plant infection symptoms and exotic vectors
Understand why there is variation in symptom expression levels between different *Xylella*-infected host plant species

Diagnostics
Develop high throughput screens/tests for testing insect vectors for the presence of the *Xylella* pathogen
Ensure there is appropriate positive control material for all vectors and subspecies of *Xylella* available in Australia
Ensure Australian laboratories have the capability to rapidly identify *Xylella* to the subspecies level
Develop a high-throughput diagnostic approach that allows for *Xylella* presence/absence testing in large numbers of plant samples
Undertake full genome sequencing of all known *Xylella* subspecies, to allow for improved identification and tracing outcomes
Native vectors
Understand the current distribution of potential native/endemic vectors of *Xylella* throughout Australia and New Zealand
Reconsider the risk assessments of *Xylella* introduction, establishment and spread in Australia, allowing for the potential for native vectors
Surveillance
Investigate the use of remote sensing technology for the detection of *Xylella* symptoms and potential vector populations (e.g. hyper-spectral cameras and drones or satellite imagery)
Investigate the potential for using image recognition technology for surveillance of exotic vectors
Area freedom
Investigate the potential for utilising sentinel plants to determine area freedom following the application of host destruction approaches in a response
Investigate likely requirements to regain international market access following a successful *Xylella* eradication response

APPENDIX 1: EXERCISE PARTICIPANTS

ORGANISATION	NAME
Australian Capital Territory Government	Jane Carder Luke Bulkeley
Australian Forestry Products Association	Michael Ramsden
Australian Government Department of Agriculture and Water Resources	Brendan Reading Sarah Hilton
Australian Melon Association	Dianne Fullelove
Australian Olive Association	Greg Seymour
Australian Processing Tomatoes Research Council	Chris Taylor Liz Mann
Australian Vignerons	Anna Hooper
AUSVEG	Kevin Clayton-Green Zarmeen Hassan
Azalea Grove Nursery	Ray Doherty
Citrus Australia	Jeff Milne
Cotton Australia	Paul Sloman
CSIRO	Kathryn Fiedler
Department of Agriculture and Fisheries, Queensland	Andrew Manners Charlotte Greer Dean Beasely Hellen Haapakoski Lynda Bauer Mundi Allen Rebecca Laws Rosalie Banks Suzy Perry
Department of Economic Development, Jobs, Transport and Resources[5], Victoria	Brendan Rodoni Dean Harapas John Gilliland
Department of Primary Industries and Regional Development, Western Australia	Sonya Broughton Vincent Lanoiselet
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Department of Primary Industries, Parks, Water and Environment, Tasmania	Alison Dann Peter Cross
Dried Fruits Australia	Jenny Treeby

[5] Now the Department of Jobs, Precincts and Regions

ORGANISATION	NAME
Driscolls	Jenny Moisander Louis Walker
Fleming's Nurseries	Liz Darmody
Hort Innovation	Penny Measham
Horticulture NZ	Leanne Stewart
Ministry of Primary Industries, New Zealand	Carolyn Bleach Wellcome Ho
New South Wales Department of Primary Industries	Satendra Kumar Nerida Donovan Rebekah Pierce
New Zealand Winegrowers	Edwin Massey
Nursery and Garden Industry Australia	Peter Vaughan Karen Brock John McDonald Chris O'Connor Steve Blyth Tony Filippi
Nursery and Garden Industry Queensland	Elaine Duncan
Pistachio Growers Association	Trevor Ranford
Plant Health Australia	Felicity Andriunas Natalie O'Donnell Stephen Dibley[6] Susanna Driessen
Primary Industries and Regions, South Australia	Bonny Vogelzang Ross Meffin

[6] Exercise facilitator

APPENDIX 2: ACRONYMS AND ABBREVIATIONS

ACRONYM	FULL NAME
PHA	Plant Health Australia
EPPRD	Emergency Plant Pest Response Deed
ORC	Owner Reimbursement Costs
PCR	Polymerase Chain Reaction
TFE	Technical Feasibility of Eradication
IP	Infected Premises
SP	Suspect Premises
RA	Restricted Area

All references to the EPPRD, including the use of defined words/terms (capitalised), are a reference to the EPPRD issues 22 August 2018.


Christine Horlock, Department of Agriculture and Fisheries Queensland