Annual Surveillance Workshop 2020 Report
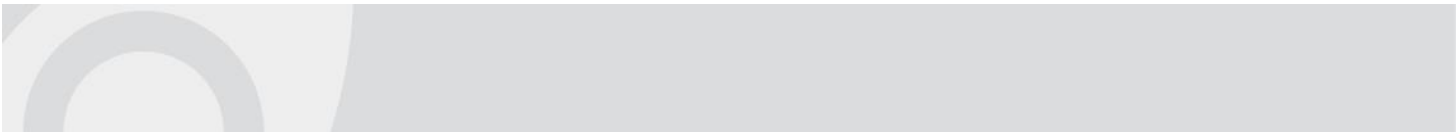
Contents

Introduction

Summary of the Annual Surveillance Workshop 2020

The Annual Surveillance Workshop (ASW) 2020 was held virtually on the 9th and 10th December 2020. Over 125 members attended the workshop from 26 organisations, covering all jurisdictions, the Australian Government, New Zealand Ministry of Primary Industries, government representatives from Fiji and Timor Leste, Plant Health Australia (PHA), the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and multiple private companies, industry bodies, universities and Research and Development Corporations (**Appendix 1**). The diversity in organisations is attributed to the workshop being held virtually allowing more individuals to attend.

This event has strengthened the Plant Surveillance Network Australasia–Pacific (PSNAP) by sharing details about current surveillance programs and experiences across the continuum.

In support of the International Year of Plant Health (IYPH) 2020 the ASW2020 theme was '*International, Regional, National and Local – where do you fit in the surveillance continuum to protect plants and our way of life?*'

The workshop objectives were to:

1. Build understanding of international, regional, national and local surveillance activities and initiatives in the wider plant pest surveillance system.
2. Connect interested people, share information and grow the Plant Surveillance Network.
3. Facilitate opportunities for capability building and succession planning.

The ASW2020 included a range of presentations and workshop sessions designed to promote networking and sharing of experiences and knowledge. These included member talks and updates on activities being carried out nationally, such as the review of the National Plant Biosecurity Surveillance Strategy and an update from the Chair of the Subcommittee on National Plant Health Surveillance.

Highlights and key outcomes from the ASW2020 included:

- The broad scope of the presentations allowing for a better understanding of how surveillance fits into the biosecurity continuum
- Insights into specific surveillance activities through PSNAP member talks
- Update on the National Plant Biosecurity Surveillance Strategy review with participants providing feedback on key elements of the strategy

There were two workshop sessions included in the ASW2020 program. The first of these workshops was on Your Plant Surveillance Network and sought feedback from participants on the PSNAP including the website and the programs on offer. From this workshop session a series of recommendations were developed to improve the PSNAP and make it more relevant to its members. These recommendations can be found on page 6. The second workshop session was on the introduction and application of National Surveillance Protocols (NSPs). This session sought feedback from the participants on the use of NSPs in developing more detailed surveillance plans and the content required to enable the successful development of surveillance plans. The participants feedback and the recommendations from this session can be found on page 7.

Impacts from COVID-19

The ASW2020 was originally planned to be held face-to-face on 1-2 April 2020 at the Novotel, Melbourne. The workshop was postponed due to the COVID-19 pandemic and travel restrictions. In June 2020, the Plant Surveillance Network Working Group (PSNWG) decided to change to a virtual format to be held later in the year. PSNWG members agreed to hold the event virtually rather than postpone to 2021.

About the ASW and report

ADWs are an initiative of the Subcommittee on National Plant Health Surveillance and supports the recommendations from the National Plant Biosecurity Surveillance Strategy. These workshops aim to improve Australia's plant health surveillance capability and capacity through encouraging the sharing of expertise and the delivery of targeted workshops.

This report provides a summary of the ASW2020 for PSNAP members and was prepared by the PSNAP Coordinator in consultation with SNPHS. The presentations are available to view on the PSNAP members portal[1]. Further information about the workshop can be obtained from and questions directed to the PSNAP Coordinator at PSNAP@phau.com.au.

ASW

The Agenda for ASW 2020 is provided in **Appendix 2**. The ASW was comprised of the following sessions designed to cover activities occurring across the biosecurity continuum:

- Introduction to the surveillance continuum – this session introduced the importance of plant pest surveillance pre-border, at the border and post border.
- International and regional surveillance –this session which focused on activities occurring pre-border that support early warning for new pest threats to Australia.
- National surveillance – this session covered border surveillance programs and programs occurring at high-risk sites near potential entry points for pest threats.
- Local surveillance and Surveillance in Trade and Market Access– these two sessions provided information on post-border initiatives to improve surveillance in commercial plant production as well as urban communities.

In addition, two workshop sessions were held on:

- The Plant Surveillance Network and
- National Surveillance Protocols

Further detail on these workshop sessions is provided in the following section.

A total of 20 presentations were delivered across the two-day workshop and, where provided, abstracts for these presentations are included in **Appendix 3**. All presentations were recorded and are available on the PSNAP website in the Members Portal, including an additional two presentations that were pre-recorded to assist support workshop objectives.

An update was also provided on the PSNAP Professional Development Program including:

1. *Surveillance Residential Program*
   The PSNAP Surveillance Residential Program enhances the national capability and capacity to detect plant pests by developing the skills of individuals. Those working in plant health surveillance gain essential skills and knowledge through experiences they would not otherwise have access to in their own organisation. The program allows participants share their ideas and experience, improve collaborations and build on existing networks.
2. *Training workshops*
   Skills-based training workshops are delivered to PSNAP members that focus on specific elements of plant health surveillance, such as development and use of National Surveillance Protocols, data standards, data collection, survey design, sample collection (i.e. how to collect, bag and label samples), and use of field triage guides.

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[1] Login to the PSNAP members portal from the website plantsurveillancenetwork.net.au/. If you are not yet a member, you can register by clicking the Join button at the top of PSNAP website homepage.

3. *Annual Surveillance Workshops*
   The Annual Surveillance Workshops (ASW) provide opportunities for PSNAP members to come together to exchange tips and techniques, share knowledge and find out what other surveillance personnel are doing and experiencing in their jobs.

Interactive workshop outcomes

Session topic: Your Plant Surveillance Network

Session purpose

The Plant Surveillance Network Australasia–Pacific (PSNAP) was developed to bring together individuals working in plant pest surveillance and related roles to share information and strengthen surveillance capacity and capability across Australia, New Zealand and the nearby regions.

The network was formed in 2017 as an initiative of the Subcommittee on National Plant Health Surveillance (SNPHS) and is overseen by a working group under SNPHS called the Plant Surveillance Network Working Group (PSNWG).

The PSNAP aims to strengthen surveillance capacity and capability by improving connections and communication between network members. The increased linkages between network members will:

1. Build capacity and capability in the plant health surveillance community.
2. Facilitate connections between surveillance practitioners and those requiring surveillance outcomes.
3. Share knowledge, tools and resources developed across the network to help increase the efficiency and consistency of plant health surveillance outcomes.

By improving these aspects of the surveillance system, our ability to respond effectively to plant pests will be enhanced, helping safeguard the economy, environment and communities.

This workshop session aimed to reflect on the current state of the PSNAP and gain a better understanding of what members want from the network into the future.

Workshop session questions

The participants were asked three questions about the network in order to better understand the needs of network members. These questions were:

1. How do you see the PSNAP contributing to your professional development?
2. What information and opportunities would you like made available to you through the PSNAP?
3. How can we improve the relevance of the PSNAP and provide further benefits to members?

Summary of outcomes

The workshop participants indicated they valued the establishment of PSNAP and the networking opportunities that had been identified and put in place to date. However, there were a number of suggestions to improve the collaboration and networking opportunities that PSNAP offers. The linking of different groups was important. In particular, better collaboration with overseas surveillance practitioners and networks was identified as a priority as participants felt that much could be learnt about how surveillance is conducted in countries where pests are present or where pest pressures differ. Encouraging more members from New Zealand and Pacific countries was a priority and offering sponsorship for travel or more online events were mentioned as possible mechanisms for this. Reaching out to the South Pacific Commission, the Pacific Plant Biosecurity Partnership and potentially PestNet could help raise awareness of PSNAP in the Pacific region. The workshop noted that better linkages

between diagnosticians and surveillance practitioners would be helpful. The participants acknowledged the linking of policy staff and on the ground experts as important and the sharing of information about when surveillance was taking place. This might help better link government and industry surveillance programs. The workshop suggested that more incentives for agronomists, crop consultants and industry members to join the network would allow for a better understanding of the knowledge gaps and potential areas of overlap between government and industry programs. It was noted that PSNAP is currently more government focussed and incentives and barriers for potential industry experts should be explored. The inclusion of data packages, video demonstrations of new techniques or pest biology and behaviour, information on new technologies and links to recent publications could incentivise membership for industry surveillance experts while still be useful for other members.

The workshop participants felt that the PSNAP website is a good repository of surveillance extension material and communication material for growers including pest factsheets.

The participants had feedback on the PSNAP website and the resources available on the site. There was a preference for the website to link to other resources rather than house them directly. Links to the Pest and Disease Image Library (PADIL), Biosecurity Import Conditions Database (BICON), resources for the Subcommittee on Domestic Quarantine and Market Access (SDQMA) and the Outbreak website should be added. The workshop also asked that the resources section be split with subheadings to make it easier to search including a section for recent publications for members to upload and they are looking forward to National Surveillance Protocols being uploaded to the site. Participants also suggested including case studies and profiles of surveillance programs and surveillance practitioners. The members directory could also have more information including who to contact in the event of an incursion and what specific areas they are specialised in. There was also a request for email alerts for members when there are significant changes to the website. Some participants also suggested a regular newsletter or a Twitter feed of relevant PSNAP information, surveillance information such as new techniques etc and good news stories such as successful eradications.

The participants indicated that more information relevant to responses should be included on the PSNAP website. This included information about contact points for surveillance expertise during incursions. The participants also felt that information about new surveillance technologies is a priority for PSNAP along with highlighting the role of surveillance in responses.

Training was discussed as a priority by the workshop. The PSNAP residential program was seen as valuable as are the training workshops. There were suggestions on content of future training workshops including:

- Better understanding of policy implication of surveillance
- New surveillance techniques.
- How to design effective programs including the differences between general surveillance and specific surveillance.
- Field triage and how to collect, preserve and dispatch samples with some basic diagnostic information.
- Basic entomology training for pathologists and basic pathology for entomologists
- Use of ICT systems to support learning.
- How to conduct observations in the field and convert findings into data collection
- Data standards and statistics.

There was a preference for training to be online where possible or recorded and to tap into existing surveillance training within industry where possible. The participants also suggested training videos on operational information such as how to install traps particularly at the grower or crop consultant level and pest biology for exotic pests.

Recommendations

1. Create better linkages and collaboration with overseas surveillance networks to allow for information flow from countries where pests exotic to Australia are common.
2. Encourage more members from New Zealand and the Asia-Pacific region to join PSNAP.
3. Find mechanisms to better share information about when surveillance programs are taking place to help link government and industry surveillance programs.
4. Investigate the barriers to industry surveillance experts joining PSNAP and consider including information that might be useful for industry surveillance (eg data packages, video demonstrations, information on new techniques etc).
5. SNPHS to consider if PSNAP is a good place to house extension information or if other existing sites (eg the Farm Biosecurity website) would be better for this information.
6. PSNAP coordinator to investigate splitting the resources section with different heading to better sort the PSNAP resources.
7. PSNWG to consider if there is scope to create a regular PSNAP newsletter or Twitter feed.
8. SNPHS to consider providing information about who to contact during an incursion for surveillance information for particular pests.
9. PSNWG to consider the training workshop including:
    a. Policy implication of surveillance
    b. New surveillance techniques
    c. How to design effective programs for general and specific surveillance
    d. Field triage and how to collect, preserve and dispatch samples with some basic diagnostic information
    e. Basic entomology and pathology training to support surveillance
    f. Use of on-line systems to support learning
    g. Conducting observations in the field and converting findings into data collection
    h. Data standards and statistics
10. PSNWG to consider development of online training options (including training videos) for inclusion on the PSNAP website.

Session topic: Introduction and application of National Surveillance Protocols

Session purpose

The purpose of this group workshop session was to review and provide feedback on the structure and content of draft National Surveillance Protocols (NSPs), specifically the methodology section. NSPs are technical reference guides for conducting surveillance on a specific plant pest or group of plant pests. They include information on surveillance methodology, pest biology and taxonomy, identification and sample processing. NSPs are based on information outlined in the SNPHS Reference Standard[2].

SNPHS are undertaking a review of the Reference Standard and feedback from this session will contribute to that review. Specific areas requiring clarification included:

- Level of detail required in the NSPs
- Whether more information is required in the surveillance design to include statistical design
- Protocols for data collection and consistency of data capture.

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[2] SNPHS Reference Standard for the Development and Approval of Nationals Surveillance Protocols for Plant Pests available here.

Draft NSPs for review

Three draft NSPs were reviewed at the ASW2020. Each group was assigned one of the following draft protocols to focus on:

- Fire blight (*Erwinia amylovora*)
- Gypsy and nun moth (*Lymantria spp.*)
- Khapra beetle (*Trogoderma granarium*)

Each group was asked to review their draft NSP and answer the following questions:

1. Could your program write a work instruction for surveillance from the information within the surveillance methodology section?
   - Why/why not?
2. Do you have other expectations of the protocol content?
   - Should any sections be added, expanded or removed?
   - Is the document too long or too short?
3. What are your expectations of the surveillance design section?
   - Is it too regional or program specific to be useful?
   - What about pests that do not have good design information (eg if the information does not exist)?
4. Do the data protocols clearly describe the minimum data you must provide to create a valid pest record for your pest?

Summary of outcomes

Overall, the workshop agreed there was a need for NSPs but there was confusion about their purpose, the intended audience and the appropriate level of detail. Most of the workshop groups felt that more detail was needed but some groups were confused about whether a NSP was intended to be a Surveillance Plan/Protocol and specifically outline how to carry out surveillance in the field.[3] Two groups suggested that an explanation of what NSPs are and how they relate to other key documents would help make this clearer. It was also suggested that in links to the other key documents would be helpful and example Surveillance Plans or Surveillance Plan templates should be included on the PSNAP website. These comments reflect the fact that NSPs are a recent introduction in Australia's national surveillance system and participants at the workshop are still obtaining an understanding of the purpose and intent of different documents being proposed.

The workshop participants suggested that there may be value in sharing state Surveillance Plans within PSNAP in addition to the NSPs, but it was noted that Surveillance Plans will be specific to the pest and surveillance purpose, and in the case of delimiting surveillance, information may be confidential.

Many of the groups recognised that NSPs needed to be flexible and not too prescriptive. A summary of key information from each section with more details elsewhere in the document would help make the documents suitable for a broader range of users. One group asked if NSPs need to represent the "gold standard" for surveillance or outline the minimum requirements for a valid Surveillance Plan. Two of the groups suggested relevant industries should be consulted in the development of NSPs, especially if NSPs are designed to inform industry surveillance programs in addition to government surveillance programs.

All groups agreed that more information providing guidance on decision making for surveillance activities was needed without being too prescriptive. Example of this included information on the best timing for putting out insect traps or looking for disease symptoms both in terms of time of day and

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[3] Surveillance Plans are detailed documents that identify the objectives of the surveillance, the operational groups that will deliver the surveillance activities, the methods that will be used to detect the pest and the sites that will be targeted to address the risks. Surveillance Plans indicate the resources and the quantity of effort required to deliver surveillance to meet the objective. Surveillance Plans are developed based on information in the relevant NSP.

season. More interpretation of biological information relevant to surveillance in the Australian context was also highlighted. For example, Gypsy moth eggs require a chilling period before hatching, guidance on areas of Australia that are cold enough for eggs to hatch could be useful in developing Surveillance Plans. The participants proposed that more information about the reasons for choosing a type of detection method in different circumstances would be beneficial. This included surveillance in different situations, eg when trying to detect Khapra beetle, visual inspection is a useful tool for inspecting clothing but trapping is more useful for detection in buildings or silos. Some of the groups indicated that more information or images to assist with field triage including symptoms and pest life stages, in-field symptom variation and pests that can be confused with the target species would be advantageous. There were also requests for more information about timing of trapping, trap/lure longevity, timing of sampling, whether overseas traps work in the Australian context (eg if weather conditions are appropriate for use of overseas insect traps) and potential Australian distribution.

The workshop agreed that NSPs should be useable across different types of surveillance (eg detection, delimiting and area freedom) in addition to in different locations. NSPs should outline general information and outline the specific requirements for each surveillance type in the appendices. It was also suggested that the next steps after an initial detection should be included.

There was considerable discussion about the level of information included in the NSPs in terms of statistical design and the included data fields. The feedback was consistent that more guidance on how to design statistically valid surveys would be ideal but that the guidance should be general and not too prescriptive. This included information on how to design Surveillance Plans for different types of surveillance and in different locations. More information was also needed on what to consider when interpreting surveillance data is needed. For example, gypsy moth lures only attract male moths and traps may attract moths from other areas not just the immediate area.

More guidance was also needed for the suggested data fields section as well. The participants found the descriptions confusing and suggested that a clearer description of each data field and the required measurement units would be beneficial. There was confusion about what was required for the host and non-host fields in the Khapra beetle NSP. Two groups indicated that it wasn't clear what nationally managed data fields meant and whether the data fields were aligned with International Standards for Phytosanitary Measures (ISPMs) or the data fields in AUSPest*Check*. For nationally coordinated data fields some participants wanted clarity about where this data should be sent. There were also requests for nationally managed fields to be indicated more clearly as when printing NSPs in in black and white this information is lost. One group requested a free text column to allow for recording of other specific information that might be relevant to the surveillance. Another group requested a data entry template noting that it needed to be printable as some programs use field sheets to enter data.

The workshop also indicated that more information on pest pathways was needed. In particular, information on which pathways should be surveyed, including potential non-traditional pathways. This was considered particularly important for the Khapra beetle NSP. In the pathway analysis discussion, it was noted that for hitch hiker pests and pests in containers that there should be consideration of contaminated containers from countries where the pest isn't present as containers are often reused.

Recommendations

1. Provide more clarity around the purpose of NSPs and guidance on the intended audience
2. Provide guidance on how NSPs relate to other surveillance documents including Surveillance Plans.
3. Include example Surveillance Plans or Surveillance Plan templates on the PSNAP website with the NSPs.
4. Structure NSPs to have a summary of recommendations for each section with more detailed information supporting the recommendation in appendices.
5. SNPHS to consider if there is benefit in sharing Surveillance Plans and if so is PSNAP or another site the best place to house them.

6. SNPHS to consider whether NSPs are intended to support industry surveillance programs and therefore whether relevant industries should be consulted in the development of NSPs.
7. Include information about the best timing of surveillance (both seasonal and time of day) and biological information that's relevant to the Australian context (eg required chilling periods).
8. Provide more guidance on the triggers to choose a particular surveillance method.
9. Include more information to assist with field triage (eg variation in symptoms between hosts).
10. Include more information on the minimum requirements to have a statistically valid surveillance design and considerations when interpreting surveillance data.
11. Include clearer guidance about the suggested data fields and if these data fields align with ISPMs and AUSPestCheck data fields. This includes a clearer explanation about what nationally managed data fields mean.
12. Specify which pathways are considered high risk for the pest and therefore are recommended for surveillance. This includes potential non-traditional pathways especially for hitch hiker pests.

ASW evaluation

Participants were asked two questions at the start of the workshop and five questions as the end of the workshop. A post-workshop questionnaire was sent out after the workshop to understand what worked well and what could be improved for future workshops. Most participants were from Australia although a number of participants from other parts of the Asia- Pacific region including Fiji, New Zealand and Timor-Leste. There were twice as many participants compared to the ASW2019 and for 60 percent of participants ASW2020 was the first ASW they attended.

Overall, the feedback was positive with the vast majority of participants enjoying the presentations and 80 percent of participants felt that the level of detail in the workshops was right. Most participants indicated that they would attend virtual workshops in the future.

There were a number of different suggestions for future ASWs including better engagement with industry surveillance practitioners and more opportunities for breakout sessions and discussions. There were also a number of suggestions for other PSNAP professional development opportunities with training in diagnostics and data analysis and survey design being the most popular.

The detailed responses to the workshop questions are below.

Workshop introduction poll

Participants were asked two questions at the start of the workshop to understand their base knowledge and location.

Intro poll 1 - What time zone are you located?
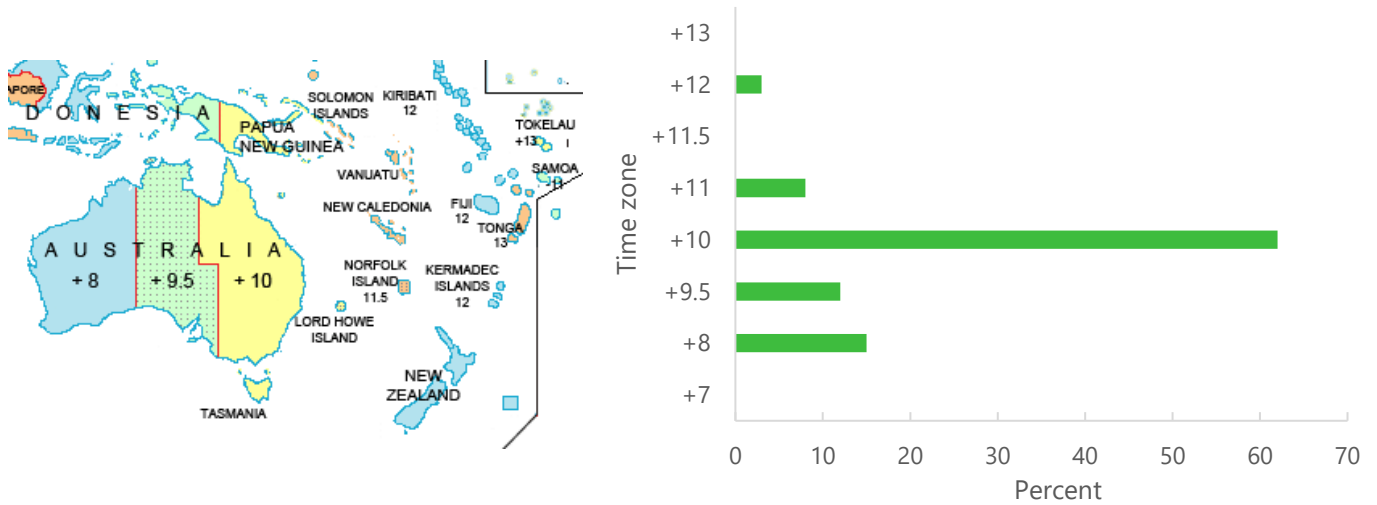
Intro poll 2 - How much do you know about the plant health surveillance system?
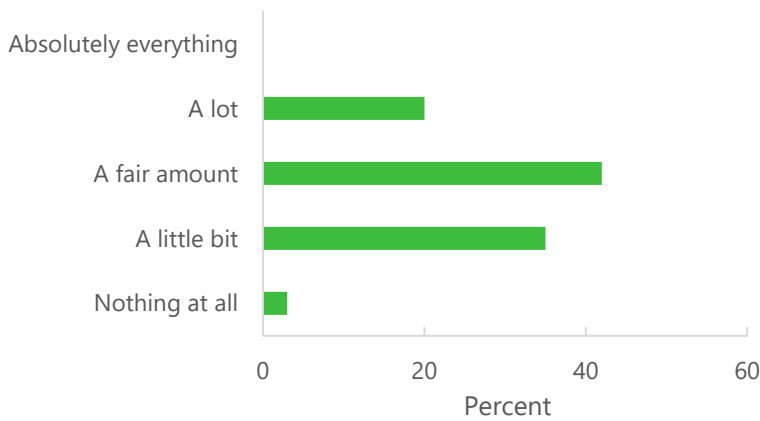
Workshop evaluation poll

Participants were asked five questions at the end of the workshop.

Evaluation poll 1 – Did this workshop meet your expectations, based on the information provided prior?
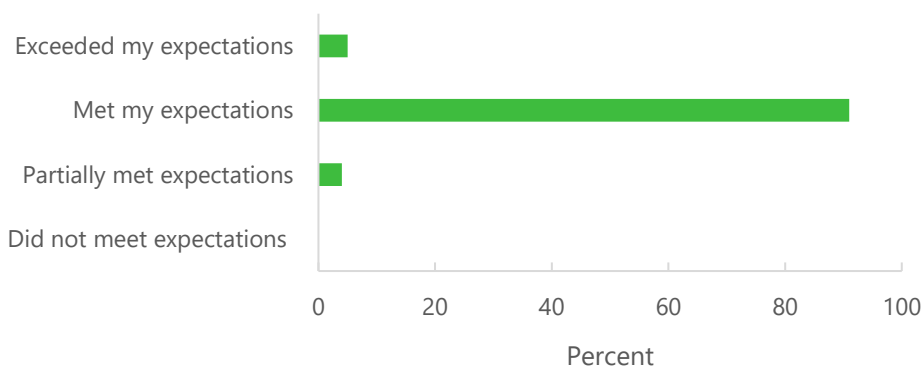
Evaluation poll 2 – How would you rate the ASW2020?
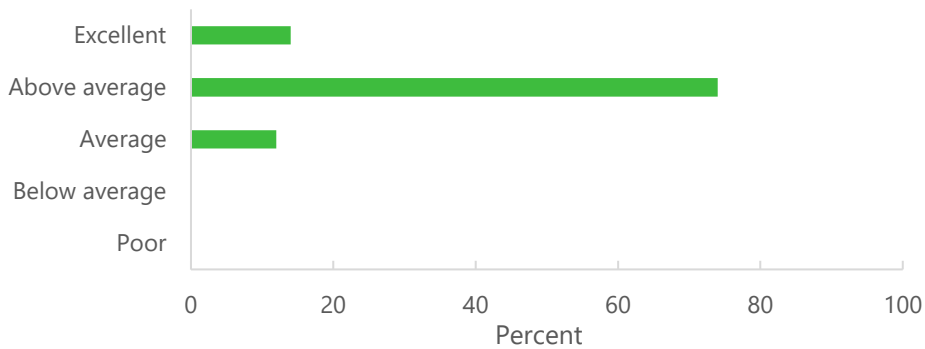
Evaluation poll 3 – What styles of workshop would you attend in future? (Select all that apply)
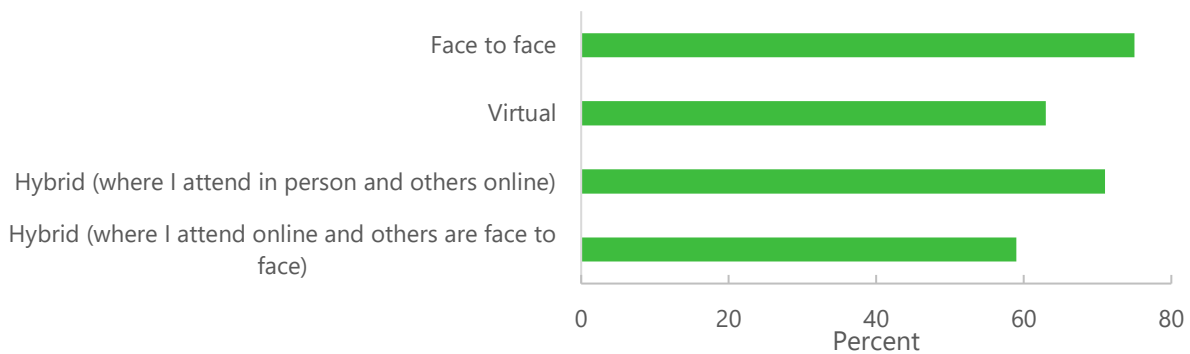
Evaluation poll 4 – Would you recommend the PSNAP to your friends and colleagues?
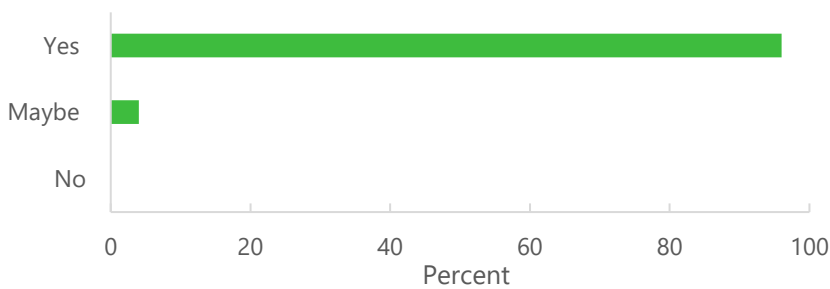
Evaluation poll 5 – When would be the best month to hold the ASW2021?
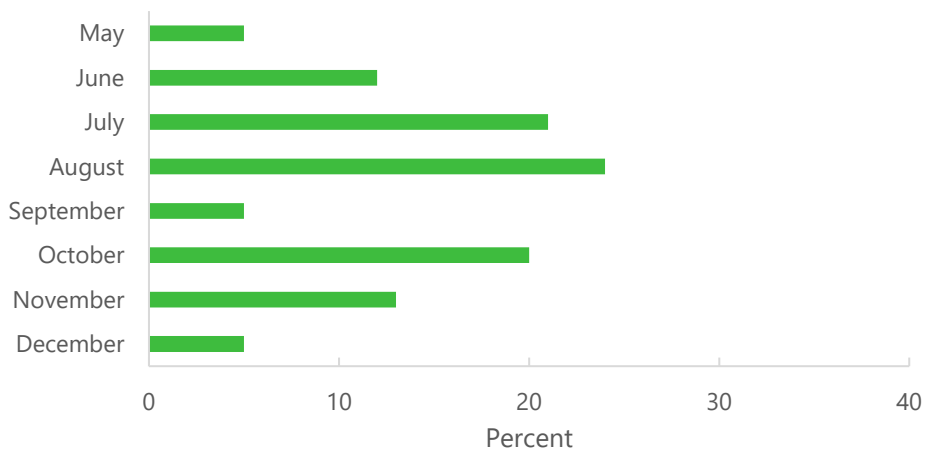
Post-workshop evaluation questionnaire

A voluntary questionnaire was sent to participants after the workshop. The following results are based on the responses from 30 workshop participants.

Question 1 – Which option best describes your primary role?
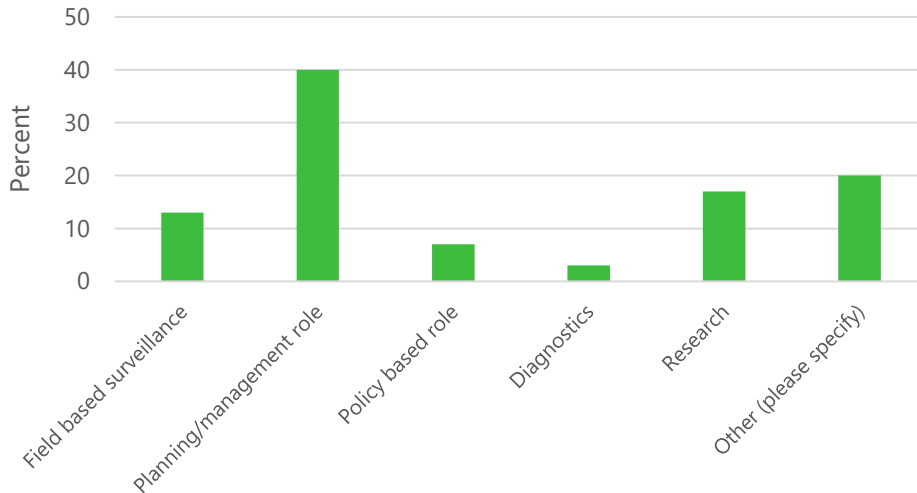
Responses to 'other'
• Industry service • I would straddle three areas – field based surveillance, planning/management and diagnostics • Surveillance procedure author and source pest and disease expertise • Working in research in pollination, I was given a place due to participation in Biosecurity Blitz, I was also involved at the start of Qfly response in WA • RDC • Extension

Question 2 – How long have you worked in a role relevant to plant health surveillance?
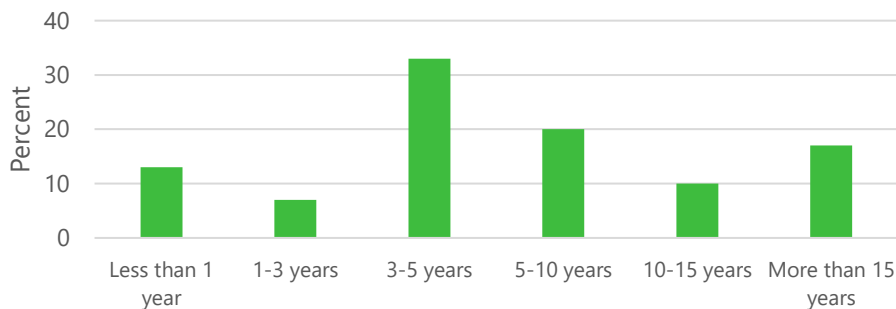
Question 3 – Where are you located?
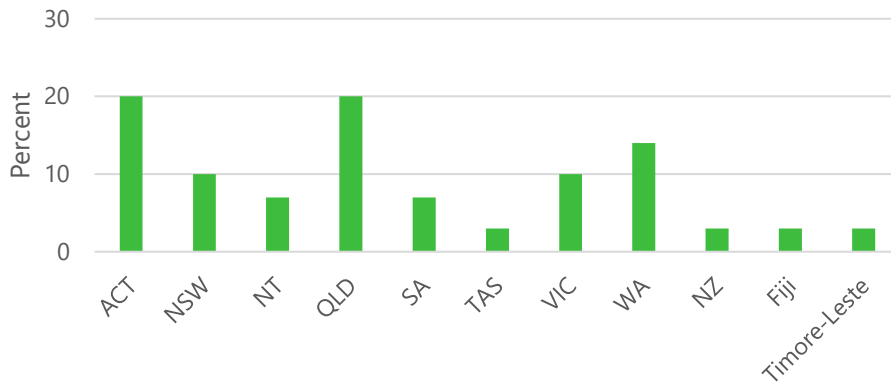
Question 4 – How many Annual Surveillance Workshop have you attended since 2017 (including ASW2020)?
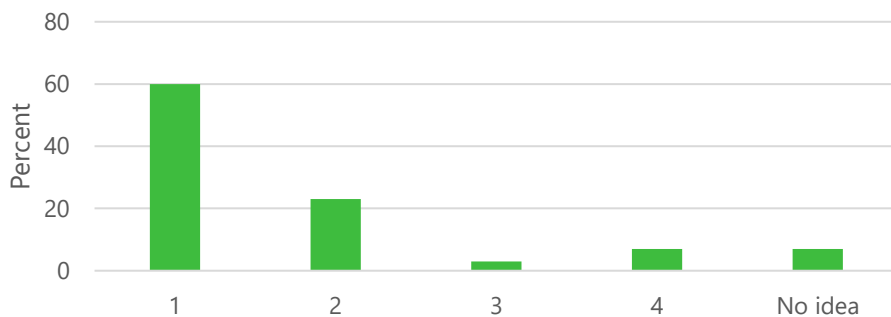
Question 5 – How much do you know about the plant health surveillance system?

Question 6 – Does your response to question 5 differ to your response at the start of the Annual Surveillance Workshop? If so, why?

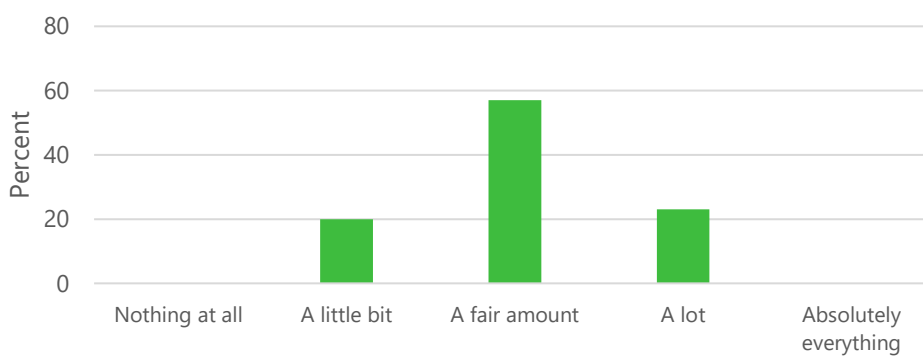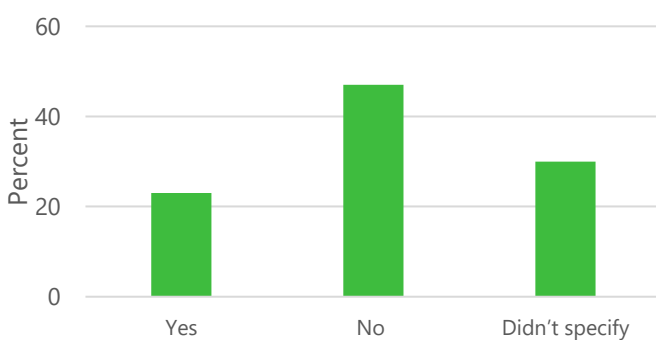| Response	Summarised extended responses
Yes, it differed	- More aware of industry programs, innovations, individuals involved. - Yes. I have learnt a lot about general surveillance. - I now understand the role of the surveillance continuum better, and where I fit within in that and how post-border surveillance could fit. - The presentations were short enough but also provided enough data to learn from. - I underestimated my knowledge
No, it didn't differ	- I am still aware of all the different agencies involved in plant health and biosecurity and I now know a little bit more about them but I still do not understand very well how they relate to each other and interact. - I know a lot about my specific part of the surveillance system but didn't learn much further about other segments at the workshop. - The more you know, the more complex it turns out to be - Response not different but I now know a little bit more - I'm more informed about some aspects of surveillance and it has given me some great ideas. - Excellent to see how other departments and surveillance programs are going (especially in other parts of Australia) - In my position I see a lot of the surveillance system and activities
Didn't specify	- Didn't complete survey at start of workshop. - I know more than before the workshop but there is more I don't know - I am continually learning - ASW 2020 accelerated this learning process - Have learnt a little bit more due the array of presentations and discussions. The introduction session was very useful. - I was in a group of more experienced staff. We decided that we knew a fair amount. - I have a better idea of the organisations involved and resources available - I learnt a little about the different stakeholder groups - I know a bit more and a lot more about the surveillance continuum - Because it's useful for my country

Question 7 – Did you enjoy the level of variety in the presentations at the Annual Surveillance Workshop 2020?

Summarised extended responses
- Liked the themes and variation in talks. - Covered the continuum quite well. - Liked he variety in speakers (and their backgrounds) and the presentations were enjoyable. - It was good to have an overview, plus some more detailed examples (eg general surveillance programs). - Great variety. Interesting to learn about work being undertaken in all spaces. Would like some more inclusion of general surveillance programs and how they work.

Summarised extended responses

- I was interested in most presentations and it was also great to understand what others were doing if not directly related to an area of interest.
- Presentations from other sectors and organisations were particularly informative.
- The variety of presentations helped give a good overview of some of the surveillance priorities of other jurisdictions and the methods of response.
- It was a good spread. Liked the broad overarching presentations and the example/specific presentations, and the mix of industry, jurisdictions and fed presentations.
- Mostly enjoyed day two.

Question 8 – Did you think the presentations were pitched at the right level? Meaning was there enough detail or too much?
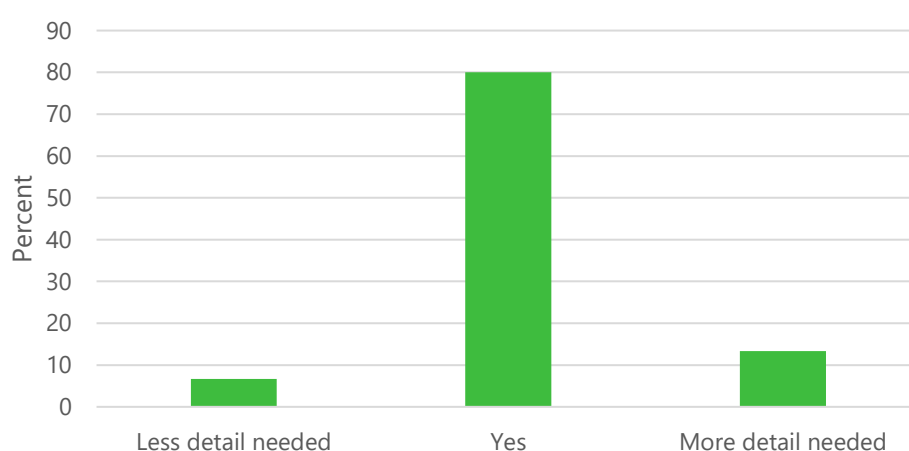
Summarised extended responses

- A couple of presentations had slides with two much information to take in, but I think the pitch was generally appropriate for such a diverse range of participants.
- Detail was about right; the review of the protocols was a bit technical and hard to do by screen share.
- Short, sharp day 2 presentations were good.
- good for me but I am reasonably new to surveillance.
- Adequate detail and nice use of the chat function to ask questions - a handy tool with the virtual format.
- Yes. Enough detail, and the identification of contacts to follow up with questions was good.
- Would have liked more specific case studies.
- I would have liked to have gone into more detail but given the time restrictions, and being the first virtual meeting, this was totally understandable.
- Presenters were given less time and were rushed to complete their presentations.
- Some presentations were very technical and heavy on specific details and when you don't have background knowledge in specific pests sometimes this can get a little tedious, but understandably relevant to people who know. Presentations on policy often are quite dry and they need a little levity, especially on a virtual platform where it's easy to tune out. No talks had too little detail.

Question 9 - What professional development would you like to see associated with the Annual Surveillance Workshop next year (either face-to-face or virtual)? This could include events such as field trips, tours, training workshops, etc.

The answers to this question included specific professional development suggestions as free text meaning that the answers could not be graphed. However, face-to-face training, training workshops and field trips were the most popular types of professional development activities suggested by the participants.
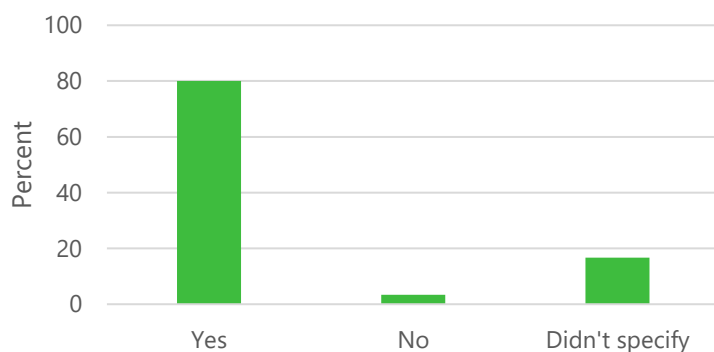
Extended responses

- I prefer face-to-face but this worked well but face-to-face is better for small group programs/workshops.
- Virtual collecting and displaying geospatial data exercise with a solo exercise at the end.
- Some back-to-basics workshops eg different types of traps and what they are used for with pest specific case studies.
- Workshop to understand surveillance in different situations to what we are familiar with, keeping in mind the practical considerations (such as distance between sites).
- Placements between jurisdictions would be a great learning opportunity and build on networks. Field trips, tours and training workshops would also be beneficial.
- Field trips and tours are always a great for further hands-on experience, but everyone learns differently. A workshop to design a mock survey with an exotic pest and a set budget may get people thinking outside the box, how can industry or public be utilized, how will diagnostics be incorporated etc.
- All of it where possible - field trip would be great as few hands-on opportunities, but training workshops are also useful.
- Training/hands on demonstrations of the different data gathering tools and more detailed training for in-field diagnostics and triage.
- I prefer face-to-face, I feel more comfortable making connections that way. Being in an isolated area and focused on one crop, anything practical such as field trips, tours to look at surveillance systems, connections with other industries and hands-on workshops would be beneficial.
- Link to diagnostics labs, PEQ or something alongside/complementary to our core work
- I prefer a workshop with combination of virtual and face-to-face with some events that involve training on core activities.
- Training activities or workshops on tricky topics, eg validation of protocols.
- Face-to-face would be preferable, with either field trips or training workshops attached so it's more hands on and interactive
- training workshops
- More variety of topic for breakouts. The protocol activity was quite specific. The workshop sessions weren't very useful for those who don't normally write surveillance standard operating procedures or work instruction.
- Field trips are always great to get a better grasp of things and see things from different perspectives.
- Taxonomy training / workshops
- Field trips to see surveillance in action.
- In-field or industry-based activities would be good
- Running through a surveillance plan design, simulated trap placement and data recording perhaps.
- Online training
- Training in reporting app use. Field-trip to a grains facility or warehouse or port AA. Joint activity with diagnosticians ie fly ID, trapping, surveillance and tracing exercise. Preference for face-to-face but a combo would work too. Tracing exercise with industry with a real dataset (ie group collects data, and we see where it has to end up... all the way to market access folks).
- Field trips and training on surveillance and trapping - different crops/techniques
- A training workshop would be beneficial
- Hybrid of face-to-face and virtual ASW. It's important to network face-to-face and have those connections but virtual allows people who might not otherwise be able to attend get to be a part of this. Tours and training workshops around surveillance and surveillance actives would be invaluable to increase everyone's skills generally and to share knowledge and information. Tours of facilities and surveillance being undertaken would be great! Seeing other people in action gives you a good feel of what needs to be done in the situation. If we're interested including people like urban gardeners or agronomists as a part of PSNAP, attending events or being apart of those sorts of events (garden expos, crop walks, etc) could be useful.
- Half day working groups trying to build a mock work instruction/data sheet from a surveillance protocol. Having to put something into practice would really focus people's thoughts on what works what doesn't. Important to make sure the groups are made up of people who actually have to do that in their workplace. Visits to other jurisdictions/federal office to see data management and reporting in action. Get ideas for pros and cons of different approaches. Include specific examples e.g. this is our database, this is how we access it, this is what irritates us about our system, this is what we use the data for.
- Workplace attachment in areas of surveillance and diagnostics at least for 2 weeks.

Extended responses

- Mock farm surveillance activities.
- Opportunities to observe on the ground surveillance activities. e.g. trapping and inspections.

Question 10 – How did you find the virtual format? Would you attend virtual workshops in the future?

Summarised extended responses

- Shorter days would be good.
- I prefer face to face because I think it makes me a better participant, after all, I am there to focus on that specific purpose.
- Virtual is fantastic for information sharing but not for building those more specific connections and the adhoc conversations.
- I'm remote and due to the cost of travel and would not always be able to attend. Also, I think virtual would be the best way of ensuring that less experienced/early career/mid career/closer to the end of career practitioners could be in the same room/s and share information. This would help ensure that info is passed on as part of a successional plan.

Question 11 – Do you have any other comments or feedback about the Annual Surveillance Workshop 2020 or the PSNAP?

Comment topic	Summarised responses
Comments about ASW	• The team that put this together were amazing and should be commended for a job well done. • Thank you for putting the workshop together, I really enjoyed participating and I need to get on the PSNAP website more. • Well organised opportunity to take part in group work. • Great team by the looks of it, and organiser did a great job. • The presenters did a really good job. • Really glad things will be available later so we can revisit the talks. • Good event, not quite as valuable as face-to-face in some respects but allowed more participants. • Not sure I got strong sense of where the group was going.

Comment topic	Summarised responses
Suggestions for future workshops	• Next time, more breakout group sessions and discussion sessions. • I realise this Surveillance workshop is aimed for Surveillance work but Conferences/ Workshops on the whole Biosecurity picture welcomed. • Keep trying to engage industry to come to the table and put value on their contributions. Every workshop discussion I have with an industry rep present helps me provide better services as a public servant. • Wouldn't mind learning a little about the day in the life of a pest scout which could be a virtual presentation/webinar.
PSNAP Website	• I will save the PSNAP website in my favourites so that I can check on it regularly to see if anything of interest is coming up. • I think that the website content is great. The effort that goes into the ASW is also fantastic. • Would be good to have a better link between PSNAP and NPBDN websites. Both of them are hard to find in search engines and they look quite different. Many of my colleagues are members of both - it would be good to find them in one place - one central page with links to each individual page
Other comments	• I am responsible for two long-running, capacity building projects in SE Asia. These projects cover technical skills in surveillance and diagnostics. I will be promoting PSNAP to participants in both projects and recommending that they join PSNAP. I will be looking for opportunities for Australian surveillance practitioners to collaborate in some way with SE Asian counterparts, eg in professional development. The ASW introduced me to a wide range of possible collaborations.

Question 12 – What skills would you like to learn in a PSNAP training workshop in the future?

Responses to 'other'
• A mini blitz. • Workshops involving people with different skills and experience getting out and having a look for/at pests and diseases. • Designing citizen science/agronomist lead surveillance program for effective, useful surveillance data • The skills for both surveillance and diagnostics specialists • Surveillance and diagnostics areas • Emergency response particularly surveillance related (using pest case studies). Could share and compare notes. • Overview of all surveillance programmes would be handy.

Question 13a – Are you familiar with the National Plant Biosecurity Diagnostics Network?
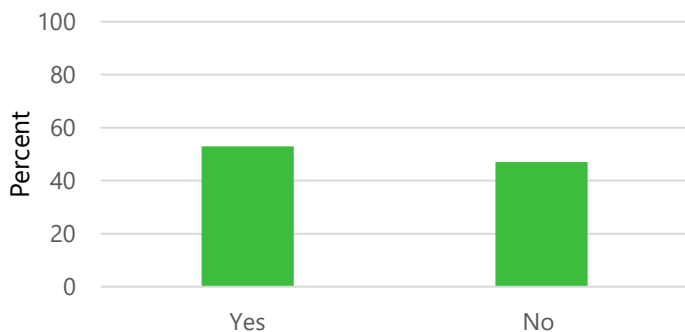
Question 13b – If yes, can you suggest any events or activities that would benefit members of both networks?

SUGGESTIONS
- Co-development of diagnostic components of surveillance protocols.   - Joint or overlapping Annual Diagnosticians' Workshop and Annual Surveillance Workshop in 2021   - Coming up with a consensus on what pest or disease background information (taxonomy, risk pathway-entry analysis, symptoms, etc.) could/should be included in a document that both NSP and diagnostic protocol could hang off would be good. Some of the same subject matter experts would be consulted so it would reduce duplication.   - Someone mentioned fly diagnostics and LAMP? Training to help diagnostics members to engage or meet a member of one group and pair up?   - I know of NPBDN, but have not attended any of the sessions. I see the core functions as quite different - although for some jurisdictions it is the same people who attend both, and so they would see overlap. In my jurisdiction these are quite separate groups, who don't interact much (i.e. if you aren't the NPBDN rep you don't hear anything much about what they do, same for PSNAP).   - maybe a scenario/blitz - joint surveillance planning and field sampling activity with in-filed diagnostics?   - In field diagnostics for surveillance professionals   - Surveillance & diagnostics go hand in hand as surveillance requires diagnostic capabilities. More just EPPs diagnostic training workshops I think would benefit everyone in this space. For non-biosecurity related training just general training on endemic pest species would be great (eg crop aphids, crop mites, or glasshouse pests). Building the diagnostic abilities of diagnosticians to be able to step into surveillance when needed is important. Having joint workshops would be valuable.   - Modelling and survey design. Surveillance and diagnostics have to work together to ensure that labs are capable of handling the throughput. Also data collection, storage and reporting on that data. All of the survey and diagnostic data has to link up to form confident reports that are easy to interpret.   - Informatics/analysis and field diagnostics   - Some who were not familiar with the NPBDN, asked to know more about it.

Appendix 1 – Participant list

FIRST NAME	SURNAME	ORGANISATION	LOCATION
Mona	Akbari	DAWE	ACT
Femi	Akinsanmi	The University of Queensland	QLD
Rosamund (Mundi)	Allen	DAF QLD	QLD
Lucy	Aukett	PHA	ACT
Rosalie	Banks	DAF QLD	QLD
Chantel	Benbow	AgVic	VIC
Bosibori	Bett	PHA	ACT
David	Britton	DAWE	QLD
Rohan	Burgess	PHA	ACT
Simone	Cameron	NT Farmers Association	NT
Daniela	Carnovale	PHA	ACT
Sally	Chesworth	PHA	ACT
Matt	Chifley	PHA	ACT
Jo	Chong-Wah	AgVic	VIC
Susie	Collins	DAWE	ACT
Lisa	Coppinger	DAF QLD	QLD
K'trie	Coster	Grains Research and Development Corporation	ACT
Louise	Croeser	DPIRD	WA
Samantha	Cullen	NT DITT	NT
Chris	Dale	DAWE	ACT
Nitesh	Datt	Biosecurity Authority of Fiji	Fiji
Richard	Davis	DAWE	QLD
Kath	Deboer	PHA	ACT
Trevor	Dunmall	PHA	QLD
Jonathan	Eccles	NSW LLS	NSW
Thilini	Ekanayake	NT DITT	NT
Jim	Eldridge	DAWE	QLD
Craig	Elliott	Wine Australia	SA
Laura	Fagan	DPIRD	WA
Luise	Fanning	AgVic	VIC
Leandra	Fernandes	PHA	ACT
Mary	Finlay-Doney	NT DITT	NT
Diana	Fisher	Biosecurity Blitz 30-day challenge winner	WA
Callum	Fletcher	AUSVEG	VIC
David	Gale	PHA	ACT
Cherie	Gambley	DAF QLD	QLD
Kathy	Gott	NSW DPI	NSW
Rebecca	Hamdorf	PIRSA	SA
Nichole	Hammond	DPIRD	WA
Kellyanne	Harris	AgVic	VIC
Zarmeen	Hassan	AUSVEG	VIC

FIRST NAME	SURNAME	ORGANISATION	LOCATION
Veronica	Hayes	DPIPWE	TAS
Sally	Heaton	NT DITT	NT
Simone	Heimoana	CSIRO	NSW
Rudi	Hoffman	AgVic	VIC
Christine	Horlock	DAF QLD	QLD
David	Hubbard	PIRSA	SA
Michael	Hughes	Quintis	WA
Tim	Hurst	AgVic	VIC
Brittany	Hyder	DAWE	VIC
Sue	Jaggar	DPIRD	WA
Rebecca	James	DAWE	NT
Sylvia	Jelinek	NSW LLS	NSW
Shakira	Johnson	AUSVEG	VIC
Sarah	Johnston	DAWE	QLD
Lynne	Jones	DAWE	QLD
Nikki	Jones	AgVic	VIC
Monica	Kehoe	DPIRD	WA
Jeevan	Khurana	Grains Research and Development Corporation	ACT
Tonny	Kinene	DPIRD	WA
Amanda	Kobelt	AgVic	VIC
Heleen	Kruger	DAWE	ACT
Emily	Lamberton	PHA	ACT
Simon	Lawson	University of the Sunshine Coast	QLD
Tara	Lee	DAWE	VIC
Jessica	Lehmann	PHA	ACT
Alison	Mackie	DPIRD	WA
Rory	MacLellan	NZ MPI	NZ
James	Maino	cesar	VIC
Elizabeth	McCrudden	DAWE	ACT
Janet	McDonald	DAF QLD	QLD
John	McDonald	Greenlife Industry Australia	QLD
Kym	McIntyre	DAF QLD	QLD
Lyndal	Middlebrook	DAWE	NSW
Jeff	Milne	Citrus Australia	VIC
Jim	Moran	AgVic	VIC
Ashlee	Morgan	DAWE	VIC
Robyn	Morrison	AgVic	VIC
Ian	Naumann	DAWE	ACT
Merran	Neilsen	NT DITT	NT
Gertraud	Norton	DAWE	ACT
Chris	Oakeley	Biosecurity Blitz 30-day challenge winner	WA
Chris	O'Connor	Macquarie University	WA
Janine	O'Donnell	NSW DPI	NSW
Natalie	O'Donnell	PHA	ACT

FIRST NAME	SURNAME	ORGANISATION	LOCATION
Karen	OMalley	NSW LLS	NSW
Simon	Ong	Quintis	WA
Amy	Parry	DPIRD	WA
Ceri	Pearce	DAF QLD	QLD
Suzy	Perry	DAF QLD	QLD
Maxine	Piggott	NT DITT	NT
Elia	Pirtle	AgVic	VIC
Stephen	Pratt	DAWE	ACT
Madeleine	Quirk	AUSVEG	VIC
Anil	Raghavendra	NSW DPI	NSW
Touhidur	Rahman	DPIRD	WA
Fiorella	Ramirez Esquivel	DAWE	ACT
Ranny	Ranny	Quintis	WA
Darsh	Rathnayake	NT DITT	NT
Olivia	Reynolds	cesar	VIC
Louise	Rossiter	NSW DPI	NSW
Alison	Seyb	NSW DPI	NSW
Jenny	Shanks	PHA	ACT
Murray	Sharman	DAF QLD	QLD
Joshua	Smith	AgVic	VIC
Mark	Stanaway	DAWE	QLD
Karen	Stralow	DAWE	NSW
Ranjith	Subasinghe	DAWE	NSW
Jamie	Summerhayes	DAWE	QLD
Praise	Tadle	NT DITT	NT
Sharyn	Taylor	PHA	ACT
Rachel	Taylor-Hukins	NSW DPI	NSW
Jonathan	Terlich	PHA	ACT
Brian	Thistleton	NT DITT	NT
Jenifer	Ticehurst	DAWE	ACT
Paco	Tovar	PHA	WA
Lucy	Tran-Nguyen	NT DITT	NT
Rod	Turner	PHA	ACT
Margaret	Uloth	DPIRD	WA
Bernie	Wittwer	DAWE	QLD
Christine	Wood	DPIRD	WA
Karl	Wotherspoon	Sustainable Timber Tasmania	TAS
Abel	Ximenes	Plant Quarantine Timor Leste	Timor-Leste
Linda	Zheng	AgVic	VIC

Appendix 2 – ASW Agenda

Wednesday 9 December 2020

DAY	TIME[4]	DESCRIPTION
Day 1	**10.45 am**	**Participants login to Zoom**
	11:00 am	**Welcome and introductions** (Natalie O'Donnell, PSNAP Coordinator)
		Introduction to the surveillance continuum • National and international (Susie Collins, DAWE) • State and operational (Louise Rossiter, NSW DPI)
		Participant activity
		International and Regional Surveillance (PSNAP member presentations) Session facilitator – Chris Dale, DAWE • International Plant Health Surveillance Program – Australia's early warning program for current and emerging regional biosecurity pest risks (Chris Dale, DAWE) • Where Plant Health Surveillance fits in the Biosecurity System (BMSB a case study) (Rory McLellan, NZ MPI) • Surveillance and studies for endemic and exotic virus diseases in Timor-Leste and northern Australia (Murray Sharman, DAF QLD)
		Update from Subcommittee on National Plant Health Surveillance Chair (Louise Rossiter, NSW DPI)
	12:35 pm	**Break**
	1:20 pm	**National Surveillance** (PSNAP member presentations) Session facilitator – Laura Fagan, DPIRD • More than 20 years of success: Northern Australia Quarantine Strategy surveillance supporting the response to exotic pest fruit fly incursions in the Torres Strait (David Britton, DAWE) • National Border Surveillance: Success in protecting Australia's borders (Brittany Hyder, DAWE) • Towards sustainable post-border surveillance programs (Paco Tovar, PHA)
		National Plant Biosecurity Surveillance Strategy review update (Jonathan Terlich, PHA)
		Plant Surveillance Network Australasia-Pacific update (Natalie O'Donnell, PHA)
		Workshop Session: Your Plant Surveillance Network Facilitator – Natalie O'Donnell
	3:30 pm	**Day 1 close**

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[4] Times reflected are Australian Eastern Daylight Time (AEDT).

Thursday 10 December 2020

DAY	TIME[4]	DESCRIPTION
Day 2	10:45 am	**Participants login to Zoom**
	11:00 am	**Day 2 welcome**
		Local Surveillance (PSNAP member presentations) Session facilitator: David Hubbard, PIRSA • CropSafe – Victoria's grains surveillance program (Luise Fanning, AgVic) • Can urban gardeners contribute to General Surveillance to complement targeted surveillance activities for biosecurity in Australia? (Kellyanne Harris, AgVic) • NT Farmers and the initiatives around Asian Vegetable Growers (Simone Cameron, NT Farmers) • iMapPESTS: aiming for the sky in cross-industry plant pest surveillance initiative (Shakira Johnson, AUSVEG)
		Participant activity
		Surveillance in Trade and Market Access (PSNAP member presentations) Session facilitator: Veronica Hayes, DPIPWE • Surveillance to support trade and market access (Janine O'Donnell, SDQMA representative for NSW DPI) • Industry Biosecurity and a Shared Responsibility (John McDonald, Greenlife Industry Australia) • Enhancing surveillance with on farm monitoring (Jeff Milne, Citrus Australia) • MyPestGuide™ learning about overseas surveillance information (Laura Fagan, DPIRD)
	1:10 pm	**Break**
	2:00 pm	**Surveillance data standards project update** (Mark Stanaway, DAWE)
		Introduction to National Surveillance Protocols (Bernie Wittwer, DAWE)
		Workshop session: Introduction and application of National Surveillance Protocols Facilitators – Mark Stanaway, Bernie Wittwer and Natalie O'Donnell
		Workshop evaluation and wrap up (Natalie O'Donnell, PHA)
	3:30 pm	**Workshop close**

Appendix 3 – Presentation abstracts

DAVID BRITTON

More than 20 years of success: Northern Australia Quarantine Strategy surveillance supporting the response to exotic pest fruit fly incursions in the Torres Strait

David Britton, DAWE

Exotic pests, weeds and diseases present in near neighbouring countries to the north of Australia represent a major threat to Australian agricultural production and the environment. The Northern Australia Quarantine Strategy (NAQS) section of Department of Agriculture, Water and the Environment conducts surveillance for plant and animal pests, weeds and diseases arriving from the north. As part of this, NAQS maintains a network of fruit fly surveillance traps in the Torres Strait and the Northern Peninsula Area of Cape York (NPA). These traps detect seasonal incursions of key exotic fruit fly pests from Papua New Guinea and West Papua. Detections of target species in these traps initiates proportional response activities delivered by the response owner the Queensland Department of Agriculture and Fisheries (QDAF) (supported by NAQS officers based in the Torres Strait). The level and nature of the response activity delivered depends on the number of detections and proximity of the detections to mainland Australia. This surveillance and response represent one of the great success stories for biosecurity in Australia and provides a model for a long-term shared biosecurity responsibility between government, industry and community.

SIMONE CAMERON

NT Farmers and the initiatives around Asian Vegetable Growers

Simone Cameron, NT Farmers Association

Simone Cameron is an Industry Development and Biosecurity Officer for the NT Farmers Association. NT Farmers Association is the peak body for all the plant-based industries in the Northern Territory. They support and represent established and emerging agribusiness industries. The total value of farming production in the NT in 2019 was around $456 million, growing from zero in the 1980's with vegetables providing $61 million, melons $69.4 million, mangoes $128.8 million and other tropical fruit $22.4 million.

NT Farmers Association initiated and assisted with the collaboration of coordinated area wide surveillance surveys predominantly for non-English speaking background farms. Since 2013 they have been pivotal in driving the development of positive strong and resilient relationships with the industries Asian vegetable growers. This assistance ensures that any seasonal pests and disease issues in crops are kept to a minimum and that when any unfortunate incursions have occurred that efficient and practical measures are in place to enable growers to continue operations as quickly as possible with little economic and financial impacts. The NT Farmers Association are a significant conduit for communication channels between our vegetable and market garden growers and other industry organisations and various government agencies. Plant health surveillance is cornerstone to the biosecurity continuum and the continued successful development of the northern plant industry of which NT Farmers Association has a large role to play.

CHRIS DALE

International Plant Health Surveillance Program – Australia's early warning program for current and emerging regional biosecurity pest risks

Chris Dale, DAWE

Australia's management of risks on regulated and unregulated pathways is largely based on intelligence and information about the pest status of other countries and the pathways that are active into Australia. The International Plant Health Surveillance Program (IPHSP) provides this early warning and pre-border intelligence in Australia's northern near neighbours, and is one of five national plant health surveillance programs coordinated and delivered through the Department of Agriculture, Water and the Environment (DAWE).

The IPHSP has coordinated and delivered an annual program of surveillance, diagnostics and capacity development activities across Indonesia, Timor-Leste, Papua New Guinea and Solomon Islands since 2012, identifying regulated and natural pest pathways from Australia's regional and near neighbours into Australia, targeting pests and locations that provide information to better manage Australia's border and supporting Australian plant biosecurity preparedness activities.

This presentation will provide an overview of the International Plant Health Surveillance Program and its importance to the Australian Plant Health Surveillance Network and National Biosecurity system and its Regional and International linkages to the Asia Pacific Plant Protection Organisations (RPPO's) and the International Plant Protection Commission (IPPC).

LAURA FAGAN

MyPestGuide™ learning from overseas surveillance information

Laura Fagan, DPIRD

Preventing invasive species from entering new areas is the most desirable and effective control strategy. Detecting pests in advance of the border can be most challenging and not all surveillance information is suitable to support the commercial trade environment. Australia needs reliable surveillance to identify the presence and/or absence of priority biosecurity pests to determine levels of risk and put in place appropriate preparedness and management measures. Can we learn anything from examining overseas surveillance information to enhance our own trade and market access and reduce our biosecurity risk? Using data collected from MyPestGuide™ users I determine the applicability and operational use of overseas information for measuring biosecurity risks to the existing commercial trade and market access pathway.

LUISE FANNING

CropSafe - Victoria's grains surveillance program

Luise Fanning and Kellyanne Harris, Agriculture Victoria

The CropSafe program is an active surveillance system looking for new pests and diseases in the Victorian grain belt. CropSafe is delivered by Agriculture Victoria's Agriculture Services Grains team in collaboration with a number of major agribusiness companies and private consultants since 2007.

CropSafe is a general surveillance program that relies on data obtained by agronomists, who are trained to identify key pests and diseases of concern. Around 200 agronomists are involved (approximately 85 percent of Victoria's agronomists) in inspecting canola, cereal and pulse crops, looking for anything that appears unusual to send in for expert diagnosis. The program has a streamlined sample receipt, analysis, reporting and record keeping process for all samples that are submitted for diagnostics. Agronomists are asked to provide basic data on the type, number and area of crops inspected. The data is then analysed for an estimate of confidence of area freedom for exotic pests and diseases of those crops. The surveillance standards in place ensure that contestable claims for area freedom can be matched with relevant data. In 2018 CropSafe agronomists reported on just over 1.9 million hectares which is approximately half of the estimated 3.2 million hectares of grain crop in Victoria.

DAVID GALE

The use of surveillance data capture and storage systems to support innovative approaches to sentinel surveillance in botanic gardens

David Gale, Daniela Carnovale and Sharyn Taylor, Plant Health Australia

Australia has over 150 botanic gardens and arboreta that hold a range of native and introduced plant species and are visited by millions of people each year including many from overseas. These factors make botanic gardens excellent sentinels for the early detection of exotic plant pests. A pilot project funded by the Department of Agriculture, Water and the Environment has established the Botanic Gardens Biosecurity Network to explore the ways in which staff and volunteers, can undertake effective surveillance for exotic plant pests. This pilot project in botanic gardens in Western Australia, Victoria, Tasmania, New South Wales and the Australian Capital Territory has been supported by the use of the MyPestGuide™ Reporter app through which absence, and suspect positive, reports have been received for the five target pests. Data are being collated into AUSPest*Check™,* to provide national aggregation and visualisation. This presentation will use the Botanic Gardens Biosecurity Network as a case study to illustrate the flow of data from staff and volunteer members of the Botanic Gardens Biosecurity Network using the MyPestGuide™ Reporter app through to AUSPest*Check™*, and the potential for the outcomes of this project to support the continued development of the Australian Plant Sentinel Network.

KELLYANNE HARRIS

Can urban gardeners contribute to General Surveillance to complement targeted surveillance activities for biosecurity in Australia?

Jo Chong Wah & Kellyanne Harris, Agriculture Victoria

Social research shows that the community are willing to participate in biosecurity surveillance but don't know 'how' or 'why' it's important. The *National Plant Biosecurity Surveillance Strategy 2013-2020* identified 'General Surveillance' as a critical component of the national surveillance system and there is interest in urban/peri-urban areas because of their position on risk pathways for pests and diseases.

The Urban Plant Health Network (UPHN) launched in October 2019 is connecting gardeners in Melbourne with industry and government experts specialising in plant health and biosecurity. Organisations involved include Agriculture Victoria, NGIV, Box Hill Institute, Cesar, AUSVEG, NSW DPI, NSW Local Land Services, Citrus Australia. Agriculture Victoria and the Department of Water and Environment fund the initiative.

The UPHN encourages Melbourne gardeners to learn about exotic pests and get involved in general surveillance of high priority pests. The UPHN highlights six high priority target pests:

- Brown Marmorated Stink Bug
- Asian Citrus Psyllid
- Glassy winged-Sharpshooter
- Red Imported Fire Ant
- Exotic bees
- Spotted Wing Drosophila

With the UPHN project using MyPestGuide Reporter urban gardeners can report anything unusual in their gardens, focusing on the six pests above.

The UPHN uses traditional approaches along with digital technologies to share information and promote surveillance. You can follow the UPHN on Facebook and Twitter (@Urbanplanthlth) or visit the website extensionaus.com.au/urbanplanthealthnetwork.

BRITTANY HYDER

National Border Surveillance: Success in protecting Australia's borders

Brittany Hyder, DAWE

The National Border Surveillance (NBS) is a national surveillance program performing surveillance at premises with Approved Arrangements involved in the importation of goods from overseas and First Points of Entry (airports, seaports and mail centres) across Australia. This program has been operating since November 2016, concentrating on the early detection of any exotic plant pests and diseases but particularly of high priority targets on the lists of National Priority Plant Pests and, more recently, Exotic Environmental Pests. The NBS has shown great success in the early detection and at times eradication of various high risks pests including invasive ants, snails, other invertebrates and plant diseases.

SHAKIRA JOHNSON

Tile iMapPESTS: aiming for the sky in cross-industry plant pest surveillance initiative

Shakira Johnson, AUSVEG; Rohan Kimber, SARDI; Andrew BakeR, Data Effects; Brendan RodonI, Agriculture Victoria; Dusty Severtson, DPIRD; Dean BrookeS, University of Queensland; Nicole Thompson, Sugar Research Australia; David Teulon, The New Zealand Institute for Plant & Food Research Limite;, Jessica Holliday, Hort Innovation, Australia

Australia's agriculture and horticulture industries have joined forces to change the way airborne pests and diseases are detected. The iMapPESTS: Sentinel Surveillance Systems for Agriculture program (iMapPESTS for short) will provide the foundation for a nationwide plant pest surveillance system to monitor and report the presence of pests that threaten major agricultural sectors across Australia, including grains, cotton, sugar, horticulture, wine and forestry industries.
A custom-designed prototype 'sentinel' mobile surveillance unit has been designed to offer optimal sampling of either airborne fungal spores or airborne insects.
Samples captured by the sentinels are sent to entomologists and molecular diagnosticians for identification of target pests and diseases, such as powdery mildew and light brown apple moth. The sentinels also collect environmental data at the time of sampling, which are married with pest and disease information and stored in a secure cloud-based system for downstream reporting.
Agriculture Victoria are using samples to test the application of Next Generation Sequencing diagnostic techniques for the broadscale detection of exotic pests and diseases. The iMapPESTS website aims to act as a centralised repository for all project-related data, reports and other materials generated across the eight distinct sub-projects nested within the overarching project.

HELEEN KRUGER

Strengthening general surveillance through systems thinking

Heleen Kruger, ABARES, DAWE

General surveillance is increasingly seen as a cost-effective way to obtain monitoring data about pest and disease status. Different forms of general surveillance are already making a considerable contribution to Australia's biosecurity system. However, such initiatives can be challenging to instigate and maintain due to interrelated social, institutional, organisational, ecological and infrastructure dimensions. Much of the literature dealing with general surveillance focuses on certain aspects of general surveillance only, such as data management, community engagement or the development of smart phone applications. In addition, there is considerable fragmentation between sectors (plant, animal, marine and environment) in their pursuits to progress general surveillance with limited sharing of lessons learned between them. In response to these challenges ABARES' General Surveillance Project explores general surveillance from a holistic systems thinking perspective to capture key considerations for the different system components and the dynamics between them in order to develop general surveillance guidelines. This session will provide an overview of the project, progress to date and next steps.

JANET MCDONALD

Protecting Queensland Timber Resource

Janet McDonald, DAF Qld

The Qld forest & timber industry value chain contributes approximately $3.2B to the economy and employs 10,000 people. The softwood industry supplies raw materials that contribute >$550M.

As part of a project developing a high-risk forest biosecurity surveillance program, Janet McDonald, DAF Forest Health Team, identified three high risk areas around Brisbane as being of particular risk based primarily on the concentration of Approved Arrangements (AAs) with high quantities of imported goods being processed. Spatial datasets of high risk sites were created, these include AAs, seaports, airports, sawmills, hardware stores and timber importers. Sites where previous incursions have been detected were also mapped.

Pinus sp. trees around these high risk sites were located using remote sensing methods and mapped, which greatly reduced the time and resources needed for surveillance and on-ground health assessments. This new mapping also reduced the amount of time required to design and implement the Projects high risk area trapping surveillance program.

As part of the same project key stakeholder groups were targeted for forest biosecurity awareness training. These groups included the Qld Arboricultural Association, Council arborists/field staff and arboriculture students. Training focused on high priority biosecurity pests, symptom recognition, reporting, field hygiene and collection techniques. It has enabled arborist's and field staff to recognise damaging tree pests and diseases, and will help to highlight future threats increasing our capacity to detect exotic pests and pathogens before they become established.

This high risk site mapping and forest biosecurity training is essential to improving the likelihood of early detection, enabling more rapid and targeted eradication, thereby protecting Queensland's pine plantations.

JOHN MCDONALD

Industry Biosecurity and a Shared Responsibility

John McDonald, Greenlife Industry Australia

Across state, territory and commonwealth legislation and within the rhetoric of biosecurity strategies, reports, infopacks, brochures, etc., there is the continued promotion of the mantra of a 'Shared Responsibility' along the biosecurity continuum. This is particularly focused upon industry with the expectation growers will take on higher levels of activities and assist government in areas such as surveillance, specifically in support of Australia's national evidence of absence.

Plant producers are likely to be heavily exposed to financial pain if they participate in a national surveillance program under the current approach across Australian governments when managing plant pest incursion responses. The system fails to recognise the value of a business(s) participating in such a manner and in fact will openly claim value for supporting national evidence of absence yet will not apply the same value domestically. For industry to be an equal partner in the 'Shared Responsibility' the national system, particularly states and territories, will need to change the overall approach as the current policies and regulations are not conducive to such an environment. Industry is investing more in plant biosecurity than they have historically with grower based programs such as BioSecure HACCP offering opportunities to underpin broader policy and regulatory change.

RORY MCLELLAN

Where Plant Health Surveillance fits in the Biosecurity system (BMSB a case study)

Rory MacLellan, Surveillance Incursion Investigation Plant Health, Biosecurity New Zealand

This presentation will show where and how targeted Plant Health Surveillance fits in the whole of Biosecurity continuum within New Zealand, using a recent detection of Brown Marmorated Stink Bug (BMSB), (*Halyomorpha halys*) as an example. BMSB is a pest of concern in all of Australasia and continues to spread throughout Europe and North America in the Northern Hemisphere and has recently been detected in Chile in the Southern hemisphere. The presentation will also highlight the lessons learned about surveillance for BMSB and what has been implemented in New Zealand for early detection of BMSB.

JEFF MILNE

Enhancing surveillance with on farm monitoring

Jeff Milne, Citrus Australia

The citrus industry is export focussed, in 2019 over 273,000 t, 40% of production valued at over $500 m went to overseas markets, predominantly in Asia.

Industry and the Department of Agriculture have developed protocols to ensure pests of concern in Australian citrus are not received in the major markets Korea, China, and Thailand. The protocols consist of Integrated Pest Management, orchard registration, and packinghouse controls and involve regular monitoring for the pests of concern verified by registered crop scouts who conduct at least one orchard inspection to verify the orchard records.

Citrus Australia maintain the database as the KCT (Korea China Thailand). By including exotic pests in the monitoring protocols industry now has evidence of absence from those pests.

Citrus Australia is currently investigating how the data can be transferred to AUSPestCheck and how it can be considered as part of national surveillance.

A pilot on farm yellow sticky trapping program for the Asian Citrus Psyllid *Diaphorina citrii* to understand the process of distribution, deployment, and diagnostics nationally has recently completed.

Citrus Australia is working with agencies to ensure both projects provide recognised surveillance outcomes.

JANINE O'DONNELL

Surveillance to support trade and market access

Janine O'Donnell, NSW DPI

This presentation will give a short introduction to how domestic trade and market access works and how plant health surveillance is vital to certifications and negotiations.

MURRAY SHARMAN

Surveillance and studies for endemic and exotic virus diseases in Timor-Leste and northern Australia

Murray Sharman[1], Lynne Jones[2], Abel Ximenes[3]
[1] Department of Agriculture and Fisheries, Queensland; [2] Department of Agriculture, Water and the Environment, Australian Government; [3] National Directorate of Quarantine and Biosecurity, Timor Leste

Several surveys for virus threats were done in northern Australia and Timor-Leste from 2016 – 2018. Samples were tested during surveys and returned to Australia under quarantine permit for further lab testing for poleroviruses. *Cotton leafroll dwarf virus* – CLRDV (the causal agent for cotton blue disease) has now been detected in *Gossypium barbadense*, *G. arboreum* and *G. hirsutum* in Timor-Leste in many locations across the country and has also been found in ornamental hibiscus. These Gossypium species were only present in very low numbers but the virus was present in greater than 25% of Gossypium plants tested.

During surveys in Timor-Leste, another three new polerovirus species were found in various host species. A couple of these aphid-transmitted polerovirus species were also detected in northern Australia, suggesting a wind-borne pathway for aphids may exist between Timor-Leste and Australia. Such a pathway may change the risk profile for a possible movement of *Cotton leafroll dwarf virus*, or other insect-borne threats, into northern Australia which is of particular interest with the expansion of cotton production in far northern regions.

PACO TOVAR

Towards sustainable post-border surveillance programs

Paco Tovar, PHA

Using recent experiences from the national forest biosecurity program and other programs, this presentation will discuss some of the pitfalls encountered in setting up multi-stakeholder programs, dealing with resource constraints, the benefits of a partnership approach and how to slowly change entrenched paradigms.

Acronyms & glossary list of common terms

ACRONYM	TERM/MEANING
–	**Area freedom** – absence of a specific pest in a specified location (which may include pest free areas, pest free places of production or pest free production sites).
ASW	**Annual Surveillance Workshop** – for members of the PSNAP.
–	**Biosecurity continuum** – describes the range of locations where biosecurity risks may arise and where biosecurity activities take place – pre-border, at the border and post-border.
CSIRO	**Commonwealth Scientific and Industrial Research Organisation –** an Australian Government agency responsible for scientific research.
DAWE	The Commonwealth **Department of Agriculture, Water and the Environment.**
DAF QLD	Queensland Government's **Department of Agriculture and Fisheries.**
–	**Delimiting survey** – a survey conducted to establish the boundaries of an area considered to be infested by or free from a pest.
–	**Detection survey** – a survey conducted in an area to determine if pests are present.
DJPR	Victorian **Department of Jobs, Precincts and Regions.**
DPIPWE	Tasmanian **Department of Primary Industries, Parks, Water and Environment.**
DPIRD	Western Australia **Department of Primary Industries and Regional Development.**
EPP	**Emergency Plant Pest** – a plant pest that is included in Schedule 13 (of the EPPRD) or which is determined by the Categorisation Group to meet one or more of the following criteria: (a) It is a known exotic Plant Pest the economic consequences of an occurrence of which would be economically or otherwise harmful for Australia, and for which it is considered to be in the regional and national interest to be free of the Plant Pest. (b) It is a variant form of an established Plant Pest which can be distinguished by appropriate investigative and diagnostic methods and which, if established in Australia, would have a regional and national impact. (c) It is a serious Plant Pest of unknown or uncertain origin which may, on the evidence available at the time, be an entirely new Plant Pest or one not listed in Schedule 13 and which if established in Australia is considered likely to have an adverse economic impact regionally and nationally. (d) It is a Plant Pest already found in Australia that: (i) is restricted to a defined area through the use of regulatory measures intended to prevent further spread of the pest out of the defined area or into an endangered area; and (ii) has been detected outside the defined area; and (iii) is not a native of Australia; and (iv) is not the subject of any instrument for management which is agreed to be effective risk mitigation and management at a national level; and (v) is considered likely to have an adverse economic impact such that an emergency response is required to prevent an incident of regional and national importance.
EPPRD	**Emergency Plant Pest Response Deed (EEPRD)** – a pre-agreed cost sharing and response framework for dealing with an incursion of an EPP.
–	**Endemic pest** – a plant pest which is native to Australia or an established pest which is not subject to containment and is therefore unlikely to be eradicated.
–	**Established pest** – a plant pest that is perpetuated, for the foreseeable future, within any area and where it is not feasible (whether in terms of technical feasibility or a benefit/cost analysis) to eradicate.
–	**Exotic pest** – a plant pest that is not known to occur in Australia.

ACRONYM	TERM/MEANING
–	**General Surveillance** – a process whereby information on particular pests which are of concern for an area is gathered from many sources, wherever it is available and provided for use by biosecurity agencies. General surveillance for a pest can support multiple surveillance objectives.
GIA	**Greenlife Industry Australia –** the peak industry body for businesses and organisations that provide products and services for greenlife production; produce, supply and retail greenlife or promote the benefits of and share greenlife with the community.
GRDC	**Grains Research and Development Corporation –** invests in research, development and extension to create enduring profitability for Australian growers.
IPPC	**International Plant Protection Convention.**
ISPM	**International Standard for Phytosanitary Measures**
NAQS	**Northern Australian Quarantine Strategy** – delivered by DAWE. Established in 1989 to provide an early warning system for exotic pest, weed and disease detections across northern Australia and to help address unique biosecurity risks facing the region. Details are available here.
NEBRA	**National Environmental Biosecurity Response Agreement** – sets out emergency response arrangements, including cost-sharing, for biosecurity incidents that primarily impact the environment and/or social amenity, including marine pest incidents, where the response is for the public good.
NSP	**National Surveillance Protocol** – a nationally endorsed technical reference guide for conducting surveillance on a specific plant pest or group of plant pests for a particular purpose. It includes information on the surveillance methodology, pest biology and taxonomy, identification and sample processing for diagnosis.
NSW DPI	**New South Wales Department of Primary Industries**
NSW LLS	**New South Wales Local Land Services**
NT DITT	**Northern Territory Department of Industry, Tourism and Trade**
–	**Phytosanitary measure** – any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of pests, or to limit the economic impact of regulated pests.
PBRI	**Plant Biosecurity Research Initiative –** a partnership between the nation's plant Research and Development Corporations, working collaboratively with Plant Health Australia, the Department of Agriculture, Water and the Environment, industry, state and federal biosecurity stakeholders.
PHA	**Plant Health Australia** – the national coordinator of the government-industry partnership for plant biosecurity in Australia.
PHC	**Plant Health Committee** – the peak government plant biosecurity policy and decision-making forum.
–	**Plant Biosecurity –** a set of measures which protect the economy, environment and community from the negative impacts of plant pests. A fully functional and effective biosecurity system is a vital part of the future profitability, productivity and sustainability of Australia's plant production industries and necessary to preserve the Australian environment and way of life.
–	**Plant health surveillance** – formal and informal monitoring to detect changes in Australia's plant pest status or changes in plant biosecurity risk or plant pest prevalence, which may affect imports, exports and/or onshore production.
–	**Plant pest** – any species, strain or biotype of invertebrate pest or pathogen injurious to plants, plant products or bees or impacting social amenity or the environment.
PIRSA	Department of **Primary Industries and Regions, South Australia**
PSNAP	**Plant Surveillance Network Australasia–Pacific** – this network.
PSNWG	**Plant Surveillance Network Working Group** – the working group of SNPHS responsible for the PSNAP.
SDQMA	**Subcommittee on Domestic Quarantine and Market Access** – a subcommittee of the Plant Health Committee.

ACRONYM	TERM/MEANING
SNPHS	**Subcommittee on National Plant Health Surveillance** – a subcommittee of the Plant Health Committee.
SPHD	**Subcommittee on Plant Health Diagnostics** – a subcommittee of the Plant Health Committee.
SRA	**Sugar Research Australia** – invests in and manages a portfolio of research, development and adoption projects that drive productivity, profitability and sustainability for the Australian sugarcane industry.
–	**Surveillance** – processes which collect and record data on pest presence or absence through survey, monitoring or other procedures.
–	**Surveillance design –** process of assessing the pest surveillance requirements to deliver across a range of surveillance objectives in order to better mitigate the risks on identified pest pathways.
–	**Surveillance plan –** identifies the objectives of the surveillance, the operational groups that will deliver the surveillance activities, the methods that will be used to detect the pest and the sites that will be targeted to address the risks. Surveillance plans will indicate the resources and the quantity of effort required to deliver surveillance to meet the objective.
–	**Surveillance protocol** – a technical reference guide for conducting surveillance on a specific plant pest or group of plant pests. It includes information on the surveillance methodology, pest biology and taxonomy, identification and sample processing.
USC	**University of the Sunshine Coast**, Queensland Australia.
UQ	**The University of Queensland**, Australia.