

Global collaboration: International Plant Sentinel Network

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ABSTRACT



Invertebrate and pathogen pests present a significant risk to global plant health, and this threat is ever rising due to the growing global trade of plant material and, increasingly, as evidence suggests that climate change is influencing pest establishment in new locations. Sentinel plants within botanic gardens and arboreta can play a vital role in providing information on future and/or unknown threats. The objective of the International Plant Sentinel Network (IPSN) is to act as an early warning system to recognise new and emerging pest and pathogen risks,

through the development of national and international partnerships between plant protection scientists and botanic gardens and arboreta. There are currently 71 members of IPSN. They include the Australian National Botanic Gardens (Canberra), Kings Park and Botanic Garden (Perth), Royal Botanic Gardens Victoria, National Arboretum Canberra, Royal Botanic Garden Sydney, Royal Tasmanian Botanical Gardens, and the Botanic Gardens and State Herbarium of South Australia. As part of the project 'Establishing a Program of Plant Pest Surveillance in Australian Botanic Gardens and Arboreta', which is funded through the Australian Government's Agricultural Competitiveness White Paper – the Government's plan for stronger farmers and a stronger economy – Plant Health Australia has had the opportunity to develop connections with the IPSN to build capacity and knowledge, locally and abroad.

This brief talk outlines the opportunities which exist through the International Plant Sentinel Network for collaboration in the context of the biosecurity, health, trade nexus as it impacts food security and nutrition.

Two organisations I shall frequently refer to are Plant Health Australia, and Botanic Gardens Conservation International. Plant Health Australia is the national coordinator of the government–industry partnership for plant biosecurity in Australia. It is a not-for-profit member-based company, and works in partnership with industry, governments, researchers and others to facilitate and manage improvements in biosecurity policy and practice across Australia's plant industries. The other organisation, Botanic Gardens Conservation International (BGCI), is a worldwide botanic garden networking organisation, established in 1987 with headquarters in the Royal Botanic Gardens, Kew, UK, and offices in the USA, Kenya, Singapore and China.

This record has been prepared from a transcript of the presentation.

The International Plant Sentinel Network (IPSN) is a global network of botanic gardens, arboreta, plant health institutes and National Plant Protection Organisations, coordinated by BGCI. The IPSN provides an early warning system for threats from new and emerging insect pests and pathogens.

How?

Plants growing outside their native range can be monitored for damage by pests or pathogens that are native or naturalised to the host country. Information can then be collated on the risks these organisms could pose if introduced into the plants' native range. And as we have heard already today, with global trade continuing to increase, there is increasing likelihood of moving insect pests and pathogens around the world on host material or as hitchhikers.

There are over 3000 botanic gardens worldwide. They have a broad geographical and climatic range, and contain about 30% of the known plant species. They also have a wealth of expertise in the staff who know their living collections 'inside out'. The gardens hold native and non-native species of plants, and contain pests and pathogens native and naturalised to the host country of the botanic gardens. Of these 3000 botanic gardens, 71 are members of the IPSN, including the Australian National Botanic Gardens here in Canberra, Kings Park and Botanic Garden in Perth, the Royal Botanic Gardens Victoria, the National Arboretum here in Canberra, the Royal Botanic Garden Sydney, Royal Tasmanian Botanical Gardens, and the Botanic Gardens and State Herbarium of South Australia.

Australia's contributions to the IPSN

IPSN member gardens in Australia are undertaking surveillance on five host plants, as part of a project funded by the UK Department for Environment, Food and Rural Affairs. They record, using a plant health checker (proforma), any insect pests or pathogens that are affecting the host species. The same logic could be applied to host species being grown in Australian botanic gardens that have their origins in a food insecure country, or where Australian natives have been grown as part of development projects: eucalyptus plantations, for example. In both those cases there is an opportunity to exchange information on the pest threats – that is, insect pests or pathogens – that could potentially impact those species.

Also, in a different approach to this surveillance, Plant Health Australia is running a project called 'Establishing a Program of Plant Pest Surveillance in Australian Botanic Gardens and Arboreta', which is funded through the Australian Government's *Agricultural Competitiveness White Paper* (2015) 'Stronger Farmers; Stronger Economy'.

In this project, botanic gardens have been looking for five pests on potentially susceptible host species. The five pests are: brown marmorated stink bug; rose rosette virus; myrtle rust; stigma leaf spot, and polyphagous shot hole borer. Rather than looking at the host, we are looking for the pest irrespective of the host. This is still potentially useful in an international context because we might find a new strain of myrtle rust, for example.

There are opportunities through this process as well. Although in our project we are looking for early detection using botanic gardens as sentinels, there may be opportunities to find the next pest that could impact one of these crops or one of these species overseas.

Thinking ahead

International trade is continuing to increase, and as a consequence there is an increased risk of moving insect pests and pathogens around the world quite quickly. Through engagement with botanic gardens, both in Australia and globally, there is an opportunity to get a 'heads-up' on what the next big pest threat might be, based on the species that are there. Thinking ahead by incorporating botanic gardens into projects, there is an opportunity for mutual development of skills and knowledge on insect pests and pathogens, for the benefit of Australia and partner countries.

Reference

Commonwealth of Australia (2015) *Agricultural Competitiveness White Paper*. Canberra. https://www.awe.gov.au/sites/default/files/documents/ag-competitiveness-white-paper_0.pdf

David Gale is currently the Manager, Data Management and Surveillance Communities, at Plant Health Australia (PHA) where, amongst other things, he has recently been managing a Department of Agriculture, Water and the Environment funded project working with Australian botanic gardens to improve national plant pest surveillance outcomes. The networks of staff and Friends of botanic gardens developed through this project also connect into the International Plant Sentinel Network (IPSN) to contribute to collaborative efforts to conduct plant pest surveillance across many countries. Prior to working at PHA David completed a Master of Philosophy undertaking a project investigating the way in which certain composts act to ameliorate acid sulphate soils in Vietnam's Mekong Delta. David was a Crawford Fund Conference Scholar in 2012 and a Crawford Fund IRRI scholarship awardee in 2013. David is an ACT RAID events representative, and the RAID representative to the ACT Crawford Committee.