

BGANZ 2017 CONGRESS

BGANZ's Potential Role in the International Plant Sentinel Network

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Executive Director and CEO

Improving national biosecurity outcomes through partnerships



Outline of Presentation

- Role and work of Plant Health Australia and NZ's B3
- Risk, Surveillance and Botanic Gardens
- Myrtle Rust – a case study
- The Virtual Co-ordination Centre - Opportunities for data sharing

Plant Health Australia

- Not for profit, public company, member based
- Provide national coordination to improve:
 - biosecurity across Australia's plant industries and native flora
 - capacity to respond to plant pest emergencies
 - Custodians of the Emergency Plant Pest Response Deed
- Work with Members to build partnership arrangements and broker and facilitate between government and industry in the national interest.

Biosecurity is the management of risks to the economy, environment and community, of pests and diseases entering, emerging, establishing or spreading.

Better Border Biosecurity



Better Border Biosecurity (B3) is a multi-partner, cooperative science collaboration that researches ways to reduce the entry and establishment of new plant pests and diseases in New Zealand.



Australian Government



State and Territory Governments



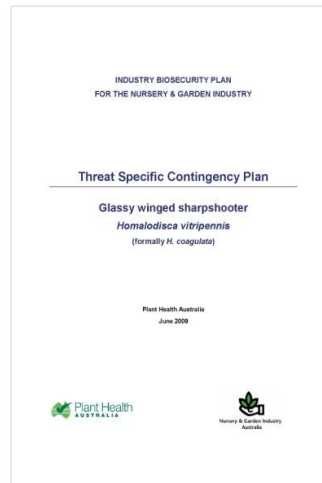
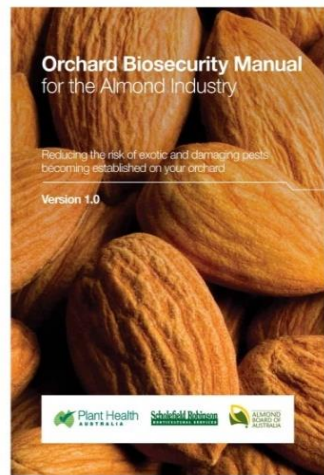
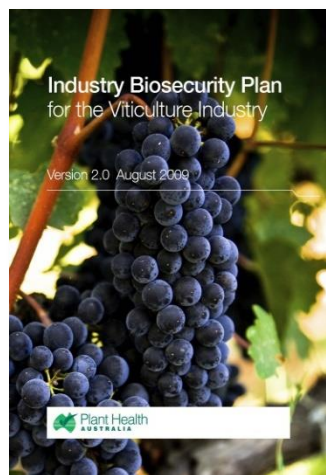
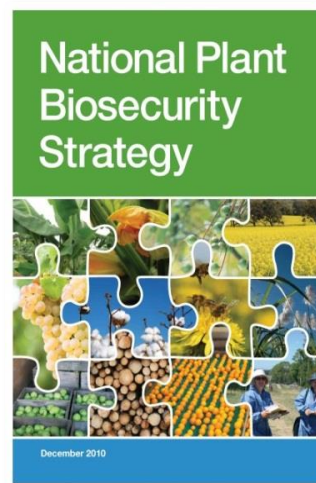
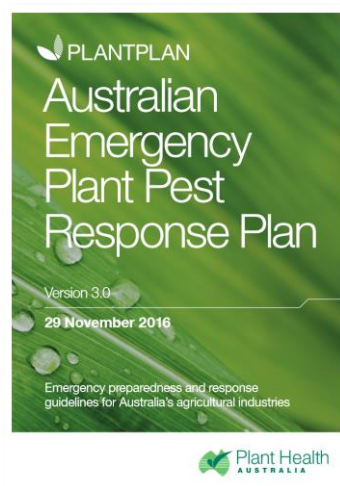
Industry members



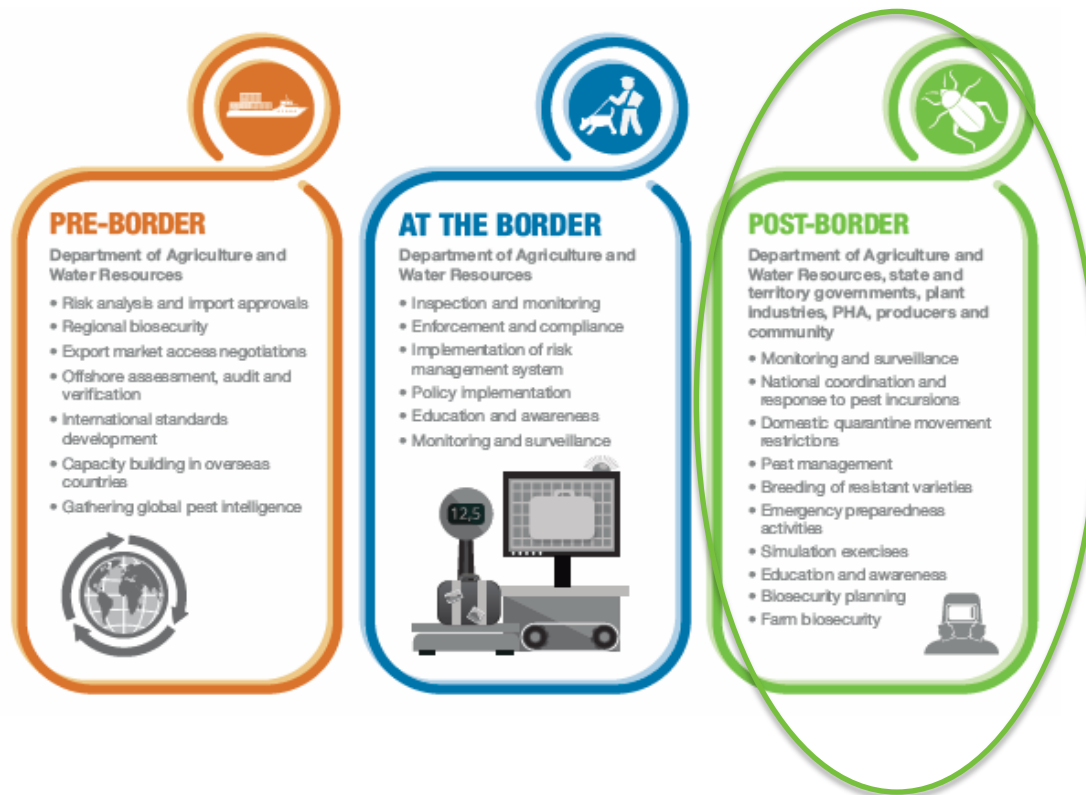
Associate members



What does PHA do?



Australia's biosecurity system



Emergency Response Arrangements

Emergency Plant Pest Response Deed

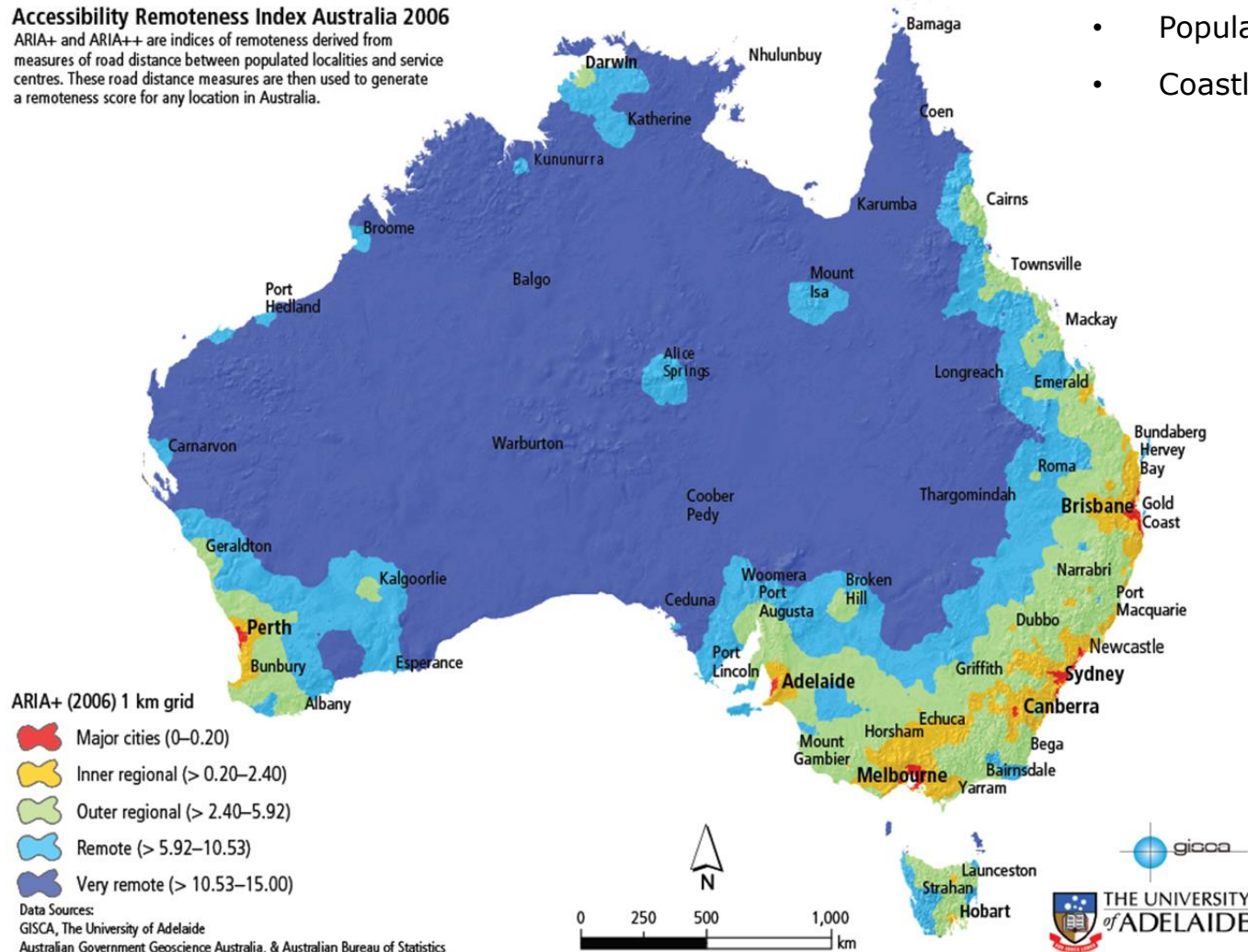
- Facilitate immediate reporting
- Facilitate early response
- Parties who fund responses have a role in decision making
- Defined funding responsibilities
- Signed by Australian government, all state and territory governments and 33 plant industries
- **Parties have obligation to ongoing process of risk mitigation at national, regional and premises levels**

Remoteness index

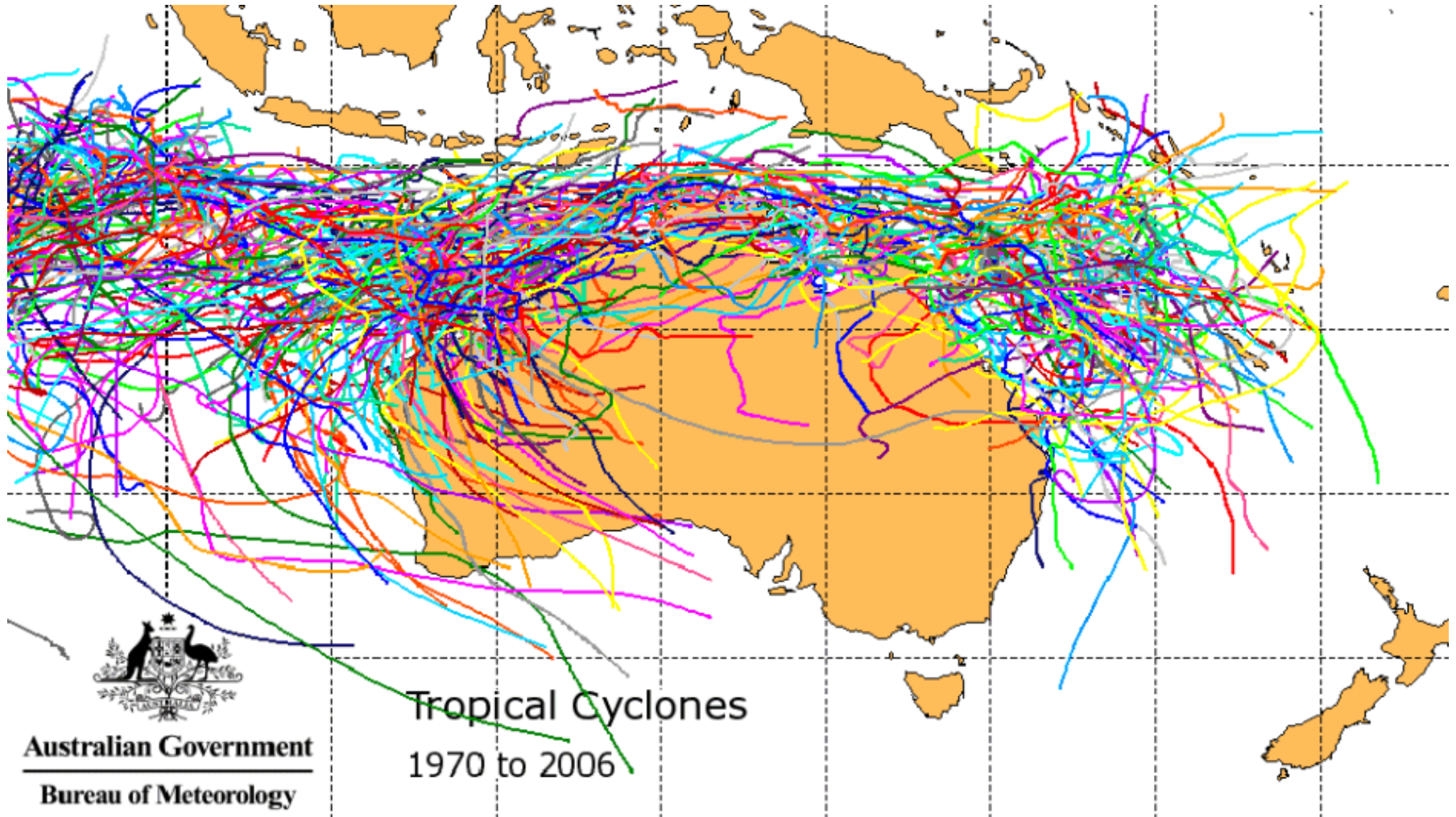
Accessibility Remoteness Index Australia 2006

ARIA+ and ARIA++ are indices of remoteness derived from measures of road distance between populated localities and service centres. These road distance measures are then used to generate a remoteness score for any location in Australia.

- Population: 24,700,000
- Coastline: 60,000km

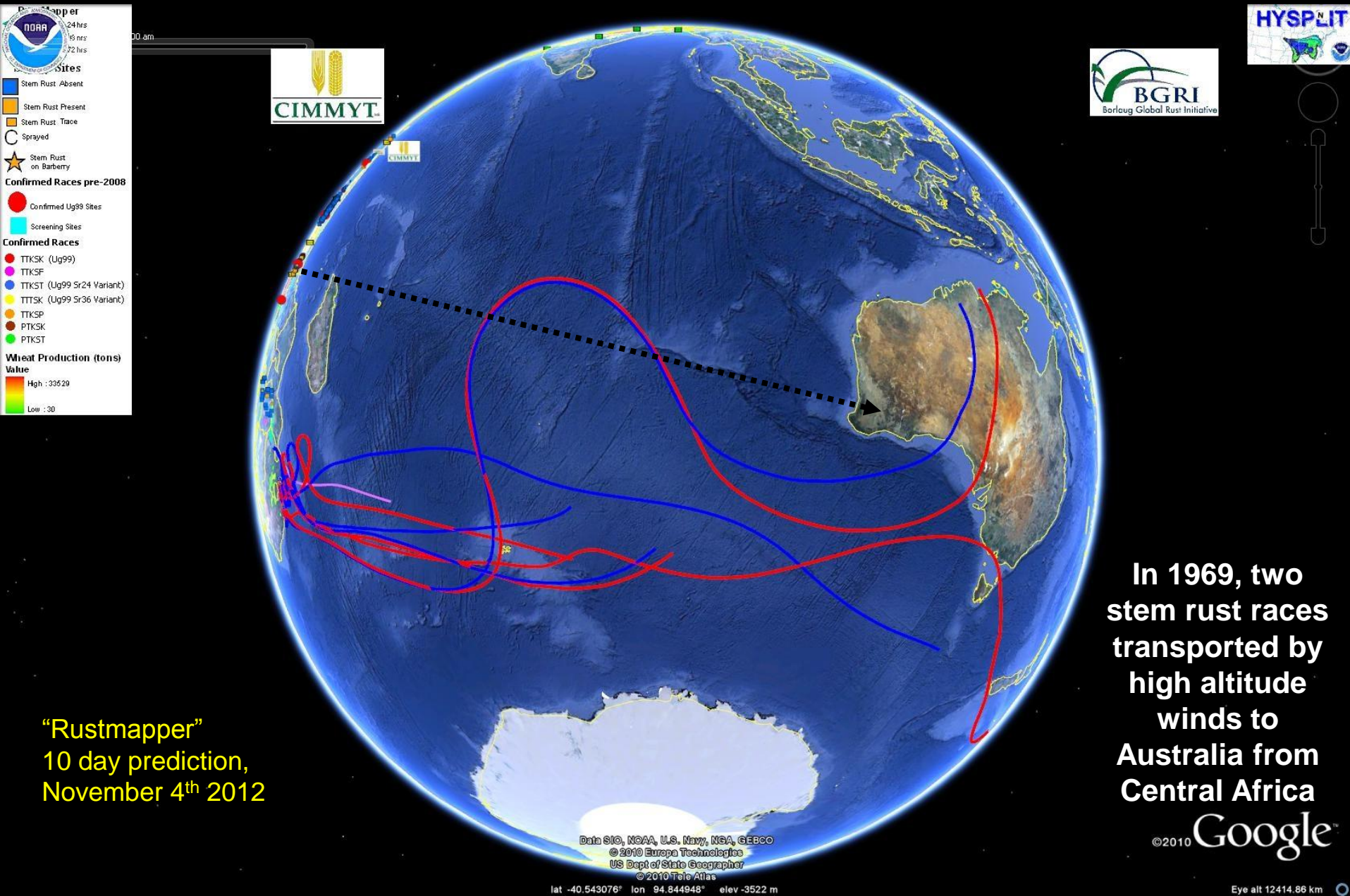


Tropical cyclones explained ?



Ug99 – should Australia be worried? Intercontinental tracking of rust pathogens

-modelling wind trajectories, Dr Dave Hodson FAO [UN]



“Rustmapper”
10 day prediction,
November 4th 2012

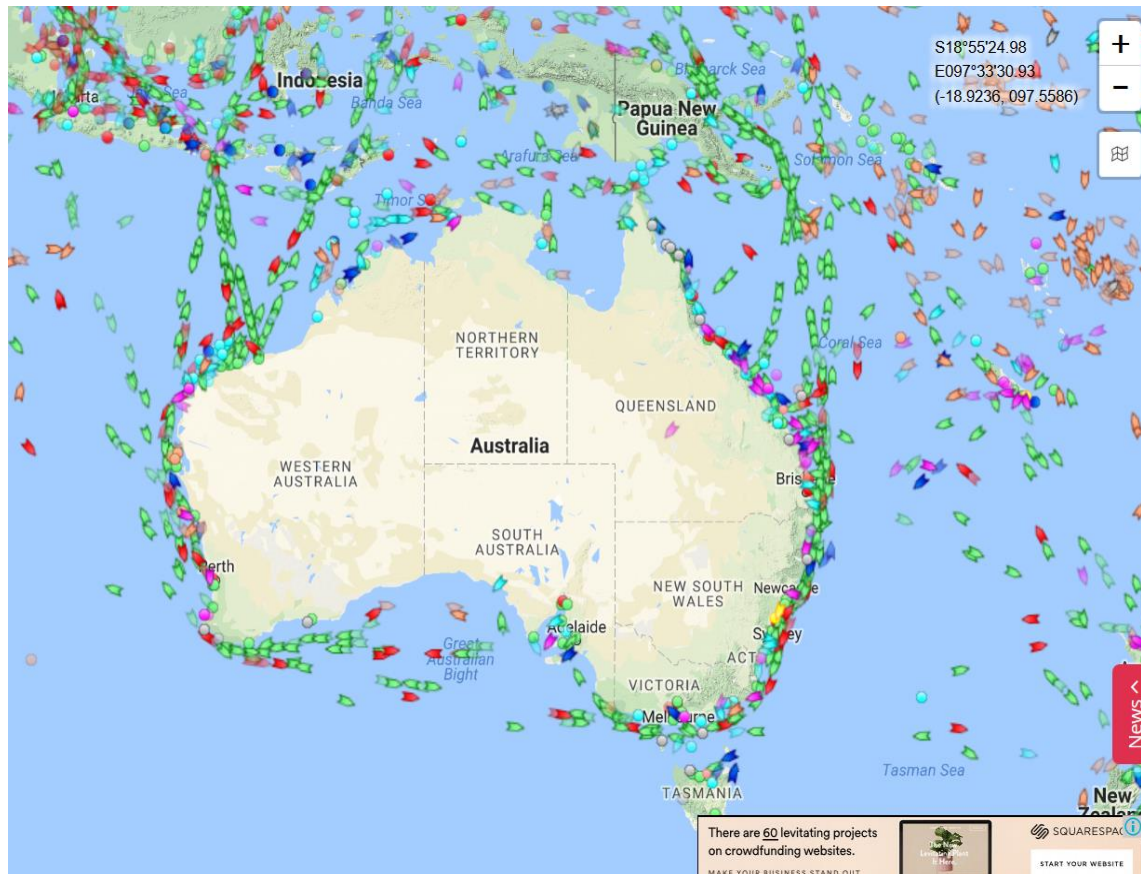
Northern Australian Quarantine Strategy



People and freight.....

www.marinetraffic.com

Marine traffic 4 pm Wed





Risk – return approach



In this photo provided by New Zealand Maritime, a sea crane, foreground, arrives to **begin removing some of the 1280 containers that remain** on board the cargo ship Rena. Picture: AP Source: AP

People and freight.....

www.flightradar24.com

Air traffic over Australia 4 pm Wed

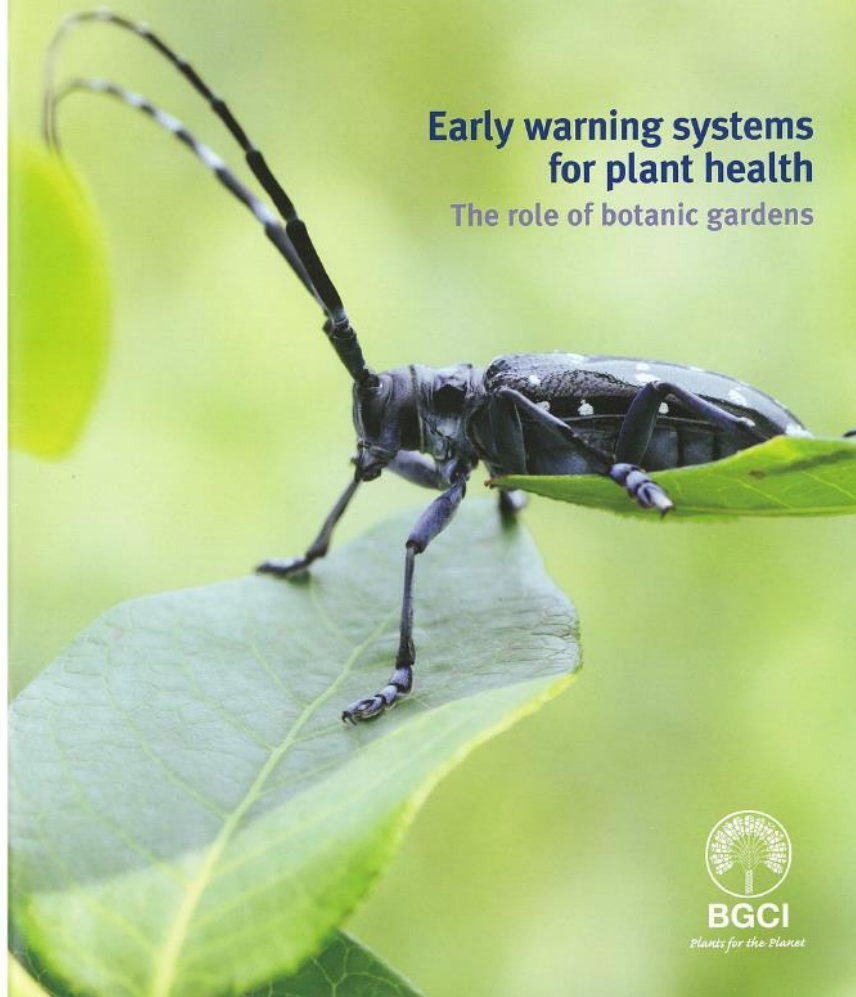


BGjournal

Journal of Botanic Gardens Conservation International

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**Early warning systems
for plant health**
The role of botanic gardens



BGCI

Plants for the Planet



International Plant
Sentinel Network

The IPSN is being developed to facilitate collaboration amongst institutes around the world, with a focus on **linking botanic gardens and arboreta**, National Plant Protection Organisations (NPPOs) and plant health scientists.

The aim will be for these institutes to work together in order to provide an **early warning system of new and emerging pest and pathogen risks**.

Member gardens will help to provide scientific evidence regarding known quarantine organisms and potential new risks in order to inform plant health activities and thus help safeguard susceptible plant species worldwide.




International Plant
Sentinel Network

The IPSN aims to:

- seek and share examples of best practice;
- develop standardised methodologies for monitoring and surveying of damaging plant pests and pathogens;
- provide training materials to increase capability among member gardens;
- facilitate access to diagnostic support;
- develop databases in order to share and store information; and
- communicate scientific evidence.

Globally significant pests and diseases



International Plant Sentinel Network


fera Kew BGCI Forest Research

EMERGING PEST AND DISEASE THREATS FOR EUROPE:

Sirococcus blight

Sirococcus tsugae


S. tsugae is a fungus which is the cause of shoot blight and defoliation (up to 70%) on cedars and hemlocks. It was first detected in the UK in 2013, and is native to the Pacific Northwest and Northeastern and Southeastern U.S. Known hosts include *Cedrus* and *Tsuga* species, specifically, *C. atlantica* (Atlas cedar), *C. deodara* (Deodar cedar), *T. canadensis* (Eastern hemlock), *T. heterophylla* (Western hemlock) and *T. mertensiana* (Mountain Hemlock).



Symptoms on *Cedrus* spp.

Affected pink needles
Brown discoloration under the bark (Forest Research)
Fruiting bodies on dead needles (Forest Research)

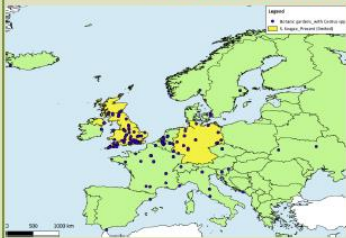
- **All year:** branch cankers are present as dark red/purple bark lesions or depressions; brown lesions are present in phloem tissue; resin bleeds may accompany cankers which spread longitudinally from affected shoots into branches
- **Other symptoms** vary dependent upon season –
- **Spring:** dead needles (which can be pink) on shoots, dead shoots, cankers and gum exudation
- **Summer:** characteristic pink needles, fruiting bodies on brown dead needles
- **Winter:** fruiting bodies may be seen on surface of cankers or dead needles, branches may be girdled and die



Symptoms on *Tsuga* spp.

Shoot blight on a young *Tsuga heterophylla* (Forest Research)
Shoot blight on *Tsuga mertensiana* (Forest Research)
Defoliation and shoot blight on *T. mertensiana* (Forest Research)

So far the only symptoms recorded on *Tsuga* spp. with *Sirococcus* blight are shoot blight and defoliation



How botanic gardens and arboreta can help?

Shoot blight will disfigure the shape of trees and cause severe defoliation (up to 70%). Cankers can girdle the branches and in severely affected cases the cankers can girdle the trunk, causing young trees to die.

Further research is required to determine:

1. The European distribution of *Sirococcus* blight
2. To collect information on the susceptibility of host species

The map opposite shows the distribution of botanic gardens and arboreta with *Cedrus* spp. present (data from www.bgci.org/plant_search.php). Institutes can aid research by reporting on:

- Whether *Sirococcus* blight is present in your collection?
- Which host species are affected?
- How severe are the symptoms?

Please note: plants should have more than one symptom before considering *S. tsugae* as a cause. Similar symptoms can be caused by other factors including environmental factors (frost damage, drought etc.)

REPORT ANY SUSPECTED SIGHTINGS TO _____ **DATE:** _____

For more information about the IPSN go to: www.plantsentinel.org.

Reference source: Forest Research, BGCI & Fera Version: 1.1 Mar 2017 Useful website: <https://natures.fera.defra.gov.uk/gpnhw/ukRegion/viewPestDiseases.htm?pestid=27308>



International Plant Sentinel Network

fera Kew BGCI

EMERGING PEST AND DISEASE THREATS IN THE UK:

Xylella fastidiosa

Xylella fastidiosa is a damaging bacterium with a vast host range. *X. fastidiosa* is causing significant mortality to olive trees (*Olea* spp.) in southern Italy and has been found on ornamental plants in Corsica, southern France and most recently Spain. *X. fastidiosa* is transmitted by xylem-feeding insects such as spittlebugs (eg. *Philaenus spumarius*) see inset image. Garden hosts include rosemary (*Rosmarinus officinalis*), lavender (*Lavandula angustifolia*), Hebe spp., and Cistus spp. For more information see: www.gov.uk/government/uploads/system/uploads/attachment_data/file/572108/xylella-fastidiosa-imp-trade.pdf



Olive *Olea* spp.

Donato Boschi, UCL, Bari (IT)
Donato Boschi, UCL, Bari (IT)
Françoise Petter, EPPO

- Leaves turn brown at the tip, progressing to branch die-back
- Chlorosis, withering and desiccation of terminal shoots
- An abundance of suckers develop at the base of the tree as long as the roots remain viable
- Brown leaves remain until dislodged by weather
- The crown of the tree appears burnt or scorched
- Trees develop a skeletal appearance



Myrtle-leaf milkwort *Polygala myrtifolia*

Donato Boschi, CHIR - Institute for Sustainable Plant Protection, UCL, Bari (IT)

- Leaf scorch and desiccation starting at the tip
- Scorch progresses to the entire leaf
- Entire branches die-back and plant turns pale brown



Oleander *Nerium oleander*

Donato Boschi, CHIR - Institute for Sustainable Plant Protection, UCL, Bari (IT)

- Chlorotic mottling along leaf edges – turns to brown
- General stunting of leaves and internodes
- Defoliation after leaf scorch has killed the leaves
- New growth will also be symptomatic



Oak *Quercus* spp.

John Hartman, University of Kentucky, Bugwood.org

- Scorch is pronounced with a dull red or yellow halo between the normal colour and scorched section
- Can appear on leaves of all ages at the same time thus a whole branch/tree can be affected
- Leaves may curl and drop prematurely



Cherry *Prunus* spp.

Donato Boschi, CHIR - Institute for Sustainable Plant Protection, UCL, Bari (IT)

- V-shape necrosis commonly appears on leaves
- Scorch is pronounced with a dull red or yellow halo between the normal colour and scorched section
- Scorch is often noted in late summer and autumn on mature leaves
- Leaves may curl and drop prematurely

Please note: plants should have more than one symptom before considering *X. fastidiosa* as a cause. Similar symptoms can be caused by other factors including other pests and diseases and environmental factors (frost damage, drought etc.)

Inset photo: Spittlebug nymph, David Cappaert, Bugwood.org, Prunus symptoms, Donato Boschi, UCL, Bari (IT)

REPORT ANY SUSPECTED SIGHTINGS TO _____ **DATE:** _____

For more information about the IPSN go to: www.plantsentinel.org.

Reference source: The RHS Version: 1.1 Mar 2017 Useful website: https://www.epppo.int/QUARANTINE/special_topics/Xylella_fastidiosa/Xylella_fastidiosa.htm

Botanic Garden networks

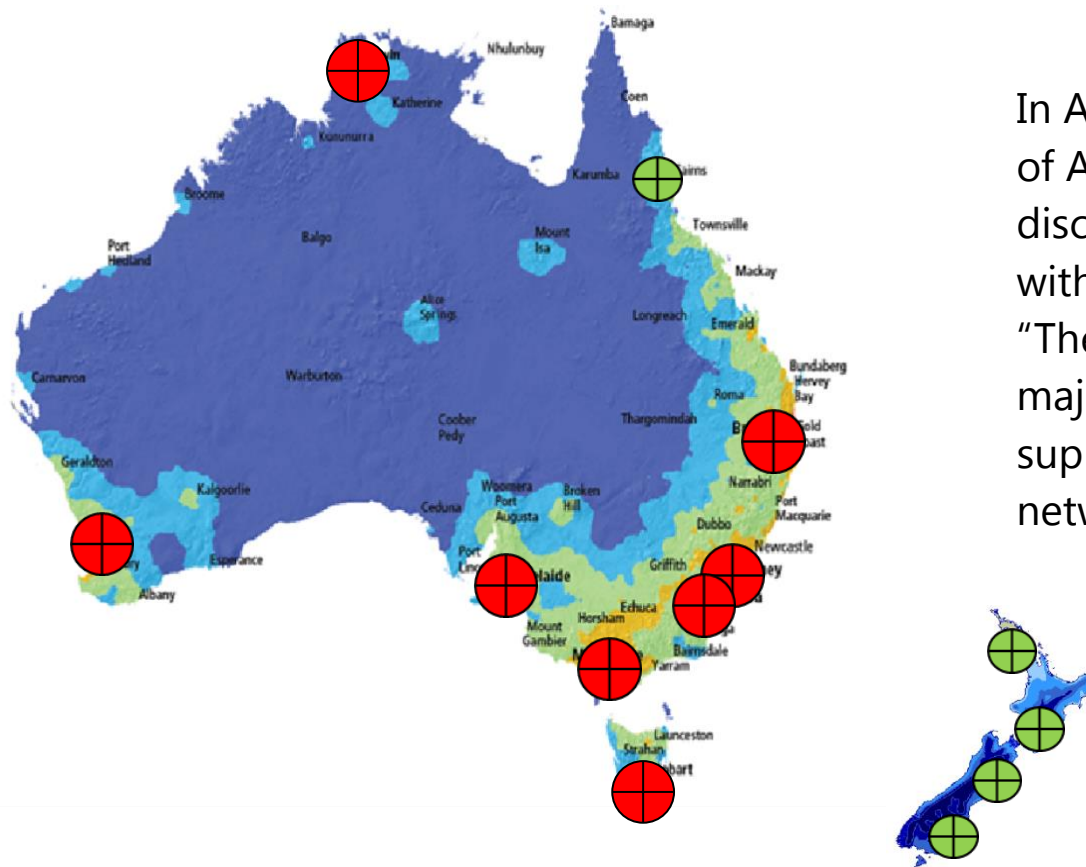


International Plant
Sentinel Network



B3

Science Solutions for
BETTER BORDER BIOSECURITY
www.b3nz.org



In April this year, the Council of Heads of Australian Botanic Gardens (CHABG) discussed the IPSN and agreed to work with PHA.

“There was strong support, with the major city botanic gardens in Australia supporting the establishment of this network across Australia”



Canberra Arboretum



Extinct in the wild

Franklin Tree (*Franklinia alatamaha*).
Toromiro (*Sophora toromiro*).

Critically endangered

Clanwilliam cypress (*Widdringtonia cedarbergensis*). Moroccan cypress (*Cupressus dupreziana* variety *atlantica*). Parana Pine (*Araucaria angustifolia*). Saharan cypress or Tarout (*Cupressus dupreziana* variety *dupreziana*). Wollemi pine (*Wollemia nobilis*). Native to Australia.

Endangered

Dawn redwood (*Metasequoia glyptostroboides*). Dove tree (*Davidia involucreata*). Giant Sequoia (*Sequoiadendron giganteum*). Guadalupe palm (*Brahea edulis*). Maidenhair tree (*Ginkgo biloba*). Monkey puzzle tree (*Araucaria araucana*). Monterey Pine (*Pinus radiata* variety *radiata*). Morrisby's gum (*Eucalyptus morrisbyi*). Spanish birch (*Betula pendula* subspecies *fontqueri*). Taiwanese trident maple (*Acer buergerianum* subspecies *formosanum*).

Uredo rangelii, *Puccinia psidii* and
now *Austropuccinia psidii* (Myrtle Rust)



Why are we still interested ?

> 350 species from 57 different genera

- Natural infection = 235
- Inoculated studies only = 115

46 species rated as highly or extremely susceptible

(Giblin FR & Carnegie AJ (2014) *Puccinia psidii* (Myrtle rust) - Australian host list. Version current at 23 Oct. 2014. <http://www.anpc.asn.au/myrtle-rust>)



IPSN Risk Assessment for NZ Myrtaceae



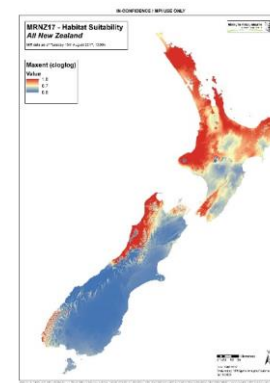
Ex post study of myrtle rust impact on NZ plants in Australian gardens

- Targeting NZ plant species: pōhutukawa, mānuka, *Lophomyrtus* & feijoa
- **Question:** Can impact of myrtle rust on these plants in Australia help inform assessment of risk for myrtle rust in NZ?
- Examine the concept of sentinel plants (IPSN) for risk assessment
- Seeking support from Australian Botanic Gardens

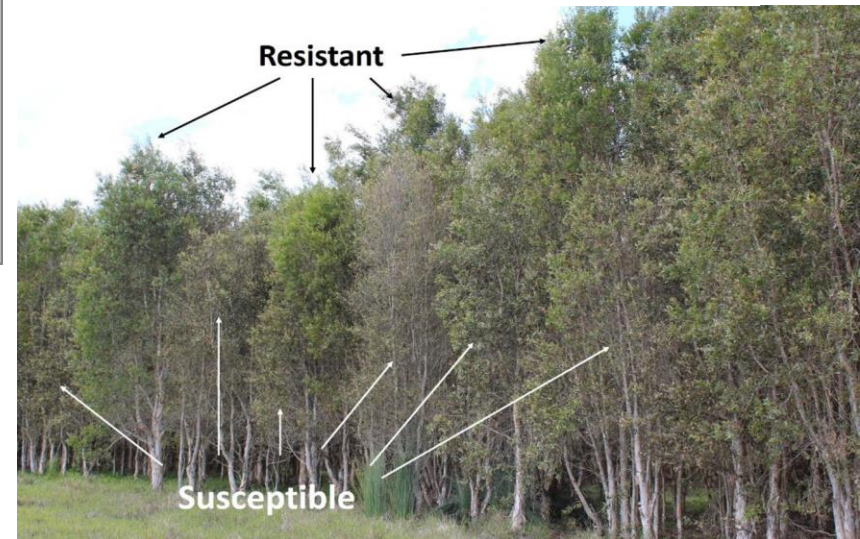
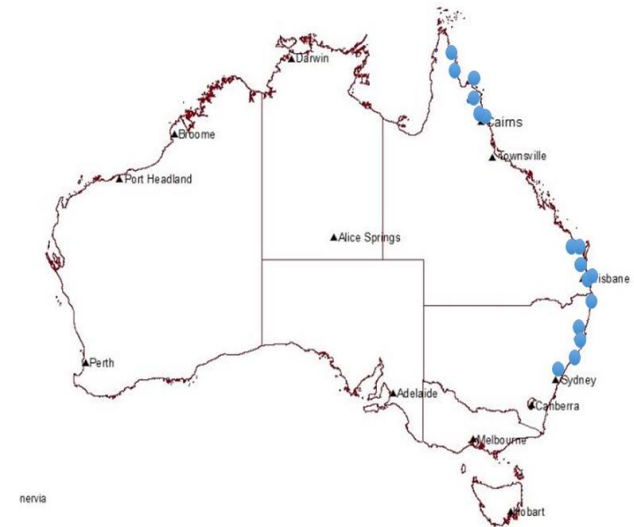
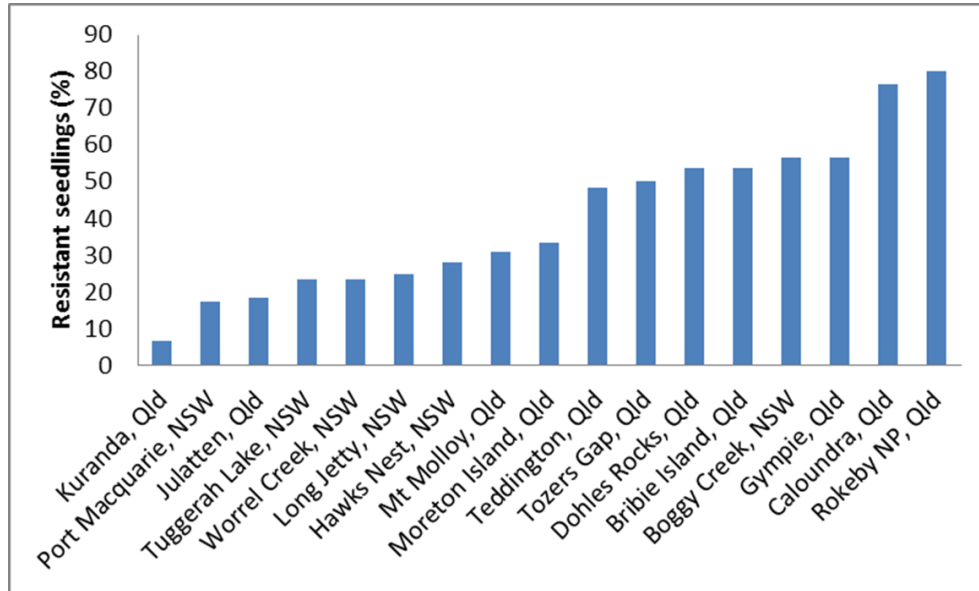
Contact: David.Teulon@plantandfood.co.nz



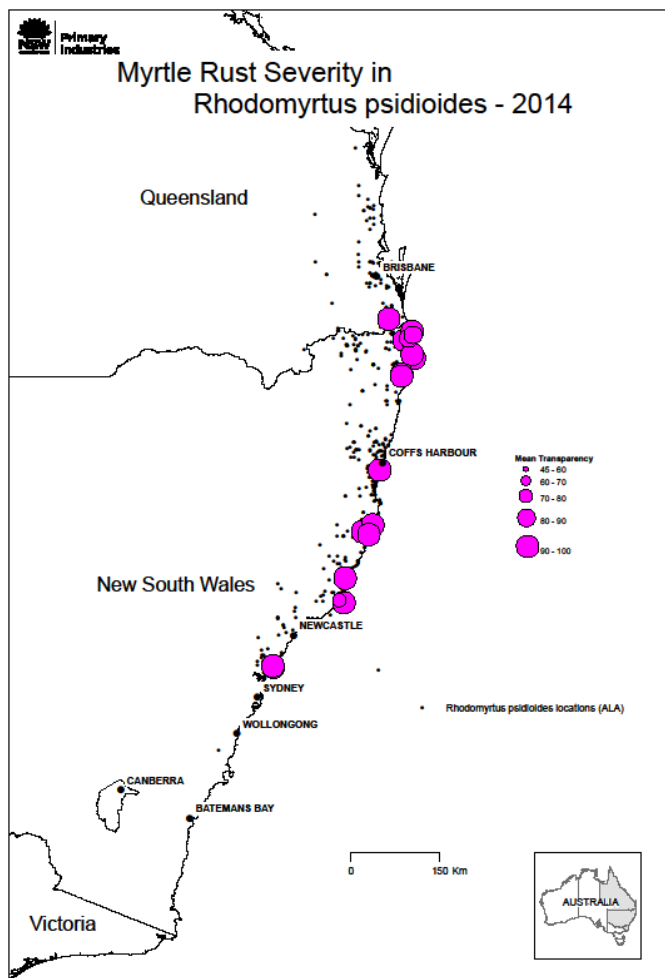
?



Melaleuca quinquenervia provenance susceptibility



Myrtle rust in *Rhodomyrtus psidioides*











Virtual Coordination Centre for Plant Pest Surveillance (AusPestCheck)

- Facilitate an innovative national system capable of receiving, collating & providing real time surveillance information on weeds and plant pests
- The project was designed to foster cooperative interaction with a wide range of plant biosecurity stakeholders



Mapping Facility : Russian Wheat Aphid



Surveillance Details

Pest type
All ▼

Pest Name
Diuraphis noxia (Russian wheat aphid)

Inspected Unit type
All ▼

Host Name or Trap Identifier
Host Name...

Pest Detection Status
All ▼

Date and Location

Select state
All states ▼

Region or Municipality
Location Name...

From date
📅

To date
📅

Data Set Details

Provider Type
All ▼

Provider Name
Provider Name...

Include Unverified data Sources
No ▼


RESET

SEARCH

Surveillance Records

View On Map

Map Satellite



Legend

- Pest Present
- Pest Absent
- Inconclusive Result
- Multiple Detection Statuses

Web sites / e-mails of interest ?

planthealthaustralia.com.au

Better Border Biosecurity b3nz.org

farmbiosecurity.com.au

biosecurityportal.org.au

beeaware.org.au

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