

CASE STUDY: PATHOGENS OF WATTLES & EUCALYPTS

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A case study of emerging disease risks for Australia in overseas plantations.

Species

Several pathogens not in Australia that infect *Acacia* and *Eucalyptus* species in overseas plantations including those listed in the table, below.¹

Potential environmental impacts

As exemplified by the impacts of myrtle rust (see our myrtle rust case study), plant species exposed to new pathogens can be devastated by disease. By exporting eucalypts and wattles for large-scale cultivation in plantations, Australia has created conditions for overseas pathogens to shift host species and adapt to infecting Australian natives. Wingfield (2003) discusses the increasing risk of such "host jumping":

... native pathogens, previously thought to be relatively host specific and non-threatening, are adapting to infect exotic plantation trees. Other than the damage that these pathogens are causing to exotics, they now pose a serious threat to the same or related tree species in their areas of origin. This tremendous threat is only just being recognised and it is little understood.

An estimated 18 million hectares in 80 countries are planted with eucalypts, and wattles are grown in plantations in Africa and South East Asia. The same risk applies to other Australian plants grown as crops – for example, sheoaks, Geraldton wax and kangaroo paw (for the cut flower trade), and *Duboisia myoporoides* (for pharmaceuticals).

High-density monocultures are favourable habitats for new pathogens to infect, and can support far greater pathogen densities than are typically found in natural situations. New diseases are rapidly emerging in overseas plantations – some of the most serious due to native pathogens jumping host to the non-native plantation species. Global trade and travel then provide the means for pathogens adapted to Australian species overseas to eventually make it into Australia, where



Pathogens	Countries	Impacts
<i>Chrysosporthe cubensis</i> (fungus)	South America, Central America, South East Asia	Jumped from Melastomataceae species, causes serious stem canker disease in eucalypts.
<i>Chrysosporthe austroafricana</i>	Africa	Jumped from <i>Syzygium</i> species, causes serious stem canker disease in eucalypts.
<i>Ceratocystis fimbriata</i> (fungus)	Republic of Congo, Uganda and Brazil	Causes disease and death in eucalypts.
<i>Ceratocystis albifundus</i>	Africa	Jumped from Protea species and 6 other genera, causes rapid wilting, dieback and death of <i>Acacia mearnsii</i> in plantations.
<i>Ceratocystis acaciavora</i>	Indonesia	Causes severe canker wilt disease in <i>Acacia mangium</i> plantations in Sumatra.

Growing eucalypts and other Australian trees in plantations overseas increases the risks of new diseases in Australia due to overseas pathogens adapting to our trees.

Photo: Forest and Kim Starr | CC BY 2.0

many more hosts await them in natural ecosystems or in cultivation. Myrtle rust is just the first of several pathogens that could follow this path. Also of serious concern are the rapidly increasing numbers of insects that are adapting to Australian trees grown overseas.

BIOSECURITY ISSUES

Taking these potential disease threats seriously requires focusing on disease risks to Australian plants overseas as well as in Australia. The biosecurity agency should be working with forest managers overseas to identify risks and to adopt practices to minimise the transfer of pathogens from native forests to plantations and crops of Australian species. We should be funding research

to assess disease risks and identify pathways for their potential entry into Australia. The risk of pathogen transfer either from Australia or into Australia should be taken into account when plants are developed for cropping overseas, particularly when there are large plant families in common.

These serious risks warrant a strong biosecurity focus, including risk identification and prioritisation, pathway analysis and contingency planning. A recent review of biosecurity recommended 'implementation of a systematic approach for national priority pests and diseases, including environmental' and 'action plans for managing national priority pests and diseases' (Craik 2017).



Scrub myrtle (*Rhodamnia rubescens*) has been so badly hit by myrtle rust since the disease reached Australia in 2010 that it was nominated for national listing as critically endangered. Myrtle rust, which originated from South America, is an example of a pathogen that jumped hosts to infect Australian eucalypts grown overseas. Photo: Tim Low

CHANGES NEEDED

Risk assessment and contingency planning

- The identification of high risk pathogens for Australia should be made a high priority.
- A program of work should be conducted to prevent emerging diseases in overseas plantations from reaching Australia, including contingency planning and surveillance.
- The potential for the generation of new disease risks should be considered when native Australian species are exported.

ABOUT OUR CASE STUDIES

Our case studies illustrate the need for changes in how Australia prevents the establishment of new invasive species. They were compiled using publicly available information at the time of the last update. We would welcome new information or updates to biosecurity response for inclusion in future updates.

CONTACT US

- Visit invasives.org.au for more information about the Invasive Species Council and to get in touch.

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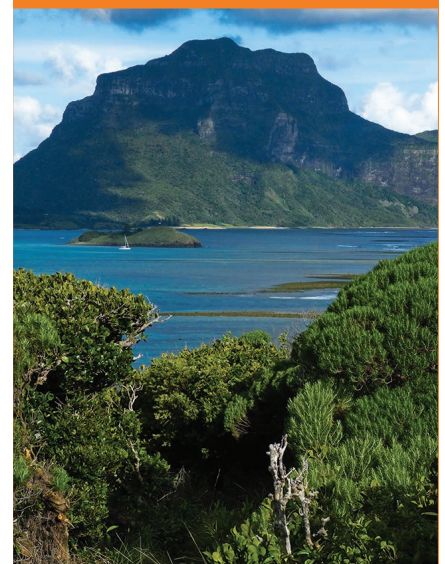
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ENDNOTES

1 This issue was summarised in Booth (2011).

OUR MISSION

To protect the environment from harmful new invasive species through prevention and early action.



Stronger biosecurity is vital to protect the highly endemic wildlife of Australia and its many special wild places. This is Lord Howe Island, where invasive species have already caused several extinctions. Photo: Robert Whyte