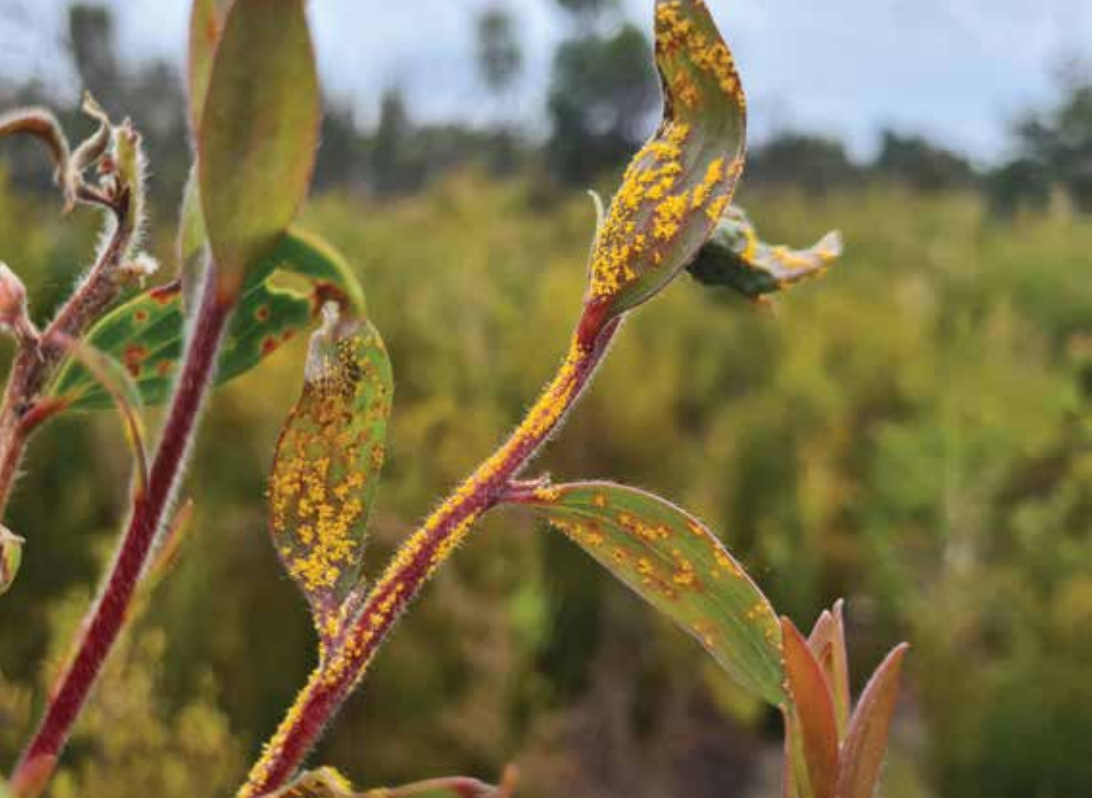
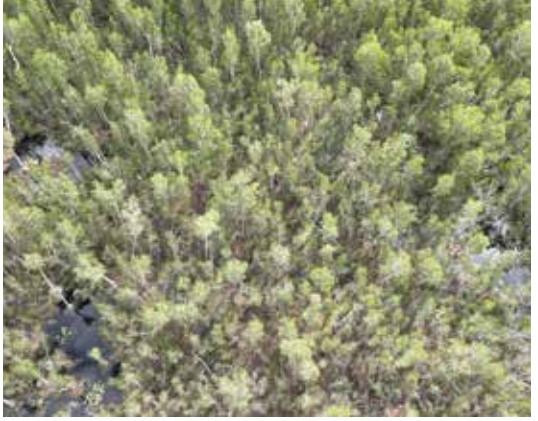
Defending WA against MYRTLE RUST

by Mia Townsend, Kylie Ireland and Loretta Lewis

Twelve years after reaching Australia, myrtle rust (*Austropuccinia psidii*) has been detected in Western Australia for the first time in the remote and rugged east Kimberley. Dealing with this serious environmental pathogen in such a vast landscape has its challenges. Citizen surveillance and community awareness are key to managing and protecting WA's myrtaceous flora from the disease.





For more than a decade, an introduced pathogen known as myrtle rust (*Austropuccinia psidii*) has significantly impacted the east coast of Australia, spreading quickly throughout New South Wales, Queensland, Victoria, Tasmania and the Northern Territory after its initial detection north of Sydney in 2010. Until recently, Western Australia has avoided infection largely due to the arid land in the centre of the State acting as a natural barrier, and the careful implementation of hygiene and quarantine protocols. Unfortunately, this honeymoon period of being 'myrtle rust free' in WA ended abruptly in June 2022, when the pathogen was detected for the first time at a remote site in the east Kimberley, about 100 kilometres north-east of Kununurra.

Now, the management of this serious plant disease is relying on teamwork and community participation to monitor and control the spread.

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Main *Eucalyptus miniata* overlooks the Ord River and surrounding east Kimberley landscape from the Five Rivers Lookout in Wyndham
Photo – Amy Priemus
Below Myrtle rust confirmed on *Melaleuca* north-east of Kununurra.
Photo – Louise Shuey

Above left *Melaleuca quinquinervia* symptoms.
Photo – Geoff Pegg

Top right Aerial view of a mound spring.
Photo – Louise Shuey

Above right *Eucalyptus* seed.
Photo – Amy Priemus

MYRTLE RUST IN WA

Myrtle rust is an introduced and highly invasive fungal disease. It is native to South and Central America but has invaded a number of other regions globally. Myrtle rust can be recognised by its characteristic masses of bright yellow or orange-yellow spores, which are often surrounded by a purplish or reddish-brown halo. It affects plants within the Myrtaceae (myrtle) family, which includes many of WA's iconic native tree and wildflower species.

Since its arrival in Australia, experts have been working to keep the pathogen out of WA through a combination of hygiene and quarantine protocols, proactive surveillance and awareness-raising activities.

In 2022, myrtle rust was detected as a part of the proactive targeted surveillance carried out by the Department of Biodiversity, Conservation and Attractions (DBCA) and the Department of Primary Industries and Regional Development (DPIRD). Myrtle rust is thought to have been introduced to the Kimberley via windblown spores from existing infestations in the NT. The infected site was one of a series of important ecosystems that form the priority ecological community of wetlands associated with the organic mound springs on the tidal mudflats of the Victoria Bonaparte Bioregion.

"While it is very concerning to have finally found myrtle rust in WA, the remote and relatively inaccessible location really is a best-case-scenario," Mia Townsend, DBCA's former Plant Diseases Program Coordinator said.

"While we are unable to do anything about the spores blowing in on the wind from the NT, we are now well placed to address other pathways that may move spores around, such as the movement of people.

"To do this, we need to keep track of where the pathogen occurs."

Discover more about myrtle rust

Scan this QR code or visit Parks and Wildlife Service's '*LANDSCOPE*' playlist on YouTube.

Protecting WA's biodiverse south-west

A priority for the management of myrtle rust in WA is to attempt to stop the spread into the south-west ecoregion, where the species diversity of myrtaceous plants is astoundingly high. Modelling shows that the climate in south-west WA is ideal for the pathogen to thrive. Coupled with a plethora of potential host species, the impact of this disease in the south-west could be very high.

Scientists are not only concerned about the potential impacts of the disease on native plants but have also expressed concerns about the impact that loss of habitat could have on fauna. Dr Bronte van Helden is leading important research into the way that mammal species in south-west WA utilise habitat, particularly in urban and peri-urban environments where myrtle rust is likely to thrive due to factors like irrigation, frequent pruning and more regular burning.

"Myrtaceous plants are critical for many mammal species in WA, often forming the key species of woodland and forested habitats," Dr Bronte van Helden said.

"Myrtle rust could have devastating consequences for these mammals, particularly threatened species. One such example is the critically endangered western ringtail possum (*Pseudocheirus occidentalis*), which relies on myrtaceous trees such as peppermint (*Agonis flexuosa*), marri (*Corymbia calophylla*) and jarrah (*Eucalyptus marginata*) for food and shelter.

"If these trees and associated habitats are degraded by myrtle rust, the possum and other threatened species will face an even greater risk of extinction."

With arid regions to the north and east of south-west WA and little cyclonic activity connecting it to known myrtle rust infected areas, the main risk of introduction to the south-west comes from human movement. It's important for visitors to think carefully about hygiene and be sure to wash or wipe down clothes and gear before and after getting out in nature.

Myrtle rust has had a devastating impact on some species and communities in Queensland and New South Wales, driving formerly common species such as the native guava (*Rhodomyrtus psidioides*) to the brink of extinction.

"From what we've seen with myrtle rust, it's particularly impacting on the Melaleuca species or paperbarks," Dr Geoff Pegg, Senior Forest Pathologist at Queensland's Department of Agriculture and Fisheries said.

"In some situations, what we're finding is reduced levels of flowering, and that plants can't compete with surrounding vegetation because they are being impacted repeatedly by the fungus.

"Finding a solution to manage this once it escapes into the surrounding environment is extremely challenging."

PREPARING FOR IMPACT

Perhaps one of the most challenging aspects to managing myrtle rust in WA is the lack of information on the potential

Top left Western ringtail possum (*Pseudocheirus occidentalis*) or ngwayir.
Photo – Jiri Lochman

Above Native guava (*Rhodomyrtus psidioides*) trees found dead four years after myrtle rust arrived in Australia.
Photo – Peter Entwistle

Right Myrtle rust on weeping paperbark (*Melaleuca leucadendra)*, found in the Kimberley in 2022.
Photo – Nathan Ashburner

Spotlight on Myrtaceae

The taxonomic family Myrtaceae represents a highly diverse and ecologically important group of plants in WA. They are found in a wide range of habitats, including forests, woodlands, heathlands, and wetlands, and play a crucial role in the ecosystem by providing food, shelter, and habitat for a diverse range of fauna, including birds, insects, and mammals. Many myrtaceous species have also been traditionally used by Aboriginal people for medicinal and cultural purposes, highlighting their cultural significance.

Myrtaceous plants can be identified using several key features that are characteristic of the family Myrtaceae.

Scent: (1) One of the most distinguishing features of Myrtaceae is the presence of aromatic oils in the leaves, stems and flowers, which gives them a characteristic scent when crushed. If held up to the light and viewed through a magnifying glass or hand lens, distinctive oil dots can be seen on the leaves of Myrtaceous plants.

Leaves: (2) Other characteristics include simple leaves that are usually opposite or alternate on the stem and have entire margins (i.e. no teeth or serrations).

Flowers: (3) The flowers of Myrtaceae are usually solitary or in clusters, with five petals and a conspicuous ring of stamens around the base of the ovary.

Fruit: (4) The fruit of Myrtaceae is typically a berry, capsule, or nut, which contains small seeds. In some species, the fruit is edible and can be used for food.

Some well-known Myrtaceae genera include:

Agonis (5) includes the WA peppermint tree (*Agonis flexuosa*), which is widespread through natural areas and gardens in the south-west of WA. *Agonis* is known to be highly susceptible to myrtle rust.

Callistemon*/*Calothamnus*/*Beaufortia (6) genera include plants commonly known as bottlebrushes. Bottlebrushes are often used as bird-attracting plants in gardens.

Melaleuca (7) genus includes paperbark trees, which are often traditionally used in Aboriginal cultural practices and some tea trees that are used in the essential oils industry. Myrtle rust was detected on two species of *Melaleuca* in the east Kimberley.

Eucalytpus*/*Corymbia (8) are the iconic gum trees and are the dominant genera in many Australian woodlands and forests. Although these genera are not highly susceptible to the pandemic strain of myrtle rust we have in Australia, they are more vulnerable to other exotic strains of myrtle rust. If a new strain was to enter Australia, the impact could be devastating for bushland areas, gardens and industries like honey production and specialty timber products.

Chamelaucium (9) includes Geraldton wax, a stunning plant that is commonly used in gardens and in flower arrangements. Many of the waxes are known to be highly susceptible to myrtle rust.

Eugenia (10) (*E. reinwardtiana)* is categorised as a Priority 1 species as not much is known about its occurrence in northern WA. If you see this plant, make a report, whether you see myrtle rust on the plant or not! Myrtle rust has had considerable impact on this species in Queensland.

Main Jarrah forest. *Photo – Jiri Lochman.*
1) Oil dots on marri leaf. *Photo – Cliff Winfield* **2)** Jarrah leaves. *Photo – Marie Lochman* **3)** *Calytrix depressa* flowers. *Photo – Cliff Winfield*
4) Leaves and fruits of marri tree. *Photo – Sallyanne Cousans*
5) Peppermint *(Agonis flexuosa)*. *Photo – Marie Lochman* **6)** *Callistemon*. *Photo – Cliff Winfield* **7)** Graceful honeymyrtle *(Melaleuca radula)*.
8) Large-fruited mallee *(Eucalyptus youngiana)*. *Photos – Marie Lochman*
9) Geraldton wax *(Chamelaucium uncinatum)*. 10) *Eugenia reinwardtiana*. *Photos – Geoff Pegg*

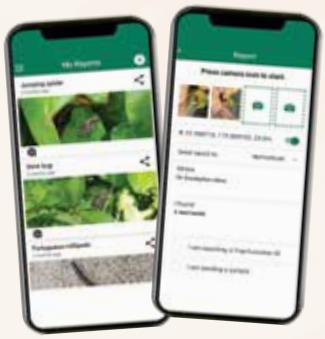
What can you do to help?

WA is a vast State, and many relatively remote areas such as the Kimberley are at risk from myrtle rust. The only way to combat the spread is for everyone to be aware of myrtle rust, know what to look for, and know what to do if it's spotted.

If we can build a network of citizen scientists keeping an eye out, we stand the best chance of finding myrtle rust early if it spreads into towns or national parks and managing it as proactively as possible.

ARRIVE CLEAN, LEAVE CLEAN!

Being aware of environmental hygiene to limit the spread of myrtle rust by people and other biosecurity threats such as dieback is another key area where everyone can play a part. Myrtle rust spores are abundant and spread mostly via wind, but they can also be spread via infected plant material, contaminated equipment, vehicles and clothing—even skin and hair.



BIOSECURITY IS EVERYONE'S RESPONSIBILITY

- Ensure items are free of soil and organic matter before entering and exiting bushland.
- Use wash down and boot cleaning stations where available.
- Wash and disinfect all items on your return home.
- Always stay on roads and trails.

If you suspect you have found myrtle rust—don't touch it! Take a photo and report it via the MyPestGuide® reporter app or by contacting the Pest and Disease Information Service on (08) 9368 3080, email padis@dpird.wa.gov.au. For general myrtle rust related enquiries, contact enquiries@dbca.wa.gov.au

susceptibility in Myrtaceous species, many of which are unique to WA. To safeguard species potentially at risk, teams at the WA Seed Centre are storing seed and growing ex-situ collections for species potentially at risk.

Screening for myrtle rust susceptibility is also underway, with University of Sydney PhD candidate Alyssa Martino conducting glasshouse trials using seed from the WA collections. Preliminary results from this pivotal research indicate that certain WA species have little to no natural resistance to the disease and may be impacted severely if the pathogen were to become widespread in WA.

Understanding how vulnerable certain species are to myrtle rust is key for directing future conservation and seed collection efforts so that WA is as prepared as possible to deal with this imminent biosecurity threat.

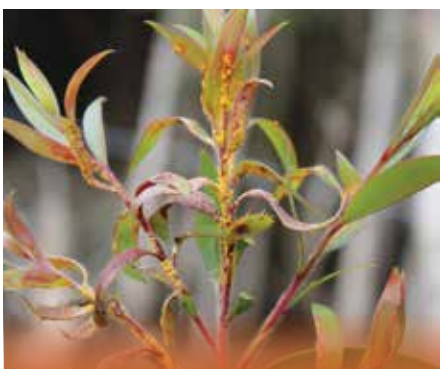
Meanwhile, DBCA officers are working closely with DPIRD on a range of myrtle rust preparedness activities, including communication and awareness raising, capacity building of surveillance staff and improved climate suitability modelling. To ensure WA is ready to manage myrtle rust should it establish in the State, DPIRD's subject matter experts are staying up to date on the latest developments in the detection, treatment and control of myrtle rust.

DBCA and DPIRD are engaged in State and Federal myrtle rust working groups, bolstering stakeholder engagement, policy and response capacity. Awareness raising is targeting the highest risk pathways for myrtle rust to spread, especially at State borders and amongst tourists who may visit infested areas and inadvertently travel with spores on their clothing and belongings.

Inset right Myrtle rust spores are bright yellow or orange-yellow.
Photo – Angus Carnegie

Inset above MyPestGuide® reporter app.

Right *Melaleuca quinquinervia* symptoms.
Photo – Geoff Pegg



Mia Townsend was formerly the Plant Diseases Program Coordinator with DBCA's Conservation and Ecosystem Management Division. She is now the Chief Executive Officer for the Dieback Working Group and can be contacted at exec.officer@dwg.org.au

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