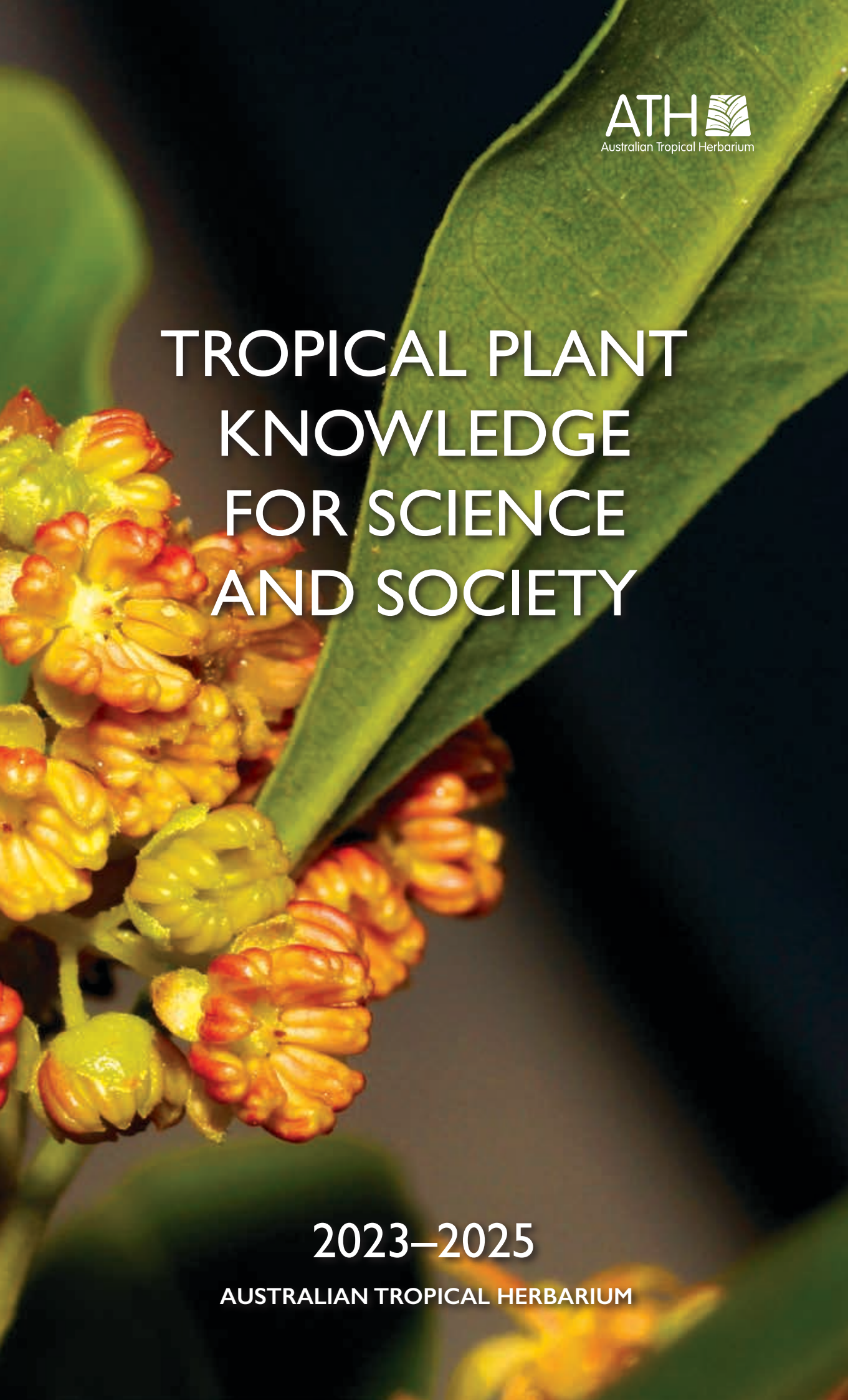


The background of the entire page is a close-up photograph of a tropical plant. It features a large, vibrant green leaf that curves diagonally across the frame. In the lower-left corner, there is a cluster of small, bright yellow-orange flowers with a textured, almost segmented appearance. The lighting is soft, highlighting the natural colors and textures of the plant.

TROPICAL PLANT KNOWLEDGE FOR SCIENCE AND SOCIETY

2023–2025

AUSTRALIAN TROPICAL HERBARIUM



ACKNOWLEDGEMENT OF COUNTRY

The Australian Tropical Herbarium acknowledges the Yirrganydji (Djabugay) people as the Traditional Owners of the lands on which our facilities are located.

We acknowledge Traditional Owners across Australia and recognise their continuing connections to land, waters and culture.

We pay our respects to Elders past and present.

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ATH Board members and Distinguished Guests celebrate the signing of a renewed 10-year ATH Joint Venture Agreement (2025-2035). Back row (l-r): Mr Peter Cochrane (Chair, ATH Board), Dr Ilona Stobutski (CSIRO), Mr Anthony Whalen (CSIRO), Dr Gillian Brown (Qld. DETSI), Prof. Jenny Seddon (JCU), The Hon. David Kempton (Qld Member for Cook), Ms Sian Breen (Qld. DETSI), Dr Mark Jacobs (Qld. DETSI), Prof. Ron White (JCU). Front row (l-r): Mr Gavin Singleton (Yirrganydji Traditional Custodian), Prof. Darren Crayn (ATH Director).

WHO WE ARE

The Australian Tropical Herbarium (ATH) is a leading research organisation dedicated to understanding, documenting and protecting the plant and fungal biodiversity of the Australian tropics.

Located at James Cook University, Nguma-bada (Smithfield) Campus, the ATH is a joint venture of:

- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Queensland Department of Environment, Tourism, Science and Innovation (DETSI)
- James Cook University (JCU)
- Director National Parks (DNP), Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW)

We bring together scientists, collections, Indigenous knowledge holders and communities to gather, generate and share knowledge that supports understanding, conservation, biosecurity and cultural continuity to deliver improved outcomes for tropical industries, societies and the environment.

ATH BOARD 2023–2025

Mr Peter Cochrane (Independent Chair)
Prof. Jenny Seddon (JCU)
Prof. Ron White (JCU)
Dr Ilona Stobutzki (CSIRO)
Mr Anthony Whalen (CSIRO)
Dr Gillian Brown (DETSI)
Dr Mark Jacobs (DETSI), 2023
Mr Eddie Jebreen (DETSI), 2024–2025
Ms Sian Breen (DETSI), 2025
ATH Director Prof. Darren Crayn



ATH Board members and Director: l-r, top-bottom: Mr Peter Cochrane (Chair), Prof. Jenny Seddon (JCU), Dr Ilona Stobutzki (CSIRO), Prof. Ron White (JCU), Mr Anthony Whalen (CSIRO), Dr Gillian Brown (DETSI), Dr Mark Jacobs (DETSI), Mr Eddie Jebreen (DETSI), Ms Sian Breen (DETSI), Prof. Darren Crayn (Director).

WHAT WE DO

KEEP INDIGENOUS PLANT KNOWLEDGE STRONG

Through trusted partnerships with Traditional Owners, we engage in two-way knowledge sharing to keep cultural plant knowledge strong and relevant for future generations.

DOCUMENT AND DESCRIBE LIFE

We continue to describe and formally name plant and fungi species that are new to science, helping ensure they can be recognised and protected.

MAP COUNTRY AND ECOSYSTEMS

Our regional ecosystem mapping informs planning, conservation, disaster recovery and land management across Queensland.

REVEAL EVOLUTIONARY STORIES

Using cutting-edge genomics, we uncover how Australia's tropical flora evolved and how species are related.

CURATE COLLECTIONS

We curate over 200,000 herbarium specimens, reflecting more than 250 years of botanical research.

SHARE KNOWLEDGE WIDELY

We make our data freely available through national and global portals used millions of times each year.



WHY TROPICAL PLANT BIODIVERSITY MATTERS

Northern Australia is home to some of the most diverse plant and fungal life on Earth, yet many species remain scientifically undocumented and/or face growing pressure from land use, invasive species and extreme weather.

Tropical plant biodiversity underpins:

- healthy ecosystems
- climate resilience
- cultural continuity
- regional livelihoods

The ATH exists to ensure this biodiversity is known, valued and protected — now and into the future.



Mycena chlorophos, a bioluminescent fungus photographed in the dark (above) and under white light (left). Photos L. Reinhold.

IMPACT BEYOND THE HERBARIUM

Our people strive to deliver data that generates real-world impact. Across all projects, ATH research:

- Informs environmental policy
- Supports Indigenous aspirations and knowledge sovereignty
- Strengthens Australia's biosecurity
- Enables conservation and restoration at scale
- Makes biodiversity data freely available worldwide

In particular, we have:

- Supported threat listings and recovery of endangered plant species
- Helped protect tens of thousands of hectares of high-value regrowth
- Mapped plant diversity on over 140 Great Barrier Reef islands
- Improved understanding of invasive species and diseases of native plants
- Supported on-Country land care, and regional land-use decision-making
- Contributed fundamental biodiversity knowledge used by researchers worldwide

ATH researchers surveying vegetation on Cape York. Photo P. Syme.

BY THE NUMBERS (2023–2025)

- 75+ peer reviewed publications
- 120+ research collaborators across 16 countries
- Over 60 million data records downloaded
- 3,000+ DNA samples added to collections
- 2,000+ Volunteer hours, mounting 4,500 specimens
- 25 Research Students
- 100+ Research talks, public seminars and lectures
- 50+ National and international representative and leadership roles
- \$1.08 million in external research grant income
- 3,900 specimens accessioned into herbarium collections

OUR RESEARCH

UNDERSTANDING TROPICAL FLORA — FROM MOLECULES TO LANDSCAPES

ATH research spans discovery, conservation, restoration and cultural knowledge.

Below are highlights of key research projects active between 2023 and 2025.

REVEALING AUSTRALIA'S PLANT DIVERSITY

EVOLUTIONARY HISTORY OF AUSTRALIA'S FERNS AND LYCOPHYTES

Australia's ferns and lycophytes are among its most threatened plant groups. ATH researchers are using advanced genomics to rebuild the evolutionary tree for all Australian species.

This work directly informs threat listings, conservation priorities and recovery planning, and has already led to the rediscovery or reclassification of species once thought extinct.

DISCOVERING AND DOCUMENTING TROPICAL FUNGI

Tropical Australia is a hotspot for fungal diversity, including species critical for ecosystem health — and others that pose biosecurity risks. ATH scientists are cataloguing fungi using DNA barcoding and genomics, documenting new species, tracking plant pathogens, and building tools that help land managers identify beneficial and harmful fungi early.

ORCHID EVOLUTION AND HIDDEN DIVERSITY

Orchids are one of Australia's most diverse yet vulnerable plant groups. ATH is leading largescale genomic studies of orchid lineages to resolve species boundaries, uncover cryptic species, and understand how orchids evolved and diversified.

This research supports conservation planning, evolutionary biology, and informed management of rare orchids targeted by illegal trade.

MAPPING AUSTRALIA'S PLANT COMMUNITIES

ATH leads regional ecosystem mapping across northern Queensland, translating field data into maps used by governments, Traditional Owners, private landholders, and industry.

Recent work includes:

- Mapping the vegetation of Great Barrier Reef Islands at fine scale
- Identifying tens of thousands of hectares of High Value Regrowth
- Updating vegetation baselines after Cyclone Jasper

These maps guide landuse decisions with major conservation and economic consequences.



A rustgill fungus, *Gymnopilus* sp., shedding spores. Photo G. Wilson.





Dendrobium gracilicaule, an orchid of eastern Australian forests.
Photo G. Wilson.



Mrs Karen Guivarra, a member of the Indigenous ethnobotany team, checking bush tucker plants. Photo T. Carrette.

KNOWLEDGE FOR PEOPLE AND COUNTRY

TROPICAL INDIGENOUS ETHNOBOTANY CENTRE (TIEC)

Respectful partnership with Traditional Owners is central to our work.

Through the Tropical Indigenous Ethnobotany Centre (TIEC) we work to:

- document and protect Indigenous plant knowledge
- support Indigenous-led research
- provide training and employment pathways
- collaborate on culturally appropriate research and education

Over the past three years, our Indigenous ethnobotanists have responded to invitations from more than 20 Indigenous groups across northern Australia to work on Country and in communities.

SCAN TO FIND OUT MORE ABOUT TIEC



ININGAI AND MBABARAM MEDICINAL PLANTS

Indigenous-led research projects with the Iningai and Mbabaram peoples investigate the properties of traditional medicinal plants using phytochemistry and bioactivity screening.

The research combines cultural knowledge with Western science, while prioritising Indigenous control over data, knowledge sharing and future benefits.

TOOLS FOR EVERYONE

ATH develops free, easy-to-use tools that support biodiversity surveys, education, conservation and community engagement, including:

RAINFOREST PLANT IDENTIFICATION KEY

An interactive digital guide for identifying 2,700+ species of tropical rainforest trees, shrubs, vines and epiphytes.

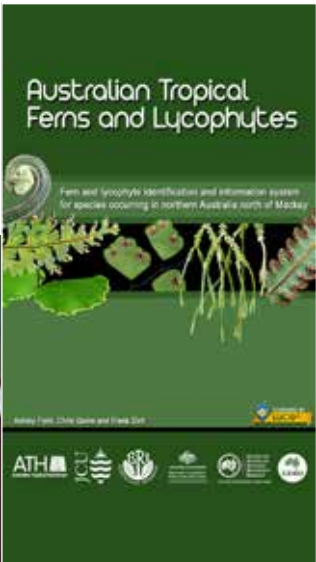
SCAN TO USE THE RAINFOREST KEY ONLINE



FERNS AND LYCOPHYTES KEY

A specialised tool for identifying Australia’s 330+ species of tropical rainforest ferns and relatives.

SCAN TO USE THE FERN KEY ONLINE



VEGETATION MAPPING PRODUCTS

Used by governments, rangers, consultants, and communities to make informed land-use decisions.

PLANT IDENTIFICATION SHORT COURSES

In partnership with the Wet Tropics Management Authority, we deliver hands-on workshops that build practical plant identification skills focused particularly on rainforest plants, and weeds.

SCAN TO FIND OUT ABOUT PLANT ID COURSES



Botanist Stuart Worboys delivering plant identification training. Photo N. Cuff.

PLANT SCIENCE FOR A CHANGING WORLD

CONSERVATION GENOMICS FOR THREATENED ORCHIDS

ATH has developed new genomic tools that allow scientists to assess genetic diversity in rare orchids using both fresh and herbarium material with applications in:

- Recovery planning
- Translocation success assessments
- Identification of hidden species

Several threatened orchid species are already benefiting from applied genomic insights.

POST-DISASTER ECOSYSTEM RECOVERY

Following severe flooding from Tropical Cyclone Jasper (Dec. 2023), ATH scientists rapidly mobilised to capture baseline vegetation data across affected regions. This ensures assessments of ecosystem recovery are strongly evidence-based.

UNDERSTANDING PLANT DISEASES: MYRTLE RUST

Myrtle rust is reshaping Australian forests. ATH research focuses on how the disease affects native species at ecological and genetic levels, helping identify which populations are most vulnerable — and which may persist.

BIODIVERSITY-BASED DRUG DISCOVERY

ATH works with health researchers to screen tropical plants for anti-inflammatory, immune-modulating and anti-oxidant compounds.

This research explores the biomedical potential of native flora while reinforcing the importance of biodiversity conservation.

WHY SOME PLANTS BECOME INVASIVE

Invasive plants cost Australia billions of dollars each year. ATH researchers study the genetic, reproductive and ecological traits that make some species invasive — and others not.

Findings feed directly into biosecurity risk assessments, weed management and restoration planning.

Research students Stephanie Goedderz (left) and Consolata Nanjala undertake genetic research on orchids. Photo T. Carrette





Post-cyclone flooding impact on a rainforest stream in the Daintree National Park. Photo D. Crayn.



Research student Laura Lopresti assessing populations of a serious environmental weed, sicklepod (*Senna obtusifolia*). Photo D. Montesinos.



Young shoots of kanuka box (*Tristaniaopsis exiliflora*) suffering myrtle rust infection. Photo M. Barrett.

PUBLICATIONS

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ATH staff undertaking plant surveys on Cape York Peninsula. Photo: P. Symes.

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16. Worboys SJ, Zorn I (2024b) Island Habitat Monitoring. Vegetation surveys and mapping of Great Barrier Reef Islands. Part 2: Whitsunday. Report for the Australian Government's Reef Trust and the Great Barrier Reef Foundation.
17. Worboys SJ, Zorn I (2024c) Island Habitat Monitoring. Vegetation surveys and mapping of Great Barrier Reef Islands. Part 3: Capricorn Coast. Report for the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



The Sir Robert Normal Building incorporating the Australian Tropical Herbarium. Photo: B. Newton.

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20. Worboys SJ, Zorn I (2024f) Great Barrier Reef Island Arks. Acquisition of islands in the Great Barrier Reef to the protected area estate. Vegetation assessments. Part 3: Capricorn Coast Management Units. Report for Queensland Department of Environment and Science.

PUBLISHED DATASETS

1. Goedderz S, Clements MA, Bent S, Nicholls J, Patel V, Crayn DM, Schlüter P, Nargar K (2024) Plastid phylogenomics reveals evolutionary relationships in the mycoheterotrophic orchid genus *Dipodium* and provides insights into plastid gene degeneration: supporting data. v1. CSIRO. Data Collection.
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THESES

1. Beyer S (2025) Life history and ecology of the endangered *Vincetoxicum rupicola*. B.Sc. (Hons) thesis. James Cook University. Advisor: Montesinos D.
2. Forbes S (2024) Direct and indirect impacts of climate change on growth, productivity and management of three important tropical crops: cassava, coffee and cacao. Ph.D. thesis. James Cook University. Advisors: Cernusak L, Crayn D.
3. Kennedy H (2024) Integrative taxonomic revision of *Melichrus* R.Br. (Ericaceae subfam. Epacridoideae). Ph.D. thesis. University of New England. Advisors: Bruhl J, Andrew R, Crayn D.
4. Krol E (2024) Species delimitation of the Cooktown orchid (*Dendrobium bigibbum*, Orchidaceae). M.Sc. thesis. University of Göttingen, Germany. Advisors: Hörandl E, Wagner N, Nargar K.
5. Lopresti L (2025) No specialist pollinators? No problem for some plant invasions. Ph.D. thesis. James Cook University. Advisors: Lach L, Montesinos D. Awarded Cum Laude, awarded University Medal.
6. Middleby K (2024) Patterns and drivers of leaf thermoregulation in rainforest trees of the Australian Wet Tropics. Ph.D. thesis. James Cook University. Advisors: Cernusak L, Crayn D.
7. Torrisi J (2025) Genetics and ecology of Kanuka Box (*Tristaniopsis exiliflora*) and myrtle rust (*Austropuccinia psidii*). B.Sc. (Hons) thesis. James Cook University. Advisors: Barrett M, Crayn D. Awarded PF Brownell Medal for Plant Physiology.
8. Turpin GP (2024) Ethnobotany and the biological activities of Iningai and Mbabaram medicinal plants. M.Phil. thesis. James Cook University. Advisors: Wangchuk P, Crayn D.

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Australian Tropical Rainforest Plants Identification System version 8 - free to use online at apps.lucidcentral.org/rainforest/

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