JAMES COOK UNIVERSITY AUSTRALIA

TESS
CENTRE FOR TROPICAL ENVIRONMENTAL & SUSTAINABILITY SCIENCE

The Centre for Tropical Environmental and Sustainability Science

Hello TESSians,

May was an action-packed month, filled with collaboration, learning and exciting research achievements across the network. We were delighted to host a highly successful thermal drones workshop for Indigenous Rangers at the DRO, bringing together practical skills development and knowledge exchange in the field.

Alongside this, our live seminar focussing on harshness vs stress and solitary behaviours attracted an excellent turnout and sparked engaging discussion among attendees.

To top it all off, our community celebrated the publication of at least 20 new research papers — a fantastic reflection of the breadth, productivity and impact of the work being undertaken across the Centre.

A big THANK YOU for all your hard work.

Susan Laurance

Director

CENTRE NEWS

Biodiversity Detection and Thermal Drones Workshop

In May, researchers from TESS delivered a collaborative thermal drone workshop at the Daintree Rainforest Observatory alongside Terrain NRM and Indigenous Ranger groups from across the Wet Tropics. The workshop combined hands-on training, wildlife monitoring, and knowledge sharing focused on caring for Country and improving conservation outcomes. Participants explored how emerging technologies such as thermal drones can support the detection of elusive rainforest species while complementing Traditional Ecological Knowledge. The event highlighted the power of collaboration between researchers, Indigenous Rangers, and environmental organisations in shaping the future of conservation science.

A sincere thank you to all Indigenous Ranger groups, collaborators, and project partners who contributed to such an engaging and inspiring event, to PhD Candidate Emmeline Norris and DRO Manager Johan Larson for sharing their skills, to Dr Andrew Dennis and his team at Terrain NRM for their organisation and delivery of the workshop, and finally to the Australian Government-funded programs from Department of Climate Change, Energy, the Environment and Water and NESP Resilient Landscapes Hub supporting this work. The future of conservation depends on collaboration, and workshops like this demonstrate what is possible when knowledge, innovation, and community come together.

Road Ecology eBook

A new eBook Road Ecology: Synthesis and Perspectives has been published by Springer Nature. “This groundbreaking book is the first to comprehensively present both the current state of knowledge and future directions in the emerging discipline of Road Ecology.” As you can guess, TESSians were involved in contributing to this work:

- Chapter 4: Habitat Loss and Fragmentation Due to Roads - Jayden E. Engert and William F. Laurance
- Chapter 31: The Impact of Roads on Birds - Sara Santos, Yun Wang, Miriam Goosem, Pedro F. Develey & Rui Lourenço

Jayden and Bill also worked on the final chapter - Chapter 50: Charting the Path Ahead: Key Research Priorities in Road Ecology

TESS Website

We are currently reviewing the TESS website (a slow process) and are hoping to launch a rather more modern version in the second half of the year. Please let us know if you have any updates or changes to your details or photos.

PAPER ALERTS

This month's research publications spanned an impressive range of themes, including tropical forest recovery and conservation genetics, wildlife behaviour and disease ecology, marine and freshwater ecosystems, climate and plant physiology, coastal and groundwater processes, Indigenous and interdisciplinary knowledge systems, and innovative environmental remediation approaches. In this issue we have highlighted research from **our HDRs and ECRs**. If you would like to browse the full list please head to the News section of the website.

An invasive plant may overcome pollination specialisation with a versatile breeding system - *Laura C. Lopresti, Lori Lach, Paula Sosenski, Victor Parra-Tabla & Daniel Montesinos*

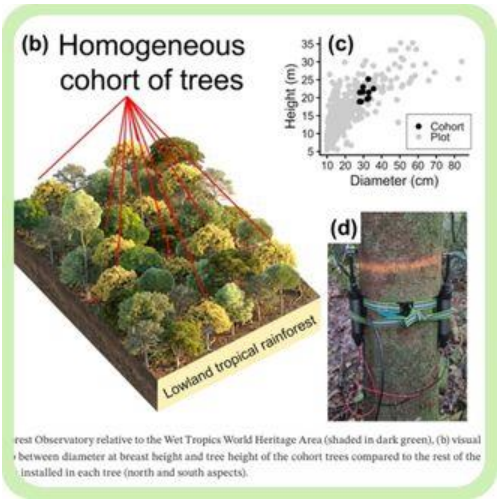
Plants with specialised pollination syndromes are less likely to become invasive compared to those with generalist syndromes, yet some highly invasive species have specialised syndromes. Few empirical studies have investigated the reproductive biology of invasive plants with specialised pollination syndromes, preventing a deep understanding of this apparent contradiction. Senna species (Fabaceae) exhibit the specialised buzz-pollination syndrome, and several Senna species are invasive globally. We assessed whether Senna obtusifolia could reproduce uniparentally via autonomous selfing, vector-mediated selfing, or without pollen (apomixis). We assessed whether it was pollen limited in either the studied native (Mexico) or invaded (Australia) regions. We experimentally manipulated pollinator access and pollen deposition in both regions and found that up to 40% of flowers set fruit from self-pollination and up to 24% of flowers set fruit in the absence of pollen. We found no evidence that S. obtusifolia was pollen limited in either region, suggesting that it has attracted suitable pollinators in both studied regions. Our findings suggest that S. obtusifolia has a mixed breeding system, combining selfing, apomixis, and outcrossing. This versatile breeding system may be key to its invasiveness, enabling uniparental reproduction during the early stage of colonization, while maintaining genetic diversity through outcrossing.

Monitoring of rainforest restoration is predominantly short-term and focused on forest structure in Australia's Wet Tropics - *Sarah Letters, Angela Dean, Susan G. W. Laurance*

Introduction: Forest restoration is increasing worldwide, driven by global initiatives and climate policy, yet the speed and scale of current efforts raise important questions about evaluating success. In tropical forests, restoration outcomes are inherently multidimensional and prolonged with structural attributes such as canopy closure recovering more rapidly than biodiversity, creating a temporal decoupling that complicates evaluation. This challenge is amplified as market-based

mechanisms increasingly underpin large-scale restoration, demanding credible and ecologically meaningful monitoring.

Objectives: To understand the metrics tropical forest restoration organizations use to assess ecosystem recovery and evaluate how well current monitoring practice aligns with restoration goals.

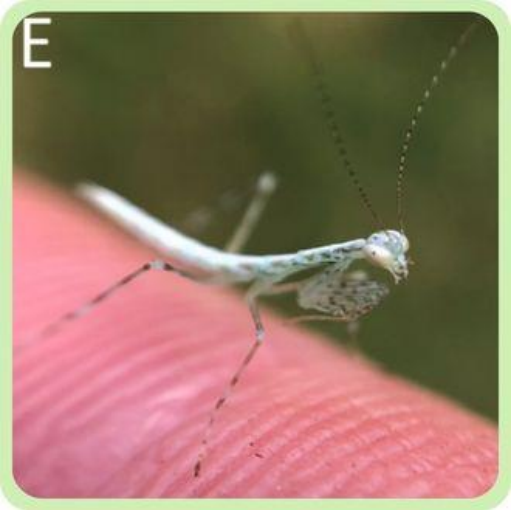


rest Observatory relative to the Wet Tropics World Heritage Area (shaded in dark green), (b) visual between diameter at breast height and tree height of the cohort trees compared to the rest of the installed in each tree (north and south aspects).

Crown Exposure Drives Sap Flow Variability Among Nearly Identical Trees in a Lowland Tropical Rainforest - *Natalia de Aguiar-Campos, Yoko F. Ishida, Will Edwards, Susan G. W. Laurance*

Tropical forest transpiration strongly influences the global hydrological cycle and is often estimated through sap flow measurements. Due to their high diversity and complex canopies, estimates often rely on mean sap flow measured from cohorts of similar trees, although within-cohort variability remains poorly investigated in tropical forests. We aimed to quantify sap flow variability in a cohort of 10 similarly sized conspecific trees in an Australian tropical rainforest. Over three campaigns (dry, wet, and dry seasons), we measured sap flow simultaneously on north and south stem aspects and at two sapwood depths using heat-ratio sensors, and estimated crown exposure for each tree. Between the first and second campaigns, a tropical cyclone increased mean crown exposure of the cohort two-fold. We found that sap flow readings varied up to 14-fold between trees under the same environmental conditions, decreasing to nine-fold when within-tree variation was accounted for. Regardless of aspect or depth, sap flow varied by an average of 52.5% within trees across the study period. Although sapwood depth was a poor predictor of sap flow, averaging across the radial profile decreased within-tree variation to 34%. Despite similar stem dimensions, crown exposure largely explained variability among and within trees. During the dry seasons, north-aspect sap flow remained stable, whereas south-aspect sap flow increased by 44% following cyclone-induced increases in exposure. In contrast, variation within and across trees was substantially lower during the wet season, presumably due to more uniform soil water availability. These results yield two recommendations to reduce uncertainty in tropical forest transpiration estimates: (i) sap flow should be measured at more than one point (at different aspects and/or depths) to account for the 52.5% difference in readings per tree; and (ii) crown exposure should be incorporated into stratification approaches to reduce within-cohort sap flow variability.

Striking, slender, and secretly spinose: A revision of the snake mantises of the genus Kongobatha (Mantodea: Nanomantidae: Fulciniinae: Neomantini) - *Matthew G. Connors, Peter Yeeles, Lori Lach, David C.F. Rentz*



Kongobatha is one of the most commonly encountered of all Australian mantis genera, and yet despite this, very little is known about the taxonomy or biology of the genus. Described to include a single Australian species, K. diademata, the only subsequent work on the genus has been the description of a second species from New Guinea, K. papua. We here describe three additional species, K. spinosistyla Connors sp. nov., K. serpens Connors sp. nov., and K. rufilinea Connors sp. nov., and redescribe K. diademata and K. papua in detail, the latter of which is recorded from Australia for the first time. We also describe for the first time the unusual, heavily spinose styli of male Kongobatha. These are apparently unique among Mantodea as a whole, but their function remains unknown.

HDR / ECR

Event: Many thanks to all the attendees at the May morning tea. We learned all about Andrea's hair-raising adventures wrangling sharks, Narcos and politicians. Kennedi and Vindi are planning a movie showing. More to come.

We would like to invite HDR students to join us for morning tea hosted by the TESS Centre. If you find yourself available and in the Nguma-bada campus between **10:00 – 11:00 on Tuesday 9 June**, please come to Building E2 Room 111. Come and swap research stories, have coffee and cake and chat to our host. No stress if you can't make it, come to the next one on Tuesday 14 July.

Funding: The Royal Society of Queensland wishes to bring to your attention an opportunity to advance scientific work. The Society hosts a Research Fund with the intention of supporting early-career researchers, sole practitioners and citizen scientists for projects that escape the attention of the mainstream grant programs. The second round of applications for grants from this new fund is open until **30 June 2026**. Read more.

Tasmin was contacted by the Rufford Foundation who are keen to organise an online webinar for students who may be interested and eligible for their grants. More information in due course but have a look at their website here.

Opportunity: If any of our HDR's have mammal trapping experience and would like to put this experience to profitable use, please contact the TESS centre for more information on an opportunity to train others.

UPCOMING EVENTS

2 June 12:00 AEST - Cairns – Online Event

June Joint Biosecurity Seminar
The next Joint Biosecurity Seminar Series is coming up on Tuesday, 2 June 2026 — bringing together leading researchers across institutions to explore emerging biosecurity challenges and innovations. Hosted collaboratively by: James Cook University (Centre for Tropical Biosecurity) and Murdoch University (Centre for Biosecurity and One Health) CSIRO

23 June 16:00 AEST - Cairns – JCU Nguma-bada campus, Smithfield

Note: this is a Tuesday

Special TESS Seminar | Yiwen Zhang visiting PhD candidate from Nanyang Technological University, Singapore will present "From Farmland to Carbon Markets: Evaluating Enhanced Rock Weathering". There will be an opportunity to meet her and chat afterwards in true TESS style.

25 June - Cairns – JCU Nguma-bada campus, Smithfield

26 June - Mareeba

Enhanced Rock Weathering Research in Australia

A Symposium on Enhanced Rock Weathering Research in Australia will be held in Cairns on 25 June 2026.The symposium will bring together leading researchers, early career scholars, practitioners, and key collaborators to explore emerging science and practical applications of enhanced rock weathering (ERW).

There will also be a separate complementary event on Friday 26 June 2026. Visit a trial on an avocado farm in Mareeba to explore how the effects of basalt addition on crop productivity, soil health and carbon dioxide removal are being assessed. This Field Visit and tour will be open to the farming community, industry bodies and key stakeholders. Please go here for further information.

11-12 June

23-24 July

Brisbane – Chapel Hill

Sedge ID Skills Workshop

June 11-12 - Book from Humanitix:
https://events.humanitix.com/introduction-to-sedge-id-skills-workshop

July 23-24 - Book from Humanitix
https://events.humanitix.com/introduction-to-sedge-id-skills-workshop-6v2krkvz

The program will include sessions on using the family key to Cyperaceae, and individually on the genera *Cyperus, Fimbristylis, Scleria, Schoenus, Eleocharis* & *Carex*. It will also focus on how to tell Cyperaceae apart from similar families such as Restionaceae and Juncaceae.

10-12 July Nguma-bada - Cairns – JCU Nguma-bada campus, Smithfield

4-6 December - Daintree Rainforest Observatory, Daintree

Australian Tropical Herbarium - Rainforest Plant ID courses 2026

The Australian Tropical Herbarium is pleased to announce dates for its annual Rainforest Plant Identification courses. Targeted at the interested layperson, the three-day introductory workshop will:

Describe the characteristics and values of Australia's tropical rainforests

- Teach you the terminology used to identify Australian tropical rainforest plants
- Introduce you to the free online tools used for rainforest plant identification
- Review the field identification characteristics of important rainforest plant families

This year we will be presenting courses at James Cook University's Nguma-bada Campus in Smithfield, Cairns, and at the Daintree Rainforest Observatory at Cape Tribulation.

Please contact enquiry@ath.org.au for further info.

	Updates will also be provided on the TESS website Events and Opportunities page.
22 July 16:00 AEST - Cairns – JCU Nguma-bada campus, Smithfield	**Special TESS Seminar** | John Terborg, James B. Duke Professor Emeritus of Environmental Science in Duke University will present "Models of national park creation: an evolving paradigm." There will be an opportunity to meet him and chat afterwards in true TESS style.
July 26-29 - Cairns – Pullman International	International Society of Ethnobiology (ISE) Congress 2026 | The theme of the ISE Congress 2026 is "Indigenous and Local Knowledge Connections: Honouring Heritage and Innovation".
August 17-20 - Cairns – Convention Centre	The 6th World Ecoacoustics Congress (WEC) | The WEC happens every 2 years and attracts hundreds of delegates to discuss advances and innovations in Ecoacoustics.
August 24-28 - Port Douglas	15th Australasian Plant Conservation Conference | Overall theme 'Plant Conservation: Culture, Collaboration and Change'. Early bird discount is open - ends 29 May.

DID YOU SEE ... ?

Did you listen to the May Science Show podcasts from outstanding researchers at JCU? In case you missed them:

Michael Bird's interview was aired on 2 May. You can listen to the entire podcast Australian science under strain or the segment here: Isotopes reveal environmental deep history

Stewart Lockie's interview was aired on 8 May. You can listen to the entire podcast Celebrating David Attenborough's 100th birthday and a new way of making vaccines or the segment here: Scientific challenges in Australia's tropical north

Susan Laurance's interview was aired on 3 May. You can listen to the entire podcast Sex testing at the Olympics: beware the exceptions or the segment here: Restoring the Daintree rainforest. More will be coming in June.

The **Monterey Bay Aquarium** Live Jelly Cam. The Jelly Cam is live every day from 7 a.m. to 7 p.m. Pacific time (currently AEST-17). However, if this is a little too calming try the Live Puffin Cam on the **Farne Islands** – 24 hours of puffins and guillemots until the end of July.

Why "Buffalo buffalo Buffalo buffalo buffalo buffalo Buffalo buffalo" makes sense.

Cairns EcoFiesta is on at Munro Martin Parklands on **Sunday 21 June 2026 10:00 – 18:00**

The largest **Titan Arum** in Cairns, Hannibal, is due to bloom by June 2026.

ENDNOTE

If you like this month's masthead image, have some fun writing out names with NASA's Your Name in Landsat (each letter gets place names and coordinates). Our "June" was made from Great Barrier Reef, Bamforth National Wildlife Refuge, Wyoming, Yapacani, Bolivia, Bellona Plateau.

We hope you enjoyed this issue and learning more about the people and projects shaping tropical environmental research at James Cook University. If you are interested in collaborating with researchers from the Centre for Tropical Environmental and Sustainability Science, we would love to hear from you.

Credits**: Masthead Image – NASA Landsat; Drone Workshop Team © Johan Larson; Senna obtusifolia (Sicklepod) Suglo20, CC BY-SA 4.0, via Wikimedia Commons; Tropical Rainforest Landscape © TISHA85 Getty Images Canva Pro; Homogenous cohort of trees © N de Aguiar Campos; Young nymph, Sydney, New South Wales, © David Odgers.**

Centre for Tropical Environmental and Sustainability Science

James Cook University Cairns

Nguma-bada Campus, Smithfield QLD 4878