



The Centre for Tropical Environmental and Sustainability Science

Hello TESSians,

It hardly seems possible that we are already halfway through the year. We had hoped to mark the occasion by celebrating the many achievements of our community over the past six months, but with everyone disappearing for semester, trimester and school holidays, we couldn't quite catch everyone in time. If we've inadvertently missed your latest success, our apologies—we look forward to celebrating it in a future issue.

Meanwhile, the world continues to provide plenty to keep scientists talking. The World Cup has already seen two matches—Mexico versus Ecuador and France versus Iraq—delayed by lightning, while across the Atlantic an intense European heatwave has pushed temperatures to 44.3°C in one French town. Curiously, that matches Townsville's 1994 record (with Cairns reaching 43.2°C in 1923). Although these figures still fall far short of the temperatures recorded in Port Augusta and Andamooka earlier this year, they are another reminder of the growing importance of understanding heat stress and a changing climate.

Against this backdrop, this edition celebrates the remarkable breadth of research across our community. From field discoveries to innovative ideas and outstanding achievements, we hope these stories spark curiosity, inspire new conversations, and remind us all why keeping an open, inquiring mind matters.

Susan Laurance, Director and Anabel Belson, Coordinator



Mid-Year Kudos

Celebrating our achievements for the past six months (which was probably months or years of hard work in the making):

Books

- Chrystopher Spicer's book on the life and work of Louis Becke has been picked up by an American publisher, and it will be published in the not too distant future.
- Bill Laurance, Jayden Engert, Miriam Goosem and [Hurriyet Babacan](#) have all published chapters in compilation works published by Springer.

Discoveries

- [PhD candidate Matthew Connors](#) recently discovered and named three new Snake Mantis species from the Kongobatha genus (*K. serpens*, *K. spinosistyla* and *K. rufilinea*), publishing his detailed observations of each species in the journal *Zootaxa*.

Media

- Michael Bird, Alex Cheesman, Darren Crayn, Bill Laurance, Susan Laurance, Alex Loukas, Stewart Lockie, Sean Ulm, Penny van Oosterzee and Deonne Walther all became podcast stars on the ABC Science Show.

Recognition

- Dr Camila Madeira Tavares Lopes, Dr Denise McGregor and Dr Laura Lopresti were admitted to the degree of Doctor of Philosophy. Dr Lopresti received special recognition for the exceptional achievement of a doctoral research thesis that had been passed cum laude and was presented with the Medal of Excellence.
- Tao Huang was awarded a Springer Nature Editor of Distinction Award 2026 for editorial service with Scientific Reports: Editorial Contribution Award and Author Service Award. As an IEEE Senior Member, he was also recently re-elected to the IEEE Region 10 Asia-Pacific Newsletter Committee which serves over 187,000 members!
- [Bill Laurance](#) has been recognised by Research.com as among the top three ecology and evolution scientists in Australia. The award is based on citation-based scholarly impact metrics.
- Susan Laurance and Bill Laurance who received notification from the Journal of Biogeography that the collaborative work "Geography and ecology shape the phylogenetic composition of Amazonian tree communities", is among the journal's top ten most cited papers.

Enhanced Rock Weathering Symposium

Last week JCU Cairns hosted the [Symposium on Enhanced Rock Weathering Research in Australia and New Zealand](#). 17 key researchers in the field, including Paul Nelson and his team Hannah Green, Fred Holden and Sofonyas Tefera, delivered presentations. It was followed by a field visit to an enhanced rock weathering (ERW) field trial on an avocado farm near Mareeba.

TESSians were lucky enough to get a sneak preview of one of the presentations, as a [seminar](#), from visiting PhD candidate [Yiwen Zhang](#). With a background in environmental science and economics she has applied life-cycle and techno-economic analysis (LCA-TEA) techniques to improve the efficiency of ERW as a

scalable carbon dioxide removal solution. We would be very interested to see more of the presentations if they are available.

Fast-Forwarding the Climate: Inside JCU's Environmental Research Complex

How will tropical forests respond to the warmer, drier and more carbon-rich climates of the future? At JCU's [Environmental Research Complex](#), researchers are bringing those future conditions into the present using specialised glasshouse chambers that independently control temperature, carbon dioxide and humidity, allowing them to study how tropical plants respond before these changes unfold in the natural environment.

Recent studies led by Alexander Cheesman and Lucas Cernusak have focused on stomata – the microscopic pores that regulate the exchange of carbon dioxide and water between plants and the atmosphere. Their findings suggest that during extreme heat, this delicate balance behaves differently than current models predict, providing important new insights into the future resilience of tropical forests and improving our ability to forecast ecosystem responses in a changing climate.

[Influence of vapour pressure deficit and CO₂ on the thermal sensitivity of stomatal function in tropical trees & Stomatal Decoupling From Photosynthesis Under High Temperatures Is Consistent With Stomatal Optimisation](#)

PAPER ALERTS

Please find below a selection of this month's research publications. If you would like to browse the full list please head to the News section of the [website](#).

[*Magnetic characteristics and mineralogy of cave sediments from Solek Cave, West Sumatra: Implications for paleoenvironmental processes within the cave*](#) - Hamdi Rifai, Rizaldi Putra, Wilda Febi Rahmadhani, Nilam Sari, Dessupri Niarti, Wardina Nasution, Erni Erni, Christopher M. Wurster

Cave sediments are essential as they preserve valuable archives of past environmental and climate conditions that physical and chemical measurements can reveal. In this study, we explore the magnetic characteristics of the cave sediments collected from Solek Cave, West Sumatra, Indonesia to understand environmental processes within the cave. We employed rock magnetic methods, including magnetic susceptibility, isothermal remanent magnetization (IRM), anhysteretic remanent magnetization (ARM), and Curie temperature measurements. Additionally, we used X-ray diffraction (XRD) and scanning electron microscopy (SEM) in order to analyze the magnetic mineralogy and morphology of the cave sediments. The results show a high concentration of magnetic minerals, specifically ferrimagnetic groups, indicated by high magnetic susceptibility ranging between 210.7 and 1301.2×10^{-8} m³/kg, with a mean value of 602.7×10^{-8} m³/kg. The calculated χ_{FD} (%) values ranged from 0.2 to 6.6, mostly less than 2%, indicating coarse-grained, multidomain ferrimagnetic minerals. Moreover, results from IRM, ARM and XRD show that the magnetic



minerals are dominated by coarse-grained magnetite with a grain size of around 20 to 110 µm. Curie temperature measurements also exhibit various titanium proportions, forming a titanomagnetite phase. The morphology and chemical compositions of the magnetic minerals, determined by SEM and energy-dispersive X-ray spectroscopy (EDS), also support the previous analyses, showing that titanomagnetite is the dominant phase, characterized by coarse grain size and angular shape. The uniformity of the magnetic characteristics and mineralogy suggests a titanomagnetite mineral source likely driven by lithogenic processes such as erosion and fluvial events.

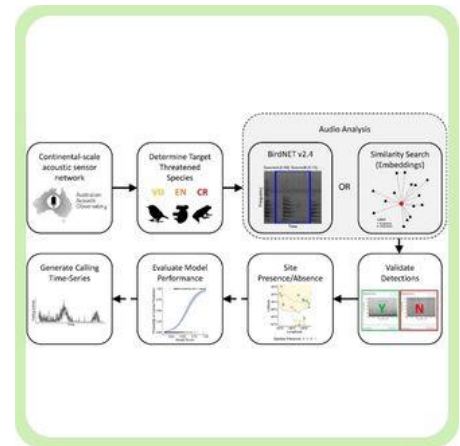
[Reframing biodiversity markets for sustainable agriculture: a systematic review and governance framework for effective nature-positive outcomes](#) - Ana Carla Leite de Almeidaa , Allan Dale, Rachel Hay, Yvette Everingham & Stewart Lockie

Biodiversity markets are gaining global attention as innovative mechanisms to mobilise private finance for conservation and support nature-positive transitions in sectors such as agriculture. Yet, empirical evidence on their design, effectiveness, and governance remains fragmented. This study presents a systematic review of biodiversity market literature, combining PRISMA-based screening of 671 peer-reviewed articles with bibliometric mapping and thematic synthesis. The review focuses on peer-reviewed studies with accessible full texts, which may have excluded some relevant literature. We traced the evolution of biodiversity market discourse beyond offsets to emerging credit systems, stacked financing models, and nature-positive outcome frameworks. The analysis reveals major challenges, including the absence of robust ecological metrics, inconsistent governance arrangements, and limited attention to equity in market design. It also highlights mounting concerns, raised across the literature, about greenwashing and the credibility of market-based claims. Without robust design and transparent oversight, biodiversity markets risk undermining conservation goals and public trust. Our findings underscore the urgent need for more rigorous, transparent, and evidence-based approaches to ensure biodiversity finance mechanisms deliver real, measurable ecological outcomes. In response, we propose a five-pillar governance framework to guide future biodiversity market development: (1) policy and institutional anchoring, (2) inclusive governance, (3) scientific and ecological integrity, (4) fit-for-purpose financial mechanisms, and (5) place-based implementation. This framework offers practical guidance for designing credible, equitable biodiversity markets that support long-term stewardship and sustainable land use.



[Needle in a haystack: Searching for threatened species using an acoustic observatory](#) - Slade Allen-Ankins, Paul Roe, Lin Schwarzkopf

Monitoring threatened species is crucial for conservation, providing the necessary information on species distribution and abundance required to detect declines and evaluate the impact of conservation actions. Passive acoustic monitoring networks, such as the Australian Acoustic Observatory (A2O), have significant potential to aid the monitoring of vocal threatened species by collecting continuous data across many locations in a cost-effective manner. We analysed over 2 million hours of acoustic recordings collected as part of the A2O from 63 sites between 2019 and 2022 to determine the site presence of 74 threatened species. Using the existing deep-learning model BirdNET to detect species belonging to classes within the model, and embeddings search for species outside the model, we successfully detected 41 out of the 74 threatened target species at a minimum of one A2O location, with some broadly distributed threatened species detected at more than ten sites. Threatened species belonging to all three threatened categories (i.e., Vulnerable, Endangered, Critically Endangered), and all three broad taxonomic groupings (i.e., birds, frogs, mammals) were found within A2O recordings, and the majority of sites searched (83%) detected at least one threatened species. We provide information on the distribution of detections for all target species, an evaluation of classification performance for all species within the existing BirdNET model, as well as easy-to-use linear classifiers trained on BirdNET embeddings for all threatened species detected, which have improved performance over the standard BirdNET model. We conclude that acoustic monitoring networks such as the A2O, powered by deep-learning models, can serve as an important tool for monitoring threatened species.



[Is the Cognitive Ability of Fawn-Footed Mosaic-Tailed Rat *Melomys cervinipes* Offspring Related to Mothers' Care or Cognitive Abilities?](#) - Misha K Rowell, Tasmin L Rymer

The cognitive abilities of many non-human animals have been investigated in recent years; however, outside of laboratory rodent strains, it is largely unknown how direct and indirect genetic factors influence the development of cognition. In a previous study, we found no impact of maternal genetic or non-genetic effects on problem solving in the fawn-footed mosaic-tailed rat *Melomys cervinipes*. However, cognition is multifaceted, and different forms of cognition may not all be influenced by the same factors. Therefore, we investigated whether maternal genetic and non-genetic effects affected the development of multiple, different measures of cognition in the fawn-footed mosaic-tailed rat. We first measured the amount of maternal care mothers provided to



their offspring and then tested mothers and offspring as adults in three tests: an associative memory test, a novel object recognition test, and a food extraction task (to assess learning). We assessed whether the maternal care provided by mothers influenced cognition and used parent-offspring regressions to determine whether the cognitive abilities of individuals had a heritable component. Offspring that received more indirect care were significantly more likely to learn the lever task than offspring that received less indirect care, possibly because this task required more neurological processing for successful completion than the other tests. No other measure of maternal care significantly influenced offspring cognition, and offspring cognition did not appear to have a heritable component. This suggests that cognitive development in this species is likely quite flexible, and that maternal direct and indirect genetic effects may not play a significant role in the development of cognition.

HDR / ECR

Collaborative Visit

MPhil candidate Danny Nanne recently spent a week at the University of Queensland, collaborating with Associate Professor Mathew Luskin, the WildObs Lab, and mentor Karlina Indraswari to further develop his camera trap research in for the Managalas project. The visit provided valuable opportunities to refine project methodologies, explore future collaborations, present his research to leading wildlife ecologists, and gain insights into emerging approaches in wildlife monitoring.

Danny commented: "Overall, the trip was successful. It enabled me to expand my professional network, connect with leading camera trap experts, and gain valuable insights that will directly contribute to the progression of my research. The experience was both academically enriching and professionally rewarding."

This month Danny will be speaking at the Papua New Guinea National Symposium on the IUCN Red List of Threatened Species. He will discuss the impact of using camera traps to record Papuan fauna and how these devices have improved field assessment and therefore national conservation goals.



Fieldwork

As part of the [NESP 4.12: Mitigating the impacts of extreme weather events on spectacled flying-foxes](#) project funded by Department of Climate Change, Environment, Energy and Water (DCCEE) and JCU, weather stations are being installed in key locations close to known flying-fox roosts. Honours student Michael Bewley-Green has done a fantastic job, travelling all over Cairns, the Tablelands and down to El Arish to get these up and running, also performing maintenance and data collection visits.



The most recent installation occurred at the DRO. Bruce Belson, JCU Engineering researcher, assisted with the calibration and gained useful knowledge and insights from Michael's experience.

Whilst onsite they assessed an older dysfunctional weather station and located failed components for replacement.

A party of sustainability students from the University of Georgia Discover Abroad program was visiting the DRO at the time. Michael and Bruce were invited to join them to view the canopy from the world famous DRO canopy crane. Many thanks to Johan and Andrew for a very enjoyable visit.

Event: Many thanks to all the attendees at the June morning tea. The next one will be **10:00 – 11:00 on Tuesday 14 July**, same venue, 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 11 August.

Funding: 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.

For any MPhils near completion or ECR's who want to do another PhD, here are some opportunities:

[Understanding endemism to benefit species conservation](#) - EOI application: CV, academic transcripts, thesis and cover letter to Professor Heloise Gibb (h.gibb@deakin.edu.au) by 10 July 2026

[Managing fruit fly in Papua New Guinea Treaty Villages](#) - Apply by 15 July 2026

[Western Sydney University Project Scholarships](#) July / August 2026 - Many scholarships for both domestic and international students.

UPCOMING EVENTS

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.

20 July 12:00 AEST - Cairns –
JCU Nguma-bada campus,
Smithfield – **Just in!**

Special TESS Seminar | [David Lindenmayer](#), Distinguished Professor and ARC Laureate Fellow, Fenner School of Environment & Society, The Australian National University. There will be an opportunity to meet him and chat afterwards in true TESS style.

22 July 16:00 AEST - Cairns –
JCU Nguma-bada campus,
Smithfield

Special TESS Seminar | [John Terborgh](#), 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.

23-24 July

Brisbane – Chapel Hill

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.

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 15 - Brisbane	10 a.m. – 1 p.m., Soapbox Science is bringing research to the Queen Street Mall in the heart of Brisbane. Soapbox Science is a public outreach platform for promoting women and non-binary scientists and the science they do.
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’.

DID YOU SEE ... ?

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

Bill Laurance’s interview was aired on 13 June. You can listen to the entire podcast [Kris sword with an intriguing history, echidnas, tropical forests and Australia’s energy potential](#) or the segment here: [Roads the biggest threat to tropical forests](#).

Darren Crayn’s interview was aired on 20 June. You can listen to the entire podcast [Insects and pain and The Selfish Gene turns 50](#) or the segment here: [Australia’s tropical herbarium](#).

The article on “[New Research Reveals English Proficiency as Leading Driver of Job Outcomes for African Immigrants in the US](#)” by Dr Lydia Okabe University of Texas at Austin and Dr Hyacinth Udah JCU. We look forward to reading the full publication.

The article in the Guardian on the [DRO osprey cam](#), it is up and running again and there are chicks.

[Burrowing bettongs returned to outback decades after local extinction](#).

The inaugural [Unpackit Awards](#).

ENDNOTE

With a current new obsession being photography, I have been researching local photographers and filmmakers and have found some wonderful portfolios. Have a look at these:

[Murray Kelman and Ash Tamayo](#) - both studying Zoology and Ecology at JCU

[Jannico Kelk](#) - multi-award-winning wildlife photographer

[Nicolas Rakotopare](#) - Associate Fellow at the International League of Conservation Photographers (Nicolas is on his way to Borneo to film jungle cats. Good luck!)

[Danny Nanne](#) – MPhil at JCU, camera trap and drone specialist

[Mike Gailer](#) – ERW researcher at JCU

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 – Hungry Ornithoptera euphorion © A Belson; Inside a Cave © Stephane Bidouze Canva Pro; Melomys cervinipes © Michael Cermak; Group photo @ Danny Nanne; Michael and Bruce © A Belson.**

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