



INSIDE THIS ISSUE

- The Director's Introduction 1
- Welcome Yue! 2
- BOO! 2
- Award day for Marianne 2
- Congratulations David, Medal of the Order of Australia! 3
- A trip to the Australian National Synchrotron for microCT imaging 4
- Back in time with caddisflies 5
- Not-so-nasty roaches 6
- 2023 Scientific Conference of the Australian Entomological Society 7
- Inaugural MABA Annual Event 2023 9
- Biosystematics 2023 11
- Visit to ANIC by Dr Doug Shears and his family 12
- A (non-insect!) creature feature 12
- Recent publications 13

ANIC: www.csiro.au/en/Research/Collections/ANIC
 ANICdotes for contact and subscriptions: [the ANICdotes home page](#)
 BANNER: *Graphium macleayanus* image: [Biodiversity Heritage Library](#)

The Director's Introduction

David Yeates, Director

As I write this introduction, the new building for ANIC and the Australian National Wildlife Collection is on the cusp of being completed. Over the past six months staff have been almost totally absorbed preparing the collection and offices for the relocation. Recent staff tours of the near-complete building demonstrate that our new home is a world-class accommodation for staff and the collection. See www.csiro.au/en/about/facilities-collections/collections/collections-precinct for information.

This issue is packed with other features, highlighting activities that staff squeezed in around packing and preparing for the move. Two staff have been recently recognised in the Australia Day Honours lists: an OAM to volunteer David Hatherley and AO to Honorary Fellow Dr Marianne Horak. Dr Juanita Rodriguez reports on a recent trip with PhD student Maddi Giannotta to the Australian National Synchrotron in Melbourne for some time on the beamline to generate MicroCT scans of wasp stingers for comparisons across Hymenoptera. This work is a collaborative effort with scientists at the University of NSW. Alice Wells reports on collaborative work describing beautifully preserved fossil caddisfly larvae from fossil beds near McGraths Flat in central NSW.

Honorary Fellow Dr Ian Naumann reports on the extremely successful and well-attended conference of the Australian Entomological Society last December. A number of staff

attended, gave scientific presentations and used the opportunity for some fieldwork in Western Australia. Dr Michael Braby has penned an in-depth article on the inaugural Moths and Butterflies Australia (MABA) conference held in Canberra from 3-5 November 2023. ANIC volunteer Dr Jon Lewis writes about his impressions of Biosystematics 2023, a celebration of 50 years of the Australian Biological Resources Study held at the end of November 2023. During the conference, CSIRO's new CEO Dr Doug Hilton launched the third and final volume of the book series *Australian Longhorn Beetles* by Adam Ślipiński, Roger de Keyser and Mengjie Jin.



David Yeates

In late February this year we were honoured with a visit by Dr Doug Shears, his wife Deirdra and two daughters. Doug has been a long-term friend of ANIC, and is a subscriber to the Australian Weevils book series. Doug's extensive CV includes significant entrepreneurial activities in Australia's agribusiness sector, include Chair of the Uncle Tobys company, and is a past member of the CSIRO Board.

The next 6 months will be busy and exciting as years of planning come into fruition and we move the collection into the new building and take up our brand new curatorial and research suites.

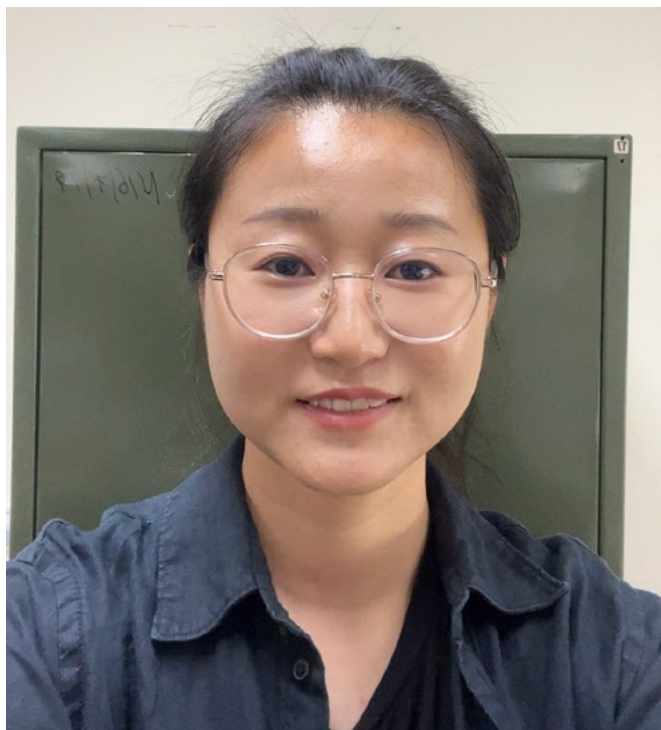
Welcome Yue!

Yue Liu

Yue is a visiting student from China and is interested in insect taxonomy and diversity. She was born and grew up in Tianjin, a city known for its rich sense of humour in China. In 2021, Yue obtained her master’s degree and started her PhD in Ding Yang’s lab at China Agricultural University. Her master’s thesis focused on the taxonomy of subfamily Empidinae (Diptera: Empididae) from western Sichuan. Before coming to ANIC, she worked on the phylogeny of Rhagionidae (Diptera: Lower Brachycera) based on molecular evidence.

Yue received a scholarship from China Scholarship Council for her visit to ANIC. She is now working with David Yeates and Keith Bayless to resolve the phylogenetic position of controversial groups and investigate driving mechanisms of species diversification in lower Brachycera (Diptera) by reconstructing the evolutionary history.

In her free time, she loves to roam around fields. She also likes experimenting with various types of coffee and enjoys the process of making drip coffee.



BOO!

Dryandra moths (*Carthaea saturnioides*), so-named for their larvae’s *Banksia* ser. *Dryandra* host plants, are known for their defensive display which reveals the eyespots on their hindwings, captured here by Living Li.



AWARD DAY FOR MARIANNE

Dr Marianne Horak wears her medal as an Officer in the General Division of the Order of Australia with pride at the Investiture Ceremony at Government house in Canberra on the 8th April. See October 2023 ANICdotes for the details of Marianne’s award.



Congratulations David, Medal of the Order of Australia!

Nicole Fisher

David Hatherly has volunteered in the digitisation of the ANIC and the Australian National Herbarium collections since 2017. David has a proud history of giving back to his community through volunteering with numerous sectors that have benefited, or continue to benefit, from David's volunteerism. We are delighted to announce that due to David's services to the community, he has been announced as a recipient of the Australian Fire Service Medal (AFSM), the Emergency Services Medal (ESM) and the Medal of the Order of Australia (OAM) respectively in the 2024 Australia Day Honours.

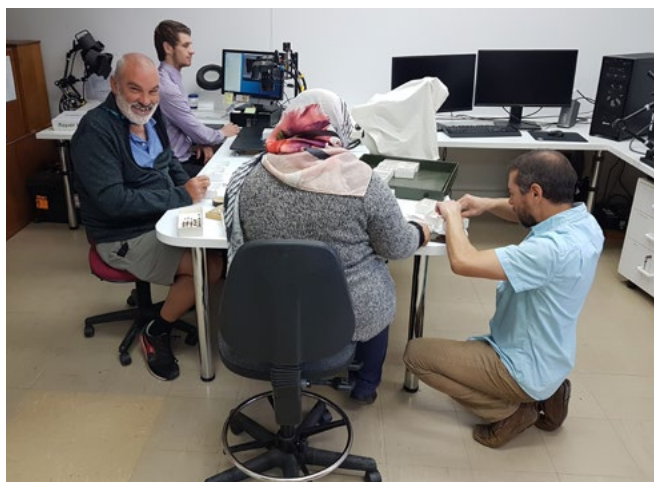
Throughout the digitisation of the ANIC, David has been involved in imaging of specimens, transcribing and validating data from specimen labels through the use of Atlas of Living Australia's DigiVol volunteer platform, data entry and geo-referencing. He more recently assisted with the digitisation of the ANIC's microscope slide collection, consisting of an estimated 350,000 slides.



David and Judy Evans celebrating ANIC's 20 year anniversary of the ANIC Volunteer Scheme in 2018

Outside David's time in ANIC as a dedicated volunteer, his other volunteer services have included:

- ACT State Emergency Services - Deputy Commander Pialligo Unit; and Member
- Australian Red Cross - Community Care Programs Volunteer 2006–2017
- Australian Volunteers for International - Development Program volunteer 2011–2013
- University of the Third Age Canberra - Website Manager
- Greening Australia - Volunteer
- National Capital Authority - Volunteer since 2017
- Member - Brindabella Community Orchestra; Monaro Folk Society; and Maruki Community Orchestra
- Australian Red Cross awards including Long Service Award 2016, and Doreen Lawrence Voluntary Service Award 2012



David working with fellow staff to image and database the bee collection

Congratulations David on this well-deserved honour. Thank you for all your efforts and best wishes from all of us in ANIC!



David attaching database numbers to microscope slides before imaging.

A trip to the Australian National Synchrotron for microCT imaging

Juanita Rodriguez

In February, PhD candidate Maddi Giannotta and I travelled to Melbourne to discover the advanced imaging capabilities of the Australian National Synchrotron. Our objective was to perform microCT scanning of wasp stingers and mutillid defensive systems.

The Synchrotron was established in 2007 and funded by Australian Nuclear Science and Technology Organisation (ANSTO). The facility houses particle accelerators for the generation of high-energy electron beams. This synchrotron radiation is used to feed various different kinds of equipment, amongst which is the Micro-Computed Tomography (MCT) beamline. This beamline is capable of producing a significantly higher spatial resolution by operating within the X-ray energy spectrum of 8 to 40 keV (Figure 1).

Our collaborators Dr. Fiorella Ramirez Esquivel and Associate Professor Sridhar Ravi from the University of New South Wales applied for beamline funding and were successful in obtaining 48 hours of equipment use for our work. Fiorella and Sridhar's previous research focused on understanding the biomechanics of the European honeybee stinger. Their project



Figure 1: The Micro-Computed Tomography Beamline

focuses on biological solutions for precise fluid delivery, which could, for example, facilitate development of novel artificial fluid injectors for targeted drug release. Other potential applications include micro-drilling and small size-scale autonomous systems.

To expand this research to all Hymenoptera, the ANIC Hymenoptera lab joined them in collaboration and the beamtime served to generate a preliminary dataset of ovipositors and stingers from various Hymenoptera families. We chose common families with different behaviour, such as parasitoids with saw-like, elongated and modified ovipositors depending on their host. We also sampled a variety of stinging Hymenoptera such as spider wasps, velvet ants, orchid wasps, ants, various bee families and social wasps. For this sampling, Fiorella, Maddi, and I collected specimens around Canberra, supplemented with samples from our cryo collection. Employing diverse staining methodologies, Fiorella prepared the specimens for imaging, selecting optimal dyes to enhance visualisation of stinger structures.

Over an intensive 48-hour period, we worked in shifts to image nonstop. We divided our team into pairs and each pair would work for 4 hours and then rest. Thankfully, the facilities at the synchrotron have onsite accommodation and a 24/7 kitchen stocked with much-needed caffeinated beverages (and Milo!). The microCT beamline consists of three separate chambers. The first one is called the photon delivery system (PDS) hutch. This system takes the beamline from the synchrotron and uses a set of filters to shape the spectrum to the necessary "high-energy" component. The second and third hutches house the imaging system, which has beamline detectors that translate the beam into an image after the signal is sent through a rotating sample. The second hutch is where standard, absorption-contrast and propagation-based phase-contrast

X-ray imaging and tomography is performed (Figure 2). This was the hutch we used for our beamtime. For each sample (usually a plastic 1.5ml tube with dry, stained, specimens inside separated by foam), we set up the sample in the stage, safely closed the hutch through a thorough search and alarm system and then proceeded to the computer lab to operate the microCT scanner. This is a time-consuming procedure, and in 48 hours we were able to image around 25 samples. After the imaging is complete, the 2D slices are assembled into a 3D model (a reconstruction), which is even more time-consuming. Fiorella and Maddi are working on these reconstructions.

Maddi's PhD project will also benefit from this beamtime, as she was able to image species from throughout her Australian velvet ant phylogeny and do full-body scans to quantify defensive attributes such as cuticular thickness.

These data will allow her to study the phylogenetic signal of defensive mechanisms in these wasps.

Through harnessing the advanced capabilities of synchrotron technology, our research will elucidate the evolutionary patterns and adaptive strategies underlying wasp defensive systems, with potential implications for medical and industry applications in the future.



Figure 2: The second 'hutch' of the beamline

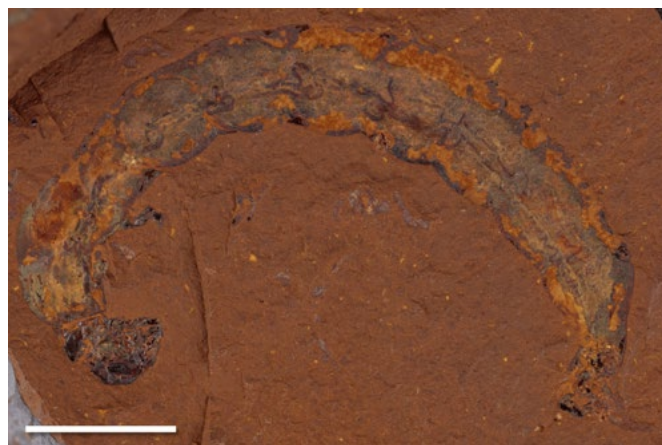
Back in time with caddisflies

Alice Wells

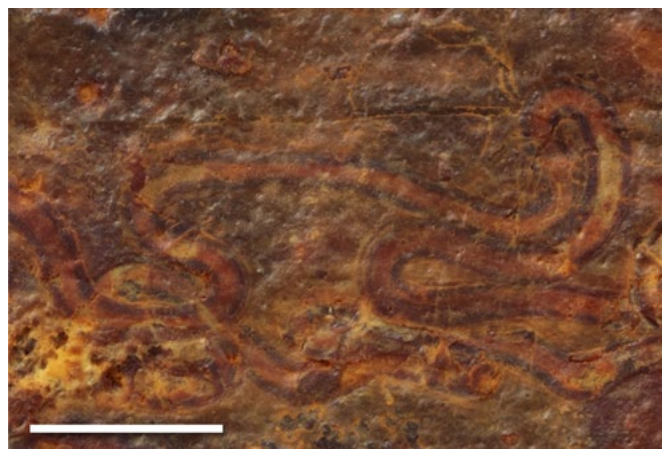
Two excited men burst into my room on the ground floor of Building 101 one morning. They came to show me images of fossil caddisfly larvae ‘with nematodes inside their bodies’. The structures within the fossil larvae certainly looked very like nematodes (see images, right), but I was not quite convinced. I puzzled over the images and later that day sent an email to say, ‘No, not nematodes at all’—the coarse and coiled internal tubes were silk glands. But that’s where an enjoyable and productive collaboration began with Michael Frese of University of Canberra (who is also a visiting scientist at CSIRO) and Matthew McCurry of the Australian Museum (Sydney). The resultant paper is now published in the *Zoological Journal of the Linnean Society* (see <https://academic.oup.com/zoolinnean/advance-article/doi/10.1093/zoolinnean/zlae003/7612822>).

Over about 18 months, more fossils of immature stages of caddisflies were found, all from a Miocene sedimentary deposit at McGraths Flat in central New South Wales. As the work progressed, Michael pushed the project further, well beyond just a descriptive study of the macrostructures of over 100 larvae and around 40 pupae, into looking at detailed micro- and nanostructures. No other fossil deposit has yielded so many complete, uncased caddisfly larvae or pupae with such detailed preservation.

Caddisflies have aquatic larvae and pupae, and moth-like adults: the order Trichoptera is considered to be the sister group of Lepidoptera, distinguished particularly by bodies covered in setae. Many caddisfly larvae build cases that they live in and often carry around, and others live in tubes (sometimes branching) spun with silk and usually with sand or plant debris accreted, some are free living. Pupae are always encased, sometimes with an inner cocoon.



Light microscope image of one of the larger larval morphotypes showing internal silk gland. Scale = 1cm



Close up of a section of the silk gland. Scale = 1mm
Images by Michael Frese

The fossils, which date from between 11 and 16 million years ago, comprise larvae of at least two forms, and probably a number of instars. Pupae were also found; they are all pharate adults (that is, still in their pupal case), of at least of two forms (images below) ready to eclose as they leave the water. However, no cases, or evidence of cases or silk/sand grain tubes have been found, nor any early pupal stages or adult caddis flies with fully expanded wings or any isolated wings. A strange puzzle!



One of the larger pupal morphotypes, a pharate adult. Scale = 0.5mm



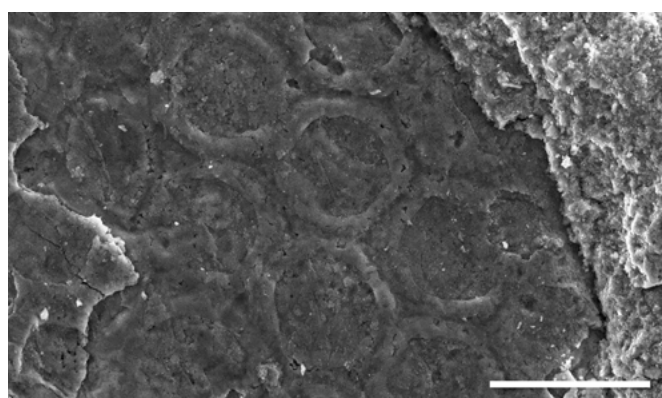
A smaller pupal morphotype. Scale = 1mm
Images by Michael Frese

...continued from page 5

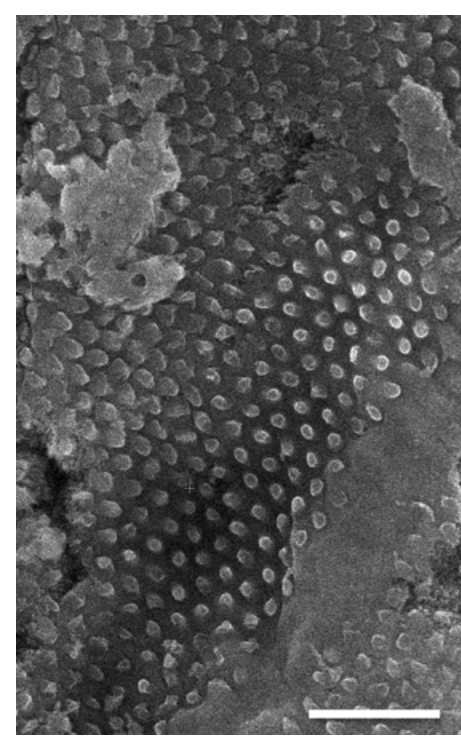
Remarkable macrostructures are visible in some larvae — an elongate spinneret used to apply silk produced by the well-developed silk glands, parts of the gut, tracheoles, and anal claws. Some of these structures together with others in the pupae give clues about the taxa represented. We tentatively identified two families, Dipseudopsidae and Hydroptilidae. We noted the likeness of the fossils to extant members of the families, and described the typical habitats they occupy.

The detail visible is quite extraordinary for fossils in sedimentary rock. Ever curious, Michael explored some of the structures using photo-microscopy and scanning electron microscopy (SEM). This paid dividends, revealing the ultrastructure of the tracheoles and, particularly, the ommatidia of the pupal compound eye (image top right). SEM images revealed fine details on the surface of the ommatidia, showing that the cornea are covered with a highly regular array of nanopillars (image bottom right), the first time a corneal nanocoating has been illustrated in a caddisfly fossil.

Our publication is the latest on the rich and diverse McGraths Flat fossil deposit (earlier papers describe fish, plants, flies, etc, and a startling monster spider — with photos that were picked up by an extraordinary number of media outlets worldwide). The nature of the fossil caddisflies, the particular life stages represented, and our putative identifications, led us to suggest that some kind of adverse event(s) caused the larvae and pharate adults to leave their silken tubes or cases before becoming trapped in the sediments. These features support the thesis that the environmental conditions at the time of deposition were unstable.



Above: Array of hexagonal ommatidia, showing numerous facets. Scale = 25µm



Right: Close up of nanostructure on corneal surface of 'part'; the 'counterpart' image matches with tiny cup-shaped excavations. Scale = 1µm

Images by Michael Frese

NOT-SO-NASTY ROACHES

These stunning cockroaches were photographed by Living Li in Southwest Western Australia - see page 8 for more details about the fieldtrip.



2023 Scientific Conference of the Australian Entomological Society

Ian Naumann

Between 12 and 16 November 2023, over 170 entomologists disregarded cold, wet, windy weather and converged on Albany on the south-west coast of Western Australia for the 54th Annual General Meeting and Scientific Conference of the Australian Entomological Society (AES), the first such face-to-face gathering since the COVID-19 pandemic. Albany was the first European settlement in Western Australia, a whaling station and an apparently bleak port-of-call for Charles Darwin during the voyage of the Beagle.

ANIC staff and associates featured as authors or co-authors of 15 presentations or posters, popping up in the sessions on taxonomy; physiology, behaviour and evolution; pollination and the Bush Blitz program. The program included gems from: Olivia Evangelista (cryptic ulopine leafhoppers); Michael Braby (the radiation of candalidine Lycaenid butterflies); Doug Hilton (amazingly diverse Heliozelid moths); Siwanon Paphatmethin (phylogenetic analysis of the vast gelechioid moth group with Andreas Zwick); Keith Bayless (multiple origins of parasitism in acalyprate flies); Bryan Lessard (work with David Yeates and others on cryptic speciation in the arbovirus vector *Culex annulirostris*); David Yeates (mind-bending complexity associated with gall-forming fergusoninid flies); Madalene Giannotta (mimicry rings in Mutillids); Dan Dashevsky (spider wasp venoms); and Juanita Rodriguez (alpine allodapine bees). Andreas Zwick received the Murray Fletcher Award for his presentation on high-throughput collection genomics.

Abstracts in the substantial Conference symposia on invasives, conservation, pollination, endosymbionts, pest management and entomological education are all well worth a look by those who could not make it to Albany. Abstracts for the Conference are now online at <https://www.aesconferences.com.au/wp-content/uploads/2023/11/AES2023-Handbook.pdf>

Apart from these symposia and happily, the Conference served up titbits which are not so easy to categorise. Delegates heard that the giant prickly stick insect, *Extatosoma tiaratum*, is the most traded insect by Australian online pet stores; that the mind-numbingly detailed field note books of the legendary ANIC orthopterist, Ken Key, have now been digitised for the enjoyment of all; that mantids are better at catching moving prey if the prey is of matte rather than shiny appearance; and that parasitoid wasps may be more effective biocontrol agents if fed a caffeinated sugar solution.

The Conference field trip (see the accompanying photographs) treated a lucky subset of delegates to the panoramic beauty and floristic diversity of the Stirling Ranges.

Following the meeting, Ian Naumann has returned to the AES Executive as Chief Operating Officer. The next AES Meeting and Scientific Conference will be 17–21 November 2024 in Hobart, Tasmania.



AES Conference attendees in Albany. Image from www.aesconferences.com.au



This striking unidentified moth is just one of many insects spotted on the conference field trip. Photograph by Ian Naumann

...continued from page 7

Mostly mothing in the Southwest

Andreas Zwick, Siwanon Paphatmethin, Ethan Beaver and Living Li bookended the Albany AES Conference with collecting in the semi-arid and humid regions of Western Australia’s Southwest. Pre-conference (7–12 November) they enjoyed a few warm and productive nights, first in the Wallaroo area (where there were lots of lacewings) and then in the Boorabbin and Mount Manning-Helena and Aurora Range areas. The team then headed south to cold, windy weather around Cape Arid and the Fitzgerald River, which produced interesting moths and butterflies despite the miserable conditions. After the AES Conference (17–20 November), the team battled more frigid weather in the Twin Creeks area (reasonably productive, to everyone’s surprise) and the Stirling Ranges before heading west to collect under the massive trees of the tinglewood forests in the Walpole-Nornalup National Park.

There were plenty of moths among the big trees, but the diversity was low. A spectacular flight of the Helena gum moth, *Austrocaligula helena* provided a welcome photo opportunity. Overall, the trip was productive for gelechioids which kept Siwanon and Andreas happy. Ethan collected a few day-flying Stathmopodids, which are represented by only a handful of specimens in ANIC, and plenty of his bagworm moths. He managed to collect several undescribed bagworm species and confirmed aspects of their larval life histories. One of the undescribed species is entirely new, known only from the specimens collected on the trip at Boorabbin. Living also did well, finding his favourite pie dish beetles (heleine Tenebrionidae) and plenty of other tiny, black beetles.



Amazing stars in the bush at Mount Manning. Photograph by Siwanon Paphatmethin



Conference excursion to the stunning Stirling Range National Park. Photograph by Siwanon Paphatmethin



Siwanon making some new friends—nearly 30 Helena gum moths! Photograph by Ethan Beaver



Some of the pinned specimens caught in the cold-but-productive Twin Creeks area. Photograph by Siwanon Paphatmethin

Inaugural MABA Annual Event 2023

Michael Braby

The inaugural MABA annual event was held at CSIRO Black Mountain Library and the Australian National Botanic Gardens (ANBG), Canberra, ACT, Australia over the weekend 3–5 November 2023. Six different activities were held over the weekend, which were attended by a total of 61 members and friends. It was wonderful to have six international members from New Zealand, USA and Europe attend the event, highlighting that MABA is now truly an international organisation.

The event started with a social function and dinner on Friday night at the Black Mountain Library at which guests were welcomed by Axel Kallies (our new President), Doug Hilton (former inaugural President of MABA and now Chief Executive of CSIRO), David Yeates (Director of the Australian National Insect Collection), and Anne-Marie Slattery (Metadata and Discovery Librarian at CSIRO). Federica Turco (Collection Manager of ANIC) gave a short presentation on progress and developments with the new ANIC building which is expected to be completed by June 2024. Michael Braby then talked about the scientific art exhibition on display for the event. This was based on art works curated from the rare book collection of the library that are not normally accessible to the public. The display featured a series of superb original water colour paintings by several notable artists which were published as colour plates, including Neville Cayley, for *What Butterfly is That?* (Waterhouse, 1932); George Browning, for *Butterflies of Australia and New Guinea* (Barrett and Burns, 1951); Ninon Geier, for *Butterflies of Australia* (Common and Waterhouse, 1972); Sybil Monteith, for the revised edition of *Butterflies of Australia* (Common and Waterhouse, 1981); and Frank Nanninga, for *The Insects of Australia* (CSIRO, 1970, CSIRO, 1991).

Following dinner, about half of the group headed off to the ANBG to observe, photograph or collect moths at several light traps that were set up by Donald Hobern, Glenn Cocking and Andreas Zwick at the western end of the gardens near Black Mountain Reserve. Various light-traps were set up to showcase the methods commonly used to study and sample moths. It was a good night for moths and many species were recorded.

The highlight of the event was undoubtedly the 20 talks presented by members at the ANBG Theatre on Saturday. The opening keynote address was delivered by Professor David Lohman (Chair of Biology, City College of New York, USA) who gave an inspiring and stimulating talk on biogeography and evolution of Indo-Australian butterflies that covered an array of fascinating topics in relation to past climate changes in SE Asia and mainland New Guinea, including diversification of *Delias* – reputed to be the largest butterfly genus in the world – and the astonishing mimicry seen in *Elymnias*. He also touched on *Wolbachia* in *Melanitis*. Three student members—Georgina Binns, Siwanon Paphatmethin, and Ethan Beaver—gave outstanding talks on their PhD projects, with all sharing the prize of the inaugural Ted Edwards Memorial Award for the best student presentation. Georgina Binns (and Chris Müller) also won the free dinner prize for guessing the correct number of eggs and/or species in a photo, which comprised a single cohort of 170 eggs of the pierid butterfly *Delias harpalyce*. Marianne Horak closed the day with a moving and fitting tribute to the late Ted Edwards who touched the lives of so many of us.

Lynette Aitchison kindly managed the large number of books on butterflies and moths for sale, and even sold several books to passers-by in the gardens! The Annual General Meeting was



Winners of the Ted Edwards Memorial Award for the best student presentation. Left to right: Ethan Beaver, Siwanon Paphatmethin and Georgina Binns with President Axel Kallies



Friday night social function, hosted in the Black Mountain Library. Left to right: Michael Braby, Axel Kallies, Doug Hilton, Anne-Marie Slattery, Ethan Beaver, Federica Turco and David Yeates

...continued on page 10

...continued from page 9



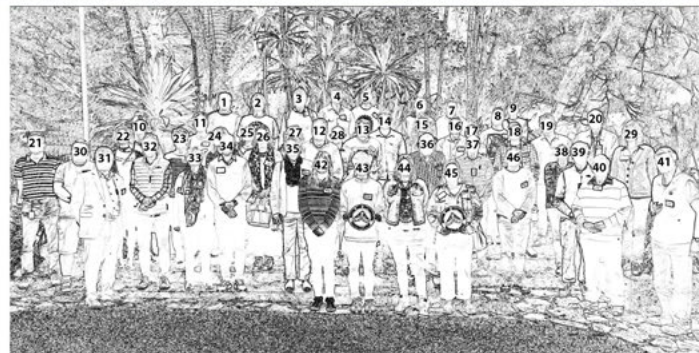
held at the Theatrette on Saturday afternoon, and the 'conference' dinner was held at the China Tea Club in North Lyneham.

The butterfly and larval host plant identification tour at the ANBG was run by Suzi Bond and Steve Holliday on the following Sunday morning. The activity was well attended, but the poor weather precluded seeing the many species that typically fly at this time of the year, and the only highlights were a nectaring *Graphium macleayanum* and a clump of mistletoe on which the immature stages of *Delias harpalyce* were found. A moth specimen preparation workshop was run by Axel Kallies in the Banksia Building at the ANBG during Sunday afternoon. The workshop focussed on relaxing and preparing specimens (collected from the light traps on Friday night) and how to properly pin and set them for inclusion in a scientific reference collection. Participants worked with macro or micromoths, or both. It was interesting to hear all the different methods used by the various experts in attendance.

The 2023 event was a fun and enjoyable experience, and provided opportunities for networking and learning about what people are doing.

MABA ANNUAL EVENT 2023

Australian National Botanic Gardens (ANBG) Black Mountain, Canberra, ACT, Australia,
3-5 November



- | | | | |
|----------------------|--------------------|----------------------|-------------------------|
| 1 Donald Hobern | 15 Ethan Beaver | 29 Lynette Aitchison | 43 Siwanon Paphatmethin |
| 2 David James | 16 David Lohman | 30 Andreas Zwick | 44 Georgina Binns |
| 3 Fabian Douglas | 17 Bruce Walsh | 31 Roger Kitching | 45 Ying Luo |
| 4 Cleve Herd | 18 Chris Sanderson | 32 Peter Samson | 46 Tony Moore |
| 5 Christopher Irving | 19 Mick Andren | 33 Marianne Horak | |
| 6 Melvin Nathan | 20 John Mebberson | 34 Michael Braby | |
| 7 Jessie Sinclair | 21 You Ning Su | 35 Angela Moon-Jones | |
| 8 David Britton | 22 Marlene Walter | 36 Graham Owen | |
| 9 Elaine Bayes | 23 Dianne Clarke | 37 Peter McQuillan | |
| 10 Doug Hilton | 24 Jurate De Prins | 38 Thekla Pleines | |
| 11 Axel Kallies | 25 Jean Griffin | 39 Bart Hacobian | |
| 12 Rob Jones | 26 Suzi Bond | 40 Don Sands | |
| 13 John Nielsen | 27 Wendy Shelton | 41 John Bundock | |
| 14 Chris Muller | 28 Gary Harris | 42 Taryn Keddie | |

Absent: Mandy Squair, Margaret Strong, Bonnie Koopmans

Biosystematics 2023

Jon Lewis

The Biosystematics 2023 conference held in Canberra in December celebrated 50 years of the Australian Biological Resources Study (ABRS) and brought together as diverse a bunch of taxa as you possibly could wish for. Around 260 delegates (including a swarm from ANIC), enjoyed a wide range of excellent presentations, and there really was something for everyone. Who could miss talks such as the hard hitting “What has the ABRS done for fish trematodes lately?”, the intriguingly titled “Velvet Parachute” and, my favourite, “Don’t trust a plastid for taxonomic advice”, something I had never even dreamed of doing until I saw the title.

While these were good, the quality of the keynote speakers was impressive. Lyn Cooke, Rudolf Meier and Simon Ho were highlights for me, each enormously knowledgeable and gifted communicators. On top of this, several pre-conference workshops were offered, including Mark Harvey’s “The



Ying Luo presenting on her use of iNaturalist to acquire additional records of leaf mining moths for her research. Photograph by Siwanon Paphatmethin

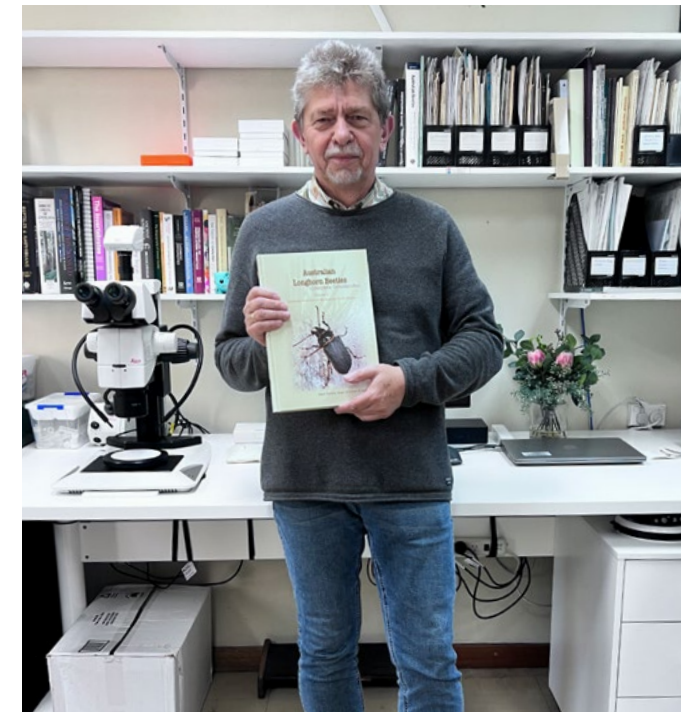
taxonomic process: How to describe new animal taxa and not break the rules of the International Code of Zoological Nomenclature”. It sounds a bit heavy-duty, but it was a riveting afternoon as Mark skilfully illuminated the dark recesses of the Code. There was plenty of time for questions and discussion was kept lively by another old ICZN warrior, ANIC’s own Bruce Halliday. The attendees (which included CSIRO Chief Executive Doug Hilton) went away with a much-improved knowledge of the Code and a fighting chance of avoiding embarrassing nomenclatural errors in the future.

Overall, Biosystematics 2023 was an impressive turn out of systematic and taxonomic talent and the conference organisers deserve great praise. And for me there was one more highlight: the systematic and taxonomic community itself, a diverse, friendly and inclusive group. To my recollection, the only suit I saw was not grey, but vibrantly



The Biosystematics conference also provided a timely opportunity to celebrate the publication of Volume 3 of the *Australian Longhorn Beetles* series, focusing on Prioninae of the Australo-Pacific Region. Left to right: Doug Hilton, Mengjie Jin and Adam Ślipiński. Photograph by Lingzi Zhou

coloured and worn with matching hair. Someone else was sporting what appeared to be a spectacular hot-pink tulle-adorned wedding dress, while many others wore shorts and Blundstones. There was also a certain amount of knitting going on in the sessions, which seems to me a major improvement on messing about on your phone or surreptitiously answering emails. So now, when I consider the importance of taxonomic diversity in sustaining a harmonious and resilient ecosystem, I need look no further for an example than Biosystematics 2023. Looking forward to the next one.



Adam with the physical evidence of his hard work! *Australian Longhorn Beetles* Volume 3 is now available from CSIRO Publishing here: <https://www.publish.csiro.au/book/8106/>. Photograph by Lingzi Zhou

Visit to ANIC by Dr Doug Shears and his family

David Yeates

We were very pleased to host a visit by Dr Doug Shears, his wife Deirdra, and two daughters Martine Donohue and Lisa Cullen in late February. Doug is a long-standing friend of CSIRO and ANIC, and is a subscriber to the Australian Weevils book series.

Beginning his career as a farmer in the Wimmera, Doug has made major contributions to Australian Agribusiness as an entrepreneur, becoming the founding Chairman of the Uncle Tobys company among many highlights. He has also held appointments to the Prime Minister's Science and Engineering Council, the Agrifood Council and the board of CSIRO.

Doug accepted our invitation to reacquaint himself with ANIC and collect his signed copy of Volume 4 of the Australian Weevils book series in person. While the collection is partially packed and some specimens have already moved in preparation for the new building, some of our display drawers were available for the tour. Doug and his wife Deirdra accepted our invitation to visit again when the new building opens in 2025.



The Shears family admiring some drawers of impressive insect representatives, as well as some of agricultural importance, with expert collection tour guides David Yeates and Federica Turco. Photograph by You Ning Su

A (NON-INSECT!) CREATURE FEATURE

The Lepidopterists' fieldwork in the southwest of WA provided an opportunity to admire some slightly larger wildlife. The route to Mount Ragged (top) yielded a honey possum or noolbenger (*Tarsipes rostratus*) a tiny marsupial which feeds on pollen and nectar, and is an important pollinator.



Photograph by Siwanon Paphatmethin



Photograph by Living Li

© Y. Living Lee / www.livingcoevo.com

Recent publications

- Bajerlein, D., Błoszyk, J., **Halliday, B.** & Konwerski, S. (2024) Hitchhiking through life: a review of phoresy in Uropodina mites (Parasitiformes: Mesostigmata). *European Zoological Journal*, 91, 31–63 + Supplementary data. <https://doi.org/10.1080/24750263.2023.2288847>
- Beaver, E.P., Braby, M.F.** & Mikheyev, A. (2023) Systematics of the *Ogyris aenone* (Waterhouse) complex (Lepidoptera: Lycaenidae): threatened Australian butterflies of national conservation significance. *Invertebrate Systematics*, 37: 457–497. <https://doi.org/10.1071/IS23003>
- Beaver, E.P., Braby, M.F., Glatz, R.E.** & Young, D.A. (2023) Systematic revision of the *Ogyris idmo* (Hewitson, 1862) species group (Lepidoptera: Lycaenidae): implications for the conservation management of Australia's most threatened butterflies. *Invertebrate Systematics*, 37: 677–701. <https://doi.org/10.1071/IS23003>
- Bickerstaff, J.R.M., Jordal, B.H.** & Riegler, M. (2023) Two sympatric lineages of Australian *Cnestus solidus* share *Ambrosiella* symbionts but not *Wolbachia*. *Heredity*, 132, no. 1 (January 2023): 43–53. <https://doi.org/10.1038/s41437-023-00659-w>
- Bouguerche, C., **Huston, D.C., Cribb, T.H., Karlsbakk, E., Ahmed, M.** & Holovachov, O. (2023) Hidden in the fog: morphological and molecular characterisation of *Derogenes varicus sensu stricto* (Trematoda, Derogenidae) from Sweden and Norway, and redescription of two poorly known *Derogenes* species. *Parasite*, 30, 35. <https://doi.org/1051/parasite/2023030>
- Braby, M.F.** (2023) Review of the Australia butterfly genus *Cyprotides* Tite, 1963 (Lepidoptera: Lycaenidae) from Australia, with descriptions of three new taxa. *Austral Entomology*, 62: 15–48. <https://doi.org/10.1111/aen.12634>
- Braby, M.F.** (2023) MABA Guidelines on collecting Lepidoptera. *Moths and Butterflies Australasia Inc. Newsletter*, 4: 1–4.
- Braby, M.F.** (2023) How butterflies conquered the world: a new 'family tree' traces their 100-million-year journey across the globe. *The Conversation*. <https://theconversation.com/how-butterflies-conquered-the-world-a-new-family-tree-traces-their-100-million-year-journey-across-the-globe-205487>
- Braby, M.F., Müller, C.** & Espeland, M. (2023) Four species in one: taxonomic revision of the *Eirmocides helenita* (Semper, 1879) complex (Lepidoptera: Lycaenidae) from Australia and New Guinea. *Austral Entomology*, 62: 167–190. <https://doi.org/10.1111/aen.12646>
- Braby, M.F., Samson, P.R.** & **Beaver, E.P.** (2023) The life history of *Hypochrysops piceatus* Kerr, Macqueen & D.P.A. Sands, 1969 (Lepidoptera: Lycaenidae), a threatened butterfly from Australia. *Journal of the Lepidopterists' Society*, 77 (3): 133–142. <https://doi.org/10.18473/lepi.77i3.a1>
- Cuesta-Porta, V., Melika, G., **Nicholls, J.A., Stone, G.N.** & Pujade-Villar, J. (2023) Re-establishment of the Nearctic oak cynipid gall wasp genus *Feron* Kinsey, 1937 (Hymenoptera: Cynipidae: Cynipini), including the description of six new species. *Zootaxa*, 5366: 1–174. <https://doi.org/10.11646/zootaxa.5366.1.1>
- Cuesta-Porta, V., Melika, G., **Nicholls, J.A., Stone, G.N., Equihua-Martinez, A., Estrada-Venegas, E.** & Pujade-Villar, J. (2023) Revision of the *Amphibolips 'niger'* group with the description of a new species (Hymenoptera: Cynipini). *Zootaxa*, 5360: 451–486. <https://doi.org/10.11646/zootaxa.5360.4.1>
- Dang, L.H., An, Y.Y., Mound, L.A.** & Qiao, G.X. (2024) Leaf-feeding species of the genus *Liothrips* from China (Thysanoptera, Phlaeothripinae). *Zootaxa*, 5419 (1): 053–084. <https://doi.org/10.11646/zootaxa.5419.1.2>
- Dang, L.H., An, Y.Y., Okajima, S.** & **Mound, L.A.** (2023) Taxonomic review of the Oriental genus *Phylladothrips* Priesner (Thysanoptera, Phlaeothripidae). *Zookeys*, 1185: 241–253. <https://doi.org/10.3897/zookeys.1185.113895>
- Dang, L.H., Guo, F.Z., An, Y.Y.** & **Mound, L.A.** (2023) Ant-mimicking thrips of the genus *Compsothrips* Reuter from China (Phlaeothripidae, Idolothripinae). *Zootaxa*, 5353 (2): 187–195. <https://doi.org/10.11646/zootaxa.5353.2.8>
- Dang, L.H., Li, Y.Y., Mound, L.A.** & Qiao, G.X. (2023) The Oriental fungus-feeding genus *Azaleothrips* Ananthakrishnan 1964 from China with one new species and four new records (Thysanoptera, Phlaeothripidae, Phlaeothripinae). *Zookeys*, 1183: 219–231. <https://doi.org/10.3897/zookeys.1183.113182>
- Deng, M., **Zwick, A., Chen, Q., Liao, C.-Q., Wang, W., Wang, X.** & Huang, G.-H. (2023) Phylogeny and classification of Endromidae (Lepidoptera: Bombycoidea) based on mitochondrial genomes. *Arthropod Systematics & Phylogeny*, 81, 395–408. <https://doi.org/10.3897/asp.81.e90721>
- Eastwood, R.G., **Braby, M.F.** & Williams, M.R. (2023) *Neolucia bollami* Eastwood, Braby & Graham sp. nov. (Lepidoptera: Lycaenidae): speciation of a new allochronic cryptic butterfly from southwestern Western Australia. *Invertebrate Systematics*, 37 (8): 552–570. <https://doi.org/10.1071/IS23009>
- Frese, M., McCurry, M.R. & **Wells, A.** (2024) Miocene caddisflies from Australia: iron-rich sediments preserve internal organs, tracheoles, and corneal nanocoating of larvae and pupae. *Zoological Journal of the Linnean Society*, zlae003. <https://doi.org/10.1093/zoolinnean/zlae033>
- Hacobian, B.S., **Braby, M.F.** & Petrie, E.A. (2023) A new subspecies of *Philiris diana* Waterhouse & Lyell, 1914 (Lepidoptera: Lycaenidae) from the Wet Tropics of northern Australia. *Records of the Australian Museum*, 75 (2): 65–78. <https://doi.org/10.3853/j.2201-4349.75.2023.1826>
- Halliday, B., Taggers, A.** & Herrod, A. (2024) A record of the parasitic mite *Hemimyialges macdonaldi* (Evans et al. 1963) (Acari: Epidermoptidae) in the Orange-bellied Parrot *Neophema chrysogaster* (Latham, 1790) (Psittaciformes: Psittaculidae) in Australia. *Australian Veterinary Journal*, 102, 96–100. <https://doi.org/10.1111/avj.13308>
- Halliday, R.B.** (2023) Prelude to a study of the feather mites of Australia (Acariformes: Astigmata). *Zootaxa*, 5280 (1), 1–73. <https://doi.org/10.11646/zootaxa.5280.1.1>
- He, S., **Su, Y.N., Tan, M.K., Zwick, A., Warren, B.H.** & Robillard, T. (2024) Museomics, molecular phylogeny and systematic revision of the Eurepini crickets (Orthoptera: Gryllidae: Eneopterinae), with description of two new genera. *Systematic Entomology*, syen.12622. <https://doi.org/10.1111/syen.12622>

- Hearn, J., Gobbo, E., Nieves-Aldrey, J.L., Branca, A., **Nicholls, J.A.**, Koutsovoulos, G., Lartillot, N., Stone, G.N. & Ronquist, F. (2023) Phylogenomic analysis of protein-coding genes resolves complex gall wasp relationships. *Systematic Entomology*, 2023: 1–28. <https://doi.org/10.1111/syen.12611>
- Heikkilä, M., Minet, J., **Zwick, A.**, Hundsdoerfer, A., Rougerie, R. & Kitching, I.J. (2023) Critical re-examination of known purported fossil Bombycoidea (Lepidoptera). *PeerJ*, 11, e16049. <https://doi.org/10.7717/peerj.16049>
- Hsiao, Y.**, **Oberprieler, R.G.**, **Zwick, A.**, **Zhou, Y-L.** & **Ślipiński, A.** (2023) Museomics unveil systematics, diversity and evolution of Australian cycad-pollinating weevils. *Proceedings of the Royal Society B: Biological Sciences*, 290 (2008): 20231385. <https://doi.org/10.1098/rspb.2023.1385>
- Huston, D.C.**, **Hodda, M.**, Hills, A. & Collins, S. (2023) Detection of *Heterodera mani* in Western Australia. *Australasian Plant Disease Notes*, 18, 1–7. <https://doi.org/10.1007/s13314-023-00503-4>
- Huston, D.C.**, **Khudhir, M.**, Lewis, J., Collins, S., Jain, A. & **Hodda, M.** (2024) DNA barcoding of Australian cereal cyst nematode populations with comments on likely origin and taxonomy (Tylenchoidea: Heterodera). *Phytoparasitica*, 52, 14 (2024). <https://doi.org/10.1007/s12600-024-01136-8>
- Jain, A., **Huston, D.C.**, Wainer, J., **Hodda, M.**, Hayes, O., Whittock, S., Darling, E., Mann, R., Edwards, J., Rodoni, B. & Sawbridge, T. (2023) Geographic range extension of hop cyst nematode, *Heterodera humuli*, from Tasmania to the Australian mainland. *Australasian Plant Disease Notes*, 18, 1–8. <https://doi.org/10.1007/s13314-023-00494-2>
- Jain, A., Wainer, J., **Huston, D.C.**, **Hodda, M.**, Dinh, Q., Mann, R., B. Rodoni, B. & Edwards, J. (2023) First report of ryegrass cyst nematode, *Heterodera mani*, in Tasmania, Australia. *Plant Disease*, 107, 1245. <https://doi.org/10.1094/PDIS-05-22-1129-PDN>
- Jin, M., De Keyzer, R., **Ashman, L.G.**, **Zwick, A.** & **Ślipiński, A.** (2023) Phylogeny and tribal classification of Australian Prioninae (Coleoptera: Cerambycidae). *Annales Zoologici*, 73(3): 499–512, 14. <https://doi.org/10.3161/00034541ANZ2023.73.3.012>
- Kawahara, A.Y. et al. incl. **Braby, M.** (2023) A comprehensive phylogeny of butterflies reveals their ancestral hostplant and biogeographic origin. *Nature Ecology & Evolution*, 7: 903–913. <https://doi.org/10.1038/s41559-023-02041-9>
- Khudhir, M.**, **Hodda, M.**, Nicholas, E., Campbell, J. & Nicholas, W.L. (2023) A catalogue of the nematode slide collection from the late W.L. Nicholas held at National Research Collections Australia, CSIRO. *Zootaxa*, 5388, 1–109. <https://doi.org/10.11646/zootaxa.5388.1.1>
- Li, X., Breinholt, J.W., Martinez, J.I., Keegan, K., Ellis, E.A., Homziak, N.T., **Zwick, A.**, Storer, C.G., McKenna, D. & Kawahara, A.Y. (2024) Large-scale genomic data reveal the phylogeny and evolution of owllet moths (Noctuoidea). *Cladistics*, 40, 21–33. <https://doi.org/10.1111/cla.12559>
- Mašán, P. & **Halliday, B.** (2023) Two new species of *Lasioseius* (Acari: Mesostigmata: Blattisociidae) with reduced sclerotization of the sternal shield. *International Journal of Acarology*, 49, 24–33. <https://doi.org/10.1080/01647954.2023.2177343>
- Mound, L.A.**, **Dang, L.H.** & Tree, D.J. (2023) Structural diversity among the leaf-feeding thrips of Australia in the genus *Teuchothrips* (Thysanoptera, Phlaeothripinae) with 20 new species. *Zootaxa*, 5383 (4): 441–475. <https://doi.org/10.11646/zootaxa.5383.4.2>
- Munir-Zaki, A.M., Ng, Y.F., **Mound, L.A.**, Low, V.L. & Azidah, A.A. (2024) *Frankliniella minuta* (Moulton) (Thysanoptera: Thripidae): an American species newly recorded in Asia, with key to *Frankliniella* species from Malaysia. *Journal of Insect Biodiversity*, 10(2): 207–214 <https://doi.org/10.61186/jibs.10.2.207>
- Pérez-Ponce de León, G., Solórzano-García, B., **Huston, D.C.**, Mendoza-Garfias, B., Cabañas-Granillo J., Cutmore, S.C. & Cribb, T.H. (2023) Molecular species delimitation of marine trematodes over wide geographical ranges: *Schikhobalotrema* spp. (Digenea: Haploplanchnidae) in needlefishes (Belonidae) from the Pacific Ocean and Gulf of Mexico. *Parasitology*, 2023:1–13. <https://doi.org/10.1017/S0031182023001245>
- Richardson, B.J.** & McCurry, M.R. (2023) Description and evolutionary biogeography of the first Miocene jumping spider (Araneae: Salticidae) from a southern continent. *Zoological Journal of the Linnean Society*, 200 (4), 1–13 <https://doi.org/10.1093/zoolinnean/zlad105>
- Šlapeta, J., **Halliday, B.**, Dunlop, J.A., Nachum-Biala, Y., Salant, H., Ghodrati, S., Modrý, D. & Harrus, S. (2023) The “southeastern Europe” lineage of the brown dog tick *Rhipicephalus sanguineus (sensu lato)* identified as *Rhipicephalus rutilus* Koch, 1844: Comparison with holotype and generation of mitogenome reference from Israel. *Current Research in Parasitology and Vector-Borne Diseases*, 3, 100118, 1–10. <https://doi.org/10.1016/j.crpvbd.2023.100118>
- Ślipiński, A.**, De Keyzer R. & Jin M. (2023) *Australian Longhorn Beetles (Coleoptera: Cerambycidae) Volume 3: Subfamily Prioninae of the Australo-Pacific Region*. CSIRO Publishing, 532pp.
- Ślipiński, A.**, Szitó, A. & **Zhou, Y-L.** (2023) Revision of the Australian species previously known as *Trogoderma* Dejean (Coleoptera: Dermestidae). *Annales Zoologici*, 73(4): 797–941. <https://doi.org/10.3161/00034541ANZ2023.73.4.017>
- Soghigian, J., Sither, C., Justi, S.A., Morinaga, G., Cassel, B.K., Vitek, C.J., Livdahl, T., Xia, S., Gloria-Soria, A., Powell, J.R. & Zavortink, T., [...] **Yeates, D.K.** et al. (2023) Phylogenomics reveals the history of host use in mosquitoes. *Nature Communications*, 14 (1), 6252. <https://doi.org/10.1038/s41467-023-41764-y>
- Sottile, S., **Nicholls, J.A.** & Cerasa, G. (2024) Life cycle closure of *Cerroneuroterus minutulus* (Giraud, 1859) with *C. aggregatus* (Wachtl, 1880) (Hymenoptera: Cynipidae: Cynipini): experimental, taxonomic and molecular approaches. *Zootaxa*, 5418: 140–158. <https://doi.org/10.11646/zootaxa.5418.2.2>
- Toussaint, E.F.A., **Braby, M.F.**, Müller, C.J., Dexter, K.A., Storer, C., Lohman, D.J. & Kawahara, A.Y. (2023) Explosive Cenozoic radiation and diversity-dependent diversification dynamics shaped the evolution of Australian skipper butterflies. *Evolutionary Journal of the Linnean Society*, 1: 1–10. <https://doi.org/10.1093/evolinnean/kzac001>
- Yeates, D.K.** (2023) In celebration of the Entomological Society of Queensland’s 100th birthday: Entomology since the jubilee. *The Australian Entomologist*, 50(3), 167–178.
- Zwick, P. & **Zwick, A.** (2023) Revision of the African *Neoperla* Needham, 1905 (Plecoptera: Perlidae: Perlinae) based on morphological and molecular data. *Zootaxa*, 5316, 1–194. <https://doi.org/10.11646/zootaxa.5316.1.1>