



INSIDE THIS ISSUE

The Director's Introduction	1
Welcome to Ian, Ethan, and our long-awaited visitors	2
25 years of the ANIC Volunteer Scheme	4
Fieldtrip to Western Australia	5
Moth-hunting in Tasmania	8
Nailed it	8
4-Wheel drive training	9
Relocation news: Lepidoptera specimen transfer	10
Continuing to make every type count.....	11
Recent publications.....	12
Relocation snippet	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

There has been a significant burst of activity in ANIC during the summer of 2022/23 as the bonds of the pandemic slowly loosen. This issue documents a number of visitors, who were scheduled to arrive earlier but were delayed because of the pandemic, as well as field work, celebrations for the volunteer scheme and updates on a number of significant curatorial activities. We keep ourselves busy, while all the time our new building rises out of the ground next to the Herbarium on the Black Mountain site, and nervous excitement grows for our move into the new building next year. All curatorial staff are now working tirelessly on decanting and consolidating the collection for the move.

We welcome Ian Naumann back to the ANIC after many years in the Department of Agriculture, Fisheries and Forestry. Ethan Beaver continues with us as a PhD student studying bagworm moths (Psychidae), after a successful honours year studying Lycaenid butterflies. Chinese visitors Zhenyu Jin and Hongliang Shi join the beetle lab and Lihong Dang returns to study Thysanoptera with Laurence Mound. We also share some great action shots from the 25th anniversary of the ANIC volunteers scheme and marvel that Tom van Gerwen has been managing the project for all that time.

The Coleoptera and Lepidoptera teams share insights from a combined field trip to Western Australia. Nick Porch (Deakin

University) joined the trip and deployed a massive net fixed to the roof of the car. The trap can be very successful when driven slowly along bush tracks. Ying Luo and Ethan Beaver also report on their Tasmanian field work searching for leaf-mining moths (Gracillariidae) and bagworm moths (Psychidae), where they enjoyed significant assistance from Tasmanian entomologists. Four-wheel drive training is essential for our fieldwork, and six staff report on their training experience both on the theoretical and practical aspects of using winches, changing tyres, and extracting vehicles bogged in sand and mud.

Decant activities in ANIC are gaining momentum, and this issue reports on the progress of the primary type audit project and the completion of the mammoth task to transfer all the Lepidoptera from 200 wooden boxes into new standard drawers and cabinets in readiness for relocation. A large team of curators and volunteers have worked on this project since 2018. As usual, the issue concludes with a list ANIC staff publications from the past six months.



David Yeates

Welcome to Ian, Ethan, and our long-awaited visitors

Ian Naumann

A familiar face has returned to ANIC. Ian Naumann, a former leader of the Hymenoptera unit, has taken up a post-retirement Honorary Fellowship with the wasp and bee team.

Ian completed a PhD in the Entomology Department of the University of Queensland and hastened down to Canberra in November 1977 to take over as the Division of Entomology's Hymenoptera taxonomist. He joined fellow newcomers John Lawrence and David Rentz, and the three set about establishing refreshed research programs on beetles, orthopteroids and parasitoid wasps. Ian was always up for an interesting diversion and at times worked on mud-nesting wasps damaging rock art, insect common names, and ANIC's earliest databasing initiatives. Editing the second edition of *The Insects of Australia* was another diversion.

In 2001, Ian moved to the Department of Agriculture, Fisheries and Forestry to be involved with biosecurity programs, such



Ian setting up at his new desk at ANIC

as the Australian Plant Pest Database and industry biosecurity planning. For over 15 years he led programs to develop scientific skills supporting trade and quarantine in South-East Asia. These programs involved insect pests, plant pathogens and livestock diseases, and frequent travel. In ANIC, Ian will continue with these international collaborations and spend some time with the wasp collection.

Ethan Beaver

Ethan joined ANIC in 2022 as an Honours student at ANU, where he completed a project on the systematics and phylogenetics of the butterfly genus *Ogyris* (Lepidoptera: Lycaenidae) with Michael Braby and Andreas Zwick. After finishing his Bachelor's degree on wildlife conservation biology in Adelaide, Ethan recently moved to Canberra to continue studying Lepidoptera, an interest that he initially fostered while growing up in East Arnhem Land, Northern Territory.



Ethan with a bagworm moth in Tasmania. Photo: Ying Luo

Ethan is staying on with the ANIC and ANU to begin a PhD project with Scott Keogh (ANU) and Andreas Zwick, this time on the diverse and little-known bagworm moths (Psychidae: Oiketinae). The project broadly aims to investigate the phylogenetics, ecology, morphology and taxonomy of a captivating group that has had no serious study in Australia since the 1940s.

In his spare time, Ethan likes to bushwalk, photograph flowers, and tend to his ever-growing garden.

Visitors to ANIC

Whilst ANIC is in a state of great activity preparing for the move to the new building, we had some final visitors to sneak through the door before closing the collection for relocation. These visitors were all slated to arrive prior to 2023, but a particular global pandemic put a halt to that! A warm welcome to our final three long-term (and long-awaited) visitors in our current facility.

Zhenyu Jin

Dr. Zhenyu Jin is a Chinese entomologist who obtained his PhD in Zoology in 2013 from the Sun Yat-sen University (Guangzhou). His PhD thesis focused on the taxonomy and systematics of the beetle family Dascillidae. Dr. Jin finished his first visit to ANIC in early 2013, and he started working at the College of Agriculture, Yangtze University (Jingzhou) in late 2013, and he maintained his passion for beetle taxonomy afterwards. Dr. Jin started his second 12-month visit to ANIC as a visiting scientist from January 2023, supported by the China Scholarship Council. Zhenyu loves to explore many beetle groups, and he starts with learning the taxonomy of Australian Elateridae and will contribute to the chapter for *Australian Beetles* Volume 4.

In his spare time, he loves skyping with his family in China, especially with his 4-year-old twin daughters. He is very outgoing with a great sense of humour, and he enjoys meeting new people and catching up with old friends.



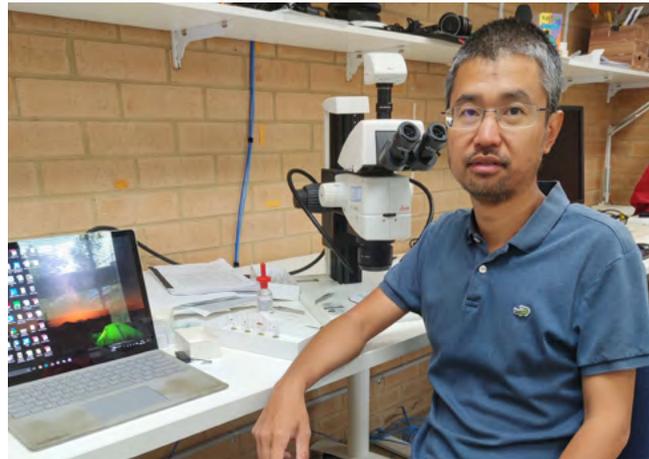
Zhenyu at his desk to work on *Australian Beetles Volume 4*

Hongliang Shi

Dr. Hongliang Shi received his PhD in Zoology from the Institute of Zoology, Chinese Academy of Sciences (Beijing) in 2013, with a thesis on the Chinese fauna of the Tribe Pterostichini (Coleoptera: Carabidae). He is now an Associate Professor at the College of Forestry, Beijing Forestry University. From December 2022, he is working in the ANIC as a visiting scientist, supported by the China Scholarship Council. During his time at ANIC, Hongliang will work closely with Adam Ślipiński on Australian Oedemeridae and will contribute to a chapter for *Australian Beetles Volume 4*.

Hongliang brought his wife (also a beetle taxonomist) and son with him, and they all love the Australian bush landscape and are amazed by the diversity of wildlife here. On holidays and weekends, they enjoy driving to various natural reserves to

hike, collect specimens, and explore the unique differences from their urban lifestyle in Beijing.



Hongliang at his desk at ANIC to work on *Australian Beetles Volume 4*

Lihong Dang

Lihong was ANIC's first thrips student from China when she spent 14 months working with Laurence Mound – returning in January 2014 from mid-summer in Canberra to a temperature of -7°C in Beijing. Her work here became part of her thesis on the systematics of Tubulifera from China and Southeast Asia (Thysanoptera), with GeXia Qiao and Laurence as supervisors. For this she was awarded her Ph.D. by the Institute of Zoology, Chinese Academy of Sciences.

Subsequently, she worked as a lecturer at the Shaanxi University of Technology in Hanzhong City for four years, and in December 2018 she was promoted to associate professor. More recently she has focused on the species-rich groups of Haplothripini and *Liothrips* group, and was awarded a youth fund project from the National Natural Science foundation

of China to support her classification work. Recognising the limitations of morphotaxonomy in understanding these groups, she started working on the mitochondrial genome of thrips, finding this very interesting because of the complex rearrangement of the mitogenome among thrips taxa.

Her work over the coming 12 months will involve further studies on plant-feeding species in China and Australia in the Haplothripini and the *Liothrips* group. Further studies are also planned on the systematics of the family Phlaeothripidae, of which these groups are members, based on morphological and molecular data. She will also do some fieldwork to familiarise herself with the Australian thrips fauna.



Lihong enjoying some of the local sights at Canberra's Balloon Spectacular

25 years of the ANIC Volunteer Scheme

Tom van Gerwen

The Volunteer Scheme commenced on the 2nd of February 1998, when the manager of the collection, Mr Graham Crompton conceived and implemented the idea with the approval of the then Chief of the Division Dr. Jim Cullen. This was when ANIC was part of the Division of Entomology. At that time Entomology stood out from all other Divisions on the site through organising Christmas parties and other important events, including formulating the beginnings of the Village Green, also known as the BBQ area. A little while ago I walked through the area and it looked exactly like what we had envisaged at that time.

At that time we had a team that worked hard and had a strong team spirit, which will never wane. We the volunteers have continued this spirit and we have a team that is happy and has many moments of laughter—especially when one tells a joke—or sheds a tear when the news is bad.



Tom Van Gerwen receiving his 25-year volunteer certificate from Collection Manager, Federica Turco

On the 1st of March 2023, we the 73 past and present volunteers proudly look at what we have achieved over the past 25 years. Overall, the volunteers have accumulated 118,280 hours, which roughly works out to 4,731 hours per year or 395 hours per month or 98 hours per 5 working days week or 20 hours per work day. Whilst I was writing this, I was wondering whether any volunteers had accumulated 2,500 volunteer hours, and to my surprise I found six people who exceeded that number:

Robert Tompsett	2,722 hours
Peter McNicol	2,769 hours
Jenifer Campbell	3,132 hours
David Ferguson	6,004 hours
Tom van Gerwen	9,196 hours
Glen Cocking	9,452 hours



L-R: Jaime Florez Fernandez, James Nicholls and Claire Yang hard at work providing lunch

So let us continue with our mantra. Team spirit, hardwork, lots of fun and laughter, and standing by your mates. I am so very proud to have led the volunteers during this period and I thank you all for the faith you had in me to do this job.

Finally, our sincere thanks to our leader, Federica, and all her staff, especially Debbie Jennings, the Honorary Fellows and those who do all the paperwork that is involved with the volunteer scheme. We thank those who, because of ill health or age, will no longer be able to come. We love you all. We say thank you so very much.

COVID may have put a stop to volunteering for a little while. However, there would be little change in the figures we have here today. A big thank you from myself and all the other volunteers.

Finally, we would like to propose a toast to the ANIC. May she grow and be looked after to the same standard of the past 25 years for the next 25, and—for that fact—forever.



L-R: Nicole Fisher, Anne Hastings and Judy Evans

Fieldtrip to Western Australia

James Bickerstaff and Siwanon Paphatmethin

In late November of 2022 a grand team of researchers travelled to southern Western Australia with the sole purpose of collecting insects. The team was composed of Coleopterists and Lepidopterists from ANIC, including Andreas Zwick, Lingzi Zhou, Siwanon Paphatmethin, Hermes Escalona, James Bickerstaff, Adam Slipinski, Ying Luo, and—visiting from Deakin University—Nick Porch.

The team travelled to the Porongurup National Park in south-western Western Australia. The Porongurup Range is a core section of the Southwest Biodiversity Hotspot and is an ancient granite mountain range, formed some 1200 million years ago.

The highest peak is 670 metres, and the range is surrounded by giant karri and jarrah tree forests and a rich diversity of flora and fauna. It was here where the team set up base on the northern side of the range.

The team all took different routes to travel to the Porongurups, with varying degrees of difficulty. Adam and Lingzi braved the Nullarbor, driving from Canberra to the Porongurup Range. Stopping along the way to take in the coastal views of South Australia, the vast expanses of the Nullarbor, and to also collect seagrass weevils in Ceduna, Adam and Lingzi travelled for seven days to ferry collecting gear from ANIC to the destined

field location. Meanwhile, Hermes, Nick and James flew to Perth and slowly drove south, stopping at various national parks to collect and to establish panel intercept traps.

With the team settled in the Porongurups, the collecting began! The first location was the Stirling Ranges, a mountain range and biodiversity hotspot 40km to the north. Similar to the Porongurups, the range is rather ancient, with the mountains formed some 2000–1200 million years ago. The range is home to one of the most diverse floral assemblages in the world and supports many different vegetation communities. Team Beetles (Adam, Hermes, Lingzi, Nick and James) established pitfall traps and panel intercept traps to be left for a week and also sifted great quantities of leaf litter throughout the range. Following this, they ventured throughout the Porongurups to similarly establish pitfall traps and panel intercept traps. The group also conducted plenty of leaf-litter sifting and sweep-netting along the way. In the tall forests of the range, Nick Porch also brought out the car net;



The whole team! Back row, L-R: Andreas Zwick, Siwanon Paphatmethin, James Bickerstaff, Adam Slipinski, Ying Luo. Front row, L-R: Lingzi Zhou, Hermes Escalona, Nick Porch



Nick Porch photographing dirt (supposedly a weevil, too)



No time for swimming - Hermes sifting seagrass in search of weevils

...continued on page 6

...continued from page 5

a massive net affixed to the roof of the car used to collect. By driving slowly up and down the roads, hundreds of flying insects (including a tiny bark beetle) were caught. It truly is a novel, quick and easy way to collect!

The beetle team also journeyed to Fitzgerald River National Park, some 180kms to the east of home base. Under the hot summer sun the day became very productive for weevils. Hundreds of *Haplonyx* specimens were found on the branches of eucalypt trees, Hermes sifted seagrass to collect weevils and Nick Porch photographed weevils on the beach.

While the day was filled with collecting insects, the following evenings were spent sorting the haul. Easily hundreds—if not thousands—of beetles were collected and sorted over the nights in the field. However, not all nights were spent sorting. The team was invited by a local conservation group, the Friends of the Porongurup Range, to present their research and also discuss their particular interest in the insect diversity of south-western Western Australia. Ying Luo and James



Amazing wildflowers in Stirling Range National Park

Bickerstaff talked about their research on leaf-mining moths and bark and ambrosia beetles, respectively fostering great excitement among the audience.

In contrast to Team Beetles, Team Moths (Andreas, Ying, and Siwanon) were tirelessly active collectors at night and spent the daytime processing the samples they had collected. Each day they travelled to different places to set up light traps before dark with the hope of collecting rare and exciting species. Their trip began at the base camp and Porongurup area. Unfortunately, they did not have very impressive nights of collecting there due to unseasonably cold weather and strong winds. Yet they managed to obtain some intriguing gelechioid moths that look like a combination of Xyloryctidae and Lecithoceridae.

The real treasure awaited Team Moths in the Stirling Ranges. They quickly filled up tubes and enjoyed seeing a dazzling array of moths, including some Hypertrophinae (Depressariidae) and



Organising moth specimens the day after a night spent light-trapping



Ying being greeted by the welcoming committee of Porongurup



Ying (top) and James (bottom) presenting their respective research to the Friends of Porongurup Range

...continued on page 7

...continued from page 6

Geometridae that look nothing like their own kind. The number of specimens collected at the Stirling Ranges kept them so busy the following day that they decided to stay at the base camp to process their finds.

Next, Team Moths ventured south to the Walpole-Nornalup National Park, where they learned a new technique for catching tiny Gracillariidae. The approach involved net-sweeping over a bush and proved to be incredibly efficient, rather than rearing moths from leafmines or catching them with light-traps. Additionally, it was here that they caught their first specimens of Carthaeidae, the smallest family of the superfamily Bombycoidea, containing a single species endemic to southwestern WA.



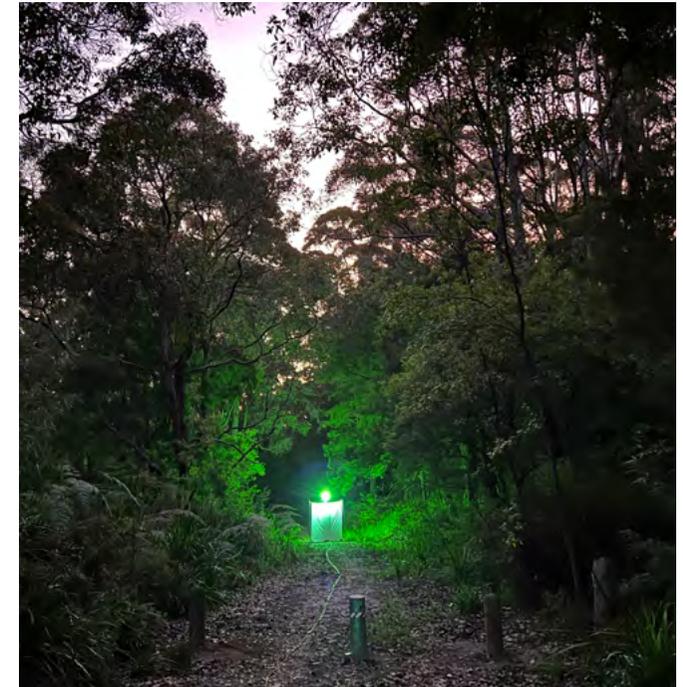
Stirling Range National Park is home to some of WA's highest peaks

The journey then took the moth team far west from the base camp to the Jarrahwood State Forest, in the hope of finding something different. Unfortunately, the forest condition did not live up to its appearance on the map, as it was largely burnt and only partially plant-covered. Nevertheless, they encountered an unexpected diversity of moths given the low vegetation diversity in the area.

Team Moths returned to the base camp and said their goodbyes, as most people were leaving the field and returning to civilisation. A reduced team (Andreas and Siwanon) continued on their journey to the east, towards Fitzgerald River National Park. The scenery of the park was impressive during the daytime, but as night fell, the swarms of mosquitoes emerged. Despite this, the lepidopterists made some exciting discoveries, including Tineodidae, which have rarely been collected in Australia. Their travels also brought them to Hopetoun, where Siwanon discovered an Asian restaurant with the most delicious milk tea in the state.

It is common on any expedition for plans to be altered due to unforeseen obstacles, and this trip was not without its challenges. Flooding and road closures at Mount Ragged meant that Team Moths had to reroute to the Dragon Rocks Nature Reserve, and a bushfire prevented exploration of the fauna of Goldfields Woodlands National Park.

The journey came to the end at Karroun Hill Nature Reserve, which was the last destination. Overall, the trip was a great success, with thousands of specimens being returned to ANIC. Many adventures were had, and great memories were made. Much to the disappointment of the team, however, the only thing that could not return across the country are the fantastic pies at the Mt Barker Bakery.



Atmospheric light-trapping at Walpole-Nornalup National Park



Ying and Andreas light-trapping in Stirling Range National Park

Moth-hunting in Tasmania

Ying Luo

In late January, research students Ying Luo and Ethan Beaver embarked on a trip to Tasmania, primarily to collect Gracillariidae (graceful leaf-mining moths). This trip was aided by some careful planning by Maddi Giannotta, another ANIC PhD student who was ultimately unable to join the trip. Nevertheless, Ying and Ethan covered approximately 1,400 kilometres travelling around Tasmania, stopping at, or travelling through, more than a dozen national parks. National Park highlights include Ben Lomond National Park, Roger River National Park, Arthur-Pieman Conservation Area and Mount Field National Park. We enjoyed looking for ‘a leaf in a forest’ (Gracillariidae) and ‘bundle of sticks in a grassland’ (Psychidae). Ying had an excellent time learning how to catch whistling moths (genus *Hecatesia*) with Ethan.

The trip was a success in no small part due to the generosity and help of others along the way. We were able to book a CSIRO vehicle (a Toyota Hilux) in Hobart, which saved us a headache with the private hire companies—thank you to the CSIRO Business and Infrastructure Services team in

Hobart! The staff at the Tasmanian Museum and Art Gallery, particularly Dr. Simon Grove and Dr. Cathy Byrne, were also very generous, lending us a microscope and net, which improved our collecting efficiency. We also stayed with Dr. Peter MacQuillan and his family, whose hospitality and knowledge was endless. Ying brought a LepiLED set-up for light-trapping, but she was pleasantly surprised by the efficacy of Peter MacQuillan’s set-up for collecting small moths. We had a surprisingly productive night using both set-ups.

This trip was funded by a Holsworth Wildlife Research Endowment received by Ying Luo.



Ying pinning and setting micromoths in the field



Ying and Ethan in the Arthur-Pieman Conservation Area

NAILED IT

Sometimes pins just aren’t cut out for the job! Weevils are well-known for having tough elytra, and this *Leptopius* sp. (Curculionidae, Entiminae) was no exception, to the point of being deemed worthy of this rather drastic tactic in the 80s. Maybe we should expand the ANIC tool selection to include hammers?



4-Wheel drive training

Jaime Florez Fernandez

After about three years (... probably more) of getting an “Overdue 4-Wheel Drive Training” notification in the CSIRO learning system, I finally got this done! The overdue notification aside, the training was not only well designed but was also great fun! Six members of staff at ANIC undertook this training, in two groups of three—Juanita Rodriguez, Bonnie Koopmans and Jaime Florez Fernandez in the first group, and Lingzi Zhou, James Bickerstaff and Thekla Pleines in the second.

For three days we were immersed in the mechanics of 4-wheel driving, experiencing dirt roads, paths that didn’t even look like a road but more like a trap, sweat, dust on top of the sweat (ie. mud), sand, sun, and also some cloudy cold days, all while getting stuck and bogged in the hills of Namadgi National Park and in the Shoalhaven River sandy shores.

The first day started in the classroom, learning theory focused on the different types of 4WD vehicles and how they work. Driving around the training centre premises during the first afternoon brought the first real challenges, like learning the benefit of stalling in the middle of a very steep hill and how to get out of it. We also practice recovery techniques using a winch, including one and two anchor points and also using pulleys, which greatly increases the power of the winch.

The second day was spent mostly on the steep roads of Namadgi NP around Paddys River. There, we realised how much power and assistance a good 4WD can offer, for example going downhill with engine braking and minimal driver interaction. However, the high power of the car can be your enemy and get you into trouble if you don’t know how to regulate it going uphill. Putting into play other techniques like lowering pressure of the tyres was also game-changing... although *someone* went a bit too hard uphill and gave us a flat tyre, which the instructor took advantage of to fill the

training quota of three tyre changes. To continue the rate of ‘inconveniences’ (which were, in reality, very welcome during this training) another of us (me?!) managed to get one of the front wheels stuck very deep into a wide crack in the road... holy moly! We had been practising how to navigate that kind of terrain, driving extremely slowly with another person outside giving directions... and we failed! It is incredible difficult to keep eyes on all four wheels when deep holes are everywhere, and communication between the people inside and outside the car is extremely important.

The third day included an hour-long trip to the Shoalhaven River to practice sand driving. I have to say that this was a fun day, and very useful indeed for future fieldwork. I remember almost getting stuck with Juanita in the soft sands of WA... not good. This day gave us some techniques to prevent that and how to get out if you do get stuck. To be sure we learned our lesson properly, our instructor bogged a Toyota Hilux by spinning the wheels until it was fully stuck in the sand. The



No sand castles here - there are cars to dig out!

instructor left us alone to decide on the tools and the strategy to recover the car. This time we used another vehicle and snatch straps. This recovery was not easy, but it was fun! Both cars can easily get stuck... *especially* if you stall the car that is getting pulled out. There has to be good communication and coordination among the people participating, but we managed to get the bogged car out! You can see the happy faces of the first group that took the training after this achievement. To celebrate, the instructors offered a BBQ lunch on the shores of the Shoalhaven, a great way to finish the training!

This accredited training course was provided by The Sutton Road Training Centre. Groups of three people are ideal.



One of the super steep tracks on the second day



Jaime, Bonnie and Juanita at Stewarts Crossing, with an un-bogged car!

Relocation news: Lepidoptera specimen transfer

Thekla Pleines

For many years, the Lepidoptera collection hall in ANIC featured several sets of wooden insect cabinets. Also quite impressive were the rows of wooden store boxes full of moths and butterflies, sitting wrapped in plastic bags on top of the steel cabinets. In addition to that, there were more than 200 wooden store boxes with 'less valuable' specimens that had been stored in cabinets in the corridor behind the beetle hall. There had simply been no space in the collection hall to accommodate them all there.

The drawback of this specimen storage method is that the specimens are much less accessible for use in research, for example. It is much easier to curate the specimens in our standard drawers with glass lids.

In the past, the funding for enough metal cabinets to house all these specimens wasn't available, and so the decision was made to keep them as safe as possible. However, in the last few years, and especially with the Canberra Collections Accommodation Project and our upcoming move into a new building, new opportunities have opened. In the new building, we plan on storing the specimens without relying on chemicals such as naphthalene as a pest deterrent. This means that the specimens must be stored safer than they might be in wooden store boxes. The timber of the boxes, also, can become infused with naphthalene and other chemicals, which could create health, safety and environment risks in the new building. As a result, the transfer of specimens to standard drawers has not only become possible, but a priority.

When I joined the Lepidoptera collection in 2018, there were already some volunteers transferring these specimens, in that case moths from field trips undertaken decades earlier. The specimen transfer became one of my main duties, especially in the first year. When the first relocation staff could be hired,

Lepidoptera transfer was a primary task for many of them. And it has stayed that way until early this year, when the last wooden box from the back corridor had been processed and valuable specimens transferred to a standard drawer. Some boxes contained specimens from long-ago field trips, but most of the boxes—as well as the cabinets—held donated collections by amateur lepidopterists such as J.F.R. Kerr, J. Macqueen, J. Landy and K.D. Fairey. The boxes stored in the corridor behind the beetle hall contained mostly exotic butterflies, but some exotic moths as well.

A huge thank-you goes to all the volunteers, relocation staff and ANIC staff who helped with this enormous task: Cecilia Melano, Patsy Cocking, Pat Spalding, Isis Londoño, Sandra Zwick, Alex Chen, Karen May, Stuart Lay, Lauren Ashman, Debbie Jennings and You Ning Su. Together, we emptied not only the wooden cabinets, but most of the 550 wooden store boxes as well. The major task of curating these specimens still lies ahead, but it will be much more manageable now that they are all stored in standard drawers.



A box of Erebidae moths from Macqueen's collection.



These drawers of exotic hawkmoths (Sphingidae) (top) and miscellaneous butterflies (bottom) have been transferred from wooden boxes. They still have a way to go before they're properly curated, but at least they're now with the rest of the collection.

Continuing to make every type count

Nicole Fisher

The digitisation of the ANIC's primary type specimens continues and is well underway.

Since reporting on this activity in the [ANICdots newsletter of April 2021](#), the curation and examining of specimens has led to a consolidated master type list of 18,153 specimens. The complete list is currently being updated but can be accessed on the ANIC website ([ANIC primary types](#)).

Ongoing efforts are needed to not only ensure the continued safety of type specimens in ANIC, but to also make them more accessible in an era where science is driven by digital and molecular data. Accordingly, the ANIC curation, digitisation and molecular teams are working together, concentrating their efforts around primary type specimens in the three areas: curation, digitisation and DNA sequencing of the specimens.

When the digitisation team completes groups, high-resolution dorsal and lateral images and associated labels can be found on CSIRO's Data Access Portal.



The digitisation room is a hive of activity with the team working on the type project

Images for the following groups are now available:

- [Blattodea \(Cockroaches\)](#)
- [Diptera - Dixidae \(Meniscus midges\)](#)
- [Hymenoptera - Bees \(Apoidea: *Anthophila*\)](#)
- [Hymenoptera - Mutillidae \(Velvet ants\)](#)
- [Hymenoptera - Pompilidae \(Spider wasps\)](#)
- [Mecoptera \(Scorpionflies\)](#)
- [Orthoptera - Rhaphidophoridae \(Cave crickets\)](#)

The molecular team's provision of reference sequences from these name-bearing type specimens will revolutionise new methods of molecular identification such as mobile DNA sequencing, eDNA surveys and DNA metabarcoding.

Of 18,153 primary types currently deposited at ANIC, 6,562 have been imaged both dorsally and laterally—36% of the overall total. Some groups require additional characteristic views or images, and as a result roughly 15,722 images have been taken in total. Of the imaged specimens, 4,082 (22%) have been sampled for DNA analysis.

Through collaboration, the curatorial, digitisation and molecular teams at ANIC are delivering well-rounded information on the primary type specimens that the ANIC holds to [the Atlas of Living Australia](#), [the Australian Faunal Directory](#), and the public. We expect to finalise the digitisation of the type specimens in time for the collection to move to our new facility in 2024.



*Carenidium tropicale*_Holotype_ANIC25-076796_dorsal_100mmx1.5

2 mm



*Zeuzera aeglopsila*_Holotype_ANIC31-083594_dorsal_100mmx1.5

2 mm



*Carenium ambiguum*_Syntype_ANIC25-077460_frontal_100mmx1

2 mm

A small selection of the types that have been imaged so far

Recent publications

Arriaga-Varela, E., Tomaszewska, W., Szawaryn, K., Robertson, J.A., Seidel, M., **Ślipiński, A.** & Fikáček, M. (2022) The resurrection of Cerasommatidiidae, an enigmatic group of coccinelloid beetles (Coleoptera: Coccinelloidea) based on molecular and morphological evidence. *Zoological Journal of the Linnean Society*. <https://doi.org/10.1093/zoolinnean/zlac082>

Bandyopadhyay, P., Karmakar, K. & **Halliday, B.** (2023) Checklist of Indian mites in the family Laelapidae (Acari: Mesostigmata). *Zootaxa*, 5249 (4), 401–424. <https://doi.org/10.11646/zootaxa.5249.4.1>

Biffi, G., Leschen, R.A.B., **Hsiao, Y.**, Daniel, G.M. & Casaria S.A. (2022) The systematics of Dymorphocerinae (Cantharidae) based on larvae. *Insect Systematics & Evolution*. <https://doi.org/10.1163/1876312X-bja10041>

Bond, S. & Vardon, M. (2022) Biodiversity accounts for the butterflies of the Australian Capital Territory. *Conservation Science and Practice*, e12869. <https://doi.org/10.1111/csp2.12869>

Braby, M.F. (2022a) MABA: The need and vision for a regional Lepidoptera society. *Moths and Butterflies Australasia Inc. Newsletter*, 1, 2–6.

Braby, M.F. (2022b) Book Review. *The Butterflies of the Malay Peninsula*. By A. Steven Corbet and H.M. Pendlebury. Fifth Edition revised by George Michael van der Poorten and Nancy E. van der Poorten. Malaysian Nature Society, Kuala Lumpur. 2020. xiv+492 pp, 138 pl; hardback; 19.8 cm x 25.8 cm. ISBN 978-983-44886-3-5. Price £65. *Moths and Butterflies Australasia Inc. Newsletter*, 1, 9–12.

Braby, M.F. (2022c) The Braby butterfly collection. *Moths and Butterflies Australasia Inc. Newsletter*, 2, 2–4.

Braby, M.F. (2023) The butterfly paintings of George J. Browning. *Moths and Butterflies Australasia Inc. Newsletter*, 3, 2–8.

Braby, M.F., Edwards, E.D. & Horak, M. (2022) Obituary. John Michael Landy AC MBE, 12 April 1930 – 24 February 2022. *Moths and Butterflies Australasia Inc. Newsletter*, 2, 19–22.

Broadley, R.A., Wallenius, T.C., Little, S.J., Lee, T.L., Cliff, N.E., de Keyzer, R.G. & **Ślipiński, A.** (2023) First Report of *Nathrius brevipennis* (Mulsant) (Coleoptera: Cerambycidae: Cerambycinae) in Australia, with notes on diagnostic characters, biology and habits, distribution, and hosts. *The Coleopterists Bulletin*, 77(1), 127–37, 11. <https://doi.org/10.1649/0010-065X-77.1.127>

Colombo, W.D., **Rodriguez, J.** & Waichert, C. (2023) A puzzling spider wasp: description of an extinct species of Paleogenia Waichert and Pitts (Hymenoptera: Pompilidae) from the upper Eocene. *Historical Biology*. <https://doi.org/10.1080/08912963.2023.2189109>

Dashevsky, D., Baumann, K., Undheim, E.A.B., Nouwens, A., Ikonomopoulou, M.P., Schmidt, J.O., Ge, L., Kwok, H.F., **Rodriguez, J.** & Fry, B.G. (2023) Functional and proteomic insights into Aculeata venoms. *Toxins*, 15, 224. <https://doi.org/10.3390/toxins15030224>

Forrister, D.L., Endara, M.-J., Soule, A.J., Younkin, G.C., Mills, A.G., Lokvam, J., Dexter, K.G., Pennington, R.T., Kidner, C.A., **Nicholls, J.A.**, Loiseau, O., Kursar, T.A. & Coley, P.D. (2023) Diversity and divergence: evolution of secondary metabolism in the tropical tree genus *Inga*. *New Phytologist*, 237, 631–642. <https://doi.org/10.1111/nph.18554>

Gunter, N.L., Saxton, N.A. & **Weir, T.A.** (2022) *Oficanthos* Paulian, 1985, a junior synonym of *Lepanus* Banthasar, 1966 (Coleoptera: Scarabaeidae: Scarabaeinae), with redescription of *Lepanus mirabilis* (Paulian, 1985). *Zootaxa*, 5194(4), 575–584 <https://doi.org/10.11646/zootaxa.5194.4.6>

Huston, D.C., Khudhir, M. & Hodda, M. (2023) Phylogenetic position of *Ptychaphelenchus eucalypticola* Hodda, 2009 within the Aphelenchoidea Skarbilovich, 1947 (Siddiqi, 1980) inferred

from partial 18S and 28S rDNA gene sequences. *Nematology*, 25, 59–76. <https://doi.org/10.1163/15685411-bja10206>

Jain, A., Wainer, J., **Huston, D.C., Hodda, M.**, Hayes, O., Whittock, S., Mann, R., Edwards, J., Rodoni, B. & Sawbridge, T. (2022) Report of a cyst nematode, *Heterodera daverti*, from Australia. *Australasian Plant Disease Notes*, 17, 35. <https://doi.org/10.1007/s13314-022-00483-x>

Jaloszynski, P. & **Ślipiński, A.** (2022) Revision of the family Murmidiidae (Coleoptera: Coccinelloidea). *Zootaxa*, 5109, 1–102. <https://doi.org/10.11646/zootaxa.5109.1.1>

Jin, M., de Keyzer, R. & **Ślipiński, A.** (2022) *Rhipidocerus weiri*: A new species of longhorn beetles (Coleoptera: Cerambycidae: Prioninae) from Northern Queensland. *Annales Zoologici*, 72(3), 365–70. 6. <https://doi.org/10.3161/00034541ANZ2022.72.3.001>

Joharchi, O., **Halliday, B.** & Frolov, A.V. (2023) A new genus and species of Eviphididae Berlese (Acari: Mesostigmata) associated with an earth-boring dung beetle (Coleoptera: Geotrupidae) in Nepal. *Systematic and Applied Acarology*, 28, 195–211. <https://doi.org/10.11158/saa.28.2.4>

Li, Y.-D., **Ślipiński, A.**, Huang, D.-Y. & Cai, C. (2023) New fossils of Sphaeriusidae from mid-Cretaceous Burmese amber revealed by confocal microscopy (Coleoptera: Myxophaga). *Frontiers in Earth Science*, 10, 901573. <https://doi.org/10.3389/feart.2022.901573>

Li, Y.-D., Jin, Z.-Y., **Ślipiński, A.**, Huang, D.-Y. & Cai, C. (2022) *Parelateriformius* from the Middle–Late Jurassic of China reinterpreted as the earliest Dascilloidea (Coleoptera: Dascilloidea). *Palaeoentomology*, 5, 545–68. <https://doi.org/10.11646/palaeoentomology.5.6.6>

Li, Y.-D., Peris, D., Yamamoto, S., **Hsiao, Y.**, Newton, A.F. & Cai, C.-Y. (2022) Revisiting the *Raractocetus* fossils from Mesozoic and Cenozoic amber deposits (Coleoptera: Lymexyliidae). *Insects*, 13(9), 768. <https://doi.org/10.3390/insects13090768>

Liu, Z., Zhou, Y.-L., Szito, A. & Ślipiński, A. (2022) The Australian hide, larder and carpet beetles (Coleoptera: Dermestidae): A Revision at the Generic Level. *Annales Zoologici*, 72(4), 837–926, 90. <https://doi.org/10.3161/00034541ANZ2022.72.4.007>

Mound, L.A. & Wells, A. (2023) Endemism among Lord Howe Island Thysanoptera, with new species of *Baenothrips* (Phlaeothripidae) and *Scirtothrips* (Thripidae). *Zootaxa* 5228 (1), 081–091. <https://doi.org/10.11646/zootaxa.5228.1.5>

Ringelberg, J.J., Koenen, E.J.M., Sauter, B., Aebli, A., Rando, J.G., Iganci, J.R., de Queiroz, L.P., Murphy, D.J., Gaudeul, M., Bruneau, A., Luckow, M., Lewis, G.P., Miller, J.T., Simon, M.F., Jordão, L.S.B., Morales, M., Bailey, C.D., Nageswara-Rao, M., Nicholls, J.A., Loiseau, O., Pennington, R.T., Dexter, K.G., Zimmermann, N.E., & Hughes, C.E. (2023) Precipitation is the main axis of tropical plant phylogenetic turnover across space and time. *Science Advances* 9, eade4954. <https://doi.org/10.1126/sciadv.ade4954>

Rodriguez, J. & Evangelista, O. (2022) *Ctenostegus hansonii* sp. nov., a new species of spider wasp endemic to Lord Howe Island (Hymenoptera: Pompilidae). *Austral Entomology*, 61 (3), 323–339. <https://doi.org/10.1111/aen.12616>

Schmidt-Lebuhn, A.N., Egli, D., Greal, A., Nicholls, J.A., Zwick, A., Dymock, J.J. & Gooden, B. (2022) Genetic data confirm the presence of *Senecio madagascariensis* in New Zealand. *New Zealand Journal of Botany*. <https://doi.org/10.1080/0028825X.2022.2148544>

Ślapeta, J., Halliday, B., Chandra, S., Alanazi, A.D. & Abdel-Shafy, S. (2022) *Rhipicephalus linnaei* (Audouin, 1826) recognised as the “tropical lineage” of the brown dog tick *Rhipicephalus sanguineus* sensu lato: Neotype designation, redescription, and establishment of morphological and molecular reference. *Ticks and Tick-borne Diseases*, 13, 102024, 1–13. <https://doi.org/10.1016/j.ttbdis.2022.102024>

Szawaryn, K. & Ślipiński, A. (2022) *Platycrus*—a remarkable new genus of the tribe Platynaspini (Coleoptera: Coccinellidae) from Laos. *Zootaxa*, 5190, 584–90. <https://doi.org/10.11646/zootaxa.5190.4.8>

Toussaint, E.F.A., Braby, M.F., Müller, C.J., Petrie, E.A. & Kawahara, A.Y. (2022) Molecular phylogeny, systematics and generic classification of the butterfly subfamily Trapezitinae (Lepidoptera: Papilionoidea: Hesperidae). *Zoological Journal of the Linnean Society*, 195, 1407–1421. <https://doi.org/10.1093/zoolinnean/zlab086>

Zhou, Y.-L., Nicholls, J.A., Liu, Z.-H., Hartley, D., Szito, A., Ślipiński, A. & Zwick, A. (2022) Molecular phylogeny of Dermestidae (Coleoptera) reveals the polyphyletic nature of *Trogoderma* Latreille and the taxonomic placement of the khapra beetle *Trogoderma granarium* Everts. *Insect Systematics and Diversity*, 6(6). <https://doi.org/10.1093/isd/ixac026>



Transferring the expanse of tiny beetles into unit trays will make the specimens easier to manage in future

RELOCATION SNIPPET

In an effort to remove cork-lined drawers from the collection before moving to the new building, we've come across some interesting and elaborate drawer layouts, such as this example: Mendelian inheritance of colour in *Chysomela varians*, in specimen format!

