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 BANNER: *Graphium macleayanus* image: [Biodiversity Heritage Library](#)

## The Director’s Introduction

David Yeates, Director

As I write this introduction, Canberra is slowly emerging from a very damp winter, our new building is emerging from the earth, and the country is emerging from the pandemic. Through winter the curatorial and relocation teams have been busy rehousing our ethanol collection, and preparing the pinned and slide collections for its upcoming move. Civil works have begun on the new building in between rain events, and we can see diggers filling trucks carting away topsoil, large pours of concrete, and walls of formwork as the foundations are laid.

The contents of this issue of ANICdotes reflect the increasing domestic travel as the pandemic recedes. We have reports of fieldwork in southwestern WA in search of *Boronia*-pollinating moths and bees, Undarra Volcanic NP in north Queensland searching for blind cave weevils, and the Stirling Ranges and Porongorups for ambrosia beetles and weevils of various kinds. Keith Bayless also reports on the rediscovery of an unusual bat-associated acalyprate fly from Barren Grounds, east of Canberra. These surveys managed to avoid the various flood events around the south-east of Australia throughout the year.

This issue also marks the retirement of Robyn Meier after eighteen years in ANIC, and the appointment of two new staff, Bonnie Koopmans and David Yuan. Both join the curatorial team, and David’s position is Type Curator, a new role for us.

David will put more emphasis on the auditing and imaging, and in many cases DNA sampling, of the approximately 19,000 primary types (holotypes, lectotypes etc) that are deposited in ANIC. Bonnie also reports on late-night virtual attendance at the Society for Preservation of Natural History Collections (SPNHC), one of the perils of living in the wrong timezone during the pandemic. To top it off, Bonnie also organised an art exhibition showcasing the amazing artistic talents of staff and affiliates in the CSIRO collections. Each piece of art uses paper made from discarded specimen labels from the relocation process, a really creative innovation to mark this rare collection activity.



David Yeates

This issue reports on Michael Braby’s donation of his large, beautifully-curated and scientifically significant butterfly collection to ANIC, and also Gunter Maywald’s donation of a similarly important paropsine beetle collection. Both add to areas of ANIC’s considerable strength. Throughout the weeks and months of lockdown, the digitisation team has been very active, and we include stories on digitising our bulk samples in the Hymenoptera collection and a new AI-powered app for identifying the Brown Marmorated Stink Bug.

## Welcome to Bonnie and David

Bonnie Koopmans and David Yuan

### Bonnie Koopmans

Bonnie is a familiar face around ANIC, but now it's official!

Growing up in West Gippsland with an obsession for art and nature, Bonnie completed a Bachelor of Communication Design (Monash University) and the now-defunct Bachelor of Natural History Illustration (University of Newcastle). Natural History Illustration introduced her to the world of collections as the degree involved the constant use of specimens, and soon she was volunteering time to tend the small collection housed at the university. This is where she gained a deep appreciation and fascination for insects, particularly alongside field illustration classes in the diverse range of habitats surrounding Newcastle.



Bonnie Koopmans is working in Federica Turco's team as a member of curatorial staff with Coleoptera and orphans

Bonnie has been working with ANIC in a variety of roles since November 2020, beginning as a casual contractor helping with pre-relocation tasks, backfilling a technician role for 6 months, joining the Relocation Team and now as an ongoing member of research projects staff. She will provide technical support for Coleoptera and several orphan groups - phasmids, mantids, cockroaches, termites, and earwigs.

Bonnie loves to illustrate, birdwatch, and bother critters in her free time, and is a jokingly maligned 'bird person' in the collection. She has recently curated a group art show about specimens by staff and associates of NRCA, which is now on display at Discovery on Black Mountain!

### David Yuan

David is also very familiar in the halls of ANIC!

David joined ANIC in 2018 as an ANU research student and completed his study on the prey preference and nest ecology of the mud dauber wasp *Sceliphron formosum* (Hymenoptera: Sphecidae) under the supervision of Dr. Juanita Rodriguez. He graduated from ANU with a Masters of Biological Science in 2019 and joined ANIC in 2020 on a casual basis as a digital curator, working under the supervision of Nicole Fisher on the type digitisation project and herbarium projects. In July 2022 David took on the role of Type Curator, working under the supervision of Dr. Federica Turco and the curatorial team on the ANIC types project.

ANIC has been undertaking a type digitisation and sampling project for a couple of years, aiming at imaging and databasing all of our over 19,000 primary types, and sampling a selection of these for DNA.

Concurrently, the ANIC Collection Management team has recently gone through a comprehensive update of our primary type list, now also available [via our website](#).

David, newly appointed to the role of ANIC Type Curator, will work collaboratively with the Collection Management team to ensure the list stays updated, the type specimens are assessed, labelled and prepared for digitisation, and ultimately safely returned into the collection.



David Yuan is working in Federica Turco's team in the brand new position of Type Curator

## Robyn retires

Deb Jennings

It is hard to believe that Robyn is retiring after almost 18 years in the ANIC. She has been such an integral part of the ANIC community as well as the Black Mountain site in general. Almost everyone on site knows who Robyn is, bearing testament to her willingness to speak her mind and get involved in issues beyond the ANIC.

Robyn started working part-time in May 2005, initially databasing ants on BioLink for Steve Shattuck. As her experience grew, Robyn became full-time and began doing curatorial work on ants in addition to the databasing. Since then, Robyn has databased close to 100,000 specimens and updated almost 7000 taxa in the tree. In addition, she has mounted over 80,000 ant specimens! Over the years, her knowledge of BioLink expanded, and in 2011 she started acting as the 'pseudo' database manager supporting BioLink-related work across the insect collection. Her attention to detail and expertise in



Robyn with Federica Turco and her son, Massimo

this field resulted in her inclusion in the CMS (Collection Management System) projects in 2012 to look at alternative database systems that will eventually replace BioLink.

Also in 2012 were Robyn's first and second visits to the Museum of Comparative Zoology (MCZ) at Harvard. Robyn assisted in sorting specimens in the MCZ ant collection, while also imaging the Australian type specimens. She made such an impression on her colleagues at Harvard that she was invited back twice more. In 2015 she was one of only 43 people to be invited to Harvard by Prof. Edward Wilson to celebrate Kathy Horton's 50 years of service to Prof. Wilson. A few years later in 2019, Robyn was again invited to Harvard to assist in updating the MCZ ant collection to reflect the latest taxonomic revisions and for Prof. Edward Wilson's 90th birthday celebrations. So, it can be said that Robyn certainly made a positive impression during this collaboration.

Robyn is well known for her straight talk and attention to detail. This really came to the fore when she played a critical role in many of the Functional User Group meetings for the new Canberra Collections Accommodation Project, as well as her involvement in the Black Mountain Infrastructure Project. There may have been many who did not appreciate Robyn's direct approach, but one can only admire her for the courage to criticise and question when she felt it was required.

Those who know Robyn well will have experienced her competitive streak. Being a retired elite kayaker, Robyn is a physical workhorse and is always ready, gloves on, to take on the task at hand. In 2007 Robyn was a key figure in moving the compactus hall collection in preparation for the compactus installation and then moving the collection back into the compactus. However, nothing compares to the competitiveness Robyn showed during the Corporate Global



Victory! The winning team of the Corporate Global Challenge in 2018. From left to right: Christy Geromboux, Robyn Meier, Stephanie Routley, Deb Jennings, Anne Hastings, Nicole Fisher



One of Robyn's many famous cakes!

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Challenges in 2018 and 2019. Robyn (aka *The Enforcer*) lead the ANICist team to an astounding CSIRO victory. She organised numerous walks and cycling expeditions that the team dared not miss. Even David Yeates was involuntarily included in some walking activity in Darwin, when we went to inspect and report on the ant collection at TERC in 2018.

And lastly, but definitely not least ... Robyn's CAKES! The birthday cakes that Robyn has so generously provided over the years have been incredible. Her cakes have always had something special about them, often including unique ingredients of the finest quality and always 100% homemade.

So, it is with a heavy heart that we bid Robyn farewell, but we wish her all the best. Go well and enjoy your freedom with Otto by your side.



Robyn and Otto at the dog park

## Fieldwork to southwestern WA

Juanita Rodriguez & Jaime Florez

Last August we joined Liz Milla and Francisco Encinas-Viso from the Australian National Herbarium on a journey south of Perth to find *Boronia megastigma* and its obligate pollinator, an undescribed species of Heliozelidae moth. This project seeks to understand the population structure of plant and pollinator using genomic data. For this, we needed to collect several plant and pollinator specimens at each locality throughout the distribution of *B. megastigma* in the southwestern portion of Western Australia. The obligate relationship between this plant and its pollinator was, for the first time, confirmed by Liz Milla during her PhD work. Once on the flower, the moth lays eggs at the base of the stamen, while also collecting pollen. The heliozelid moth carries pollen in a specialised pouch located on the last tergites of the abdomen. This pouch collects pollen through contact with the fertile anther during oviposition.

After laying the egg, the moth bends its abdomen forward to release a pollen cluster on top of the stigma. Liz has also found that *Boronia* flower structure has coevolved with moth pollinating behaviour and its morphological adaptations.

We took advantage of the geographic location of the trip to sample unique colletid bee lineages for a project in collaboration with Michael Batley from the Australian Museum, and Eduardo Almeida from Universidade de São Paulo. The project's goals are twofold, as on one hand we aim to establish the phylogenetic relationships of Colletinae tribes, genera and subgenera, and on the other hand, to determine the phylogenetic validity of *Leioproctus* subgenera and related genera.



The team collecting *Boronia* and the Heliozelidae moth. From left to right: Francisco Encinas-Viso, Juanita Rodriguez, Jaime Florez.

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The trip started in Perth, with a visit to Kalamunda National Park. Close to the trailhead to Rocky Pool we found many plant species in bloom, including *Hakea trifurcata* and *Leucopogon pulchellus*, with a variety of native bees flying around. After Kalamunda, we headed to Lion's Lookout in Lesmurdie, looking for an interesting *Leioproctus* species, *L. opaculus*, recorded from there. The diversity of native flowers in this small natural area was incredible. We knew that *L. opaculus* had been found on *Verticordia*, which was in full bloom. Here we collected bees from *Isopogon dubius*, *Verticordia acerosa*, *Hibbertia aurea*, *Gastrolobium spathulatum*, *Leucopogon pulchellus*, *Grevillea pilulifera* and many more.

The next day we started our journey south, and with it came a cooler climate and some rain. Our first sites were near Busselton, one near a pine plantation and another in native forest. We could not find the *Boronia* population we were looking for (probably due to the extent of disturbance in the pine plantation), but we found male bees sleeping in the introduced *Zantedeschia aethiopica*. As we headed to our second site, we found the first *Boronia* population. To locate the plants, Liz uses her sense of smell and has perfected this skill to a very accurate level, detecting plants within metres. Jaime quickly learnt to detect the *Boronia* scent and joined her in "sniffing the air for *Boronia* plants" (Fran and I, well, not so much...). Using this technique and just looking around in the bush, we were able to find enough plants at this site. Nonetheless, the day was cool and we only found a couple of adult moths, so we came up with the idea of collecting oviposited ovaries in hopes of dissecting larvae for DNA extraction. At this site we were also able to collect bees on *Acacia divergens* and *Hovea elliptica*.

*Boronia megastigma* populations usually grow in muddy, wet soil, and as the weather began to turn rainy, we found

ourselves looking for *Boronia* in challenging habitats, including dense heathland, and difficult substrate to move around on. Despite this, as we moved south, plant and moth population sizes began increasing and our collecting became more successful. Bee collecting was still good, as we found an increasing abundance of pea flowers (*Daviesia*) to collect from. An interesting flower that we collected from was *Leucopogon pulchellus*, a native from southwestern WA on which we found lots of colletid activity.

Near Walpole at the beautiful Bibbulmun track we collected on *Acacia myrtifolia*, *Leucopogon pulchellus*, and *Taxandria juniperina*. This would be our last bee collecting for some days, because -as we approached Albany- the rain became a daily event. *Boronia megastigma* moths, however, did not seem bothered at all by the rain, and we found some of the largest populations in this area.

As we returned north through Collie State Forest, the weather improved, as did our *Boronia* moth-finding skills. We found



Juanita Rodriguez prepping collected specimens.

numerous populations and were able to collect bees on *Daviesia incrassata*, *Acacia pulchella* and *Euchilopsis linearis*.

Back in Perth we returned to Lesmurdie to look for *Leioproctus opaculus*, which we found in great numbers and on various plant species. We also travelled north to the locality where *Hesperocolletes douglasi*, the Rottneest bee or Douglas's Broad-headed Bee, was rediscovered to test our luck. Only two specimens are known of this elusive genus and species. This site was our last stop in the field. On our last day we met Terry Houston at the Western Australian Museum and ran into Michael Batley, who was also visiting at the time. Overall, it was a productive trip for all projects involved. We now have hundreds of specimens to process, curate and dissect.



Liz Milla (right) navigating to the next collecting spot with Francisco Encinas-Viso (left).

## Weevils, caves, dung, sea grass and the hairy men

Hermes E. Escalona

This year, with the end of major travel restrictions, the team had the opportunity to do fieldwork in different corners of Australia. It started with a trip together with Jaime Florez in May to the volcanic McBride Province in northern Queensland. This area contains remnants of inland dry rainforest in a landscape dominated by eucalypt savanna and *Acacia*. These patches of green scrub have a closed canopy and often develop on deep basalt soils, and this atypical environment harbours a rich and poorly known insect fauna.

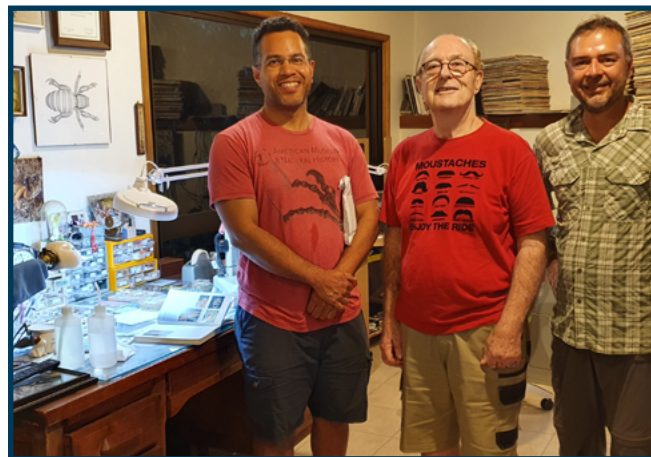
We set up our base camp at Undara Experience and coordinated our activities with the local ranger Anthony Staniland, with the approval of the Ewamian Aboriginal Corporation. Collecting efforts were concentrated in Undara Volcanic NP, Forty Mile Scrub NP and Kinrara NP. Insect collecting techniques included extensive leaf-litter sifting, bark spray and Malaise traps. The dry rainforest floor largely consists of basalt boulders that makes access difficult, particularly in remote areas without infrastructure for visitors, such as Kinrara NP.



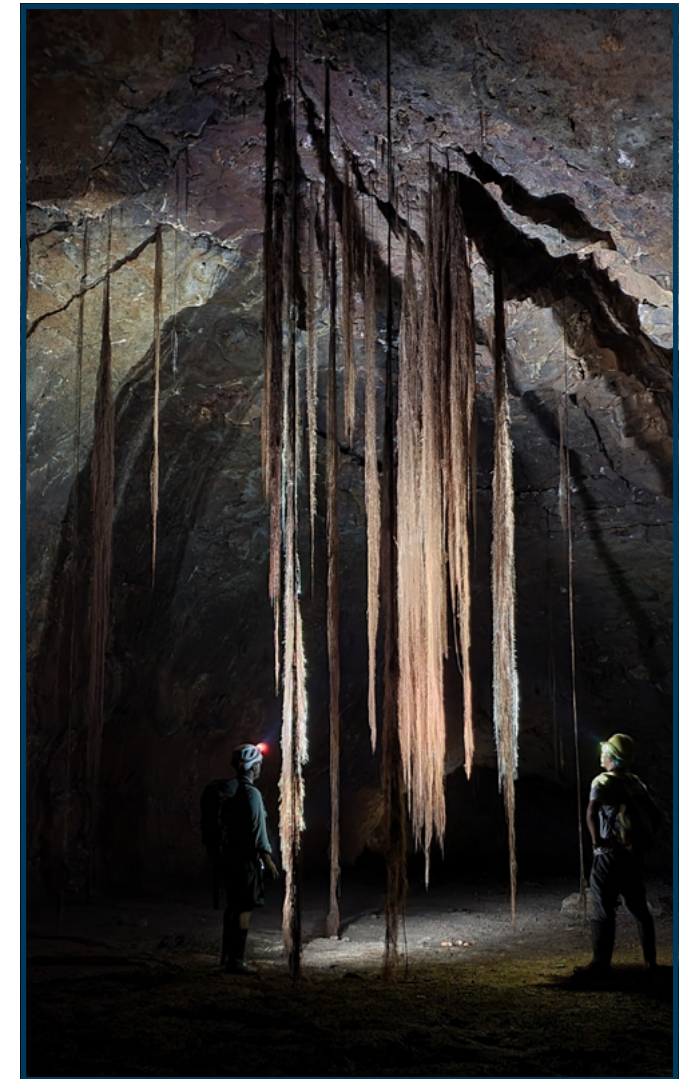
Jaime setting up a Malaise trap at Undara crater

The collection of insects also extended to the underground. The lava flows of the Undara Volcano left a vast cave system that includes a world hotspot of cave biodiversity, Bayliss Cave. We visited Bayliss Cave in search of the weevil *Undarobius howarthi* Escalona & Oberprieler, a unique Australian weevil adapted to life in permanent darkness. Four specimens were collected for further DNA studies.

Visiting Bayliss Cave was a unique thrilling experience due to its large dimensions and abundance of cave fauna. Back on the surface and not far from Bayliss Cave, we had the opportunity to study the behaviour of the enigmatic weevil *Tentegia stupida* (F.), which represents a lineage of sceptical weevils that decided to rebel against herbivory and give marsupial poo a go instead. During a brief stop at Mount Surprise, we were surprised with stories about the legendary hairy men that apparently inhabit the local dry rainforest, an interesting observation that we couldn't verify. We finished the trip with the usual visit to our dear David Rentz (ex CSIRO) in Kuranda.



Hermes Escalona, David Rentz and Jaime Florez in Kuranda



Hermes and Jaime exploring Bayliss Cave, Undara NP

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A second trip was undertaken to southwest Western Australia with James Bickerstaff, a trip aimed at collecting insects in traditional localities for entomologists, such as the majestic Karri forest around Pemberton and the ranges surrounding Walpole with their endemic “Tingles” eucalyptus trees, but also to explore the less known Porongurup NP and Stirling Ranges NP. Stirling Ranges NP is known for its high level of plant endemism, yet its invertebrate fauna is not well known. Porongurup NP is a range that reach 670 m above sea level, with giant boulders and an isolated population of Karri forest. The collecting of beetles in this area, despite the rain, was successful, particularly if we don't consider the total absence of bark beetles for James' research. Highlights of the trip include finding the elusive genera *Ganyme* sp. (Ulodidae) and *Myrtonymus* sp. (Curculionidae), night collecting in a golf buggy, and above all, the friendship of Loxley Fedec and Bo Janmaat, passionate conservationists, and guardians of the Twin Creeks Conservation Reserve. In Perth, we had the opportunity to learn about the intense activities of DPI WA to eradicate the evil little pseudoweevil *Euwallacea fornicatus*, an invasive species from Asia, and liaise with DPI research activities.



Hermes filming the odd behaviour of *Tentegia stupida* (F.), Undara NP

The latest round of fieldwork included extensive sampling of seagrass, a flowering plant, in shore meadows along the coast of NSW with Nick Porch, WA and SA. Seagrass is an important marine component of the Australian coast, playing a main role in the food web. We recently found that seagrass accumulations along the coast also sustain a diverse community of insects, with a large biomass of weevils that were thought to be rare, such as the genera *Wollastoniscis*, *Notiominmetes*, *Psaldus* and *Aphela* (Notiomimetini, Cyclominae, Curculionidae).

We are grateful to Frank Zich (CSIRO Cairns) for his support during our fieldwork in North Queensland and to Kylie Ireland (DPI WA) for her kind assistance during our visit.



James with a fogging trap near Moons Crossing Rd, near Pemberton, WA



*Briara* sp. (Staphylinidae, Pselaphinae) found on plant debris at Jervis Bay



Nick sifting sea grass litter at Jervis Bay, NSW



*Psaldus* sp. (Curculionidae, Cyclominae) found on seagrass at Jervis Bay

## Unexpected rediscovery of a purported bat fly extends its known range and habitat

Keith M. Bayless

In some cases, obtaining specimens of a rare species deepens the mystery of their life history instead of improving resolution. Here the first specimen of *Clisa australis* (McAlpine, 1966) collected in more than 30 years is reported. The fly was described by former Australian Museum scientist David K. McAlpine from Carrai caves, near Kempsey, NSW, now part of The Castles Nature Reserve. Adults and larvae of *C. australis* were associated with bent-wing bats in a humid chamber deep in the cave beyond the reach of daylight. An additional population was discovered with bats in a mine shaft near Glen Innes, also in Northern NSW.

*Clisa australis* is the only known endemic mainland Australian species of Cypselosomatidae. This small, obscure family is related to stilt-legged flies and cactus flies. The closest relative of *Clisa australis* is likely *C. disneyi* (McAlpine, 1978), which has patterned wings. That species is known from one specimen collected in mossy rainforest at the summit of Mt. Gower, Lord Howe Island, by the ornithologist John Disney during a study of the endangered woodhen *Hypotaenidia sylvestris*. Another cypselosomatid genus, the ant mimic *Formicosepsis*, is present in far north QLD, but the species are shared with Papua New Guinea. The Carrai cave spider, *Progradungula carraiensis*, endemic to the type cave of *C. australis*, is also curiously isolated from its closest relatives in Tasmania, the Otways, and New Zealand (Gray 1983).

I visited The Castles in January 2018 but could not access the cave due to an overabundance of stinging trees and dearth of appropriate climbing gear. The beautiful vistas and singular plant community of the reserve were relatively inaccessible due to the steep, treacherous terrain lacking trails or carparks. A megafire swept through the area in November 2019. The endemic cave arthropod community has, subsequently, not been assessed.

There is reasonable hope of *Clisa*'s survival as they adapted to an additional nascent habitat: dunnies in national parks. Throughout the late 1970s and 80s, researchers picked up specimens of *Clisa australis* in open pit outhouses from Northern NSW to the Mount Tomah Botanical Garden. Bats cohabited at least some of the pits. Just as quickly, the flies were apparently extirpated from this habitat due to the installation of chemical sanitation systems. I have checked the walls and ceilings of an embarrassing number of public toilets in parks since 2015 in pursuit of *Clisa* specimens, without success. The predominant fly in chemically treated outhouses is a species of *Sylvicola* (Anisopodidae), impressive but not surprising as their larvae can develop on organic matter preserved in ethanol and formaldehyde (Edwards 1928). I am not aware of any collecting events of *Clisa australis* since the 1990s.

Last summer, with the help of ANIC colleagues Olivia Evangelista, James Bickerstaff, and Ying Luo, I sampled Diptera in Barren Grounds, near Jamberoo, NSW. The primary target was *Notoconops alexanderi*, representing the monotypic unplaced Australian endemic subfamily Notoconopinae, a group of thick-headed flies (Schneider 2010). None were found. However, in a malaise trap sample from a stream in a dark humid gully choked with splitting tangle ferns (*Gleichenia*) and tree ferns (*Cyathea*), a specimen of *Clisa australis* appeared, nestled under numerous land leeches. This fly had never been previously collected via passive trapping. I fruitlessly installed additional malaise traps in the area. No nearby caves are known, and the locality is hundreds of kilometers from the previous southernmost record of the fly, which was human-influenced (a dunny in the Blue Mountains).



*Clisa australis* from Barren Grounds, dorsal and lateral. The family is easily diagnosed by the lack of vein M4 beyond cell dm which is unusually rounded, bm and dm cells confluent, postocellars divergent, vibrissae present, 4-6 dorsocentrals, scutellum convex, male terminalia elongate bent anteriorly, long pairs of setae on tergites 8 and 9, and the dark bluish shining body. Body length ~4mm. Photos: Olivia Evangelista



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Not enough data exists to ascertain whether *Clisa australis* was always widespread but rare, or whether its range and life history are changing due to human-mediated pressures including megafires and habitat destruction. This freshly preserved material unlocks many possibilities. Genome sequencing is already underway to place the genus in an evolutionary context. It is a distinctive fly, so I humbly ask all readers to look out for additional specimens, now a less drastic request as this discovery shows that spelunking in proximity to bat guano or worse is not a prerequisite for finding *C. australis*.

#### Literature

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## Fieldwork bonus!

Undetermined scutigero centipede adapted for subterranean life - Bayliss Cave, Undara National Park, Queensland.

Photo: Hermes Escalona



## SPNHC – Conferencing in the wee hours of the morning!

Bonnie Koopmans

Many conferences and meetings have been cancelled over the course of the pandemic, and the Society for the Preservation of Natural History Collections (SPNHC) conference was no exception. Returning in June 2022 with a conference in beautiful Edinburgh, who wouldn't be keen to travel again?! It was not to be, sadly. Overseas travel from Australia is still a risky game, and travel policies also remain restrictive.

The *great* thing about the massive uptake of Zoom, Webex and other virtual meeting platforms, however, is that we could all still attend the conference from afar. The *terrible* thing about the massive uptake of virtual platforms was that now our conference schedule – spanning normal business hours on the other side of the world - ran from 6:30pm to 2:30am in Australia. Thus, a number of staff from the collections attended virtually, in the comfort of their homes, fighting off sleep. A perfect opportunity for midnight snacks!

The sheer quantity and diversity of talks made it very difficult to choose which to attend, with everything covered from 'Our museum suffered an earthquake, here's what we did about it' to 'which pen to write on bones with'. There were many talks about moving and transporting collections, which were eagerly attended in the face of the upcoming move to the collections facility on Black Mountain. The new collections facility got its own talk, discussing the plans and move considerations, presented by Relocation Manager Maggie White.

Though it took well into the next week for our sleep schedule to recover, SPNHC from afar was a great experience, full of fun specimen stories, niche information and many pages of notes.

The next SPNHC conference will be another hybrid in-person/virtual event, hosted in San Francisco by the California Academy of Sciences from May 28 to June 2, 2023.



How many conferences cater 12am blueberry pancakes? Only the ones hosted in my living room



## Michael Braby donation to ANIC

Michael F. Braby

In June this year You Ning Su helped me transfer my private collection of Australian butterflies to the ANIC Lepidoptera unit. The collection consists of 9,900 pinned specimens (both adults and immatures) in 70 standard metal drawers representing 430 species and subspecies. A breakdown of material for each family is as follows: Papilionidae (122 specimens), Hesperiiidae (2,064), Pieridae (1,462), Nymphalidae (1,264), and Lycaenidae (4,989). The collection was due to be transferred to ANIC in 2020, but was delayed by two years because of disruptions caused by COVID-19.

Over the past 20 years I have deposited material in the ANIC on an ad-hoc basis, mostly type material or species that were poorly represented, but this is by far my largest donation. The donation is in addition to the 1,100 butterfly specimens that I collected and lodged in the Northern Territory Museum during my 10 years (2005–2014) based at Darwin. My tissues

collection (DNA), which currently comprises over 1,400 specimens, was also donated a few years ago to the ANIC, where it is stored in one of the -20°C freezers.

My Australian butterfly collection was accumulated over a 42-year period. I first started collecting butterflies (and other insects) during the school summer holidays of 1980-81, when I was a high school student in Melbourne. The first butterfly specimen I collected was a male Macleay's Swallowtail, *Graphium macleayanum*, from Toolangi on 18 January 1981 during a three-day bike ride. I had no net and, using my hat, managed to catch the butterfly as it descended to feed on flowers along the roadside. I had no idea what it was and stuffed the specimen in a film container to identify later. Of course, it did not survive too well! But I remember thinking at the time "Wow, that was a magnificent creature"; it now has its place in the collection. My field notes indicate that two other

butterflies I observed that day at Toolangi were *Danaus petilia* and *Tisiphone abeona*. Later that year at school I met another student who also collected butterflies, Tim Brain. Although he was many years younger, he had an encyclopaedic knowledge of the local fauna; the following season he took me to some good collecting places in the northeast of Melbourne around Eltham, Research and Kangaroo Ground. He also introduced me to an astonishing array of species then completely new to me, particularly skippers (*Trapezites*, *Hesperilla*) and blues (*Acrodipsas*, *Jalmenus*, *Hypochrysops*, *Ogyris*). On occasion we would ride our bikes to Kangaroo Ground Memorial Tower to collect hilltopping species.

By the end of the 1981–82 season I was pretty much hooked. It was very much a hobby then but, like many hobbies, it got more serious and a bit out of hand over time, especially when I was an undergraduate student at La Trobe University. After five years, the collection had grown rapidly and storage space was becoming a real issue. In 1986, through Prof Tim New, I was most fortunate to meet Mary Le Souëf, from whom I purchased a set of two second-hand cabinets comprising 12 wooden drawers made by her late husband, John 'Zoo' Le Souëf. The following year I met David Crosby, and he kindly gave me a few old wooden store boxes made by George Lyell. These store boxes were perfect to temporarily store small quantities of specimens when I lived in Townsville for five years (1989–1994).

However, the importance of natural history collections did not really become apparent to me until 1988 when I first visited the ANIC and met Ted Edwards. Ted showed me the national butterfly collection. He also introduced me to the science of taxonomy by giving me an impressive dossier of scientific papers on Australian butterfly taxonomy that he had



Donated drawer of *Hypochrysops* spp. (Lycaenidae)



*Delias aestiva* (Pieridae) from Darwin, including the first reared specimens!

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authored or co-authored. Although I had studied some aspects of systematics at university, morphological taxonomy wasn't considered fashionable science and biology students were encouraged to pursue more 'glamorous' topics as career paths, such as evolutionary biology, ecology or 'field biology', as it was known then, before the term 'conservation biology' was coined. Times don't seem to have changed much since then! Anyhow, Ted's output of papers on butterfly taxonomy were the first scientific papers on the subject that I had ever read, and they sowed seeds for later research activity in this field.

My own collection includes 281 paratypes representing the following taxa: *Hasora hurama territorialis* Meyer, Weir & Brown, 2015, *Taractrocera psammopetra* Braby, 2015, *Erina geminus gagadju* (Braby, 2017), *Neolucia hobartensis albolineata* Braby & Wurtz, 2018, plus five taxa currently in



Michael Braby with one of the donated drawers

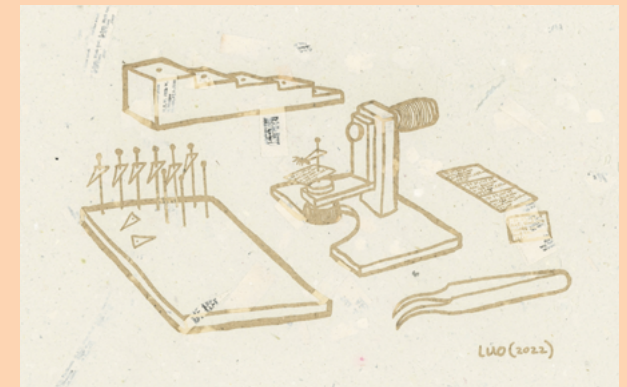
preparation. Previously, I had lodged around 160 paratypes of butterflies from Australia, West Papua and New Caledonia in various collections (ANIC, AMS, NMV, SAMA, QM and NHMUK). Holotypes representing the following 10 taxa have already been lodged in the ANIC: *Candalides medicea* (Braby, 1996), *Acropdipsas mortoni* Sands, 1997, *Candalides noelkeri* Braby & Douglas, 2004, *Eirmocides absmilis edwardsi* (Braby, 2008), *Eirmocides absmilis eastwoodi* (Braby, 2008), *Taractrocera psammopetra*, *Erina geminus gagadju*, *Neolucia hobartensis albolineata*, plus two species currently in preparation.

In addition to the types, other significant elements in the collection include species that were previously poorly represented in the ANIC. In particular, my time in the Northern Territory and Kimberley of Western Australia provided an opportunity to acquire good series of rarely sampled species, such as *Hasora hurama territorialis*, *Croitana aestiva*, *Taractrocera ilia*, *Taractrocera psammopetra*, *Protographium leosthenes geimbia*, *Leptosia nina*, *Appias albina*, *Delias aestiva*, *Danaus chrysippus cratippus*, *Euploea alcathoe enastri*, *Acraea terpsicore*, *Ogyris iphis doddi*, *Deudorix smilis*, *Candalides caesia*, *Erina delospila* and *Erina geminus gagadju* amongst others. There are also a few unusual aberrations. One specimen of particular interest, that was generously given to me by Fabian Douglas, is a male *Delias mysis* in which the red postmedian band on the underside of the hindwing is yellow instead of red.

Few professional entomologists collect butterflies, and the majority of butterfly specimens in the ANIC have been acquired through the generous donation of private collections. My collection is no exception. I am pleased that my collection has finally been incorporated into this extensive national treasure where it will be properly preserved, curated and available for future research.

## COLLECTED WORKS

An exhibition currently on display in the Industry Link room of the Discovery centre. This exhibition celebrates the artistic talent of CSIRO collection staff and affiliates.



*Tools of the Trade*, Ying Luo, Laser-etched digital illustration



## COLLECTED WORKS

Celebrating specimens, collections,  
and the humans who work with them

CSIRO Discovery Centre  
North-Science Rd, Acton ACT  
5 October - 27 January

Opening hours: Monday to Friday 8:30am - 4:30pm

## Gunter Maywald donation to ANIC

Lingzi Zhou

On June 12th 2022, Adam and I drove a long way north from Canberra to Stanthorpe, Queensland, to pick up a huge private collection of beetles. This was also our first visit to the beautiful bushy Granite Belt.

We met Dr Gunter Maywald, our host and donor of this collection, in his beloved spacious house. The collection is fairly large, with three full cabinets of paropsine beetles (Chrysomelidae), comprised of over 5000 specimens of *Trachymela*, 3500 *Paropsisterna* and 2000 *Paropsis*, plus small numbers of other paropsine genera. The whole collection is well organized by genera and species codes, with every specimen properly labelled and beautifully mounted on the card with a unique database code. We were told that nearly all the specimens were collected by Gunter during his trips across Australia, including Western Australia and Tasmania, and with the bulk of the samples from Queensland and New South Wales.

Notably, each specimen in the collection is fully databased in BioLink and associated with host images where possible. Imagine the many days and hours that have been devoted to building this collection, especially without technical support. Knowing that Gunter spent 6-7 years to sort out the Australasian leaf beetle genus *Paropsis* Olivier to complete his doctoral thesis after he retired from the IT profession, we appreciate his contribution to paropsine beetle taxonomy and admire his persistence, passion and dedication towards building his collection over many years.

The paropsine beetles have now been relocated to their new home in the Australian National Insect Collection, and with the taxonomic work largely completed, we are confident that these beetles are of great scientific value, and will be precious material for future research.



Left to right: Lingzi Zhou, Gunter Maywald and Adam Ślipiński meeting in Stanthorpe in June 2022



Some of the drawers now holding Dr Gunter Maywald's donation in ANIC

## BUILDING PROGRESS

### The Canberra Collections Accommodation Project (CCAP) is progressing

Building commencement and progress has been delayed due to the (seemingly) ceaseless rain here in Canberra, however our colleagues in the Herbarium have been able to keep us updated on the CCAP progress from their unique vantage point!

The hole in the ground has increased in size and the foundation preparations are beginning.

The delivery of the new building is still —at this stage— slated for September 2023, but that is based on a limited number of rain (no work) days between now and then... so we will see how that goes!



## ANIC slides accommodation revamped

Federica Turco

As many ANICdotes readers know, ANIC holds a substantial collection of slide-mounted specimens and dissections, with an estimated 280,000 microscope slides in our care. These include groups such as mites, nematodes and thrips, of which we hold the largest reference collections in Australia, along with many insect orders such as Diptera and Hemiptera (to mention just a couple). Our slides are maintained in two ways, either vertically or horizontally. The slide transfer project herewith presented, deals with the horizontally kept slides only.

Part of our slide collections had been housed in a variety of cabinetry over the years, acquired through original purchases or donations, especially in our collections of small orders (Fig. 1). In the last three years, the ANIC Collection Management team has been working on finding better accommodation for



Fig 1: The original variety of slide storage and cabinetry

these collections, aiming at consistency, safe-keeping of our valuable specimens and improved accessibility of the reference collections.

In 2019 I initiated a discussion on the design of new slide cabinets with ANIC users so that a variety of viewpoints, experiences and opinions could be considered and included in the design. We opted for cabinet and slide tray sizes that would balance optimal use of floor space, accessibility of specimens as well as their safety. In fact, we decided to limit such cabinets to a height of 1.6 m so that users don't have to climb on steps and/or tilt the trays to investigate and select content for their use (Fig. 2). Also, trays were kept to a standard 20-slide size so as to use desk space more efficiently and to have an improved manoeuvrability of trays when moving them between cabinets



Fig 2: The new cabinets, custom built by Delta Designs Ltd

and workstations, compared to larger trays used in other institutions for long-term storage (Fig. 3 - next page).

A supplier that could custom-build cabinets to our requirement was then selected, and ANIC has since been ordering these from Delta Designs Ltd. in the USA, with the aim of transferring our slide collections in stages.

The beginning of this large curatorial project serendipitously coincided with the approval and funding of the long-awaited National Collections building project. Inevitably the re-curation and re-housing of the slide collections has become part of a much bigger collection management process, aimed at preparing all ANIC collections for transfer to a new facility in 2024. At the time of relocation, ANIC slides kept horizontally will already be partly transferred into the new storage solution, and the rest will be transported and then re-housed in new cabinets in the new building. ANIC slides kept vertically will stay in their current accommodation and will be relocated as-is in 2024.

As stated above, the project started a few years ago and, with all distractions and disruptions that the COVID pandemic has imposed on our lives, we have now transferred 4,820 trays (accounting for over 96,000 slides), including empty space for future expansion. We have completed the transfer of our small orders, nearly finished Nematodes, Hemiptera and Lepidoptera dissections and transferred 40% of the ANIC mites.

What's next for the ANIC slides? We'll continue finishing off most of the groups we have started, and the delivery of another four cabinets in May 2023 will allow us to complete the transfer of the slides of Nematodes and Lepidoptera dissections and reach 60% transfer of ANIC mites.

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As I report about this project and its progress, I would like to extend a heart-felt thank-you to all of those in the ANIC Collection Management team (Bonnie Koopmans, Bruce Halliday, Manda Khudhir, Olivia Evangelista, Thekla Pleines, You Ning Su) and the NRCA Relocation Team (Alberto Venchi, Joe Scott), involved in this project.



Fig 3: The new horizontal slide trays, each holding 20 slides

## The Wonderful Web of Weevils

Deb Jennings

Recently the illustrated catalogue of the weevil genera of Australia (Curculionioidea, Coleoptera) was published online. This collaborative project includes ANIC staff Debbie Jennings, Rolf Oberprieler and Hermes Escalona, as well as Andrew Wright from IT, who played a major part in setting up the website and will continue to offer IT support.

The purpose of the website is to provide a visual guide to the diversity of Australian weevils and to assist in basic taxonomic identifications. Australian weevils include more than 4110 described species in more than 800 genera, but there are still many more species and genera that are undescribed. Weevils are of considerable importance in Australia and worldwide. Many are valuable pollinators, while others have been used with great success as biocontrol agents due to their high host plant specificity. However, there are also many species that are major pests in agriculture, and they have a significant impact on crop production. This website will serve as an additional tool to assist in identifying “the good, the bad and the ugly”, with a targeted audience ranging from budding entomologists to agencies dealing with biosecurity, ecology, pest identification and so on.

Due to the extensive collection in ANIC, we were able to include almost all the known Australian genera of weevils. This was possible due to the work of several dedicated curators and collectors, such as Everard B. Britton, John Lawrence, Andrew Calder, Tom Weir, Rolf Oberprieler, Geoff Monteith, Adam Ślipiński among others but particularly due to the efforts of Elwood C. Zimmerman (1912-2004). From 1972, at 60 years of age, Zimmerman devoted all his energy to build a world-class reference collection of weevils with emphasis on the Australo-Pacific fauna. He published six volumes on the taxonomy of Australian Weevils (Zimmerman 1991, 1992, 1993, 1994ab, Oberprieler & Zimmerman 2020) that forms the

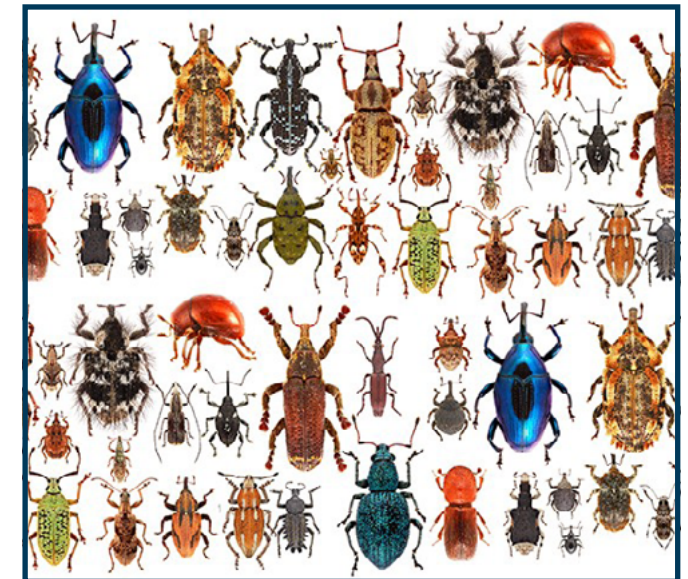
core of Australian weevil research. We are further indebted to Zimmerman who, together with his wife, Hannah, set up an endowment for weevil research to continue at ANIC.

The site is still a work in progress - missing taxa and taxonomic changes will be updated regularly, with new taxa uploaded as required.

### Acknowledgements

Thanks to Federica Turco, Nicole Fisher, Olivia Evangelista and Anne Hastings (ANIC-CSIRO) for keeping the photographic equipment running smoothly and general assistance on online digital resources. Also, thanks to Adam Ślipiński and David Yeates for encouraging the development of the website.

[See Australian Weevils Online here](#)



Australian Weevils Online is now up and running

## AI-based image recognition app developed for stink bugs

Nicole Fisher & Michael Elias

The generalist sap-sucking *Halyomorpha halys* (Brown Marmorated Stink Bug (BMSB)), is a pest species native to north Asia. This species could cause significant damage to Australian agriculture and horticulture, being a major threat to crops such as apples, stone fruits, hazelnuts and grains. Australia has approximately 600 named native stink bug species, as well as several thousand more undescribed species, many of which are difficult to tell apart from *Halyomorpha halys*. There have been increasing border detections requiring response actions, and the Department of Agriculture, Fisheries and Forestry (DAFF, previously Department of Agriculture, Water and the Environment (DAWE)) has recognised the need for instant identification of BMSB at the time of detection at the Australian border.

Through the Biosecurity Innovation Program, and in collaboration with Microsoft and Altis Consulting, DAFF funded the development and testing of a prototype smartphone app capable of using artificial intelligence-based image classification. This work was carried out by ANIC and the Australian National Herbarium.

The smartphone app is able to accurately identify stinkbugs. When a user provides a live image from the device's camera feed, the app provides constantly updated identification estimates depending on the view provided. The user can tap suggested species names to see profile information and, with another single tap, create photographic, geocoded, and time-stamped observation records.

In preparing images for input into the app, more than 200 specimens held in ANIC were identified and curated, with an additional 500 specimens borrowed from overseas collections.

The digitisation team produced a library of more than 10,000 high-resolution training images. These images were produced

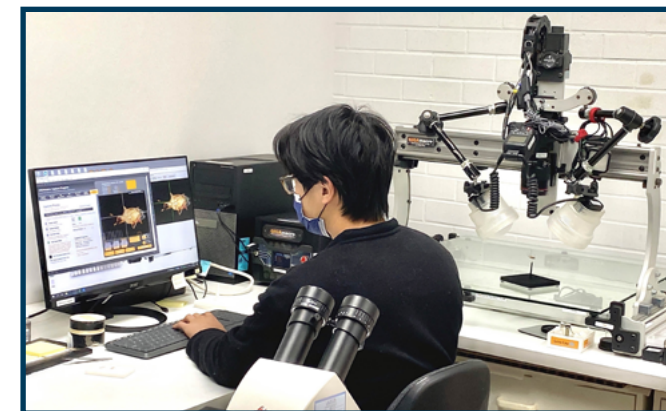
from focus-stacking views taken from multiple angles. After training several iterations of the image classification model, we demonstrated the ability of the app to identify BMSB, 17 other exotic pests and 21 native stink bug species and 4 exotic pest lookalikes with high accuracy.

The app code has been licensed to DAFF, which will conduct end-user testing and business analysis to ascertain what further software development is required before integrating the mobile identification app into biosecurity procedures.

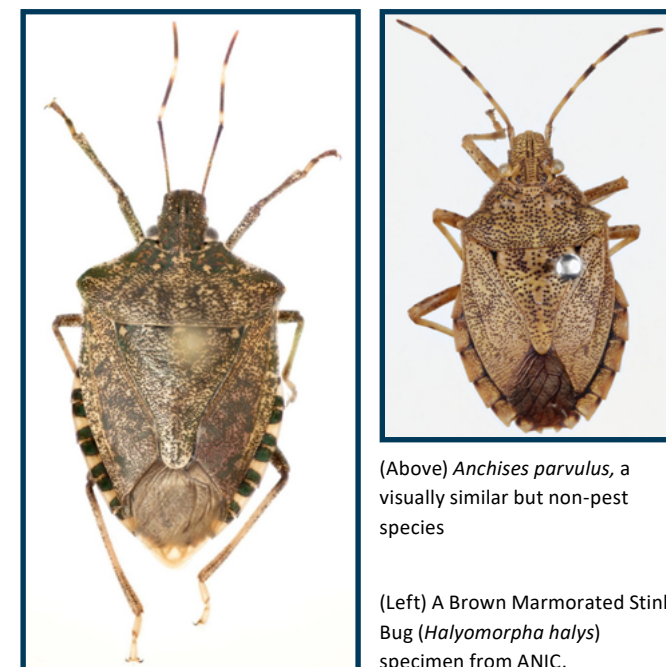
The app has the ability to help keep *Halyomorpha halys* out of Australia and avoid its potential to impact more than 300 different species of economically important plants. This work demonstrates the practical applications of research collections and cross-discipline collaboration between CSIRO and government departments to target a significant biosecurity threat to Australia.



Testing the app with images taken for 3 species of stink bugs. Using a smartphone or tablet camera to zoom in or out and look at specimens from different angles, the AI model in the app identifies species and provides an accuracy estimate.



David Yuan digitising stink bugs for recognition in the app.



(Above) *Anchises parvulus*, a visually similar but non-pest species

(Left) A Brown Marmorated Stink Bug (*Halyomorpha halys*) specimen from ANIC.

## Hymenoptera's 'jewel-box' bulk samples collection now online

Nicole Fisher & Juanita Rodriguez

In this era of rapid global change, it is increasingly important to detect and report change at the time of collecting, rather than delaying until specimen data can be digitised or later used for research. Biological outliers (e.g., in phenology, distribution, morphology/anatomy, etc.) may indicate the beginning of significant, transformative change that merits immediate attention. Hence the great potential in linking and exposing specimens held in bulk samples.

As in many entomological collections, not all specimen material in the ANIC is registered, sorted or identified to species level, and much may sit in bulk collections. The Hymenoptera collection includes a bulk collection known as the 'jewel-box' samples. Years ago, many samples of micro-Hymenoptera were critical-point dried and each sample was placed in a 'jewel box'. Each box was photographed, along with the label information for each sample.



Each sample can be searched for taxa of interest

Increased access to bulk collection samples will offer opportunities for greatly improved statistical analysis and will serve as a key building block for species distribution and population abundance. Encouraging the sharing of these collection samples and managing them well is critical if collections are to support land-use and conservation activities and to understand changes in species. The key shared quality is that these bulk collections represent a potential goldmine for taxonomists and other researchers looking for sources of already collected entomological material to study. We encourage researchers to explore the range of these bulk collections we have made available here, and to contact us for further details including how to access any that are of particular interest.

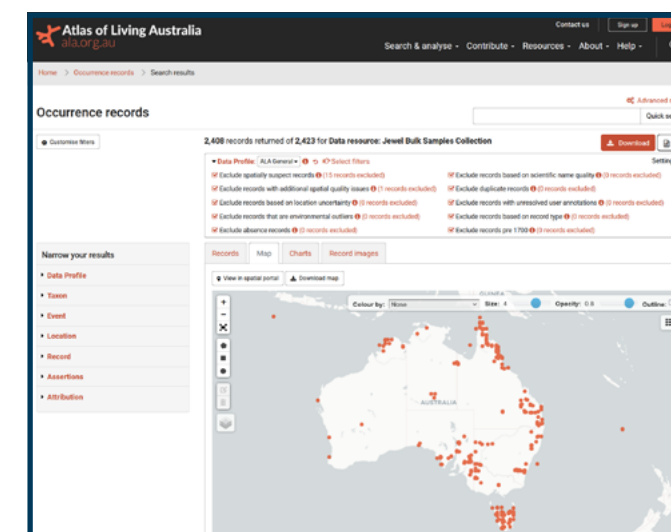


ANIC's jewel box collection on the Atlas of Living Australia

We are grateful to imaging and data entry staff member Noreen Tasleem, and volunteer David Hatherly for their help in digitising this collection.

This collection is now available to view at <https://data.csiro.au/collection/csiro:56193>

In addition, we'd like to thank Rosemary O'Connor, Data Engineer at the Atlas of Living Australia (ALA) for loading the images and data to the ALA which can now be searched online here: [https://biocache.ala.org.au/occurrences/search?q=data\\_resource\\_uid%3Aadr19819](https://biocache.ala.org.au/occurrences/search?q=data_resource_uid%3Aadr19819)



By mobilising these bulk collection samples, event sampling location information is exposed and searchable. This allows users access to collection recourses, making more Australian collection material available for research and study



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