

## Our first issue for 2018

David Yeates, Director

Our autumn issue of ANICdotes usually brings with it news of summer field work, new staff and visitors, and issue #12 is no exception. We have stories of our researchers conducting challenging and rewarding field work in the rainforests of Borneo, northern NSW and Western Australia.

This issue also contains some important highlights for the collection. Just before Easter we celebrated the 20th anniversary of the ANIC volunteer scheme. Many current and past volunteers, staff, honorary fellows and visiting scientists attended the event, held on a beautiful autumn day on the village green. We were very pleased to welcome Jim Cullen, Chief of the Division of Entomology when the scheme was set up in 1998, to the celebration as well. We took the opportunity to honour Tom van Gerwen, who has coordinated the scheme for the past 20 years, at the event as well.

Some may forget that ANIC also houses one of the largest and most important nematode collections in Australia, and this year we were very pleased to see an ANIC Honorary Fellow and nematode researcher's name in the Australia Day Honours List. Dr Robin Bedding was made a Member of the Order of Australia for his work developing nematode biological control agents for *Sirex* woodwasp.

We also devote two pages introducing new staff, many of them employed through CSIRO's Environomics Future Science

Platform, or Biosecurity and Digitisation initiatives. Environomics, short for environmental genomics, is a new program exploring the interactions between the genetic structure of organisms and the environments in which they live. The ANIC digitisation program is part of a wider CSIRO initiative to make the resources of the national biological collections available to a wider audience, mainly through the Atlas of Living Australia. Our development of these new projects have been so successful that we now have a severe shortage of office space in the collection halls.

We are now working closely with the CSIRO Executive to develop a business case for the development of new accommodation for ANIC that would bring the large CSIRO collections together on the Black Mountain Site in a single facility. More on this exciting and daunting prospect in future issues of ANICdotes.

In March we also hosted a visit by our minister, Senator the Honorable Zed Seselja, accompanied by our CEO, Larry Marshall.

ANIC: [www.csiro.au/en/Research/Collections/ANIC](http://www.csiro.au/en/Research/Collections/ANIC)

ANICdotes for contact and subscriptions: [the ANICdotes home page](#)

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



David Yeates

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## New England field trip

Lauren Ashman

In January this year the beetle team along with lepidopterist Andreas Zwick and dipterist Xuankun Li spent 12 days collecting around New England and Dorrig National Parks near Armidale, NSW.

The final team members were: Adam Ślipiński, Andreas Zwick, Lauren Ashman, Mengjie Jin, Yu-Lingzi Zhou, Zhenhua Liu, Xuankun Li and visitor Yun Li from China. We drove north for two days to our cabins at Banksia Point. There we met up with Roger de Keyzer (NSW Dept. of Environment), an amateur collector with decades of local knowledge to share.

We spent the next week travelling around New England, hand collecting, fogging (spraying trees with pyrethrum) and gathering leaf litter/soil samples to run through Berlese funnels. Xuankun and Andreas also set Malaise traps and light traps for their own collecting. All in all, we collected close to 50 different beetle families, including the rare Cupedidae (Archostemata) and Phloeostichidae, and found some previously unknown protocucujid larvae inside tree bark. Mengjie and Roger had great success ripping into fallen logs to search for prionine (Cerambycidae) larvae and adults, and Mengjie brought home a lot of the larvae to rear.

This area is not called New England for nothing. We drove through rolling green hills that felt quite out of place in this sunburnt country.

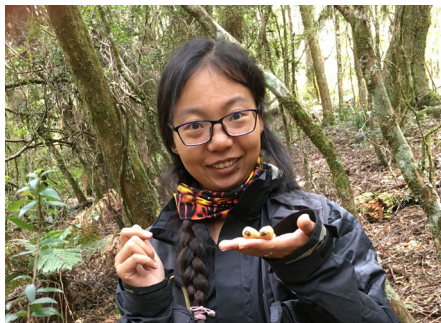
Our collection sites ranged from rainforest gullies and open *Eucalyptus* forests to dense stands of *Nothofagus* and hoop pines. We enjoyed beautiful sunny weather for the whole trip. Unfortunately, this meant the area was drier than usual, so the normally abundant lamiine beetles (Cerambycidae) were hard to find. However, it also meant that the national park known as “leeches’ paradise” was virtually leech free!



From the left: Zhenhua Liu, Xuankun, Mengjie Jin, Lauren Ashman, Adam Ślipiński, Yu-Lingzi Zhou, Andreas Zwick and Yun Li. [Photo by: Zhenhua Liu]



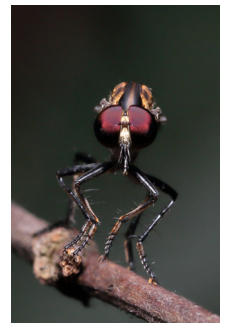
The cabin accommodation at Banksia Point Lookout. [Photo by: Zhenhua Liu]



Mengjie with some of the Cerambycidae larvae she collected. [Photo by: Adam Ślipiński]



The day-time food thief! [Photo by: Zhenhua Liu]



Other collectables!! [Photo by: Zhenhua Liu]

We spent each night sorting through the day's catch, and I learned a lot about identifying different beetle families, although I still needed help with the myriad of small brown beetles that we extracted from the Berlese funnels. Everyone was thoroughly spoilt by Adam's excellent cooking, homemade

pizza and potato pancakes in the bush! And no-one went hungry despite the local quoll stealing food from our table. And in broad daylight too! All too soon it was time to come back, laden with valuable specimens and good memories.



## An expedition to Western Australia

Juanita Rodriguez

In late 2017, a group of ANIC researchers, graduate students and overseas visitors travelled to Western Australia to collect specimens and make natural history observations.

In Western Australia, the humid forests southeast of Perth are in some senses a depauperate version of eastern eucalypt forests. However, this area is also home to a number of bizarre endemics, some of which have closer affinities with African, Neotropical, or New Zealand species than with other Australian fauna. Examples include *Austromerope poultoni*, a meropeid scorpionfly, and the fish *Lepidogalaxias salamandroides*.

Additional phylogenetically important taxa of wasps and acalyptrate flies exist in Western Australia, but very little suitable material is available. Southwestern WA is also highly heterogeneous, with several small disparate bioregions.

We arrived on a Sunday in late November, and immediately set up malaise traps in parks near Perth. We then went on to set traps near Kalamunda on the Darling Scarp, and some further east in Williams in the drier wheat belt.

In John Forrest National Park, Keith Bayless, from the California Academy of Sciences, collected the Western Clawless Upside-down fly *Nothoasteia clausa*. It was found in the *Xanthorrhoea* grass-trees. Currently placed in Neurochaetidae, this species could possibly be more closely related to African neurochaetids than to Eastern Australian *Neurochaeta*. These bizarre flies live deep within the grass trees.

Malaise traps were also set up to collect rare specimens of Ctenocerinae spider wasps unique to WA.

Monday started with a two-day visit to the Western Australian Museum followed by a visit to the collection at the Department of Agriculture and Food. Both visits were to obtain specimens or collect data on the mutillids for a project on Müllerian mimicry in Australian velvet ants.



Keith Bayless looking for *Nothoasteia clausa* in *Xanthorrhoea* grass-trees.

Next we drove south to the Tuart Forest biome. This unique and restricted coastal eucalyptus forest is dry, with huge tuart gum trees, punctuated by verdant green washes. Some of the best collecting was in the campground at Peppermint Grove Beach where we stayed. Pompilid wasps swarmed the trees and the lights at night were flush with strange coastal, estuarine, and forest Diptera.

We then travelled southeast to the wet eucalyptus forests around Pemberton, the closest biome to rain forest found in WA. Keith was interested in finding fern flies (Teratomyzidae). One endemic genus can be found there- *Lips*, along with undescribed species of *Auster* and *Pous*.

The cabin where we stayed was next to a pond near the forest. We set up malaise traps and yellow pan traps. Ferns in this area were dense and diverse. Keith found one specimen of an undescribed fern fly along the Bibbulmun Track. Perhaps November was a bit too dry and late in the season; a future trip should be planned for September.



*Nothoasteia clausa*, upside down fly.

Destinations further southwest included Mount Chudalup and Point D'Entrecasteaux. This is the furthest southwest area of Australia and is marked by cliffs with striking vistas and bizarre scrubby endemic flora. Keith was particularly interested in collecting native beach flies, since this is a centre of diversity of the Coelopidae. They were abundant in the huge piles of kelp washed up along the beach at the bottom of the cliffs.

On the way back to recover traps around Ludlow and three other localities around Perth, we also stopped near Jewel Cave in Augusta. Forty seven years later, this part of our trip mirrored a trip that Don Colless made in 1970. Colless's expedition yielded amazing material that has not been seen since, such as the only pseudopomyzid from WA. Our trip was also fruitful. We collected fresh material of many important species for genomic analyses, and also found new species with bizarre structures, such as a pompilid wasp with modified flattened antennae. Collecting insects in this area of Australia is a rewarding and challenging experience. Researchers from ANIC are keen to undertake future expeditions with more colleagues to unlock its secrets.



## Borneo re-visited

Alice Wells & Laurence Mound

When the 5th Natural Resources in the Tropics Conference was advertised, we noticed that it involved a three-hour trip up the Rajang River in Sarawak, one of the largest rivers in the world, let alone on the island of Borneo. The prospect of walking in the footprints of Rajah Brooke was too tempting, and a further incentive was that the organiser, Prof. Sin Yeng Wong, had expressed an interest in thrips as pollinators of rainforest plants. So we registered and offered two talks, one on the use of caddis flies as indicators of the health of freshwater streams, and the other on the significance of thrips as pollinators and nutrient recyclers in rainforest. The conference was held at two sites. For four days we were at Sibuan on the lower reaches of the Rajang, about 60 km from the sea, where the local market proved irresistible. Australian sensibilities were taxed however, both by the sight of neatly packaged live chickens, and by the overpowering (delicious?) aroma of durian fruit. The conference talks ranged over many aspects of tropical forests, and was opened and closed with the usual rituals of local dancers and local food. Everyone then clambered aboard a long narrow river launch, and the 80 km journey up the Rajang was a fascinating reminder that H & S is an unknown concept for most people in this world. Kapit, a small forestry town, was the centre of the second half of the conference, and the fort built by Rajah Brooke in 1880 to control pirates is still on the river bank. The huge barges of erstwhile forest trees on their way downstream to the furniture shops of the world were a reminder of the dependency of our economies on biological systems. The conference included a one-day field excursion, involving several hours of walking along a stream bed, scrambling up its muddy banks, and feeding the leeches when wading through lowland bogs. This emphasised why we know so little about rainforest biology; such studies involve demanding physical work. Excellent observations by local students are establishing pollination details, but despite their



Main photo: An intrepid Alice wading through part of a local river! Left inset: Proboscis monkey. Right inset: Bako National park *Nepenthes*.

finding two new species of thrips in flowers, it seems that the ubiquitous chrysomelids are the active pollinators of forest aroids. Penny Gullan and Peter Cranston had also attended the conference, and together we flew to Kuching for a little R & R. This involved more tramping up and down the steep slopes of rainforests, but the proboscis monkeys, the diversity of pitcher

plants, the cat museum, and the Chinese cuisine provided the recuperation. We returned home via Peninsular Malaysia, to give two more talks, to discuss manuscript drafts with Prof. Ng Foo Yong at the Universiti Kebangsaan Malaysia, and to study his impressive slide collections of Thysanoptera.



## Dr Robin Bedding and the story behind *Deladenus siricidicola*

Mike Hodda

Dr Robin Bedding, an Honorary Fellow in the Insect & Nematode Biosecurity Team at the Australian National Insect Collection, was invested as a Member of the Order of Australia in the recent Australia Day Honours list “For significant service to science in the field of entomology as a researcher, and to the forestry industry both nationally and internationally”.

Robin has made major contributions to biological control, mass production of nematodes, cryogenics and bacterial associations. He has received multiple awards for his work, including a Centenary Medal, the Sir Ian McLennan Achievement for Industry Award, the Clunies Ross National Science and Technology Award and a CSIRO Medal for Research Achievement. His research was developed into commercial products that are now sold around the world. He has even had a scientific name proposed in his honour (more on this later).

But all this started with some basic systematic work involving two different nematodes.

One was a species of the genus *Parasitylenchus*, which is in the family Allantonematidae. This is a large, distinctive nematode found as an internal parasite of wasps laying their eggs in pine trees in New Zealand. The wasp (*Sirex noctilio*) is a pest, and causes major damage to plantations.

The other was a species of the genus *Deladenus*, which is in a different family, the Sphaerulariidae. This is a much smaller nematode, found feeding on fungi in trees such as oak, but also alfalfa and grasses in Europe and North America, always in association with a fungus, which is its food.

Only they weren't two species...they were the same thing!

Through careful research, Robin managed to produce both forms in culture from a single culture started with a single female.



Dr Robyn Bedding

This was the crucial step in controlling the pest wasps. It meant that the nematodes could kill the wasps, then survive on fungi, waiting for any wasps that reappear. Otherwise, when the wasps die, the nematodes die as well, giving the wasps an opening to become a pest again.

The fact that nematodes feed on fungi is key to producing large numbers of nematodes easily and cheaply. This means that nematodes can be produced in large numbers for delivery to sites where the wasps might become a problem. Fungi are easy to grow in the laboratory as food for the nematodes, whereas wasps are not easy to culture. This makes the nematodes a great biological control agent.

In fact, these nematodes were so good as a biological control agent that they were produced commercially in large numbers, and had great success in controlling the wasps.

Then a different taxonomic problem arose. Some of the cultures of the nematodes worked very well in controlling the wasps, but some didn't. This involved detective work not between different families of nematodes, but within and between species. There were at least two different species



The two forms of adult female of *Beddingia siricidicola* of the nematodes, but also different populations within the species that differed in their ability to attack the wasps.

There was also evolution going on within populations. Nematodes grown for many generations on fungi evolved to be better fungal feeders and worse parasites, thus losing their potential to control the wasps. Once all this was established and incorporated into the nematode production system, effective commercial production of the nematodes for biocontrol could resume.

The original nematode was eventually named *Beddingia siricidicola* in his honour, and Robin went on to develop other nematodes as commercial biological control products for other pests, such as beetles in turf and grapes.

But it all hinged on understanding the taxonomy and relationships of the nematodes in the first place.

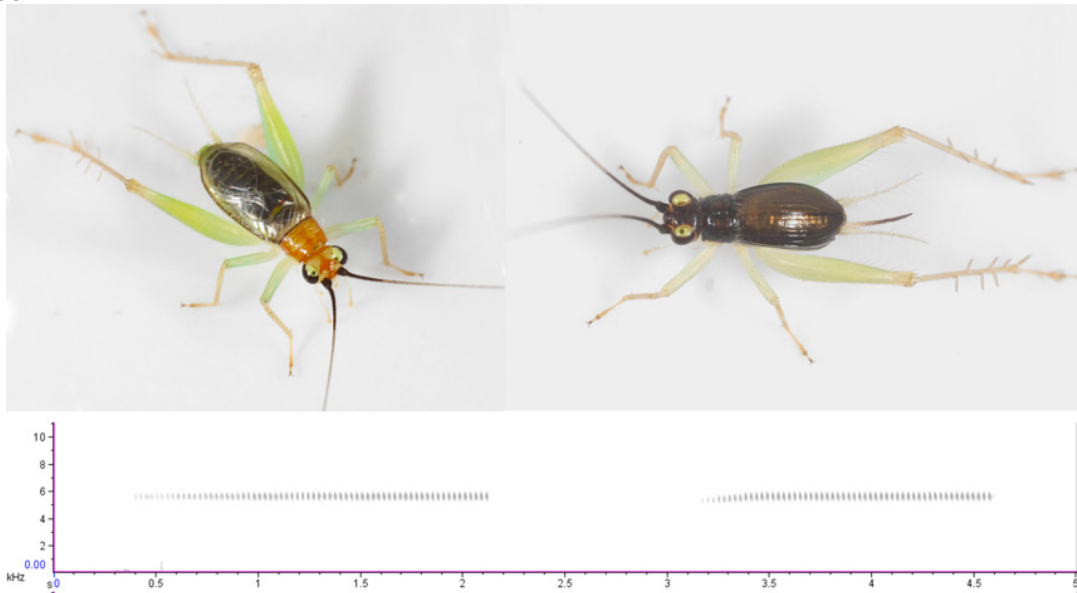
## A guide to the crickets of Australia

You Ning Su

Crickets occur in most Australian habitats but only a few entomologists can identify the species. This is because many entomologists lack familiarity with the group, and the collections that might assist them are mostly located in big cities that are away from the locations where most species occur. Aside from the technical monograph published in 1983 by Otte & Alexander, there is no other single source from which crickets can be reliably identified.

Together, Dr D.C.F. Rentz and I, drew on the resources of the ANIC, the available literature and our personal notes and photos to complete a guidebook to the crickets of Australia. Illustrated keys and tables as well as sonograms will be used to aid identification.

The guide book will be a comprehensive account of the Australian cricket fauna. It will contain keys and tools to identify all the genera and, in some cases allow identification of species. There will be chapters discussing cricket ecology, their life history and their place in the Australian landscape. It will also provide a guide to the collection, preservation and storage of crickets for future study. And finally, it will direct readers to the relevant literature when needed to help to complete identifications or source further information.



*Anaxipha fuscocinctum* (Trigonidiidae: Trigonidiinae) male, female and sonogram.

## QUESTACON COLOURS EXHIBITION

Throughout the year in 2017, Federica Turco and the ANIC technical staff were involved in advising, preparing and providing material for the insect displays in the Questacon Colours exhibition. We worked with Alex Jordan, the Exhibition Content Developer at Questacon, to put together an exhibition on colours in insects. We focussed on the themes of where the colour comes from, how it is produced and why colour is important in the survival and evolution of the highly successful insects.

A set of displays was created during an ANIC technicians' working bee, to tell the story of "Creating Colour", which covered the topics of pigmented colour, iridescence, wax colouration, opalescence and circular polarisation in insects. Another set of displays looked at "Colour in Action" and focussed on camouflage colours, warning colours, the use of colour in mimicry and its role in sexual dimorphism. See the photo below.



The exhibition was finally opened in December, 2017 and it will run until early 2019. The insect section of the exhibition is proving to be very popular, particularly the circular polarisation in insects.



## Welcome to new staff in ANIC

David Yeates and Debbie Jennings

### MAHIN CHAVOSHI

The Hymenoptera lab is pleased to welcome new Ph.D. student, Mahin Chavoshi, who has obtained a PhD scholarship from ANU and CSIRO. Mahin has B.Sc. and M.Sc. degrees from the University of Tehran, Iran, and a M.Sc. from Memorial University of Newfoundland, Canada. She is interested in Hymenoptera molecular systematics and taxonomy. In the ANIC Hymenoptera lab, she will study the classification and phylogeny of Australian spider wasps.



### ANDREW VOSSEN

Andrew Vossen is investigating the skills required to be a generalist diagnostician in entomology to deliver training materials to graduates employed in the biosecurity and environmental sectors. Andrew recently completed a Bachelor of Ecology degree at the University of New England, where he primarily focused on plant- and insect- related disciplines. Previously he developed technical and project management skills at Sydney Water. With roles ranging from a field technical officer to the Supervisor of the Sydney Catchment Authority Hydrometric Monitoring and Sampling Contract, Andrew delivered contractual requirements and managed business

partnerships. An interest in ecological research drives his professional aspirations and directions.



### STEPH ROUTLEY

Steph joined us in October, 2017. She comes from across the road, at ANU, where she studied behavioural ecology and vertebrate parasitology, focusing mainly on helminths. She's working on Insect and Nematode Biosecurity, looking at biological reference collections and their contribution to biosecurity activities in Australia. She was recently a speaker at an Annual Plant Biosecurity Workshop, where she presented a new system for assessing the quality of the diagnostic protocols that are used to identify incoming pests. She is also a Health and Safety Representative (HSR) for NCMI.



### JAMES NICHOLLS

James is part of the team working on the Environomics Future Science Platform project "High-throughput Collection Genomics", developing methods to obtain genomic-scale DNA sequence data from the specimens housed at ANIC, and hence facilitating the use of the collections as a resource for genetic research into Australian insects. This project will involve optimising the molecular laboratory procedures involved in extracting DNA from pinned material, including some very old specimens, and converting this DNA into a format that can be sequenced. Part of the project will also involve miniaturising these lab procedures in order to develop a high-throughput pipeline that can be used to generate sequence data for many thousands of specimens. James came to ANIC after 11 years of post-doc work at the University of Edinburgh, Scotland. His previous work has involved the use of similar genetic/genomic data to explore questions in insect-plant interactions, community assembly, phylogeography and taxonomy. Much of his work has focussed on oak gallwasps and the associated community of parasitoid wasps. However, he has also worked extensively on both birds (field-based behavioural work and DNA-based assessments of their diet) and plants (using genomic methods to address taxonomic questions, based at the Royal Botanic Garden Edinburgh).





### CHRISTY GEROMBOUX

Christy Geromboux started as ANIC's new database manager late in 2017. And only now is she beginning to realise the huge scope of the work.

As CSIRO moves towards the implementation of its new Collections Management System (Collective Access), she will be working with the ANIC and DigiVol staff to digitise as many of the ~13 million insect specimens as possible. Since beginning her job she has learned many useful (albeit specific) skills, such as how to rehydrate an ant and where to best to pin a beetle so that its legs do not pop out. It is safe to say her life (and resumé) have forever been enriched.

In her spare time she loves to play bridge, socialise with friends, and travel. This year she hopes to achieve her lifelong goal of winning Best Costume in the Canberra Times Fun run.



### VIDUSHI PATEL

Vidushi has recently joined NCMI as a Research Technician. She is working for the Environomics Future Science Platform, which aims to generate molecular data for the Australian National Insect Collection. The aim of this initiative is to increase our understanding of insects and thus our ability to manage biodiversity on Earth more efficiently. Vidushi is currently working on optimising DNA extraction protocols for insects in order to enable high-throughput whole genome sequencing of large numbers of species.

She brings a lot of molecular biology expertise from the Australian National University, where she also obtained her degree, a Bachelor of Biotechnology Honours (first class) and a Ph.D. in Molecular Biology and Genomics. Vidushi has a huge interest in new technologies to solve real-world problems.

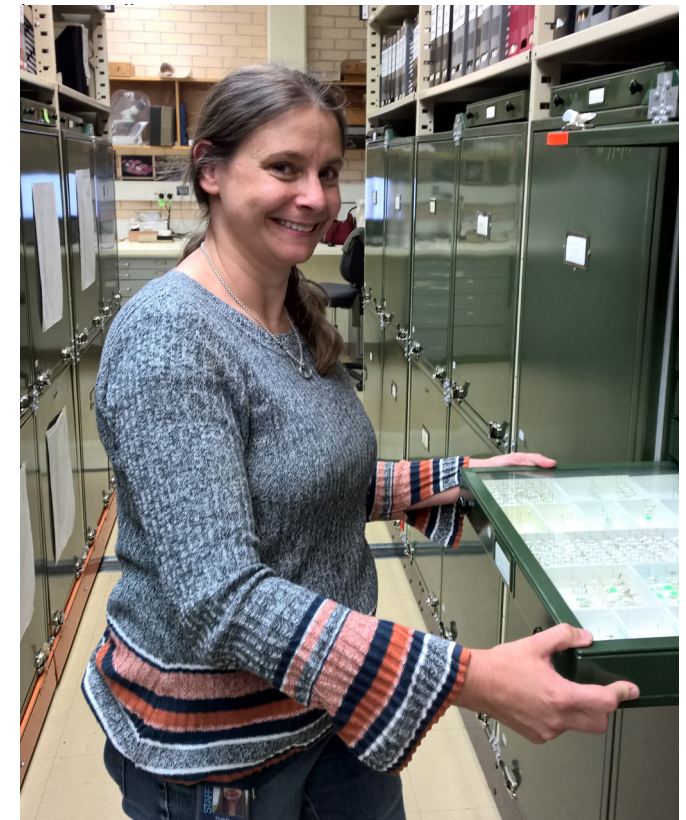
Away from science, Vidushi loves travelling, seeing new places and trying various cuisines.



### THEKLA PLEINES

Thekla Pleines has been working as a casual in the Hymenoptera collection since August 2017. Her tasks include organising, identifying, pinning and imaging Hymenoptera. She has also been involved in field work and molecular lab work. Currently she is curating the collection of Mutillidae (velvet ants) for a research project on Müllerian mimicry.

Thekla completed her Ph.D. in 2008 on the evolution of wild barley species at the IPK (Leibniz Institute of Plant Sciences and Crop Plant Research) in Gatersleben, Germany. Prior to completing her Ph.D., she spent two years working at the herbarium of the Natural History Museum in Stuttgart, Germany. This experience sparked her interest in natural







Jim Cullen and Tom Van Gerwen do the birthday honours!



Fede and the newest member of the team, Massimo, join in the celebrations as well!

## ANIC volunteer scheme 20th Anniversary Celebration

Deb Jennings

This year marks the 20th anniversary of the ANIC volunteer scheme, and we celebrated this significant milestone in typical ANIC fashion on the Village Green. Fortunately the weather was amazing and we did not have to use an alternate venue. To mark the occasion, we had the Turkish Pide House in Belconnen provide the catering, instead of the usual BBQ, and a huge feast was had by all!

The idea for the volunteer scheme was conceived and initiated by the ANIC Collection Manager at the time, Graham Crompton, with the support of the Chief of the Division, Jim Cullen. A former long-term staff member, Tom Van Gerwen, who had then recently retired, was invited to be the co-ordinator of the scheme. Tom accepted the invitation, and on the 2nd February 1998 the volunteer program commenced.

Tom is still volunteering to this day and was awarded a certificate of appreciation for 20 years of voluntary service by the ANIC Director, Dr David Yeates. Other volunteers also

reached significant milestones, with Rita Romaniuk being awarded a certificate for completing 19 years (and entering her 20th year) of volunteering, Jenny Campbell and Glenn Cocking their 15-year certificates, while David Ferguson, Robert Tompsett and Judy Evans their 10-year certificates.

Unfortunately Graham Crompton was unable to attend the celebration, as was Larry Marshall. However, we were fortunate in having Toni Moate, Director of the National Collections & Marine Infrastructure, and Andrew Young, Director of National Research Collections, with us, to recognise the achievements of the volunteers and their significant contribution to ANIC over the years. Hazel Bennet, Chief Operating Officer, also managed to come over and congratulate the volunteers on this milestone.

The Canberra Weekly newspaper will be publishing an article in early April on the 20 years of the volunteer scheme.

Clockwise from the top: Glenn Cocking, Tom Van Gerwen, Dave Ferguson, Robert Tompsett, Jenny Campbell, Rita Romaniuk and Judy Evans, with their awards.



## 2017 Visit from two DigiVol transcribers

Marie and Ross Davidson

We joined DigiVol in June 2016 and it has been a perfect fit for both of us.

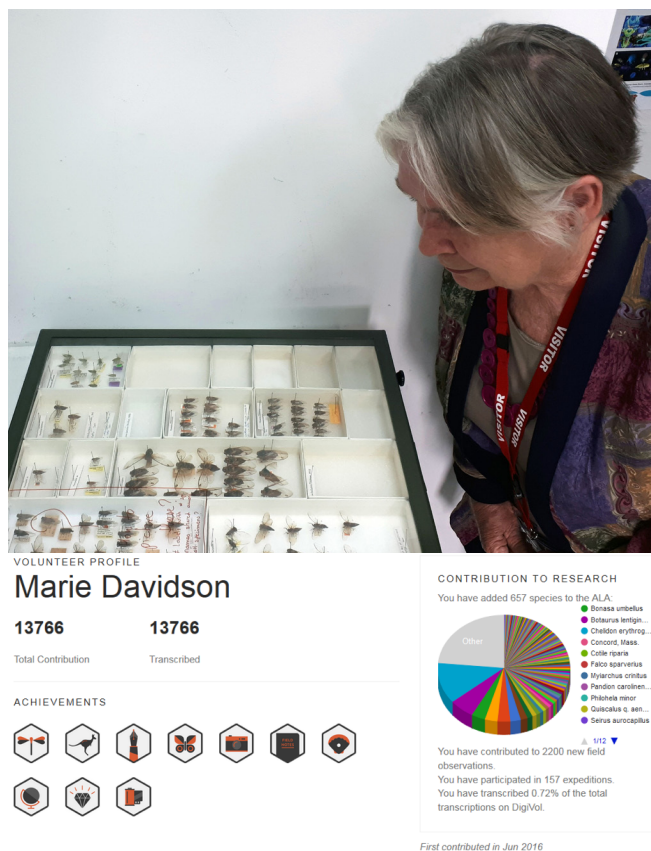
We visited ANIC in December 2017 on a hunch that, as transcribers who over the last year we have transcribed many native bees' labels from ANIC, we might be able to see the wonderful collection first-hand. We were not disappointed.

We are interested in native bees, and by extension have an interest in native flowers. This stems in part from our country childhoods and in part from a detailed biology assignment one of our sons completed about ultra-violet nectar guide pads for bees (and other insects) on Australian native flowers.

Once we became transcribers, we discovered that those bees are even more interesting than we'd imagined. Thus we discovered the beautiful blue-banded bees of Western Australia and the tiny bees of Cape York Peninsula. We learnt of stinging and stingless bees; social and solitary bees. Then, a range of colours that we hadn't anticipated. Over 1500 species of native bees! Plenty there to keep us involved.

But I think we were most fascinated not just by the bees themselves, but by the entomologists working in the field. Until we became involved, it had never occurred to us to imagine collectors working in extremely remote outback sites, alongside isolated waterholes and up mountain ranges. Names became familiar, the scientific names of course, but also those who described them: Froggatt, Cockerell, Rayment, Walker, Smith and many others. Indeed, one of the small delights of walking through the ANIC corridors was to see these names highlighted on one of the walls.

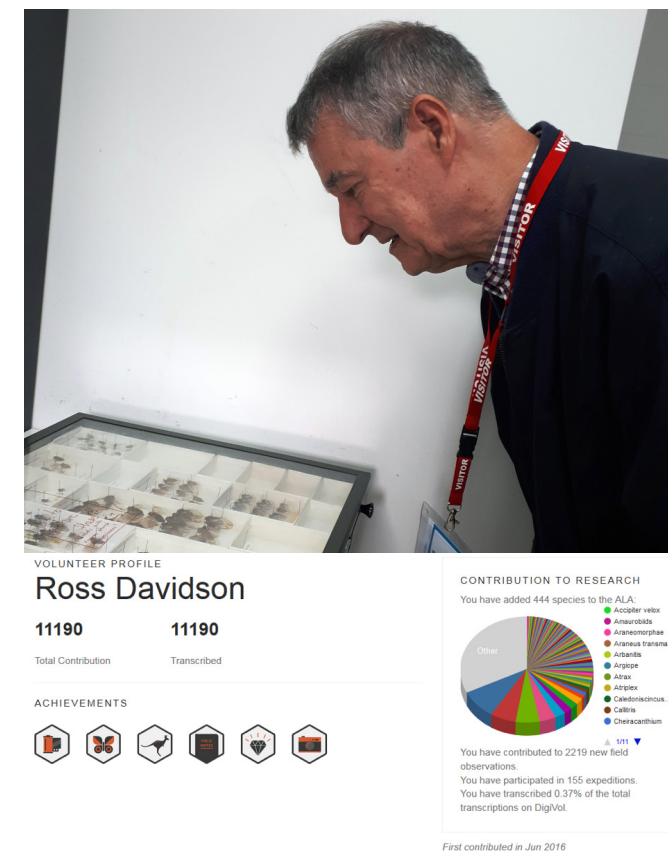
One simply cannot do DigiVol transcription without a degree of detective work and research: not all collectors wrote beautiful copperplate script! What is a malaise trap? Where



Above; Marie Davidson, Below: her volunteer profile

is Gunbower? It evolved into a 'this goes with this, goes with that' experience.

The experience has also enriched us personally and we now walk through gardens and bushlands and notice the native bees and occasionally their nests. Once we wouldn't have noticed this richness around us.



Above; Ross Davidson, Below: his volunteer profile

ANIC greeted us with wonderful courtesy, and while we know this is a very busy place, all gave their time generously and enthusiastically showed us material from the collection. It was a wonderful experience and we are very grateful indeed for the warm welcome. Thank you, Nicole, Alison and Saleta.



## Coleoptera collaborations

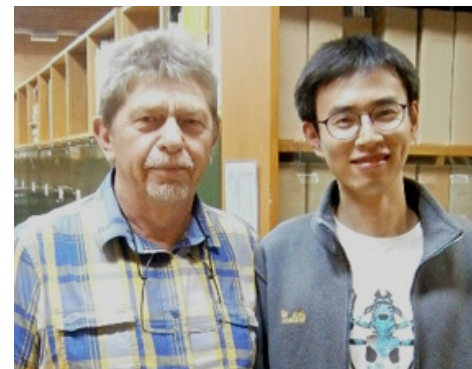
Cate Lemann



Armin Moczek, Professor of Biology, from Indiana University in Bloomington, Indiana, USA, investigates the genetic, developmental and ecological mechanisms of introduced and native dung beetles, and the interactions between them. These mechanisms and their interactions help shape their rapid short term-evolution.



Ryan Ridenbaugh, from the University of Florida in the USA, is working on *Paropsisterna varicollis*. In particular, he is looking into potential natural enemies of this pest species of the family Chrysomelidae.



Yun Li, from Sun Yat Sen University in China, pictured here with Adam, participated in the New England National Park field trip. On his return, he spent time getting familiar with the Australian beetle fauna held in our collection.



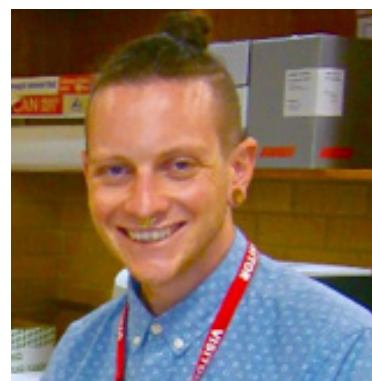
Nicole Gunter, from Cleveland Museum of Natural History, Ohio, USA, and Tom Weir, continuing their collaboration on the *Lepanus* descriptions in the subfamily Scarabaeinae.



John Lawrence and David Rentz, both from Queensland, visited us early in 2018. John was here to continue work on the second volume of "Australian Beetles" while David, a collector extraordinaire, was contributing material of the family Cerambycidae.



Chris Reid from the Australian Museum in Sydney, visited us to continue his study of scarab beetles.



Dan Power, a visual artist based in Canberra, has an academic background in evolutionary biology. He was here to find beetle inspiration for a range of art projects.



Mary Finlay Doney, from the Northern Territory Department of Primary Industry and Resources, visited Adam to study coccinellids.



Brian Levey, from the National Museum in Cardiff in the UK, came on a visit to study the buprestid genus *Melobasis*.

Other visitors: Paul Zborowski, image identifications with Adam. Roger De Keyser, Cerambycidae: Prioninae collaboration with Mengjie Jin and Adam. Allen Sundholm, looking into all sorts of beetles. Jan Clark and Julie Landford, Using beetle specimens as inspiration for artistic projects.



## Visitors and Honoraries

David Yeates and Debbie Jennings



Honoraries and some of our visitors gather on the steps outside the collection halls for a photo shoot. From the top left, clockwise: David Rentz, Marianne Horak, John Lawrence, Gunter Theischinger, Ted Edwards, Dan Bickel, Laurence Mound and Bruce Halliday.

## ANIC TOURS

### This one is a snippet tour!

Senator the Honorable Zed Seselja, David Yeates and Larry Marshall take a very quick look at the insect collection.





## Recent publications

Anderson, C.J., Oakeshott, J.G., Tay, W.T., Gordon, K.H.J., **Zwick, A.** & Walsh, T.K. (2018) Hybridization and gene flow in the mega-pest lineage of moth, *Helicoverpa*. *Proceedings of the National Academy of Sciences of the United States of America*, 27 (20), <http://doi.org/10.1073/pnas.1718831115>

**Banks, N.C.**, Tangchitsomkid, N., Chanmalee, T., Sangsawang, T., Songvilay, P., Phannamvong, N., Thamakhot, S., Painsi, D.R., Bayliss, K.L. & **Hodda, M.** (2018) Nematodes network too: diversity, abundance and dispersal via plant produce trade networks. *Biological Invasions* 20, (in press)

Cai, C., **Ślipiński, A.**, Leschen, R.A.B., Yin, Z., Zhuo, D. & Huang, D. (2018) The first Mesozoic Jacobson's beetle (Coleoptera: Jacobsoniidae) in Cretaceous Burmese amber and biogeographical stasis. *Journal of Systematic Palaeontology* 16 (7), 543-550.

Chen, K., **Horak, M.**, Du, X.C. & Zhang, D.D. (2017) Revision of the Australian species of *Agrotera* Schrank (Lepidoptera: Pyraloidea: Crambidae: Spilomelinae). *Zootaxa*, 4362 (2), 213-224. <http://doi.org/10.1080/14772019.2017.1314388>

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**Ferguson, D.J.** & **Yeates, D.K.** (2018) Immature stages of two Australian mydas flies (Diptera: Mydidae) of the genera *Diochlistus* and *Miltinus*. *Austral Entomology* (2018), 1-9. <http://doi.org/10.1111/aen.12326>

**Ferguson, D.J.** & **Yeates, D.K.** (2018) Immature stages of the Australian flower-loving fly *Apiocera striativentris* (Diptera: Apioceridae). *Zootaxa* 4387 (2), 394-400. <http://dx.doi.org/10.11646/zootaxa.4387.2.10>

Gilbert, J.D.J., **Wells A.** & Simpson S.J. (2018) Skew in ovarian activation depends on domicile size in phyllode-glueing thrips. *Scientific Reports* (2018) 8, 3597 <http://doi.org/10.1038/s41598-018-21635-z>

Haddad, S., Shin, S., Lemmon, A. R., Lemmon, E. M., Svacha, P., Farrell, B., **Ślipiński, A.**, Windsor, D. & McKenna, D. D. (2018) Anchored hybrid enrichment provides new insights into the phylogeny and evolution of longhorned beetles (Cerambycidae). *Systematic Entomology*, 43, 68-89. <http://doi.org/10.1111/syen.12257>

**Hodda, M.**, Clinton, B. & Dawson, B. (2017) Enhancing Diagnostic Capability for Priority Pests: Imaging audit. pp18, CSIRO, Australia.

**Hodda, M.** & Dawson, B. (2017) Assessment of Molecular Diagnostic Capability for Priority Plant Pests (NPPPs). pp62, CSIRO, Australia.

**Hodda, M.** & Manwaring, A. (2017) National Entomology Skills Analysis. 1-13, CSIRO, Australia.

**Hodda, M.**, **Routley, S.** & Manwaring, A. (2017) Comparison of diagnostic resources for NPPPs. pp18, CSIRO, Australia.

**Hodda, M.**, **Routley, S.** & Manwaring, A. (2017) Standards to assess biological collections. pp12, CSIRO, Australia.

**Hodda, M.**, Van Der Schyff, G. & Welsh, L. (2017) Enhancing Diagnostic Capability for Priority Pests: Collections and Capability audit. pp48, CSIRO, Australia.

**Hodda, M.** & The Reference Collection Working Group of the Subcommittee on Plant Health Diagnostics (2018) National Plant Pest Reference Collections Strategy. Plant Health Australia, Canberra, ACT, pp36.

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