ANICdotes

The official newsletter of the Australian National Insect Collection

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# Our second issue for 2017

David Yeates, Director

This issue of ANICdotes is chock full of recent field work and conferences attended by staff over the Canberra winter, and we also focus on the important work contributed by our Honorary Fellows. ANIC benefits tremendously both in curation and research, from this group of unpaid workers. Collectively our Honorary Fellows have hundreds of years experience studying insects and working on insect collections, and we rely on their expertise every day. Honorary Fellow Ted Edwards explains the entomological significance of remnant sandhill habitat in western NSW. Ted and Honorary Fellow Marianne Horak, assisted by a number of ANIC staff including You Ning Su, organised the 8th and very successful moth weekend in July. Visiting Scientist Alice Wells describes recent field work in Borneo. Sadly, we also report on the passing of long-time volunteer Alexander (Sandy) Roy and technician Amar Singh.

Our resident communicator and social media Czar Bryan Lessard has been busy as usual, with a number of radio and TV appearances over recent months, and was very active when ANIC's work on the identity of the Lord Howe Island Stick Insect *Dryococelus australis* was published in early October. Bryan juggles these outreach activities during his postdoc research, which revises the Australian soldier fly fauna which is funded by a grant from The Australian Biological Resources Study (ABRS). Cate Lemann has been spearheading ANIC's collaboration with the ANU school of Art and Design, culminating in an exhibition of artworks in CSIRO's Discovery Centre.


David Yeates

Three ANIC staff and students (Alan Landford, Xuankun Li and James Lumbers) attended the first Fly School in Wrightwood, California, during the northern summer. Fly School was an intensive masterclass in Diptera identification and biology, involving expert instructors from all over the world. The summative task of the two-week course was to collect and identify 50 families of Diptera from the surrounding habitats. As I understand it, Xuankun Li topped the class. Anybody interested in learning fly identification to family should look out for Fly Schools of the future (http://dipteracourse.com).

Our Hymenopterist Juanita Rodriguez has been busy on field work in places as far afield as the wheatbelt of WA and Lord Howe Island and she also attended the Evolution meetings in Portland, Oregon. There she presented work she completed during her last postdoc on phylogenomics and the evolution of chemical defense in millipedes. In late breaking news we have just learnt that the second volume of the *Australian Longhorn Beetles* by Adam Slipinski and Hermes Escalona won a Certificate of Commendation in the category of Taxonomic Zoology by the 2017 Whitley Awards committee.

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BANNER: *Graphium macleayanus* image: Biodiversity Heritage Library.

# "Because I enjoy the work"

Bruce Halliday

If you ask any of the Honorary Fellows in ANIC "Why do you do it?", the answer will always include a statement about enjoying the work. That's why each of us donates our time to continuing our research programs after we retire, without any tangible reward. Taxonomic research is difficult and demanding, and it can take many years for a taxonomist to develop a comprehensive understanding of a group of animals. This extended learning process means that taxonomists often do their best work late in their careers, and it explains why they are reluctant to stop work even after their period of paid employment.

Description and identification of insects and related creatures will always be the cornerstone of a taxonomist's work, and that is especially true of the Honorary Fellows. Some recent examples of our work of this type include a study of some mites that live in the burrows of funnel web spiders in Southeast Asia (Bruce Halliday); a review of some moths in the genus *Cryptophlebia*, whose caterpillars tunnel in plant twigs and fruit, including crops such as macadamia nuts and avocados (Marianne Horak); taxonomic studies of the tiny but beautiful jumping spiders in the family Salticidae, whose spectacular courtship dances have recently attracted a lot of attention in the media (Barry Richardson); and a major taxonomic study of 75 species of minute beetles in the family Ciidae, which spend their lives in bracket fungi on decomposing wood (John Lawrence). Laurence Mound continues taxonomic work of this type on thrips, and his recent publications include behavioural studies of species that occur in fungi, the potentially beneficial effects of species that visit the flowers of coffee plants, and the identification of an important pest species that attacks mango plants in Central America.

ANIC's Honorary Fellows, left to right: Robin Bedding, Ted Edwards, Bruce Halliday, Marianne Horak, Mike Lacey, John Lawrence, Laurence Mound, Kim Pullen, Barry Richardson and Tom Weir.

Tom Weir is one of the longest-serving members of the ANIC team, and he is now applying his lifetime of entomological knowledge to several collaborative projects on the classification and evolution of beetles and aquatic bugs, including dung beetles and pond-skaters. Ted Edwards has spent more than 40 years working on moths and butterflies in ANIC, and still plays a vital role in the care and maintenance of the collection. He is currently working on a study of the moths of Lord Howe Island, and on a book about the moths of the Australian Capital Territory. Kim Pullen is also using his extensive knowledge of the natural history of Canberra and the surrounding region to write an illustrated book about the insects of the ACT.

The team of Honorary Fellows now includes Drs Robin Bedding and Mike Lacey. Both had long research careers in CSIRO, with a special interest in unconventional methods of pest control. They are now exploring biochemical methods to improve the survival and storage of the nematode *Beddingia siricidicola.* This tiny parasitic worm is used internationally for control of the the wood wasp *Sirex noctilio,* an important economic pest of pine trees. Robin has also been collaborating on a study of disruption of *S. noctilio* biocontrol by the bark beetle *Ips grandicollis,* and is investigating the mass production of predatory nematodes to control plant-parasitic nematodes for a commercial partner. He has been contributing to the National Sirex Coordination Committee every year for the past 30 years, and more recently has served on Academy of Science fellowship committees. Mike has been collaborating with international colleagues to identify the trace quantities of termite trail pheromones and sex pheromones, which provide important clues for understanding termite evolutionary history.

The Honorary Fellows are free to engage in extra-curricular work that is difficult for paid staff to justify. Several of them devote time to editorial work for major journals, or serve as scientific advisers to government bodies or as committee members of international scientific organisations. The Honorary Fellow program is an ANIC success story, which delivers significant benefits to the nation at minimal cost. It is one of those rare examples of a cooperative arrangement in which everyone wins.

# Zara Sandhill

Ted Edwards and Glenn Cocking

Some among us have a few spiritual homes where our soul is at peace. For Ted one such place is Zara Sandhill. Zara homestead, and the adjoining sandhill, is on Zara sheep property about 46 km (60 km by road) north northwest of Deniliquin, NSW, and beside Forest Anabranch, which is a branch of Billabong Creek. Zara is one of a group of famous grazing properties including Boonoke, Wanganella and Barratta. Wanganella in particular is famous for the development of the Peppin strain of long-legged, drought-tolerant, tough, merino sheep.

Ted first visited Zara in the 1967 drought and found an amazing oasis on the dry, barren and battered saltbush plains. Others have had the same experience, and Zara Sandhill has been the subject of extensive study and conservation work. The reason is simple; it is the only reasonably intact, naturally vegetated sandhill left on the Riverine Plain. The remainder has been so grazed and degraded as to be almost bare. The Riverine Plain is a geographically defined area of alluvial plain stretching from a little south of Echuca in Victoria to Ivanhoe in the north and from Narrandera in the east to Balranald in the west. It is essentially flat, sloping slightly westwards. The river systems of the Murray, Edward, Murrumbidgee and Lachlan cross it, as do many creeks and depressions, which are mostly dry or only occasionally flowing.

The long sedimentary history of these rivers and streams has left the plain crisscrossed with prior stream beds. In past periods of aridity, sand deposited by the streams was blown into sandhills that mark the courses of the more recent channels through the heavy, clay soils of the plain.

The sandhills had unique vegetation, and although all the plants are found elsewhere, the combination is not. Much the same may be said of the moths.

Remnants of natural habitat at Zara Sandhill

Glenn mounting moths in the field

Through the courtesy of Mr Barry Doidge, manager of Zara, we have been able to collect moths at Zara Sandhill on several occasions, often *en route* to areas further west. To enter the thick sandhill vegetation after the exposed open plains is a gift to the moth student, who suddenly finds a wide variety of plants and reliable shelter from the wind.

Our most notable moth success so far has been the rediscovery of *Anthela stygiana* (Anthelidae), a large yellow and grey moth. This species was described from Deniliquin but for almost a century no specimens that might have been this species have been known from within 500 km of Deniliquin. We have now reared a good series of this moth from spindle-shaped cocoons collected from under slabs of bark of its foodplant at Zara, Willow Wattle or Cooba, *Acacia salicina*.

The Sandhill was preserved as the horse paddock at Zara (horses are choosey feeders and get extra-special treatment, so their home paddock is very lightly grazed) after 1860 when it was bought by William Officer, whose wife was a naturalist and who collected many plants from Zara. The Officer family sold Zara to the Faulkiner family in 1927 and it is currently run by Australian Food and Agriculture Co. Although Zara Sandhill is now fenced off, it still faces many challenges. It may yet be overrun by weeds, particularly African Boxthorn, (*Lycium ferocissimum*, Solanaceae), or regeneration may again be interrupted by rabbits. However its conservation value is now recognised and we hope it will provide many more interesting moths for the ANIC.

For more information see: Stafford, M.J. & Eldridge, D.J. (2000) Vegetation, soil and management of “Zara”: a sandhill remnant on the Riverine Plain. *Cunninghamia,* 6(3), 717-746.

# A challenging experience: The 'Heart of Borneo Tama Abu Scientific Expedition 2017'

Alice Wells

Biosecurity is a prime concern of the Australian Government. To recognise incursive species, we need to know not just our Australian flora and fauna, but also the flora and fauna of the islands to our north. This is particularly so for thrips, as the group includes pests of agriculture and horticulture, and for caddisflies a better knowledge of the fauna of the islands to our north will help us to understand the relationships of our fauna. Little is known of the thrips of Borneo — about 230 species being recorded for the three states (Peninsular Malaysia, Sarawak and Sabah) combined, and some 20 species from Indonesian Borneo (Kalimantan). Caddisflies fare slightly better with 324 species known for Borneo.

The Tama Abu Scientific Expedition 2017 to the 'Heart of Borneo' was the fifth in a series of expeditions organised by the Sarawak Forest Department. This particular expedition aimed to 'develop baseline data for biodiversity, communities and eco-tourism, to support conservation in the Tama Abu Range', a mountainous area of rainforest in north-eastern Sarawak, close to the border of Kalimantan. Supporting this aim was foremost, but particularly for me, the fact that the expedition provided an opportunity to sample the two insect groups in which I have an interest — caddisflies (Trichoptera) and thrips (Thysanoptera).

The expedition set out from Miri on the NW coast of Sarawak the morning after a grand evening 'launch' with dignitaries, speeches, traditional Bornean dancing, a 10-course dinner and a warning to be dressed appropriately to walk the final 500 metres down the muddy road to the Camp. The convoy of 48 four-wheel drive vehicles was escorted out of the town by around 12 motor-cycle police and a lead police car, its siren sounding. It took 9 hours of weaving left to right along the rough logging concession road to reach close to the site of the expedition, where we bailed out and slipped our way down the muddy slope to the Camp beside the river, Sungai Baleh. Local porters carried all the heavy equipment and bags.

Mud, mud glorious mud! Alice Wells with Leanda Mason (Curtin Uni, Perth) and a Kelabit woman at Long Peluan.

The camp organisation was brilliant, with scarcely a glitch. The facilities were built by indigenous Borneans solely for the two weeks of the expedition. We camped in style — taps with running cold water (piped from a small tributary on the slope on the opposite side of the river); power from a generator for lights throughout and even along some walkways, a power board with 12 plugs for recharging electronic equipment; dormitories with canvas beds; washrooms with squat toilets, buckets, dippers and taps; kitchen providing all meals, and even snacks for those working or idling around the camp in the afternoons (chick peas, sweetish ground peanut- or pea-soupy mixes); a medical 'klinik' with a doctor and two assistants; and so on.

BUT the camp, beside the fast-flowing river, was set up on a narrow, rather uneven area at the bottom of a very steep valley with no easy movement laterally along the river. Access to the camp was via a newly excavated, ~1 km steep, slippery muddy track. A bulldozer on loan from the nearby logging

company kept re-grading the upper ~500 metres, digging the track ever deeper into the hill. Even the bulldozer became bogged on one occasion, and another had to be called in! The bulldozer pulled back up to the road any vehicles that ventured as far as the 'carpark', and on the day on which most participants departed, it carried most of the larger bags and equipment to the road from the carpark to which the porters had carried the mountain of large heavy items.

Access to the near-primary forest adjacent to the camp was via two bridges (one a log, the other just planks held in place by poles), then an abrupt steep, slippery, muddy, ascent through the forest, then up down, up down all the way along all the transects the guides (a mix of Iban, Kelabit, Penan, etc) had marked. Every morning guides were assigned to every person or party leaving the camp. The Malaysians were all great field workers: totally intrepid in the mud, on the steep slopes and in the frequent rains of this dry season! Not so an elderly Australian who became a kind of camp mascot (keep fit so you can try to do silly things in your retirement).

The participants were a broad mix of flora and fauna workers — people working on higher plants, ferns, fungi, mosses, liverworts and mammals, birds, reptiles and frogs, fishes, insects and spiders — as well as a soils team, a team of geologists and an ethnobotanist studying traditional uses of plants for medicines.

I made some forays into the forest, reaching small streams, with the guide swinging me up slopes like a sack of spuds. I returned with good samples of dead-wood and litter thrips, from foliage of ferns and flowering plants, a couple from plant galls, and some from vegetable crops and fruit trees in two small villages (Long Peluan and Long Beruang). I made a number of good caddisflies collections but mostly from the same site on the river beside the camp.

Another similar expedition will be held next year. However, as the only near-pristine forest left in Sarawak is in similar terrain, it is no go for me... However, other contributors would be welcome — both fauna and flora workers.

My crude, readily transportable light set up for collecting caddisflies used a small cheap UV light over a plastic container of alcohol.


A small sample from one night's collection of caddisflies.

One of the two bridges leading to the forest survived a storm that brought the river up over 1 m.

# AES Scientific Conference

Mengjie Jin

From 17th to 20th September, Adam Ślipiński, Lauren Ashman, Yu-Lingzi Zhou, Zhenhua Liu, Mengjie Jin, Laurence Mound, Alice Wells, Juanita Rodriguez and Xuankun Li attended the 48th AGM and Scientific Conference held by the Australian Entomological Society under the theme " Biosecurity: a Partnership Approach" in Terrigal, NSW. We enjoyed the time in Terrigal, meeting and networking with other entomologists, exploring the local entomological fauna of the coast, and enjoying the beautiful weather.

During the 3-day conference, we gave seven presentations based on our current projects. Laurence talked about the thrips fauna in Norfork Island, arguing that the establishment of a thrips species in a new area as a pest is remarkably unpredictable. Adam showed a phylogenetic tree of true ladybird beetles phylogeny (Coleoptera: Coccinellidae: Coccinellini), which indicates that the evolutionary history of Coccinellini is very dynamic in respect to changes in host preferences. Juanita presented a paper on the phylogeny of spider wasps (Hymenoptera: Pompilidae) using revised fossil and geological records. Zhenhua shared an evolutionary scenario of the first possible cycad pollinator among Mesozoic fossils: Boganiidae (Coleoptera). Lingzi introduced her work on the cocoon-forming beetles (Bothrideridae), trying to unravel the generic relationships in this poorly known family. Mengjie's talk focused on the generic classification for flat bark beetles (Cucujidae), a study inspired by some very unusual specimens collected in South America. During the last conference day, Lauren gave a rapid-fire talk presenting her future projects on the phylogeny and systematics of the longhorn beetle genus *Rhytiphora*.

Lauren giving her rapid-fire talk on *Rhytiphora*.

# Inaugural Fly School

Alan Landford

In June 2017, Alan Landford (ANIC Diptera Technician) and two ANIC-ANU PhD students, Xuankun Li and James Lumbers, travelled to Los Angeles, USA, to attend the inaugural Fly School, a training course for dipterists. They joined about 20 other students and fly researchers from over a dozen countries at this intensive two-week course, which was held at a summer camp in the mountains near Wrightwood, California.

Fly School was organised and run by the Los Angeles County Natural History Museum (LACNHM) Foundation with some generous local donations, which assisted in lowering accommodation and tuition costs. Accommodation was in traditional shared bunkhouses, and part of the summer camp facilities were converted to a very efficient working laboratory with individual microscopes and visitor kits provided for all (see photograph).

A number of highly qualified Diptera instructors from the USA, Canada and South America challenged participants to an exhausting schedule of daily lab, lecture and fieldwork activities. Instructors included (in alphabetical order) Drs Dalton de Souza Amorim, Keith Bayless, Brian Brown, Eliana Buenaventura, David Grimaldi and Jeff Skevington. Other tutors and speakers of note were Doug Yanega, Jim Hogue and Brad Mullens. They were ably supported by staff and associates of LACNHM, notably Emily Hartop, who undertook the lion's share of the organisation of Fly School.

A rundown of topics across the program was group-by-group presentations on the Nematocera, Bibionomorpha, Lower Brachycera, Empidoidea, Phoroidea, Syrphoidea, Acalyptratae and Calyptratae. Coverage of every family included biology, phylogeny, economic importance and identification.

Interspersed over the two weeks were presentations and discussions on phylogenies, night lighting and Malaise traps, specimen preparation, curation, labelling, taxonomy, nomenclature, dissection, systematics, fossils, aquatic and medical/veterinary entomology, evolution of larvae, scientific illustration and professional development. A number of 'lightning talks' were given on one of the evenings by instructors and some of the students.

Laborotory showing course attendees busy at their microscopes.

Each student was also required to put together and accurately identify a collection of up to 200 specimens from at least 50 families of Diptera from various desert, mountain and meadow localities. Many of the places where we collected afforded spectacular views and included deserts studded with Joshua Tree, Yucca, cactus and prominent rattlesnake warnings. The wildflower meadows challenged us with cold snow-melt water in the streams and poison oak/poison ivy in the most productive collecting areas.

Overall, around 85 families of flies were collected, of the number of 100+ Diptera families believed to occur in the area, which was unanimously declared a very good result. Our own Xuankun won the award for the highest number (55) of Diptera families collected, and Alan won the award for the 'best fly' - the only specimen collected of the family Acroceridae, a spider parasite (see photograph).

Participants' concentration on flies during the two weeks was greatly aided by the absence of any phone or wi-fi reception except on rare fleeting visits to the local town and during our only dinner away from camp - at Wrightwood's Mexican restaurant. A light moment was the screening of the movie 'The Fly' (appropriately) in the camp's large Yurt.

On the final day in California, a small group of participants including the three of us from ANIC were fortunate to be able to visit the LACNHM and spend some time looking at specimens and being shown through the entomology collection.

Xuankun and James finished off the experience by spending a further two weeks at the Bishop Museum in Hawaii on their return trip to Australia to review that collection and prepare loan material for their groups of interest.

We would like to thank David Yeates and ANIC and David Rowell, ANU for their support of this trip and note that Xuankun was successful in obtaining a Higher Degree Research (HDR) Conference Travel Grant from the ANU Research School of Biology to cover some of his travel costs.

The only Acroceridae fly collected during field work.

James Lumbers collecting.

## THE FLY GUY REPORT

Our own Bry the Fly Guy (aka Dr Bryan Lessard) has continued to promote the ANIC and its research outcomes to the general public. Since the last issue of ANICdotes, he has been a guest on Gardening Australia (ABC Television), Scope TV (Channel Eleven) and Totally Wild (Channel Ten), and presented "Bry the Fly Guy's Top 5" biodiversity countdown on ABC Radio Evenings with Chris Bath. He also promoted ANIC's involvement in confirming the identity of the Balls Pyramid population of Lord Howe stick insects on national radio and television, and was invited to speak at New Scientist Live, talking about Wildlife Forensics. Bryan has also published a guide to promoting entomological collections using social media in the latest *Annals of the Entomological Society of America*:
https://academic.oup.com/aesa/article/110/5/467/4103476/A-Guide-to-Public-Engagement-for-Entomological

Bryan is working hard to complete his revision of the Australian soldier flies and joined Goterra, Australia's first black soldier fly farm turning food waste into farm feed, at the inaugural Agritech Summit in Japan to discuss the future of farming.

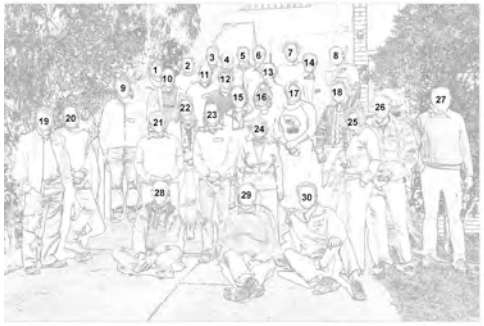


Bryan outside ANIC during filming for the ABC program Gardening Australia .

# 8th ANIC Moth meeting 22 - 23 July 2017

Ted Edwards

On the 22nd and 23rd of July the Lepidoptera unit held its biennial moth weekend and about 32 people attended. All participants made full use of the collection, identifications and advice offered and Marianne displayed the finer points of dissecting moth genitalia. As with every moth weekend we all had a wonderful time with good spirits, cheer, camaraderie and the joy of meeting old and new friends, swapping old and new stories and the tall and true tales of the one that got away. We thank all the fantastic friends who came from afar for the get-together; the guests make the party and their enthusiasm is contagious. We all firmly believe that such efforts lift our profile and engender much good-will. We thank our managers for agreeing to let us hold this very productive event. We also thank the ANIC staff who helped with ready generosity in providing extra chairs and microscopes. And a special thanks to Cate who organised a non-payment reward for our efforts. It is lovely to be appreciated in-house.



1 John Nielsen
2 Zwick, Andreas
3 Cocking, Glenn
4 Mackey, Peter
5 Landford, Alan
6 Chandler, Graham
7 Kallies, Axel
8 Williams, Steve
9 Douglas, Fabian
10 Sundholm, Allen
11 Harris, Gary
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14 Moulds, Max
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23 Braby, Michael
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28 Hill, Lionel
29 Edwards, Ted
30 Su, You Ning

# Juanita Rodriguez attends Evolution meeting

In June, I had the opportunity to travel across the Pacific to attend the Evolution meeting in Portland, Oregon, and one of its pre-conference workshops. This meeting was particularly large, with 1,735 attendees, over 1,000 talks and more than 600 posters presented from the 23th to the 27th of June. The conference kicked off with the pre-conference workshops, of which I attended the one on “Trees, traits and functions: semantics for comparative biology”. This is an emerging field that deals with normalising the terms we use for traits among different taxa, so that we can compare and use them in larger datasets. It also aids in the rapid generation of morphological data, which is sometimes referred to as phenomics. An example is the possibility of extracting data matrices from text files of species descriptions.

I presented in the posters session, which is quite interesting and different from the actual Evolution meeting, because you get to invite researchers to visit your poster. I showed the results from my research on millipedes, in which we collected transcriptomes and chemical defence data for species of most orders and plotted the chemical defences to see if they increased in complexity through time.

After the evolution meeting I headed to Utah State University, where I met with my collaborators James Pitts and Emily Sadler to obtain Ultra Conserved Element data for all Australian genera of spider wasps. We also examined material from Australia held at the USU collection in which we found interesting specimens and potential new taxa.

# Micro/Macro

Cate Lemann

Micro/Macro is a collaboration between the ANIC and the ANU's School of Art & Design.

This year, for the first time, the results of this partnership are on public display.

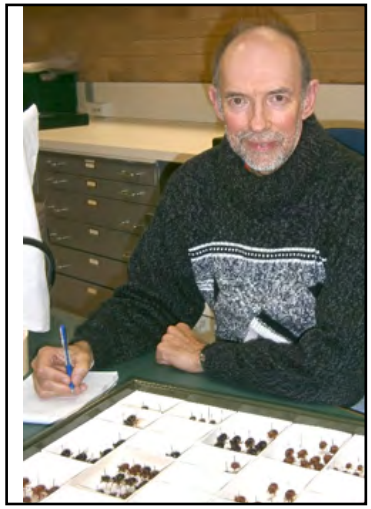
The outcomes of Micro/Macro are presented as experimental drawings by current ANU undergraduate students inspired by selected specimens of beetles. This exhibition is the result of an ongoing relationship between the School of Art & Design (SOA&D) and the CSIRO. For the past four years, the ANIC has lent a selection of its beetles to SOA&D for their course known as Foundation studies, Vision and Perception, offered to their first year students.

Insects can be scientifically represented by mapping their geographic locations, sequencing their DNA, or, more traditionally, through precise taxonomic illustrations such as high-resolution photos and black-and-white drawings. However, this exhibition displays the exciting results when art students have only four hours to respond to these fascinating and diverse insects. Rather than replicating the specimens in detail, the students are encouraged to consider scale, patterns, colour and form as a creative exercise. Each studio of students selected from their works to cover the panels which are currently on display, with some of the beetle subjects, in the CSIRO Discovery Gallery. The opening was well attended and marked the success of this collaboration and the positive experience for students, teachers and ANIC staff.

A panel from the exhibition, including art from various students.

Gilbert Riedelbauch (Head of Foundation Studies), Prof. Denise Ferris (Head of ANU School of Art and Design), Dr Andrew Young (Program Director: CSIRO National Research Collections Australia) and Cate Lemann (ANIC Project Officer).

# Activity in the Coleoptera Hall

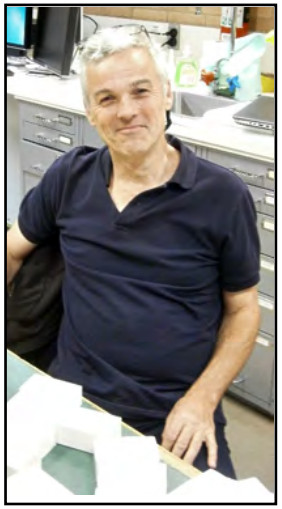

Allen Sundholm working on Buprestidae and Scarabidae.


Roger de Keyzer with Adam. They are collaborating on Prionine Cerambycidae with Mengjie.

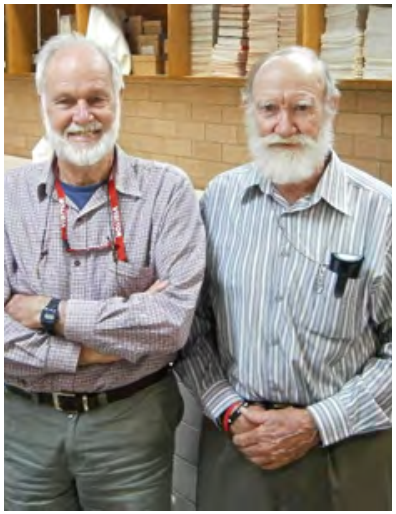

Takahiro Yoshida (Japan) doing research on Australian Silvanidae.


Zoe Mielens (ANU) comparing and documenting *Merimna atrata* (Buprestidae).


Wioletta Tomaszewska and Adam, continuing their collaboration on Coccinellidae.


Chris Reid (Aust. Mus.) working on Lucanidae, Scarabidae and Chrysomelidae.


Josh Jenkins Shaw (Copenhagen) doing research on Aleocharinae (Staphylinidae).


Geoff Monteith and Tom Weir: Dung Beetle boys.


Damien O'Connor learning about collections for the Dept of Ag. ACT.


Orlagh Billing (Work Experience Student) learning about weevils and imaging.


Mary Finlay-Doney (NT DPI) learning about Coccinellidae from Adam.


Lesley Ballantyne, depositing and curating Lampyridae for the collection.


Kip Will (Berkeley USA) Carabidae and Sloane notebooks.

# Alexander Roy, 1925–2017

Bruce Halliday

Sandy Roy first came into ANIC in October 2001. He told us that he was retired and had an interest in spiders, and he said he would like to work in the Collection as a volunteer. At that time our collection of spiders was sadly neglected, and included large accumulations of unsorted specimens donated by members of the public, students, ecologists, and other non-specialists. Sandy set to work on transferring all the specimens into standard storage tubes with correct labels, and sorting and identifying them as far as he could. In several years of dedicated work he transformed the collection from an untidy assortment of unprocessed specimens, to a properly curated and well-organised collection that is regularly used in formal taxonomic research projects.

He then did the same for our tick collection, with even more dramatic results. Before he started to work, the ANIC tick collection was an unorganised accumulation of specimens, mostly rescued from other laboratories when they closed down. Sandy spent hundreds of hours transferring all the specimens into standard tubes and racks, and preparing a detailed catalogue of over 5,000 collections of specimens. As a result the collection is now being used as a source of specimens and information for medical research into tick-borne diseases, and has formed an important component of several projects in tick taxonomy. Without his patient and dedicated work, we would not have been able to support those projects in the way we have.

Sandy then completely re-organised our mite collection, and almost single-handedly prepared a database and catalogue of mite type specimens, which will eventually be published. His appetite was still not satisfied, so he started work on sorting and organising our collections of termites and fleas, which he continued until his failing health finally made it impossible for him to continue. In the time he was in the ANIC, he donated over 11,000 hours of his time to the service of the collection, the equivalent of more than six years of full-time work.

Sandy showed an extraordinary ability to work quietly and patiently with very little supervision and to produce outstanding results. He enjoyed lively banter with the people he worked with, and his gently provocative sense of humour made him welcome in any conversation. He was a true gentleman, it was a pleasure to have him as a member of our team, and he will be sadly missed.

Sandy at work in the collection

## Vale Amar Singh

Amar Singh, who sadly passed away on Tuesday 5th Sep 2017, joined CSIRO in the 1990s as a participant in a program that was designed to give a helping hand to those who needed it. Amar suffered from epilepsy and associated life-long complications which limited his capacity for some tasks. In spite of those limitations and aided by his happy-go-lucky approach to life, Amar became a valued and respected team member at CSIRO and in ANIC. The often inglorious tasks Amar undertook for ANIC over several years ranged from de-corking a huge number of insects drawers through to ethanol top-up, field store clear-outs and much heavy lifting. While these may be considered to be menial, humble and far from glamorous, Amar was happy to get his hands dirty and was justifiably proud of his achievements to support the research groups. We will remember him fondly and miss him.

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An unusually 'woolly' litter thrips collected by Alice Wells in Borneo.