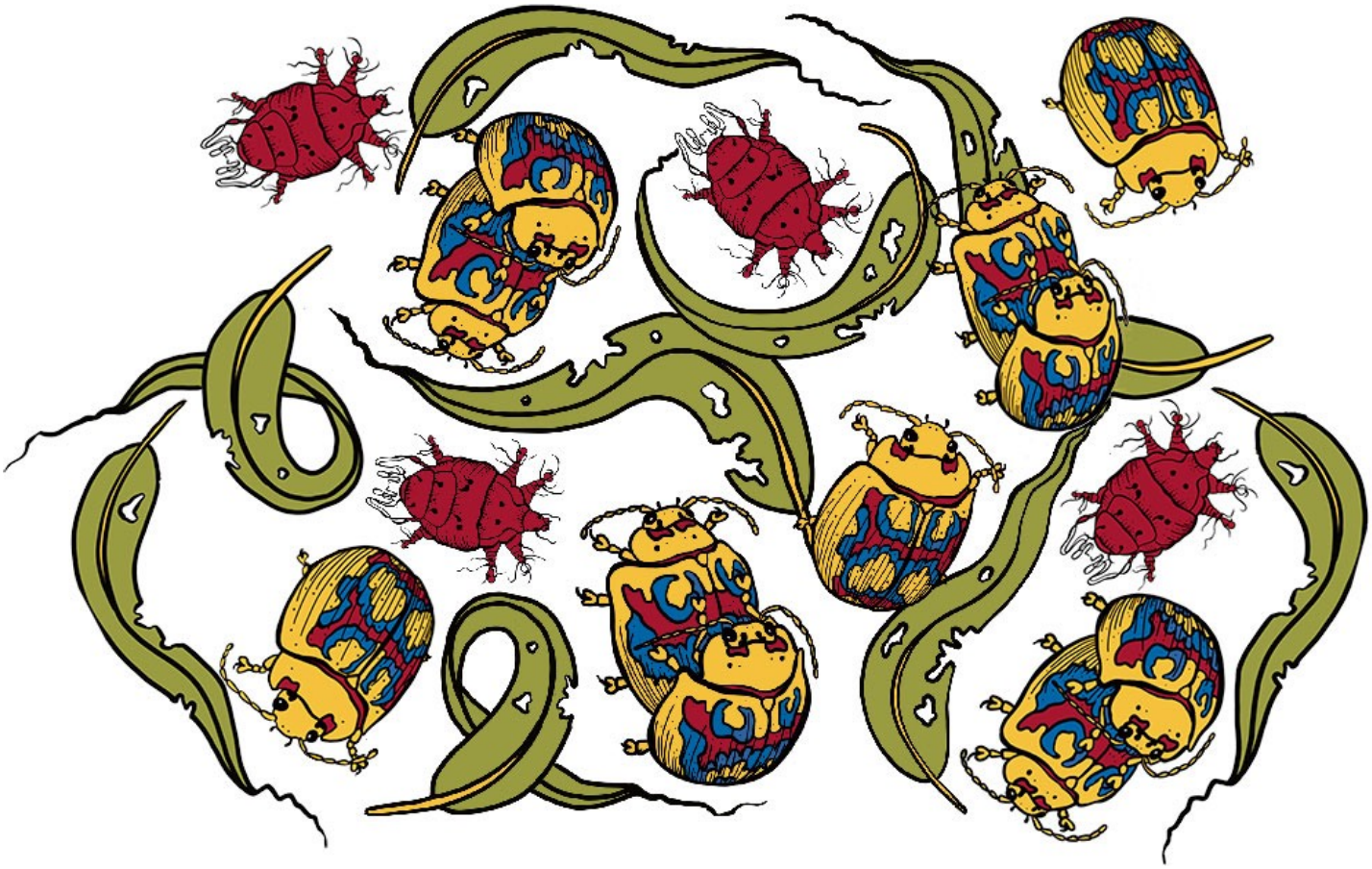
Entomological Society of Queensland

NEWS BULLETIN



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Entomological Society of Queensland

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Front cover image: "Team beetle STI" arose from a shirty science collaboration (www.shirtyscience.com) between evolutionary ecologist Dr Megan Head at ANU and artist Sophie Kristine. The artwork depicts *Eucalyptus* leaves intertwined with paropsine beetles and their sexually-transmitted mites–a fascinating system discovered and described by Dr Helen Nahrung (our 2021 President) and Dr Owen Seeman. Artwork used with permission.

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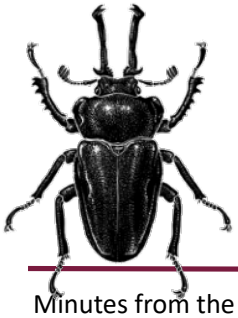

Entomological Society of Queensland
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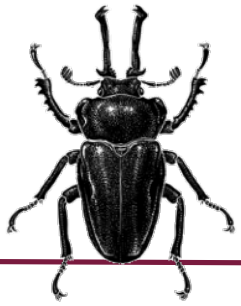
The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held on the second Tuesday of each month (March to June, August to December). Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society. Membership is open to anyone interested in Entomology. Contributions to the *News Bulletin* such as items of news, trip reports, announcements, etc, are welcome and should be sent to the News Bulletin Editor.

The Society publishes **THE AUSTRALIAN ENTOMOLOGIST**. This is a refereed, illustrated journal devoted to Entomology in the Australian region, including New Zealand, Papua New Guinea and the islands of the South Western Pacific. The journal is published in four parts annually.

EMBLEM: The Society's emblem, chosen in 1973 on the 50th anniversary of the Society, is the King Stag Beetle, *Phalacrognathus muelleri* (Macleay), Family Lucanidae (Coleoptera). Its magnificent purple and green colouration makes it one of the most attractive beetle species in Australia. Other common names include Rainbow, Golden and Magnificent Stag Beetle. It is restricted to the rainforests of northern Queensland. Emblem illustration by Sybil Curtis.



Entomological Society of Queensland
Minutes for General Meeting

Tuesday, December 14th, 2021
Virtual meeting via Zoom (remote log-in) and in person at the Ground floor Seminar Room, Ecosciences Precinct, Boggo Rd. Meeting open: 3:03pm
Attendance (60):

Members (54):

Helen Nahrung **(Chair)**, Don Sands (speaker), Ethan Briggs (speaker), Geoff Monteith (speaker), Mark Schutze (speaker), Tim Heard (speaker), Alisha Steward, Andrew Hayes, Andy Howe, Bernie Franzmann, Dawn Franzmann, Brendan Trewin, Bill Palmer, Chris Lambkin, Noel Starick, Cody Story, Colleen Foelz, Dalton Baker, David Comben, David Schlipalius, Davina Paterson, Edward Bryans, Graham Forbes, Jane Royer, Jessa Thurman, Kathy Ebert, Melissa Starkie, Mike Muller, Nadine Baldwin, Owen Seeman, Penny Mills, Richard Bull, Simon Lawson, Susan Wright, Tommi Mason, *Alexandra Glauerdt, Alison Pound, Dave Rentz, David Merritt, David Nok Yan Lam, Desley Tree, Eric Sinclair, Genevieve Dickson, Geoff Waite, Helen Schwencke, Jodie Cheesman, Jutta Goodwin, Lyn Cook, Matthew Connors, Mona Moradi, Nicole McMullen, Peter Osbourne, Stuart Lay, Tamara Taylor.

Visitors (5): Beth Fowler, Hayley Bandera, Sophie Richardo, Yuna Hernandez, *Ross Field. And one unknown affiliate.

Attendees that joined the meeting virtually are listed after the asterisks (*).

Minutes: The minutes of the last meeting were circulated in News Bulletin 49[8] November 2021. Moved the minutes be accepted as a true record: Don Sands, Seconded: Owen Seeman. Carried: All.

Nominations for membership approved by council:

Michael Haddrell

General Business:

- Thanks to Vivian who has kindly donated a lucky door prize to be won by one of our members at today's meeting.
- Calendars available to be picked up and/or purchased after the meeting.
- We will be staging a street activity space with members of BOIC at the 2022 World Science Festival in March. Details and requests for help will be sent out closer to the event (Saturday 12th March).

Main Business:
Notes & Exhibits presentations:

Don Sands - an AmAZing new book

Geoff Monteith - Unveiling the 2022 cover of *The Australian Entomologist*

Ethan Briggs - Update on the feather-leg tarantula project

Mark Schutze - Mango shoot looper, a new detection in Queensland

Tim Heard - Native bees and a new style of observation hive

Vote of thanks: Christine Lambkin.

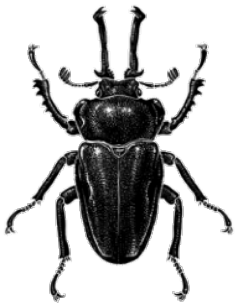
Next meeting: The next meeting is our Annual General Meeting (AGM) and Presidential Address by Helen Nahrung on 8 March. Have a wonderful Christmas and New Year everyone! Let's hope 2022 is a much more "normal" one compared with the last two we have lived through! Thanks to everyone who has joined us in-person and/or online via Zoom.

Meeting closed: 4:05pm.

ESQ President Helen Nahrung (left) with Ethan Briggs, the recipient of the 2021 Small Grant Scheme, who presented at the December meeting.

At our next meeting...

Annual General Meeting
and
Presidential Address:



An ongoing history of invasive forest insects in Australia

Presented by Helen Nahrung

Senior Research Fellow,
University of the Sunshine Coast Forest Research Institute,
working in partnership with the Department of Agriculture and Fisheries.

Above left: *Sirex* woodwasp, the most important invasive pest of pines in the southern hemisphere (photo Michael Ramsden).

Invasive forest insects have been documented in Australia since the late 1880s, and continue to arrive and establish. Some of these cause significant impacts through their costs of prevention, eradication and management, and through productivity, trade and asset losses, and environmental decline. Invasions occur across successive stages: arrival, establishment, spread, and impact, each with different mitigation measures. I will discuss the non-native forest insect species established in Australia's native, amenity and plantation trees, and timber-in-service, the manner in which they come, how they are detected after arrival, how good we are at predicting them, and some of their ongoing management issues.

Join us... *Virtually* or *In person*!

Tuesday 8th March at 1pm

Ground floor EcoSciences Seminar Room.

All welcome!

Zoom links:

Meeting ID:
89854191976
Zoom app:
https://usc-au.zoom.us/j/89854191976
Phone:
+61280152088,89854191976#
Room System:
89854191976@zoom.aarnet.edu.au

Detection of the mango shoot looper, *Perixera illepidaria* (Lepidoptera: Geometridae)

presented by Mark Schutze

Senior Entomologist

Plant Biosecurity Laboratory (QLD-DAF)

Fig. 1. Mango shoot looper larvae feeding on mango.

Fig. 2. Mango shoot looper larvae, displaying variable colour patterns.

The Plant Biosecurity Lab (Biosecurity Qld, Qld-Department of Agriculture and Fisheries) got wind of a new insect this September when specimens from Mutchilba (Far North Queensland) were submitted for identification. Caterpillars had been found in relatively high numbers in mango and were stripping back flowers and destroying young fruit (Fig. 1). The caterpillars were quite distinctive, being the typical geometrid loopers with geometric patterns on their variably coloured bodies (Fig. 2). Pupae were also found in the field and are similarly quite distinctive, possessing little 'horns' and dark lateral lines (Fig. 3). Eclosed moths were reasonably small and rather non-descript (Fig. 4). Apart from clearly being geometrids, we hadn't seen them before and got to work figuring out what they might be.

An initial literature search on geometrids and mangoes yielded a paper from 2014 on a new pest detection in India of the looper *Perixera illepidaria* (Kumar et al., 2014). Looking like a good lead, the paper went on to show photos of the culprit that displayed remarkable similarity to the specimens in hand. Superficially, they were an almost exact match. Further, the damage as described in Kumar et al. (2014) was consistent with that observed in northern Queensland, especially the type of plant material being consumed and the extent of damage inflicted on mangos, and then lychees, as Queensland detections continued.

The species was first described in 1857 as *Anisodes illepidaria*, later becoming *Perixera illepidaria* in

Fig. 3. Mango shoot looper pupae

Holloway's *Lepidoptera of Borneo* series (Holloway, 1976). Unfortunately, there is scant available on these moths for us to secure morphological confirmation by itself. Nevertheless, whilst Holloway is relatively brief in reference to this species, he does provide basic information including its distribution; that includes several southern and SE Asian/Pacific countries and some images. The closest locale to Australia, according to Holloway's distribution list, is Sulawesi.

Regrettably, the images of the moth that are available on the website are rather low resolution and are unusable to support an identification. However, the male genitalic structures are reasonably useful given the distinctive morphological characters. Despite this, however, we still needed to review other species of *Perixera* in determining this as likely *P. illepidaria* or a possible native congeneric.

According to available records, such as the Atlas of Living Australia, we found fourteen species of *Perixera* known from Australia that were not listed by Holloway. Three of these were synonyms of species listed in Holloway. Holloway himself provides a total

Fig. 4. Mango shoot looper adult

of 36 species, including five from Australia. All up, we found 19 species known from Australia. The next question: how do we know it's not one of them?

An examination of Holloway's male genitalic images revealed quite distinctive variation from species to species, lending confidence that if we have a close match between our specimens and those of *P. illepidaria* by Holloway then we're on the right track for an identification. And indeed, dissected male moths revealed that distinctive characters as shown in Holloway's images aligned very closely with our moths (Fig. 5); and were very different from, for example, dissected '*Anisodes sp.*' that we have in the Queensland Primary Industries Insect Collection (QDPC). Another tick in the box of an identification, but we weren't done yet. Surely DNA would hold the final key!

Well, DNA data is only as good as the databases available. Unfortunately, Genbank does not have any sequences for this species, with the closest match (93.01%) being *Perixera griseata*; sufficient to support generic identification, but not so to species level, alas. The Barcode of Life Data Systems Database (BOLD) also contains *Perixera* sequences, but none for *Perixera illepidaria*… or does it?

Curiously, a BOLD search using *COI* sequence data generated from our specimens yields a perfect (or near perfect) match for no less than three accessions. These are, regrettably, only identified as far as genus with one specimen possessing the species code 'MS01'. Being Early-Release/Private data, access to information is limited. Yet, from what we can see, these specimens were collected some years ago. Images of the moths collected certainly resemble our

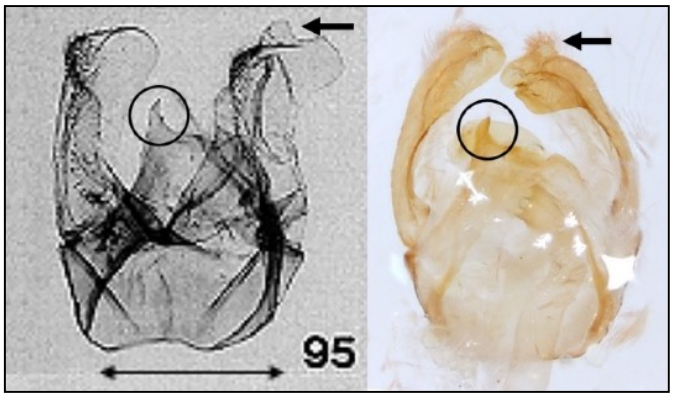


Fig. 5. Comparison of male genitalic structure of *P. illepidaria* from Holloway against the dissected genitalia from suspect mango shoot looper specimen received by the Plant Biosecurity Laboratory.

target, and they were collected from the general region from which *P. illepidaria* is known. Indeed, one record is even closer to Australia than previous records with at least one specimen collected from West Papua. The specimens are housed in the Bavarian State Collection (Germany), and yes – before you ask, we have made contact to request they confirm their specimens with morphology (if male specimens). We await their reply.

With all of this now in hand, we are sufficiently confident that, based on available evidence, what we are dealing with is the mango shoot looper.

Where are we now?

So far we've not found it further north of Cairns or south of Cardwell. Most identifications are now being managed by AgriScience Queensland as the response has moved from biosecurity detection to one of in-field management as it's deemed not technically feasible to eradicate by the National Consultative Committee on Emergency Plant Pests so we here at the PBl are no longer receiving many specimens. Of those we have identified, however, they were collected from Dimbulah, Mareeba, Mutchilba, East Trinity, Biboohra, Tolga, Walkamin, and Kennedy.

As for food plants, mango and lychee are clearly the main hosts, but close relatives such as rambutan may potentially emerge as hosts so we're keeping an eye out on those as well. There appears to be evidence of resistance to some pesticides, but others are being deployed that are having some effect, the specifics of those I shall not go into details here, other than to direct interested parties to my AgriScience colleagues who have the most up-to-date information on that front as they manage the pest on the ground.

Finally, this may not be a new arrival. Based on reports, we have heard that some growers have seen this looper for the last six years. The reason why it's not been brought to our attention remains unknown to me, other than people perhaps thinking it was 'just another pest caterpillar' in the landscape, possibly even a native species. This reinforces the need to keep a keen eye open for anything that looks different or new and to report it to be sure.

If indeed these observations are true and it has been here for at least the last few years, then we may at least take solace in that it has not distributed further afield (as far as we know) and may, indeed, remain relatively localised given the implementation of management practices. We shall see.

In finishing up, we encourage anyone who finds suspect caterpillars, pupae, or moths outside of this geographic range (north of Cairns/south of Cardwell), and especially if associate with lychee or mango, to contact one of the hotlines: Biosecurity Queensland (13 25 23) or the Emergency Plant Pest Hotline (1800 084 881).

I acknowledge Justin Bartlett (PBL Senior Entomology Technician, Qld-DAF) for his work on the initial identification of this pest, and Dr Ian Newton (Senior Entomologist, Tropical Fruit Production Systems, Horticulture and Forestry Science, Qld-DAF) who provided the specimens and is playing a lead role of in-field management of this pest. Justin and Ian also provided photos, other that the image from Holloway (Figure 5).

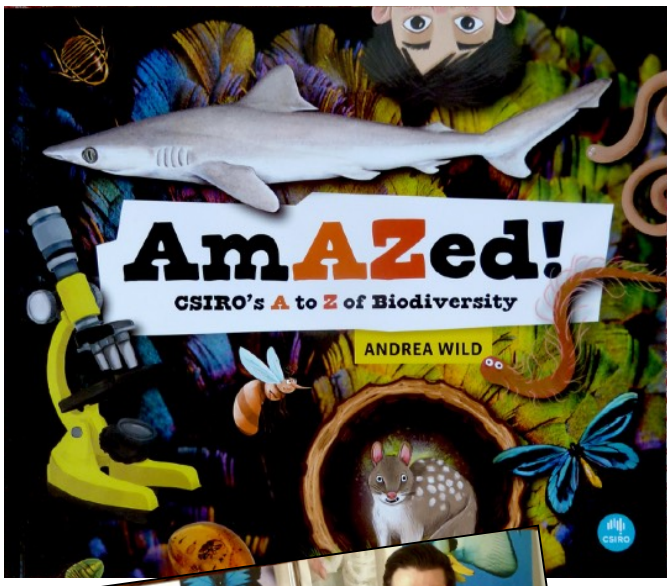
References

Holloway, J.D. (1976). *Moths of Borneo with special reference to Mt Kinabalu*. Malayan Nature Society, Southene Sdn Bhd, Kuala Lumpur, Malaysia. http://www.mothsofborneo.com/part-10/cosymbiini/cosymbiini_6_14.php. Accessed September 2021.

Kumar, V., Reddy, P. V. R., Anal, A. K. D., & Nath, V. (2014). Outbreak of the looper, *Perixera illepidaria* (Lepidoptera: Geometridae) on litchi, *Litchi chinensis* (Sapindales: Sapindaceae)-a new pest record from India. *Florida Entomologist*, *97*(1), 22-29.

An Alphabetical Introduction to the Importance of Biological Reference Collections: A Book for (? Young) students

Presented by Don Sands



This is a delightfully produced and illustrated book, intended mainly for students becoming interested in biodiversity, with a focus on the role that collections (e.g. CSIRO's collections) contribute to understanding species, identities, interactions, and their importance to humans and the environment. The publishers (CSIRO Publishing) say this soft covered book is *"Packed with fabulous facts about plants, animals, microbes, and the scientists who study them"*, and I was pleased to see the invertebrates scored so well in the texts and with illustrations! Animals and their topics are treated alphabetically. The book is written by Andrea Wild, a science writer with CSIRO's National Research Collections (including ANIC) in Canberra. Andrea writes articles and press releases on the importance of collections, and the roles of skilled taxonomists for understanding the significance of Australian insect biodiversity.

At $29.99 this book is a bargain and will be of interest for many, well beyond the students !!!

https://www.publish.csiro.au/book/7984

Cover Art of our ESQ Journal, *Australian Entomologist*

By Geoff Monteith
Queensland Museum

The Society's scientific journal, *Australian Entomologist*, starts each year with a new volume number and that for the new year of 2022 will be Volume 49. This means that in the following year of 2023, the year of our big celebrations for the 100th Anniversary of the Entomological Society of Queensland, the *Australian Entomologist* will have its 50th Anniversary. So, two big birthdays for the Society in 2023!

Each volume of the journal has a scientific-quality insect illustration on the cover which lasts for the four issues of that year, and we have tried to use images from as many talented artists as possible over the years. I'm pleased to announce that the artist chosen for 2022 is Tommi Mason (Fig. 1), an undergraduate student doing entomology at the University of Queensland. The insect she has chosen is a local stag beetle, *Ryssonotus nebulosus* (Kirby, 1814). Hers is a digital image which Tommi created from a source photograph using the Procreate® program on an iPad. She describes the technique as layering blocks and shapes of darker to lighter colours, refining details with each new layer and adding the last details using various types and sizes of digital brushes. It has produced a spectacular result (Fig. 2)!

The stag beetle, *Ryssonotus nebulosus* (Kirby, 1819), is common along the east coast of Australia from Victoria to the Queensland Wet Tropics. It breeds in dead wood with white rot fungus, often in suburban parks and gardens in Brisbane and flies readily to light. Its distinctive velvety mottling on pronotum and elytra make it easy to recognise. Previously there were several species in genus *Ryssonotus* but since a recent review of the genus (Reid & Beatson, 2016) all the other species have been moved to a new genus *Safrina* leaving *R. nebulosus* as the only species in *Ryssonotus.* One from my garden in St Lucia, photographed in the 1970s by Owen Kelly, shows it in life (Fig. 3).

The cover of *Australian Entomologist* has evolved over the years. It was commenced in 1972 under the name, *Australian Entomological Magazine,* as a private business operation by Max Moulds, then in Sydney, and he operated it under that name for 16 years.

Fig. 1. Tommi Mason with her image for the 2022 volume of *Australian Entomologist*. Photo: K. Ebert.

Fig. 2. Tommi Mason's digital image of a male *Ryssonotus nebulosus*.

Fig. 3. A living male *Ryssonotus nebulosus* from a Brisbane backyard. Photo: O. Kelly

Fig. 4. A selection of cover images from past issues. The first issue in 1972 is at top left.

Through those years it had a pink, lightweight cover, made to resemble the well-known British journal, *Entomologists Monthly Magazine.* Greg Daniels, the current Editor of *Australian Entomologist,* designed that first cover layout. It used an image of the famous primitive cicada, *Tettigarcta crinita* Distant, 1833 drawn by Se Pyong Kim, an artist/dipterist then working for David McAlpine at the Australian Museum. The choice of a cicada obviously reflected Max's passion for the group.

In 1988, Max generously gifted the journal to our Society and the first ESQ editor was Don Sands who gained some advice from CSIRO Publications for its new design. This resulted in changing its cover to the heavier weight bright yellow stock we still use. Sybil Curtis upgraded her original 1973 design of the Society's logo, another stag beetle, *Phalacrognathus muelleri,* for use as the cover insect and that was used for 1988 and 1989, after which we have changed the cover insect every year until now.

When Kevin Lambkin, then at the Queensland Museum, became Editor in 1993, a decision was made to change the journal's name to *Australian Entomologist,* partly to reinforce the fact that it was a refereed scientific journal and not a "magazine". This was the opportunity to redesign the cover and a more modern and professional layout was prepared by Paul Ramsden (brother of ESQ member, Michael Ramsden) of the Queensland Museum's Publication Graphics Department. This allowed for a special insect illustration to be the centrepiece of each year's cover, while incorporating Sybil Curtis's ESQ logo insect as a repeated image in the border design. This design has remained up until present day.

We have tried to feature many of Australia's top insect artists, and over the years, 30 different artists have had their work on the cover (Fig. 4). Some of them have contributed more than once with Geoff Thompson from the Queensland Museum heading the list with no less than 10 covers. Others who have contributed more than one cover design are Albert Orr (5), Andrew Atkins (3), Sybil Curtis (2) and Alan Westcott (2). We thank them all.

I wonder what insect will grace our Volume 50 cover in 2023, and who will be the artist?

Reference

REID, C.A.M. and BEATSON, M. (2016). Revision of the stag beetle genus *Ryssonotus* MacLeay (Coleoptera: Lucanidae), with descriptions of a new genus and three new species *Zootaxa* 4150 (1): 1–39.

A comparison of the Australian Stingless Bee genera *Tetragonula* vs *Austroplebeia*

By Tim Heard
Sugarbag Bees

At the December 2020 meeting, I demonstrated two observation hives giving distinct views of a nest of the native stingless bee, *Tetragonula carbonaria*. At this Dec. 2021 meeting, I compare the nesting biology of the two genera of Australian stingless bees *Tetragonula* vs *Austroplebeia*, using a flat observation hive divided into two, and stocked with a colony of each species *Tetragonula carbonaria* and *Austroplebeia australis* (Fig. 1). The observation hive is a flat structure compressed in the horizontal plane with a large clear observation window on the top side. These design features provide enhanced opportunities for observation of nest structures and bee behaviour.

The two genera occupy similar distributions on the northern and east parts of Australia except that *Austroplebeia* seem to prefer less humid inland areas where they often occur in high densities. *Tetragonula* proliferate in higher rainfall areas.

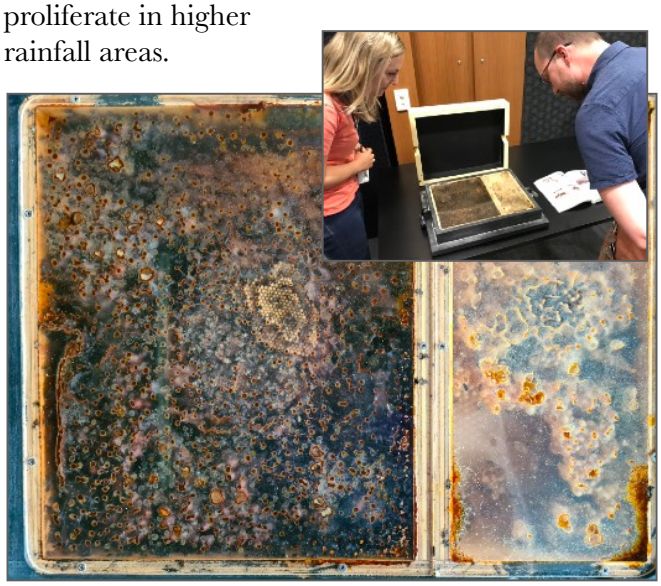


Fig. 1. A flat observation hive containing a nest of *Tetragonula carbonaria* on the left and *Austroplebeia australis* on the right. Inset: Mark Schutze and another member examine the different nest structures in the flat observation hive exhibited at the Notes & Exhibits meeting.

Molecular systematic techniques provide strong evidence that the two genera have different biogeographical origins: *Austroplebeia* from Africa and *Tetragonula* from Asia. These two clades are deeply divided and are estimated to have separated more than 70 million years ago. Consequently, there are striking differences between the two genera, including aspects of their nesting biology, many of which can be observed in the observation hives (see Table 1).

The heavy use of plant resins in the propolis building material of *T. carbonaria* gives the nest of this species a dark colour and sticky texture. This contrasts with the dominance of wax in *A. australis* on the right which shows a light colour and waxy texture (Figure 1).

The nest entrance of *T. carbonaria* is always open while that of *A. australis* is closed by the guards at night (Fig. 2).

The brood cells of the two genera also differ in several aspects. Those of *T. carbonaria* also open upwards while those of *A. australis* open in any direction (Fig. 3).

Fig. 2. The nest entrance of *A. australis* is closed at night.

Fig. 3. The brood cells of *T. carbonaria* open upwards (left) while those of *A. australis* open in any direction (right).

	Tetragonula	*Austroplebeia*	More information
Number of species	6 known	5 known	Table 7-2
Biogeographic origin	Asian	African	Chapter 6
Distribution	In Australia and Asia	Endemic to Australia and New Guinea	Chapter 6 and Figure 7-3
Climate	Mainly in high-rainfall areas	In both high- and low-rainfall areas	Figure 7-3
Body colour	Black head and thorax	Black with pale markings on face and thorax	Figure 7-4
Back edge of thorax	Projecting	Rounded	Figure 7-4
Inside tibia of hind leg	Hairy ridge narrow	Hairy ridge broad	Figure 7-5
Nest construction materials	Heavy use of propolis	Light use of propolis, liberal use of wax	Figure 7-6
Nest entrance	Always open (but see *T. sapiens* and *T. clypearis)*	Closed at night and other periods of inactivity (but see *A. cincta*)	Figure 7-7 (see exceptions in text)
Brood architecture	Variable: regular comb, semi-comb or cluster	Cluster (but see *A. cincta*)	See images in species sections below
Brood cell orientation, shape and position of opening	Vertical, larval cells and cocoons oval, always open on top.	Irregular, larval cells spherical, cocoons oval, open in any direction: upwards, sideways, or downwards	For *Tetragonula* see: Figure 7-11 and Figure 7-15. For *Austroplebeia* see: Figure 7-8, Figure 7-9 and Figure 7-37
Laying of eggs by workers	No	Occasionally	Read more in Section 3.3.3 Worker reproduction

Table 1. A summary of the differences between the two general of Australian stingless bees. From the Australian Native Bee Book, www.nativebeebook.com.au

Testing the species limits of the Queensland feather-leg tarantulas

Ethan Briggs
PhD Candidate at The University of Queensland
& 2021 ESQ Small Grant Recipient

I was very lucky to be awarded the 2021 ESQ Small Grant to help complete one of my PhD chapters, and I am sincerely grateful to the ESQ for this award. My PhD research is focused on Australian tarantula biogeography, phylogenomics and systematics. Tarantulas are one of the most widespread mygalomorph spider families, being found across all continents (except Antarctica) with currently over 1000 described species.

In Australia, tarantulas are often referred to commonly as whistling, barking or bird-eating spiders, but all are placed within the tarantula family, Theraphosidae.

Tarantulas are widespread throughout the Australian continent, found in harsh arid areas to monsoon tropical regions, only being excluded from the South-eastern and Southern margins of the continent. To date, there have only been ten species described in Australia, with six remaining recognised/uncontested. This makes Australia relatively species-poor when compared with neighbouring regions such as Asia, with more than 150 species. Given that

Australian tarantulas have not been revised, it is possible that there are many more species than currently described.

The group I am focusing on for this project is the Queensland feather-leg tarantulas (Fig. 1) and as of February 2022, only a single species within the feather-leg genus is recognised, *Selenotypus plumipes,* Pocock 1895. While *S. plumipes* was described from the Townsville region, several morphologically differentiated and geographically disjunct populations have been observed throughout much of Queensland. The finding of these populations plus a lack of systematics revision of *Selenotypus* leads to the hypotheses that each of these disjunct populations may be a distinct and undescribed species. Hereby, I look to test the species limits of the Queensland feather-leg tarantulas and subsequently describe any new species that are found.

Fig. 1: *Selenotypus plumipes*, its characteristically 'plumose' 4th pair of legs.

To test these putative species, widespread sampling has been undertaken, collecting samples from Cape York, the Queensland Outback and of course, the type locality of *S. plumipes.* Sampling tarantulas is often easier said than done, with most species being found deep underground, only being given away by their burrow entrance (Fig. 2). Upon completion of these field trips, specimens from several differentiated populations were collected, spiders notably varying in habitat type, plumosity, colour and size.

Once sampled, specimens were brought back to the University of Queensland for DNA extractions and PCR amplification. I am using independent genetic data including sequences from both mitochondrial and nuclear loci to test if these populations are reproductively isolated or distinct biological species. If populations are reciprocally monophyletic across independent loci, it can be inferred that there has been no recent gene flow. Alternately, if populations share the same genetic sequences across different populations, this suggests contemporary connectivity.

Fantastically, several of these populations have been found to be genetically distinct across all 3 independent loci, therefore are likely to be undescribed species rather than population level variation with *Selenotypus plumipes*!

Fig. 2: Burrow entrance of a *Selenotypus* species.

President's Annual Report 2021

—Helen Nahrung

2021! – A year that went simultaneously VERY FAST and yet it seems like three years since last February! I'd like to think we hit our stride with COVID, grappling with social distances, masks on-masks off in in-person meetings, the resumption of afternoon tea (yay!), a remote meeting by choice (our first live international speaker from an international venue!), and a remote meeting by COVID. COVID de-railed our initial Perkins plan and we remain eternally grateful to Myron Zalucki who stepped in and up, and gave a wonderful Perkins address attended by a record-breaking 129 members and guests! And of course, our Perkins dinner, organisingly-committeed by Mark Schutze, Kathy Ebert and Penny Mills, and held at Women's College – unfortunately capped at 50 but a special night nevertheless! Jim Thompson, Chief Executive Officer of the Queensland Museum was a special guest at the dinner, giving an excellent precis of entomology in Queensland ahead of ESQ's Centenary…

…which is now NEXT ACTUAL YEAR!! (woah, right?!) The Centenary Sub-committee, chaired by Tim Heard, in conjunction with the Queensland Museum, has worked hard this year planning some awesome events – get your diaries (I mean, ESQ calendars) – ready! And yes, talking of calendars – we ran our now-traditional photographic competition with record entries, and a truly beautiful (and sold-out!) calendar – thank you to Kathy and Melissa for coordinating that.

Despite, again, some event cancellations, we maintained our links with like-minded clubs, including Butterflies and Other Invertebrates (BOIC) with whom we have a joint World Science Festival event planned next month (must I write "COVID-willing"?!), the Queensland Science Network, and became members of the Queensland Water and Land Carers. We are looking forward to Bug Catches in the next year. And talking of catching bugs (not COVID!), our collecting permit – another membership privilege—expired and is still under renewal – a thousand thanks to Christine Lambkin for her **indefatigable** work as our Permits Officer and the service it provides to our membership.

As well as opening up our general meeting attendance by Zoom, ESQ members also receive an electronic copy of the *Australian Entomologist* as part of their subscription – and many thanks to Susan Wright, Business Manager, and Greg Daniels, current Editor, and the rest of the editorial committee for some truly epic issues. And our very own *News Bulletin* (complete with its "cover that's meant to represent the President" – I guess "colourful and slightly smutty" is fitting, after all) – thanks again to Kathy Ebert for her tireless enthusiasm in compiling it so artfully!

Thank you to all of our speakers for an excellent diversity of talks and topics and tales! I loved all of them – and the accompanying wonderful write-ups in the bulletin! And congratulations again to our Award winners this year: Elodie Tanner for her Student Award, and the 2021 Small Grant Scheme recipient, Ethan Briggs, both of whom gave excellent presentations in the June and December Notes and Exhibits meetings, respectively.

ESQ council meetings were likewise a mix of Zoom and live, and I thank everyone for their patience with my more-than-occasional screw-ups of procedure and technology, and their valued role on council: Past President Mark Schutze and super-Secretary Penny Mills who know the Constitution and By-Laws almost as well as I remember Elizabeth Exley knowing them when I was on Council back in the mid-1990s! Thanks to Mike Muller, Brendan Trewin, Vivian Sandoval (ret.) and Melissa Starkie as general councillors, Andrew Hayes as Vice-President, and Bill Palmer as our excellent holder of the purse-strings as Treasurer.

Vivian and her Bugs and Beads shop (https://www.bugsandbeads.com/) continued generously donating gifts, lucky door prizes, and a proportion of online sales to the society – thank you, Vivian!

Lastly, but most importantly, I would like to sincerely thank all the ESQ members for their involvement and participation in the Society and its events – I hope I am as vibrant and engaged as the Society when I'm about to turn 100, too! In closing, I wish the Council and especially the incoming President of 2022 all the very best for a smooth and productive year ahead!

~Helen

Brendan Trewin wins the lucky door prize at the December meeting: a canvas insect bag filled with an insect colouring book, cockroach soap and insect colouring pencil kit (see below), compliments of Vivian Sandoval at Bugs & Beads.

2022 ESQ Small Grants Scheme - up to $2000

The Small Grants Scheme is available each year to support entomology related projects up to $2000. Applicants must be members and projects must be undertaken in Australia. Preference is given to stand-alone projects rather than top ups to existing projects. Proposals must be submitted by April 30, 2022. Successful applicants will be notified in June in order to start their project in July. Recipients are required to provide a one-page report on the project midpoint and a presentation at a Notes & Exhibits meeting is encouraged but not required. A written summary of research findings and project outcomes is also encouraged. More details and application form available on the society website: https://www.esq.org.au/awards.html

Submissions now open for: 2022 ESQ Student Award

Did you finish up your Honours Degree this year? Is your project entomology related? You can apply for the ESQ Student Award! Applications for the $500 Student Award are now being accepted. All you need to do is send us a copy of your Honours thesis before April 2022. You don't need to be a member to apply. Submission forms are available on the website - Check it out!!

https://www.esq.org.au/awards.html

Secretary's Annual Report for 2021

Attendance at Council Meetings: The 2021 Council met 10 times from the March AGM to February 2022. Due to COVID-19 circumstances, the August Council Meeting was held online via Zoom. At other Council Meetings in 2021 councillors were able to attend in-person or via Zoom. Attendance by council members (Mar-Feb) is provided in Table 1.

Table 1. Attendance record for ESQ Council Members in 2021 (March 2021–February 2022). Additionally, Tim Heard (ESQ2023 subcommittee Chair) and Christine Lambkin (Permit Officer) attended four meetings and two meetings respectively. Gary Fitt was out-going Past President for the March Council Meeting prior to the AGM before stepping down from Council in 2021 (not recorded in Table 1). Shannon Close was an outgoing Councillor and was unable to attend the March Council Meeting. Vivian Sandoval resigned from her position of Councillor in July and was replaced by Melissa Starkie in September.

Position	Name	Attendance
President	Helen Nahrung	10
Vice President	Andrew Hayes	8
Past President	Mark Schutze	9
Secretary (& Assistant News Bulletin Editor)	Penny Mills	10
Treasurer	Bill Palmer	9
Australian Entomologist Business Manager	Susan Wright	9
New Bulletin Editor	Kathy Ebert	10
Councillor	Mike Muller	10
Councillor	Vivian Sandoval	2
Councillor	Melissa Starkie	5
Councillor	Brendan Trewin	9
ESQ Centenary Subcommittee Chair	Tim Heard	4
ESQ Permit Officer	Christine Lambkin	2

Membership: Council approved 36 new membership applications between January and December 2021 (21 general; 12 student; 3 joint). This was a bit lower than the number of new members approved last year. Our new student members include tertiary and secondary students from: UQ (10), Lincoln University, New Zealand (1), North Lakes State College (1). One membership application was declined due to the unreasonable request of free membership for a non-student member. Twenty-nine memberships were terminated (ten requested terminations and three deceased). At end of 2021, the total number of ESQ members was 419.

Student award: One student award submission was received and judged by Helen Nahrung (Chair), Bill Palmer and Simon Lawson. The winner was **Elodie Tanner** (UQ; Supervisor: Michael Furlong) for her thesis on**:** *The effect of herbivory on Diamondback Moth host-plant selection: Implications for trap cropping*. Elodie presented her thesis at the June 2021 Notes and Exhibits and the accompanying article in the *News Bulletin* Vol. 49 (4).

Small Grants Scheme: Five applications for the 2021 SGS were received by the Secretary. The judging panel of Helen Nahrung (Chair), Andrew Howe, and Brendan Trewin selected **Ethan Briggs's** proposal titled: *Testing the species limits of the Queensland feather-leg tarantulas Theraphosidae:* Selenotypus *Pocock 1895*. Ethan gave an excellent summary of his project at the December Notes and Exhibits meeting. Hopefully our previous year's winner, Ethan Beaver, will be able to travel to Queensland for field work in 2022 and we will be able to hear more about how his project is progressing.

General Meetings were scheduled as hybrid events (face-to-face at the Ecosciences Precinct in Dutton Park and via a Zoom link). Due to COVID restrictions, our August meeting was fully virtual. However, we were able to have some sort of normalcy return to our general meetings and were able to offer afternoon tea and biscuits at most of them (observing the social distancing regulations of course!) We also had our biennial Perkins Memorial Lecture, which was presented by Emeritus Professor Myron Zalucki. It was a record-breaking attendance with a whopping 129 people tuning in to hear Myron, either in person or via Zoom. Our previous attendance record was 77 for Prof. Madeleine Beekman's 2017 Perkins Memorial Lecture. The record-breaking attendance was on the back of 80 people tuning in to listen to Myron virtually. We had 49 people attend in-person, which was also fantastic, given the COVID-19 room restriction caps that were in place at the time. Speakers, titles, and attendance records are listed in Table 2. We had a slight increase in average member attendance from 2020 (51.3 participants vs 50.4 participants), thanks, in part, to our continuation of our hybrid Room 'n' Zoom meetings. Our overall average attendance was slightly lower in 2021 compared with 2020 (61.1 vs 61.4).

Table 2. Details of 2021 ESQ General Meetings (Mar–Dec), including month, type of presentation (if different from general presentation), speakers, titles, and attendance records for ESQ members and visitors. Due to COVID-19 restrictions, the August General Meeting was a virtual-only event.

Month		Speaker	Title	# Members attended: total(online)	#Visitors attended: total(online)	Un-determined	total attendees (online)
Mar	Presidential Address	Mark Schutze (DAFQ)	Names matter: robust systematics = stable taxonomy = accurate diagnostics	48(29)	2(1)	3(3)	53(33)
Apr		Andy Howe (USC)	*Harmonia axyridis*: the gift that keeps on giving	43(19)	1(1)	1(1)	45(21)
May		Toni Withers (SCION)	Australian paropsine beetles and their biocontrol across the ditch	32(13)	4(4)	0	36(17)
June	Notes and Exhibits	Elodie Tanner (student award)	The effect of herbivory on Diamondback Moth host-plant selection: Implications for trap cropping	61(32)	2(1)	0	63(33)
		Chris Burwell (QM)	Dragonflies and damselflies of Karawatha Forest and Yugarapul				
		Jessa Thurman (UQ)	Myths of the giant wood moths				
		Jodie Cheesman (DAF)	It's a bird, it's a plane … no, it's a flying prawn!				
Aug		Di Taylor (DAF)	Prospects for the biological control of bellyache bush and prickly acacia	(53)	(6)	0	(59)
Sept		Chris Moeseneder (CSIRO)	An integrative approach to understanding the Australian flower beetles	48(28)	1(1)	0	49(29)
Oct	Perkins Lecture	Myron Zalucki (UQ)	Challenges for insect conservation management and pest management: have we asked the right questions?	77(40)	48(36)	4(4)	129(76)
Nov		Austin McLennan	The scientific effort underpinning current efforts to eradicate Fire Ants from Australia	46(18)	10(2)	0	56(20)
Dec	Notes and Exhibits	Don Sands	AmAZing (new book from CSIRO)	54(19)	5(1)	1(1)	60(21)
		Geoff Monteith	Unveiling of the 2022 cover of the *Australian Entomologist*				
		Ethan Briggs	An update on feather-legged tarantulas				
		Mark Schutze	Mango Shoot Looper, a new detection in NQ				
		Tim Heard	Native stingless bees				
			Average attendance	51.3	8.8		61.1

Perkins Memorial Dinner: Our third Biennial Perkins Memorial dinner was graciously hosted by Women's College at the University of Queensland in October. Thanks goes to the Chair of the Perkins Dinner subcommittee, Mark Schutze, for pulling off a fantastic night with great food, excellent speeches, and wonderful entomological displays.

Acknowledgements: Thanks to all of Council for another fantastic year, which saw our hybrid meetings continue with great online participation from our members. Thanks to Vivian for her contribution to Council since 2019, and for Melissa for taking on the role of Councillor in the later half of the year when asked. It was another challenging year faced by everyone, and I think we met these challenges head-on and came out the other side relatively unscathed. I look forward to continuing my service with the ESQ as we approach one of the most important and largest event for our Society: our Centennial celebrations in 2023.

Penelope J. Mills
ESQ Secretary

Treasurer's Annual Report For Financial Year 2021

To get a complete picture of the financial position of the Society, members must also read the financial information contained in the report for the *Australian Entomologist.* It is my strong, considered opinion that the financial status of the Society would be better presented in one statement for the benefit of members, the Council, funding bodies and any regulatory bodies.

Overall, the financial situation for the Society is very sound indeed. When we consider the Society as a whole, we have some **$54,829.58** in assets over our liabilities. However we are anticipating considerable, unusual expenditure over the next two years in relation to events to be held for our centenary in 2023.

The general account operated by the Treasurer showed a small decrease of $156.86 for the year after allowing for a $3,000 investment in term deposits. The increase in membership fees came into effect in 2021 and contributed to that very satisfactory result.

ESQ has 419 financial members. There were some 36 new memberships approved by Council which is an indication of the good health of the Society. Some 29 memberships were terminated by resignation, death or by falling two years behind in their subscription.

Interest rates on term deposits remain at historically low levels and are likely to remain low for some time.

The printing and postage of our News Bulletin remains a major expenditure ($4,252.70).The customary small grant award ($2,000) and Student Award ($500.00) were made but the Student Award winner chose not to deposit her cheque before December 31st. A contribution towards production of the Journal of $2500 was also made. Calendar sales more than covered production costs and the Perkins dinner did not incur significant expenditure over ticket sales.

A very satisfactory outcome was achieved for properly insuring the Society. I have been concerned for some time that our insurance coverage was inadequate for all contingencies. This year we were able to become a member of Queensland Water and Land Carers. This entity fully insures all its members with no annual insurance premiums required. The Society is for the first time in its history therefore fully and appropriately insured and at no cost to the Society.

Bill Palmer
Treasurer
Entomological Society of Queensland
28th Jan 2022

Nominations for ESQ 2021 Office Bearers

The following nominations were received by the Secretary before closing date of January 25th:

President: Andrew Hayes. *Nominated by* Helen Nahrung, *Seconded by* Simon Lawson
Vice President: Ross Wylie. *Nominated by* Helen Nahrung, *Seconded by* Simon Lawson
Secretary: Penelope Mills. *Nominated by* Lyn Cook, *Seconded by* Ethan Briggs
Treasurer: Bill Palmer. *Nominated by* Helen Nahrung, *Seconded by* Andrew Hayes
Councillor: Brendan Trewin. *Nominated by* Penny Mills, *Seconded by* Helen Nahrung
Councillor: Melissa Starkie. *Nominated by* Bill Palmer, *Seconded by* Andrew Hayes
Councillor: Mike Muller. *Nominated by* Penny Mills, *Seconded by* Andrew Hayes
News Bulletin Editor: Kathy Ebert. *Nominated by* Brendan Trewin, *Seconded by* Bill Palmer
Australian Entomologist - Business Manager: Susan Wright, *Nominated by* Helen Nahrung, *Seconded by* Penny Mills

Annual Report - 2021
FINANCIAL STATEMENT FOR THE *ENTOMOLOGICAL SOCIETY OF QUEENSLAND*
JANUARY 1 TO DECEMBER 31 2021

ASSETS	$	LIABILITIES	$
CBA Cheque Account (00901185) Closing Balance	$ 13,208.64	Subs in advance (2022)	$ 3,492.00
CBA Term Deposit (50113582)	$ 8,000.00	Subs in advance (2023)	$216.00
CBA Term Deposit (50122237)	$ 8,000.00	Outstanding CHQ for Student Award	$500.00
Stationary (Printed envelopes)	$ 75.00		
Unsold past issues of Beetle Brochures 378 @ 3.84 ea.	$ 1,451.52		
TOTAL	**$30,735.16**	TOTAL	**$4,208.00**

Excess Assets over Liabilities **$** **26,527.16**

INCOME	$	EXPENDITURE	$
Beetle Brochures	409.88	Administration costs	289.34
Calendar Sales	1,130.70	*Australian Entomologist*	2,500.00
Membership Fees	12,840.01	Merchant Bank Fees	192.24
Bugs and Beads	29.50	Postage (Bulletin)	1,658.90
Perkins Dinner Tickets	3,470.00	Printing costs (Bulletin)	2,593.80
Donations	–	Calendar expenses	781.05
Bank interest - Term Deposits	52.68	Insurance expenses	460.00
		Perkins Dinner expenses	4,219.30
		Professional fees	275.00
		Small Grant Award	2,000.00
		Student Award	–
		Term deposit transfer	$3000.00
		Web Page maintenance	120.00
TOTAL	**$17,932.77**	TOTAL	**$18,089.63**

Net Trading Profit / (Loss) **$** **(156.86)**

I Certify this is a true and accurate financial statement of the *Entomological Society of Queensland* for the period 1 January 2021 to 31 December 2021.

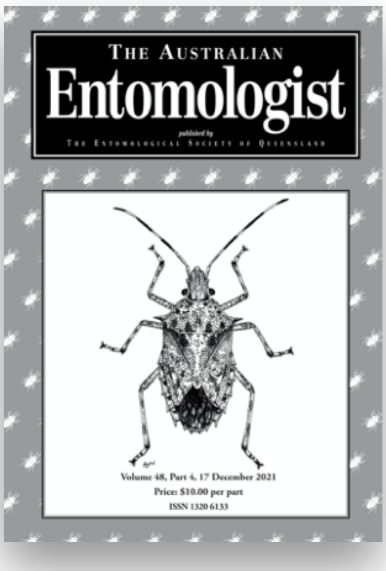
Bob Miller FIPA, FFA, JP (Qual)
Independent Accountant
20 Jan 2022

ANNUAL REPORT 2021
FINANCIAL STATEMENT FOR THE *AUSTRALIAN ENTOMOLOGIST* – JANUARY 1 TO DECEMBER 31, 2021

Assets		**$**		**Liabilities**		**$**
CBA Chq A/c 00908915						
Closing Balance		12,072.06		Subs in Advance (2022)		3,330.00
					O/S	
Term Deposits				Graphic design	Chq449	500.00
Bank Aust A/c 307023174		11,634.37		for Vol 48-4 Brochures		
Bank Aust A/c 307023175		4,191.73			O/S	
Bank Aust A/c 138340573		5,721.04		Printing Costs	Chq448	2,383.70
				for Vol 48-4 Publication		
Stationery					O/S	
(Printed Envelopes)		25.00		Postage - Vol48-4	Chq450	574.76
				Stationery	Chq451	40.07
Unsold past issues					O/S	
(Aust Entomol.)				Reimburse–Subs	Chq441	80.00
2089 @ 0.75 ea (Cost)		1,566.75				
Total		**35,210.95**		**Total**		**6,908.53**
Excess Assets over Liabilities				**$ 28,302.42**		
Income		**$**		**Expenditure**		**$**
Subscriptions		12,107.00		Merchant Bank Fees		140.69
Page Charges		1,440.00		Postage		1,582.15
Interest -Bank Aust (T/D 307023174)		178.06		Printing Costs		5,775.87
Interest -Bank Aust (T/D 307023175)		35.33		Graphic Layout Costs		1,500.00
Interest -Bank Aust (T/D 138340573)		95.63		Professional Fees		275.00
Postage Reimbursements		–		Digitising Costs		–
Back Issues - Sales		70.00				
Royalty from Informit		292.37				
Donation		100.00				
Transfer from ESQ		2,500.00				
Total		**16,818.39**		**Total**		**9,273.71**
Net Trading Profit / (Loss)				**7,544.68**		
2021 Subscriptions as at Dec 31:		**2021**		**2020**		
Australian Subscriptions		116		134		
Overseas Subscriptions		31		34		
Total Subscribers		**147**		**168**		

I Certify this is a true and accurate financial statement of the *Entomological Society of Queensland* for the period 1 January 2021 to 31 December 2021.

Bob Miller FIPA, FFA, JP (Qual)
Independent Accountant
20 Jan 2022



The Australian Entomologist
Annual Journal Report for 2021

In another year which saw little improvement regarding shutdowns and many researchers still separated from their study subjects, scientific papers still came forth. We had contributions from 52 individual authors covering a wide variety of taxa and topics. Part 4 was also our largest ever issue with 194 pages. This year, our joint efforts produced 406 pages, 35 papers and 3 book reviews containing 19 new species, 3 new genera and 1 new tribe, multiple range extensions, new records for Australia and biological and ecological notes on many previously poorly known species. We covered mostly Australian species but some from Vanuatu also featured. The Torres Strait continues to produce subject matter for numerous researchers. Taxa covered included Araneae (Desidae), Coleoptera (Buprestidae, Carabidae, Chrysomelidae, Latridiidae Scarabaeidae, Staphylinidae), Diptera (Limoniidae), Hemiptera (Cicadidae, Eriococcidae, Pseudococcidae), Hymenoptera (Colletidae), Lepidoptera (Castniidae, Erebidae, Psychidae, Sphingidae and butterflies), Odonata (Synthemistidae) and Trichoptera (Hydroptilidae, Polycentropodidae), and Thysanoptera (Phlaeothripidae). There was no special issue this year. We maintained the look of the journal with over a quarter of the journal in colour. The cover image for 2021 was an ink on paper illustration of a *Bromocoris souefi* (Pentatomidae), by ESQ member Andrew Maynard. The first three issues were mailed out within normal circulation deadlines with part 4 delayed a few days due to a problem with the printing (we had to wait for the glue to dry on the binding as it was such a large issue!)

Our financial statement for 2021 indicates a net profit of $7544.68. This is far more than expected but is a little misleading. Due to fewer subscriptions paid in advance of 2021, and half of the subscriptions in advance of 2022 also paid in 2021, in total we received approximately 18 months' worth of subscriptions in the year. This increased the income for 2021 substantially over and above the norm. We also received a $2500 contribution from the ESQ. This contribution was part of the arrangement to give all members free access to the pdf of each issue. This amount will continue to be negotiated depending on how finances are faring. Printing costs were also carried over from Vol 48 (4) into 2022 and this issue cost almost $1000 more than the average issue. Nearly all revenue fell again this year excepting page charges which, due to our large issue, was double what we would normally receive. Costs remained reasonably stable with a pleasant decrease in postage, mostly due to our decrease in hardcopy subscribers but also in part to our wonderful Post Office at St Lucia who gives us a wonderful deal. He has also given advice on how to avoid those costs rising in future.

This is the second year *The Australian Entomologist* is available to ESQ members as part of their membership. Our readership now stands at 390 ESQ members receiving the link via email and 147 subscribers.

Hardcopy subscriber numbers fell this year to 130, with geographic distribution being as follows: ACT 15, NSW 16, QLD 48, SA 7, TAS 3, VIC 9, WA 5, Norfolk Island 1 and Overseas 26.

We have a few members of the Editorial Committee who would like to stand down, so if you think you would like to assist please get in touch with any one of us and we can outline what it involves. We are not a large journal and there are a limited number of manuscripts each year.

I'd like to thank my fellow members of *The Australian Entomologist* Publication Committee, Greg Daniels as Editor, and Christine Lambkin, Trevor Lambkin, David Lane and Geoff Monteith as Assistant Editors for all their support and their efforts in sustaining such a quality journal. In addition, the ESQ council for all their support during the year. We are now looking forward to gearing up for our 50th Anniversary Volume in 2023 coinciding with ESQ's Centenary year.

Special thanks to all the authors and referees who make this journal what it is and to our loyal subscribers. We will endeavour to continue offering a place for entomological discoveries to be published in an inexpensive, timely and accessible manner into 2022. We hope you enjoy reading it.

Susan Wright
Business Manager
Australian Entomologist

ESQ Collecting Permit Report for 2021

The Queensland Parks and Wildlife Service (QPWS), Department of Environment and Science (DES) Scientific Purpose Permit ESQ PTUKI for National Parks and CYPAL WITK18701717-3 and State Forests WITF18701717 to collect unprotected invertebrates in QLD was valid until 8 June 2021. The ESQ PTUKI **Final Report** for those permits was submitted 31st August 2021.

In August 2021, **95 ESQ members were endorsed on the ESQ collecting permits** for National Parks and CYPAL WITK18701717, WITK18701717-1, and WITK18701717-3 and State Forests WITF18701717 for 271 protected areas.

Since June 2020 **174 notifications** were submitted online to QPWS&P covering work by **31 ESQ members** endorsed on the permit. **Covid 19** has had a massive effect on the activities of ESQ members endorsed on the permit with the closure of camping grounds, restrictions on movement, and the closure of many National Parks and State Forests. Some projects have been cancelled, and many significantly delayed. **Living Y. Li** (ANU & CSIRO) planned to conduct fieldwork at Mt Cook NP, Ngalbal bula (Cedar bay) NP and Wooroonooran NP in late April 2020 and due to the travel restrictions imposed by COVID19 was unable to. Fortunately, Living travelled extensively in the Wet Tropics of Queensland including **Mt Lewis NP, Kuranda NP, Tully Falls NP and Cardwell SF** from December 2020 to Jan 2021. Assisted by Mareeba and Atherton rangers, **Living** made it up to several vertical mountain tops and collected about 12 endemic flightless *Apterotheca* species (Tenebrionidae) and various Adeliine tenebrionids in ethanol for genomic studies.

Left to right: *Apterotheca dasymeros*, *Apterotheca elongata*, *Emcephalus floccosus*. Images : L. Li

Eleven ESQ members currently endorsed on the permit have completed **19 field work notifications for areas with CYPAL** conditions in the last 12 months. While a number of ESQ members attempting to enter CYPAL areas reported difficulty communicating with the relevant Aboriginal Corporation this has improved over the last year. Kutini-Payamu (Iron Range) NP and Daintree NP are under the greatest demand. Under the ESQ Protocols and Procedures Ethical Biodiversity Research Guidelines members collecting in **CYPAL areas** must submit a **plain language report to** the relevant **Aboriginal Corporation** and the ESQ Permit Officer within 3 months of access. **Four 'CYPAL' reports** were submitted in 2021, three for **Kutini-Payamu (Iron Range) National Park** for work on Lepidoptera (moths and butterflies) by **7 ESQ members** endorsed on the permit.

ESQ is extremely grateful that the traditional owners of Kutini-Payamu NP, the **Kuuku Ya'u**, have granted permission for ESQ members to work on their beautiful country. ESQ also thanks **Tony Pascoe**, Traditional Owner and Director of **Lockhart Corporation, Toby Monroe**, Ranger Coordinator, South Cape York Catchments, **Gary Featonby**, Ranger-in-Charge, Kutini-Payamu National Park, and **Stu, Lynn and Tim Layton** at the GreenHoose for their ongoing hospitality and enthusiasm for the research that ESQ members are conducting.

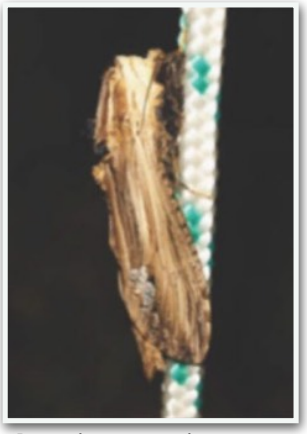
In 2020, **David Lane** made a short three day visit to **Kutini-Payamu (Iron Range) National Park** to search for life history details of *Philiris* sp. (Lycaenidae) and Sphingidae species, including light trapping for adult moths by night. **Tony Pascoe**, Traditional Owner and Director of **Lockhart Corporation**, suggested that

light trapping might be of interest to Lockhart Rangers, and other interested parties. That occurred on the 2nd **November 2020** with much discussion about the large Woodmoths (Family Cossidae) coming to light, and the types of rainforest trees in which the moths are likely breeding. Conditions were extremely dry, with minimal rainfall during the preceding month. Extensive roadworks created much dust intrusion into the roadside vegetation, however it appears that will have little long term disruption or influence to the local fauna with the upcoming wet season rainfall likely to offset the short term disruption. Daytime searches were confined to areas along Gordon Creek, which were being utilised as flight corridors by numerous butterfly species (mostly *Appias ada*, *Delias mysis* and *Delias ennia*). Other observed butterflies of note were life history stages of *Philirus ziska* on *Trophis scandens*, and adults of *Allora major*.

In **February 2021** a team of **Douglas Hilton, Marlene Walter and Axel Kallies** with photographer **John Lenagan** from Melbourne also visited **Kutini-Payamu National Park** who collected for 11 days using butterfly nets and pheromones during the day to attract clear-wing moths (Sesiidae) and at night using lights suspended in front of a white sheet, primarily at Cook's Hut Campground and Mt Tozer. Highlights were:

Xyleutes persona collected at Kutini-Payamu NP. Photos: J. Lenagan

- 7 species of clear wing moths (Sesiidae), a poorly collected family in Australia.
- 2 new species of woolly-bear moths (Brachodidae); one in *Nigilgia,* the other in *Paranigilgia*, the latter the first record of the genus for Australia.
- collection of *Pseudarbela* (Psychidae) in Australia for the first time.
- collection of an undescribed species of *Heliozela* (Heliozelidae).
- Images of 750 species in iNaturalist, 150 species being new to the region, 25 new to iNaturalist.



Duomitus ceramica collected at Kutini-Payamu NP. Photos: J. Lenagan

Cliff Meyer, Stephen Brown and Richard Weir continued their self-funded butterfly distribution and biological surveys to determine the impact that Cyclone Trevor in March 2019 had on the butterfly populations within **Kutini-Payamu (Iron Range) National Park** for four days at the beginning of **June 2021**.A total of 78 species of butterfly were recorded in the park over the period compared to 77 species recorded during the July 2019 survey. Seventeen species recorded in 2019 were not seen in 2021 but an additional 17 species were recorded in 2021. A total of 95 species of butterfly have been recorded by the team across both the 2019 and

Gordon Creek collecting locations two years after Cyclone Trevor - photographs taken during 2021 survey.



Butterflies from 2021 survey at Kutini-Payamu. Above left to right: Pied Flat (male), Pale Orange Darter (female), Orange Palm Dart (male). Below left: Caper Gull (male) and below right: Orange Bush Brown (male).


2021 survey periods. A further 10 species of butterfly were recorded in 2017 but have not been seen by the team since Cyclone Trevor. As with 2019, very few adult or immature stages of the Blues family of butterflies (Lycaenidae) were observed. The highlight of the survey was the first record of a Nymphalid butterfly on mainland Australia, which was only known from the Torres Strait prior to this survey. This discovery is the subject of a scientific paper that included the comprehensive comparative table supplied by the team and is included below in publications.

Daniel Dashevsky, Maddi Giannotta and Juanita Rodriguez from Canberra (ANIC, ANU, CSIRO) completed a CYPAL report for **Annan River NP, Mt Cook NP, and Endeavour River NP** where they concentrated on Daniel's spider wasp venom project that requires samples of fresh venom for transcriptomes in **January 2021**. **Mick Hale**, operations manager for the Yuku-Baja Muliku (YBM) Land Trust who manage Annan River NP, organised the team to meet the YBM rangers who led them along a 4WD tracks, past locked gates, and deep into parts of Annan River NP that would have been inaccessible without their help. As soon as the team arrived at the isolated patch of rainforest the YBM rangers had in mind and stepped out of the car, a black-and-orange *Heterodontonyx* (the largest genus of pompilids in Australia) landed on George, one of the rangers. The team had a very productive first day with the capture of another *Heterodontonyx*, several mutilids for Maddi, and an assortment of other taxa from the forest and riverbank. Each day the team would either join the YBM rangers or visit other areas swinging nets or setting Malaise traps, meeting with success on beaches, coastal heaths, the rainforest on Mt. Cook, and the sclerophyll savannah that covers most of Cape York. They collected at least one new species of both Pompilidae and Mutilidae. Live wasps accumulated and occasional afternoons were spent extracting venom and dissecting venom glands. With a cyclone


Left: Following the guides from the Yuku Baja Muliku Land Trust down a 4WD track in Annan River National Park. Right: Daniel Dashevsky and Maddi Giannotta setting up a malaise trap on Mt Cook. Images: Juanita Rodriguez

brewing in the Gulf of Carpentaria they pulled in Malaise traps, packed bags, microscopes, and samples, and rolled south to Cairns and flew back to Canberra.

Thirty-five **ESQ members reported in 2021** on identifications of **18696 specimens** collected under the ESQ permits including 4500 Arachnids including **761 spiders** with 8 Holotypes of new species & **3723 mites** with 27 Holotypes of new species; **3 velvet worms** (Peripatopsidae) all Holotypes of new species, **8394 butterflies** (506 Hesperiidae, 1220 Lycaenidae, 3473 Nymphalidae, 620 Papilionidae, 2575 Pieridae) **& 343 moths** (74 Erebidae, 39 Noctuidae, 48 Sphingidae); **103 dragonflies & damselflies, 8 cockroaches, 3194 beetles** including **3029 dung beetles**, 77 flower beetles (Cetoniinae) & 61 darkling beetles (Tenebrionidae); **919 Hemiptera** including 77 Anthocoridae, 17 Eurybrachidae & **796 Psyllidae**; **1218 Hymenoptera** including 68 bees, 233 Braconidae, 639 Encyrtidae, 49 ants, 53 Sphecoidea & 53 Torymidae with a Holotype of a new species; and last but not least **29 lice** (Phthiraptera) with 3 Holotypes of new species. 5 members submitted NULL reports. Included in the report are those **specimens of Arachnida** (2159 specimens) **and Insecta** (480 specimens) **identified and registered at QM since the last ESQ report** to QPWS**.** *Many of these are new species, with 43 Holotypes included in the Report.*

Publications:

Four publications have *acknowledged the ESQ permit directly* as a source of material for study (authors in bold ESQ members).

Cartwright, David I. (2021). A new distinctive Caddisfly species of the Genus *Plectrocnemia* Stephens from North-Eastern Australia (Trichoptera: Polycentropodidae). *Australian Entomologist* 48 (1): 57–63.

Meyer C.E., Brown S.S., & **Weir R.P.** (2021). Range extension for *Trapezites petalia* (Hewitson, 1868) (Lepidoptera: Hesperiidae: Trapezitinae) in Queensland. *Australian Entomologist* **48** (3): 215–216.

Monteith, Geoff B., Sandoval-Gomez, Vivian E., Chaboo Caroline S. (2021). Natural history of the Australian Tortoise Beetle, *Notosacantha dorsalis* (Waterhouse, 1877) (Coleoptera: Chrysomelidae: Cassidinae: Notosacanthini) with summary of the genus in Australia. *Australian Entomologist* **48** (4): 329–354.

Popple L.W. & **Moulds M.S**. (2021). Redescription of *Psaltoda fumipennis* Ashton, 1912 and description of a new allied species from the Queensland Wet Tropics (Hemiptera: Cicadidae: Cicadinae). *Australian Entomologist* **48** (4): 355–374.

The ESQ Permit was also used to collect specimens that contributed to studies and publications by endorsed members:

Cranston, Peter S., Krosch, Matt & Baker, Andrew M. 2021 Molecular evidence for deeper diversity in Australian Tanypodinae (Chironomidae): *Yarrhpelopia* and related new taxa *Zootaxa* 4949 (1): 001–023.

Ebert Kathryn M., Arnold William G., Ebert Paul R., **Merritt David J.** 2021. Hindgut microbiota reflects different digestive strategies in dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae). *Appl Environ Microbiol* 87:e02100-20. https://doi.org/10.1128/AEM.02100-20

Wilson Jeremy D., Rix Michael G. (2021) Systematics of the Australian golden trapdoor spiders of the *Euoplos variabilis*-group (Mygalomorphae : Idiopidae : Euoplini): parapatry and sympatry between closely related species in subtropical Queensland. *Invertebrate Systematics* **35**, 514-541. https://doi.org/10.1071/IS20055

We developed **Ethical Biodiversity Research Guidelines** for ESQ researchers working with Aboriginal groups that a member must have signed agreement before being endorsed on the ESQ permit. The set of protocols and procedures that ESQ biological researchers should follow when working on country have been upgraded several times and posted on the ESQ permit website. The ongoing aim is to significantly increase cultural understanding focusing on potential benefits for Traditional Owners, integrating their cultural

aspirations, two-way communication and knowledge transfer including training in appropriate level of cultural knowledge and best scientific practice.

With the advent of the QPWS&P trial **Application for Research Endorsement** (ARE) for the Wet Tropics World Heritage Area (WTWHA) the **renewal process** required negotiations, especially with the Rainforest Aboriginal Peoples of the Wet Tropics, to provide **evidence of support from Aboriginal Corporations** (AC) **before submission** of the application. This process started in May 2021, and was ongoing as of August 2021 with the ARE completed for 35 parks under 15 Aboriginal Corporations in WTWHA on the permit renewal.

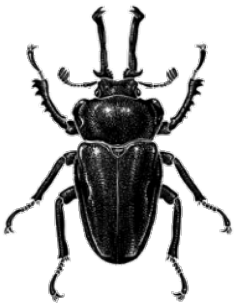
Chris Lambkin, as ESQ Permit Officer, suggested to **Aboriginal Corporations** that with their approval, **as a minimum**, ESQ members endorsed on the permit should follow the same Protocols and Procedures that apply to co-managed lands covered by CYPAL, ILUA, or IMA when entering country of the Rainforest Aboriginal Peoples (RAP) on parks in WTWHA, i.e. ESQ members must contact the relevant Aboriginal Corporation at least three months before, obtain written permissions to enter country, explain working as self-funded volunteers on existing PTUKI, give details of proposed work, suggesting interested RAP accompany them, and offer demonstration, training, and explanation of their work as in-kind payment. A written report outlining what was collected must be sent to the RAP within 12 weeks of access.

An alternative offered to each Aboriginal Corporation (and to those with co-managed lands outside WTWHA) was that we develop a MOU between the relevant AC and ESQ. Then when an endorsed ESQ member proposed to collect on country they need to negotiate a signed agreement with the AC with the full details incorporated before access. I expressly excluded the right to access and collect in RAA areas from the proposals but asked the relevant AC if they would to allow access and collection in RAA areas, and to add other areas that they would not allow members to access.

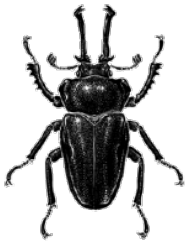
The **Yuku Baja Muliku** have agreed to develop an MOU with ESQ for access to Yuku Baja-Muliku (**Annan River**) NP, and the **Kuuku Ya'u** responsible for our most visited **Kutini-Payamu (Iron Range)** NP (CYPAL) are happy with the conditions, protocols & methods of the previous ESQ permits.

The PTUKI renewal is now an online process. After 2 weeks of interaction with the IT section and other QPWS&P staff, with over 100 protected areas added online, I crashed the system and then submitted the application directly to the Permit Office. There were **287 protected areas on the renewal application** in early September 2021. In early January 2022, I was advised that the permit would be 6-8 weeks away. Members will be advised when we receive the renewed permit, with a requirement to complete an application for endorsement including signing agreement with current conditions.

ESQ Permit Officer
Queensland Museum
South Brisbane, Qld 4104
Email christine.lambkin@qm.qld.gov.au
1 Feb 2022



Collecting dung beetles with rotting mushroom bait. Photo: K. Ebert



Insect snaps!

Some of our awesome calendar photo entries!

A male common glider (*Tramea loewii*) decided to land on a plant stake in my backyard in Yeerongpilly, Queensland. If it was looking for a source of still water it would have been disappointed, as there is none to be found close by in my suburban jungle. This is a common, widespread species found throughout northern and eastern Australia (excluding South Australia and Tasmania). It is also known to occur further afield in South East Asia, on islands in the western Pacific, and has been recorded in New Zealand since 2005.

~Penny Mills

Commonly known as the Cowboy Beetle, *Chondropyga dorsalis* is a large diurnally active cetoniine scarab beetle often encountered during summer months in bush and gardens of Eastern Australia. Beetles fly clumsily and make a loud buzz, often crash-landing in leaf litter or foliage. Females looking for ovipositing sites may quickly disappear into leaf litter as they dig down in search of rotting wood. This specimen was photographed in Mount Colah, NSW.

~ Helen Smith

The Hibiscus Harlequin Bug (*Tectocoris diophthalmus*) has striking colours from nymph to adult. Nymphs are a brilliant shiny blue which progresses to towards a matt, mostly orange colour in the adults. They feed on the sap of hibiscus plants, from which they get their common name, but may also feed on sap of bottle trees and other species. They were present in especially large numbers – giving the trees spectacular jewelled effect – when I found these in June of 2021.

~Will Arnold

Announcements

PhD Projects (Plants, Beetles or birds) in forest biodiversity conservation!

Project aims:
The aim of the research program is to understand how forests can be managed to produce timber while limiting harm to biodiversity, by determining the optimal mix of forestry systems and reserves under differing wildfire regimes. We will apply the land sparing vs land sharing paradigm to forestry (Phalan et al 2011; Betts et al 2021), recognising that for overall timber production at the landscape-scale, there are trade-offs between intensity of management at site-scale and the area available for reserves. Currently it is unknown which mix is better: intensive timber production with more reserves, widespread low-intensity forestry, or a combination of these. The research will involve field-based biodiversity surveys in forests that range from unmanaged areas through to low intensity native forest logging and intensive timber plantation management. Data analysis will quantify the biodiversity value of different forest management systems. By integrating species' frequency data with information on timber yield, students will determine the optimal landscape-scale approach for their taxon of interest. There is also scope for students to collaborate internationally on analysis of global-scale impacts of logging on biodiversity. Outcomes of the project will provide an evidence base for forest policy and management to improve conservation outcomes in timber production landscapes.

Individual project details:
Plants: https://www.utas.edu.au/research/degrees/available-projects/accordion-projects/science-technology-and-engineering/area/biological-sciences/conservation-of-plant-communities-in-forest-landscapes
Beetles: https://www.utas.edu.au/research/degrees/available-projects/accordion-projects/science-technology-and-engineering/area/biological-sciences/beetle-conservation-in-forest-landscapes
Birds: https://www.utas.edu.au/research/degrees/available-projects/accordion-projects/science-technology-and-engineering/area/biological-sciences/conservation-of-forest-birds

Scholarships:
This research is funded by the Australian Research Council. There are three scholarships available from our ARC grants, and one will require application for a University competitive scholarship. Scholarships provide:

- a tax free living allowance stipend of $28,854 per annum (2022 rate, indexed annually) for 3.5 years
- a relocation allowance of up to $2,000
- a tuition fees offset covering the cost of tuition fees for up to four years

Location:
Students will join the Forest Sustainability Group in the Biological Sciences Discipline at the University of Tasmania in Hobart. UTAS Biological Sciences is consistently rated as well above world standard in ecology and biological sciences. It is a vibrant and friendly department, with an active postgraduate student society.

Deadline:
There is a competitive scholarship round closing on **7 March 2022**. Some projects may be filled prior to this date.

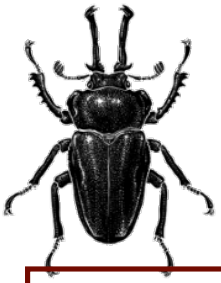
Reminder: Membership Renewal for 2022

Membership renewals for 2022 were due on the first of January. Don't forget to renew! Renewal forms with payment information are available on our website:

https://www.esq.org.au/renew.html

Note: if you have recently joined the Society (after 1 October) your membership is paid through Dec. 2022. **Questions?** You are welcome to contact Bill, our treasurer!

Bill Palmer, ESQ Treasurer, PO Box 537, Indooroopilly, Q 4068,
Email: treasurer@esq.org.au



Diary Dates for 2022

Meetings held on the second Tuesday of the respective month

MARCH 8	Helen Nahrung, ESQ President	AGM and Presidential Address: *"An ongoing history of invasive forest insects in Austrlalia"*
APRIL 13	Ann Ray, Xavier University Ohio	*"Why are lamiines (ALB) the worst?"*
MAY 11	Babar Hassan, University of Sunshine Coast	*Termites*
JUNE 8	Notes and Exhibits	Student Award winner and other presentations TBD
AUGUST 10	TBD	
SEPTEMBER 14	Pauline Wyatt, DAF	*"Fruit fly research to improve market access for horticulture"*
OCTOBER 12	TBD	
NOVEMBER 9	Dalton Baker, University of Queensland	*"Biology and ecology of citrus blossom bug in avocado"*
DECEMBER 14	Notes & Exhibits	Notes and Exhibits/Christmas Afternoon Tea

SOCIETY SUBSCRIPTION RATES for 2021

(includes electronic subscription to *Australian Entomologist*)

GENERAL	Person who has full membership privileges	**$40pa**
JOINT	Residents in the same household who share a copy of the *News Bulletin*, but each otherwise has full membership privileges.	**$50pa**
STUDENT	Student membership conveys full membership privileges at a reduced rate. **Free the first year**, $20pa subsequent years. Students and others at the discretion of the Society Council.	**$20pa**

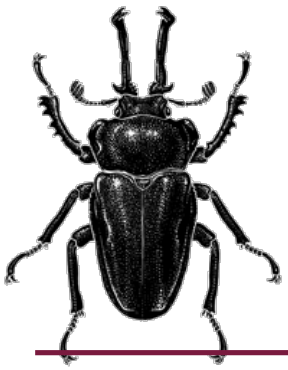
ESQ membership subscriptions should be sent to the Treasurer, PO Box 537, Indooroopilly, QLD 4068
http://www.esq.org.au/membership.html

THE *AUSTRALIAN ENTOMOLOGIST* SUBSCRIPTION RATES for 2021

Printed copy:

AUSTRALIA	Individuals/Institutions	**AU$50pa/AU$70pa**
ASIA/PACIFIC	Individuals/Institutions	**AU$80pa/AU100pa**
ELSEWHERE	Individuals/Institutions	**AU$100pa/AU$150pa**
Electronic copy: (for non-members)	Individuals/Institutions	**AU$30pa/AU$50pa**

Journal subscriptions should be sent to the Business Manager, PO Box 537, Indooroopilly QLD 4068
http://www.esq.org.au/publications.html



Entomological Society of Queensland

Next meeting:

Tuesday, 8th March, 1:00 pm

Annual General Meeting

&

Presidential Address:

"An ongoing history of invasive forest insects in Australia"

Presented by Helen Nahrung

University of Sunshine Coast Forest Research Institute

***Venue:* ground floor seminar rooms at EcoSciences Precinct**

Or join us... ***Virtually!***

Using the Zoom link here

https://usc-au.zoom.us/j/89854191976

Next News Bulletin:
Volume 50, Issue 1 (March 2022)

Deadline for contributions: 12 March 2022

Send your news/stories/notices to the editor at: k.ebert@uq.edu.au