Entomological Society of Queensland

NEWS BULLETIN

Price $3.50
Print Post Approved
100001946

Volume 47, Issue 3, May 2019

Entomological Society of Queensland

Website: www.esq.org.au
Address: PO Box 537, Indooroopilly QLD 4068

Front Cover: A photograph of the Old World Bollworm, *Helicoverpa armigera*, a cosmopolitan species found naturally in Africa, southern Europe, across Asia and in Australia. *H. armigera*, together with *H. punctigera* (found only in Australia) are major pests of many crops in Australian agriculture, particularly cotton, and is very well adapted to exploit agricultural systems, being highly polyphagous and mobile, highly fecund and having a capacity for strategic diapause. *H. armigera* is particularly damaging through its capacity to rapidly evolve resistance to pesticides, which it has done successively in Australia. For the last 20 years it has however, been well managed with transgenic Bt cottons accompanied by a pre-emptive resistance management strategy. In the last few years *H. armigera* has been confirmed to have invaded South America where it is causing havoc to cropping and moving northwards towards the USA. Interesting times ahead. *Photo by Cheryl Mares, CSIRO Entomology, Narrabri. Used with permission.*

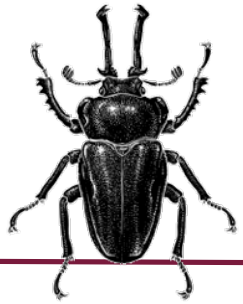
ISSN 1037-2989

Entomological Society of Queensland

Table of Contents

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, May 14th, 2019

Held in the Library, Ecosciences Precinct, Boggo Rd, Dutton Park.

Meeting open: 1pm

Attendance (52):

Members (40): Nancy Schellhorn, David Comben, Christine Goosem, Jessa Thurman, Andy Wang, Mike Barnett, Kempsy Ledger, Lui Lawrence-Rangger, Craig Edwards, Ethan Briggs, Lyn Cook, Andrew Hulthen, Cate Paull, Mark Schutze, M. P. Zalucki, David Exton, Liam Bromley, Mukund Madhav, Vivian Sandoval, Colleen Foelz, Jane Royer, Helen Schwencke, Peter Osborne, Gary Fitt,, Geoff Monteith, Don Sands, Des Foley, Nadine Baldwin, Natalia Medeiros De Souza, Ngon Hoc Le, Rebecca Nagy, Stephen Frances, Alisha Steward, Diana Leemon, Lachlan Jones, Shannon Close, Kathy Ebert, Danyelle Miller, Vanessa Cockington, Penny Mills.

Visitors (12): Peter James, Mona Moradi, Tracey Steinrucken, Runmeng Chen, Brendan Missenden, Kate Fiedler, Nicole Forrest, Rieks van Klinken, Rebecca Bastley, Ningning Feng, Abigail Makin, Kumaran Nagalingan.

Minutes: The minutes of the last meeting were circulated in News Bulletin 47[2] April 2019. Moved the minutes be accepted as a true record: Penny Mills, Seconded: Vivian Sandoval, Carried: All.

Nominations for membership approved by council:

General Members:

Vanessa Cockington

Student Members:

Danyelle Miller (*UQ*)

General Business:

The ESQ Student Award for 2019 was awarded to Craig Edwards from the University of Queensland. Geoff Monteith gave a brief note on Professor Trevor Clifford who passed away last week. Unfinancial members have been notified of their overdue subscriptions.

Main Business: Nancy Schellhorn (co-founder and CEO of RapidAIM) presented on the topic of "*The journey to RapidAIM*". Vote of thanks provided by Cate Paull.

Next meeting: 11 June:

The next meeting will be on 11th June, which is a Notes & Exhibits meeting. We will hear from this year's student award winner Craig Edwards about "Iterative hypothesis testing uncovers 49 species, which represent a new genus of *Melaleuca*-galling scale insects".

Meeting closed: 2 pm.

A blurry, but strange sight! Red-velvet mites (Trombidiidae) are free-living predators as adults, but their younger instars can get a bit attached. Young instars normally feed on insects and other arthropods, but this one decided to go after its own kind. Seen in Lamington National Park. *Photo: J. Thurman.*

At our next meeting...

Notes & Exhibits!!

The June meeting is one of our special *Notes & Exhibits* meeting. This is a less formal meeting consisting of several short talks and exhibits. Any member is welcome to share any item of entomological interest. It might be a 5 minute talk about an interesting observation, some items to show as an exhibit, a research update or plan - anything goes! The main presentation at this meeting will be from our 2019 student award winner, Craig Edwards, followed by some short presentations and displays:

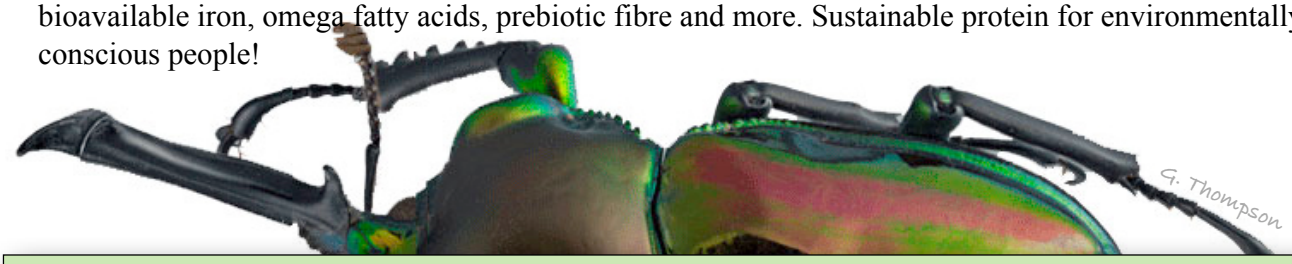
Craig Edwards, ESQ 2019 Student Award winner from UQ will talk about his Honours thesis research on *Melaleuca*-galling scale insects.

Shannon Close, UQ student and ESQ 2017 Small Grants Recipient, will share amazing photos from her work on batflies: "*Got milk? An update on the 'milk glands' of viviparous bat flies*."

Don Sands will present news on "*Minute primitive moths Heliozelidae: A flagship group of reciprocal conservation significance*". Don will provide a brief summary of progress with this project and recognition of the conservation significance of heliozelid moths and their interactions with several genera (including *Boronia* spp.) of Rutaceae.

Joolie Gibbs, Director of the Gympie Regional Art Gallery will share some of her insect art in "*Insecta I have dined with.*" Joolie describes her art as environmental art, as it spans many media to highlight her concerns for the environment, from drawing, painting, sculpture, paper making, basketry and others. "I often feel I am documenting my surroundings in my own way, and get quite excited with insects, particularly macro invertebrates."

Grilo Protein Company is a Byron Bay based company on a mission to minimize our footprint on the planet and make people healthier through eco-friendly, nutritious and clean food made from organic crickets. Crickets have up to 69% protein, all essential amino acids, all the vitamin B12 you need in just 1 Tbs, bioavailable iron, omega fatty acids, prebiotic fibre and more. Sustainable protein for environmentally-conscious people!



Tuesday 11 June at 1pm

Ground floor Library at EcoSciences. Tea & Coffee following.

All welcome!

RapidAIM Real-time fruit fly monitoring: Taking the guesswork out of pest surveillance, detection and control

presented by Dr Nancy Schellhorn, PhD
Co-founder & CEO
RapidAIM Pty Ltd

Pests of global significance regularly cause economic loss due to their transboundary nature and because they are difficult to manage. They are often highly mobile, fail to recognise borders and property boundaries, reproduce rapidly, and require labour intensive actions to monitor their arrival and to control their populations. However, technology is providing opportunities to achieve greater efficiencies for insect pest surveillance, detection and monitoring. Advances have been made in data flow, real-time insect surveillance (detection and monitoring), and information communication. Over the last decade, automation of pest surveillance and taxonomic identification, especially for tephritid fruit flies, has emerged in research institutions and the commercial market (Jiang et al. 2008; Liu et al. 2009; Faria et al. 2014; Philimis 2015; Doitsidis et al. 2017; Goldshtein et al. 2017).

Freeing high-power computation from the desktop has been a key driver in the development of innovative solutions to automate insect monitoring and detection. Thus far, the majority of solutions include camera/s focused on dead insects caught in the bottom of traps or stuck to sticky cards (Table 1). As with manual traps, all of the automated solutions include off-the-shelf pheromones or attractants of the target insects. The camera takes pictures at fixed intervals (e.g. Trapview, Semios), and the software displays the images for the end user to confirm. For some systems, the confirmation process feeds back into the software as a component of the machine learning algorithm for improved automated diagnostics (e.g.,Trapview). Optical photosensors are being used to discriminate wing-beat frequency of insects entering a trap (e.g., Farmsense and AgroPestAlert). Electromagnetic current is used by Spensa Tech for monitoring lepidopteran orchard pests. The current from the 'Z-trap' surrounds and kills the insect, and the amount of current provides an indication of the size of the insect, which functions as a surrogate for the insect's identity. RapidAIM automated insect monitoring uses a novel type of capacitance sensing, like a behavioural fingerprint of insects, which detects and discriminates an insect as it enters the trap, and delivers the information to mobile app in real time. The technology was invented by the author, with co-inventor Darren Moore, while employed as scientist at CSIRO.

The first application of the RapidAIM technology is for the surveillance and monitoring of fruit fly. Fruit fly costs the growers of Australia $300M every year

Table 1. Examples of automated insect monitoring and communication technology around the world.

Company Name	Location	Type	Target	Product Stage
DTN (formerly Spensa Tech)	Purdue, Indiana, USA	Sentinel; camera-fitted trap	Lepidopteran pests of pome fruit	Acquired by DTN April 2018; Commercial www.dtn.com
DTN (formerly Spensa Tech)	Purdue, Indiana, USA	Z-Trap; electromagnetic current inside delta trap	Lepidopteran pest of pome fruit	Acquired by DTN April 2018; Commercial www.dtn.com
TrapView	Hrusevje, Slovenia	Camera-fitted traps in various designs	Lepidoptera and Diptera	Commercial www.trapview.com
SnapTrap	Victoria, Australia	Camera-fitted traps	Fruit fly	Commercial www.snaptrap.com
SemiosBio Technologies Inc.	Vancouver, British Columbia,Canada	Variable rate mating disruption and automated pest camera trap	Lepidopteran pests of fruit and nuts; CA red scale	Commercial www.semios.com
iScout (Pessl Instruments)	Graz, Austria	Camera-fitted sticky trap	Non-specific	Commercial www.pesslinstruments.com/
RapidAIM Pty Ltd.	Brisbane, Queensland, Australia	Novel capacitance-type sensor	Fruit fly for 1st product	Commercial www.rapidaim.io
AgroPestAlert	Tudela, Spain	Photosensor – wing-beat frequency	Non-specific	Prototype agropestalert.com/
Farmsence Inc	Riverside, CA, USA	Optical – wing-beat frequency	Lepidopteran	Prototype www.farmsense.io

in control and crop loss. Monitoring for fruit fly is mandatory for trade, and its done manually. Every 7-14 days biosecurity agents and crop advisors check fruit fly traps. Often traps are empty during an inspection round, however if fruit nearby contains fruit fly larvae, a 7-14 day delay until the next inspection could be too late for effective management to stop an infestation. Therefore, manual monitoring of fruit fly traps causes delays, risks outbreaks, and the loss of markets.

RapidAIM real-time insect monitoring technology promises to change this and take the guesswork out of fruit fly surveillance and management. We provide a service and crop advisors, biosecurity agencies, and growers subscribe. They receive, as a mobile phone app, real-time alerts of the presence and location of fruit fly. This allows for early detection, targeted control and confirmation that control is working. We arrived at this solution by combining our knowledge of insect behaviour with the development of hardware and software to create

a grid of instrumented, low-powered (patented) smart traps that detects the presences of a fruit fly, sends the information to the Cloud for analytics and generates an alert for an end user on a smart phone or desktop computer. RapidAIM is an IoT (internet of things) system–an internet-linked hardware and software system, using LPWAN (low power wide area network), a type of wireless radio communication, with data analytic capability. Darren Moore, Laura Jones, and I have since exited CSIRO, formed a company, RapidAIM Pty Ltd, which is the exclusive licensor of the RapidAIM insect-sensing technology. The team had tremendous support and training via the CSIRO ON accelerator, a 13-week intensive training course, followed by, Acceleration Innovation funds to fast-track our prototype testing, opportunities to pitch the business to investors, and to develop our business acumen.

While working at CSIRO, the team first became interested in automated insect monitoring to address the question of insect pest and natural enemy movement between different habitats. Our first approach to real-time detection of arthropods entering a trap was in 2009 using optics, where we quickly developed a patent for relatively low power, high quality images of an insect entering a trap. However, image capture of insects in traps, whether alive or dead, requires much higher data transfer capacity, higher power demand, and the technology is not scalable because every trap needs to connect to a 3G/4G network. Low power, and sending tiny packages, allows for a cost effective, scalable solution for real-time detection of fruit fly, without the need for end-users to train data sets.

Depending on the objectives of the grower, regional communities and government, there are many advantages of using the RapidAIM–RapidFLY system. The advantage in pest-free non-endemic areas, for example South Australia and Tasmania, is that visits to traps can be reduced by at least 75%. Instead of checking traps 36 times a year, lure changes and maintenance can be reduced to 4-9 times a year. This allows for more efficient

Fig. 1. The trap.

workflow, and the possible deployment of more RapidAIM traps in locations with a history of previous detections or known to have higher risk. The significance of RapidAIM for endemic areas, for example the Goulburn Valley, and Orange/ Young, is that fruit fly control can happen quickly, can be targeted, and you can validate control. For the objective of either surveillance or monitoring, RapidAIM can enable community-lead area-wide approaches. Every member of the community can have RapidAIM in their pocket, providing them with real-time confidential detection information for their property, which can also be shared amongst end-users if there is willingness to do so. This allows for faster population suppression, reduced damage of fruit, and increased flow of trade.

The RapidAIM team has been refining the service offering in several regions, and has also deployed five grids of RapidAIM smart trap infrastructure (Figure 1), as a collaborative project delivered by Hort Innovation, with support from the Australian Government Department of Agriculture and Water Resources as part of its Agricultural Competitiveness White Paper. At present, approximately 50 growers and stakeholders within pome fruit, summerfruit and the cherry industry are using the demo-version of the RapidAIM mobile app, and so far the feedback has been great. The company will be rolling out the first commercial subscription offering for the 2019 fruit-growing season. RapidAIM offers a monthly subscription for real-time pest detection information delivered as a mobile app (Figure 2).

Although Darren, Laura and I have exited CSIRO, prior to exiting several people contributed to developing and supporting the business going forward, the development of the technology, and continued collaboration including: David Burt, Ryan McAllister, Andy (Xiaobei) Wang, Stephen Brosnan, Cate Paull, Paul DeBarro, Gary Fitt, and Andy Hulthen.

Register your interest or contact us with questions at: www.rapidaim.io

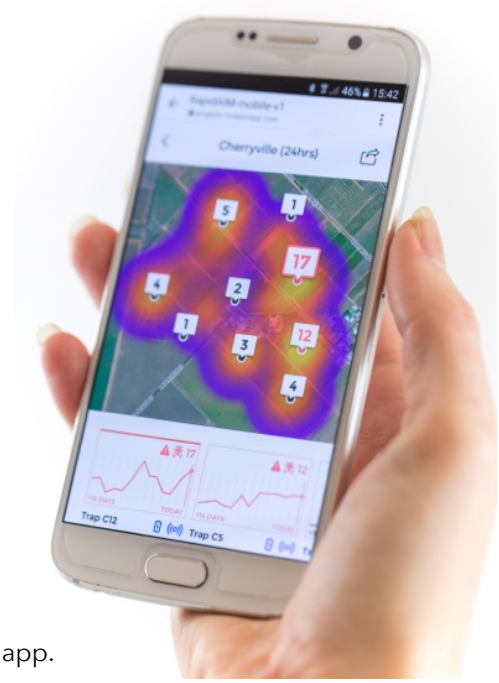


Fig. 2. The app.

nancy@rapidaim.io

References

Doitsidis, L., N. Fouskitakis, N. K. Varikou, I. I. Rigakis, S. A. Chatzichristofis, A. K. Papfilippaki, and A. E. Birouraki. 2017. Remote monitoring of the *Bactrocera oleae* (Gmelin) (Diptera: Tephritidae) population using an automated McPhail trap. *Computers and Electronics in Agriculture* 137: 69-78.

Faria, F.A., P. Perre, R.A. Zucchi, L.R. Jorge, T.M. Lewinsohn, A. Rocha, and R. da S. Torres. 2014. Automatic identification of fruit flies (Diptera: Tephritidae). *Journal of Visual Communication Image Research*, 25: 1516-1527.

Goldshtein, E., Y. Cohen, A. Hetrzroni, Y. Gazit, D. Timar, L. Rosenfeld, Y. Grinshpon, A. Hoffman, and A. Mizrach. 2017. Development of an automatic monitoring trap for Mediterranean fruit fly (*Ceratitis capitata*) to optimize control applications frequency. *Computers and Electronics in Agriculture* 139: 115-125.

Jiang, J.-A., C.-L. Tseng, F.-M. Lu, E.-C. Yang, Z.-S. Wu, C.-P. Chen, S. Lin, L.-C. Lin, and C.-S. Liao. 2008. A GSM-based remote wireless automated monitoring system for field information: A case study for ecological monitoring of the oriental fruit fly (*Bactrocera dorsalis* Hendel). *Computers and Electronics in Agriculture* 62: 243-259.

Liu, Y., J. Zhang, M. Richards, B. Pham, P. Roe, and A. Clarke. 2009. Towards continuous surveillance of fruit flies using sensor networks and machine vision. 5th International Conference on Wireless Communications, Networking and Mobile Computing. September 2009, Beijing, China. DOI: 10.1109/WICOM.2009.5303034

Philimis, P. 2015. E-FLYWATCH Development of an innovative automated and wireless trap with warning and monitoring modules for integrated management of the Mediterranean (*Ceratitis capitata*) & olive (*Dacus oleae*) fruit flies. Final report project reference: 262362 (www.e-flywatch.com; permalink: http://cordis.europa.eu/result/rcn/141151_en.html).

Vale
Martin Baehr

March 10, 1943 – April 17, 2019

With the recent death of Dr Martin Baehr in Munich, Germany, Australia has lost one of the most productive taxonomists ever to work on the Australian fauna. After completing his PhD on the structure and function of the thorax and legs of Carabidae, Martin Baehr served his career as a curator at the Bavarian State Collection of Zoology (Zoologische Staatssammlung München) in Munich. He was first appointed in 1982 as curator of the Hemiptera and Orthoptera collections but then became head of Coleoptera from 1996. He first visited Australia and Tasmania for a year in 1973-74, and fell in love with the country, though then being interested in Onychophora, reptiles and arachnids. A return month-long visit to Queensland in 1981 allowed him to concentrate on carabid collecting and turned his interest to the Australian fauna. He returned for extended field and museum trips every two years for the rest of his life, exploring every corner of the continent and often spending weeks alone in remote areas like the Kimberley, Kakadu and Cape York. His prodigious collections were matched by his research output and he published 187 papers totaling 5789 pages on the Australian biota and described 1167 new Carabidae from Australia as well as 52 Araneae, 13 Hemiptera, 1 Onychophora and 33 Orthoptera. In parallel, he published another 183 papers on non-Australian Carabidae, mostly from SE Asia and the islands through to New Guinea. He was a frequent visitor to the Queensland Museum and our photo shows him working with the carabid collection on his last visit in April 2015.

Moth Migration comes to Regional Galleries

The Moth Migration Project is a crowd sourced art installation created by New York artist, Hilary Lorenz. It comprises a total of about 20,000 hand-printed or drawn, cut-out moths from all over the world and is currently on show at Gympie and Bundaberg Regional Galleries.

Hilary installs it, usually with the help of volunteers and each installation takes about 100 person hours of hard work. Geoff Thompson and Caroline Fewtrell happened to be travelling in the area and were able to participate in a lino-printing workshop at Gympie Regional Gallery on Saturday 27th April. All materials were supplied and we were both able to cut a lino block and print our moths on the excellent, century-old press owned by the gallery.

Hilary later visited Queensland Museum to see the Dodd Collection and view some of the rare books in the library. The exhibition continues at Gympie until 22nd June and at Bundaberg till 16th June.
For more information see:
http://mothmigrationproject.net/
https://www.gympie.qld.gov.au/gallery
http://www.bundabergregionalgalleries.com.au/

Above: Hilary helps participants to use the gallery press.
Below: Hilary and Geoff Thompson (QM).

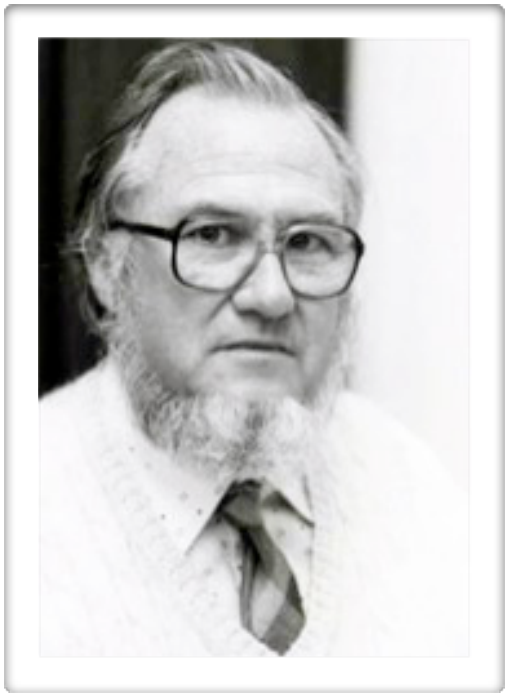
I went to the shops and I ~~bought~~ *found* a … stag beetle?!

Imagine my surprise and delight when the beetle silhouette on the wall outside my local Aldi turned out to be a female *Lamprima aurata* Latreille, 1817. Such a beautiful specimen to behold and with unusual-coloured elytra of purple-maroon. After photographing her I moved her to a garden outside one of the local shops, much to the consternation of some of my entomologist friends. I have been on the lookout for more specimens but, so far, I have had no additional sightings of stag beetles.

- Penny Mills

News from the North

Peter Shanahan displayed his insect collection at the Visitor Centre of the Cairns Botanic Gardens from 16 April - 17 May. Peter is a rainforest biologist who has spent his life collecting insects and sharing his knowledge with others. His collections are of species endemic to the Australasian tropical rainforest region. Peter often takes his collection to schools or to various public functions. For this event, he brought copies of his technical illustrations for the kids to colour in. This proved to be very popular! Peter and David Rentz were on hand to answer questions about the insects in the collections during several info sessions held over the school holidays and weekends.



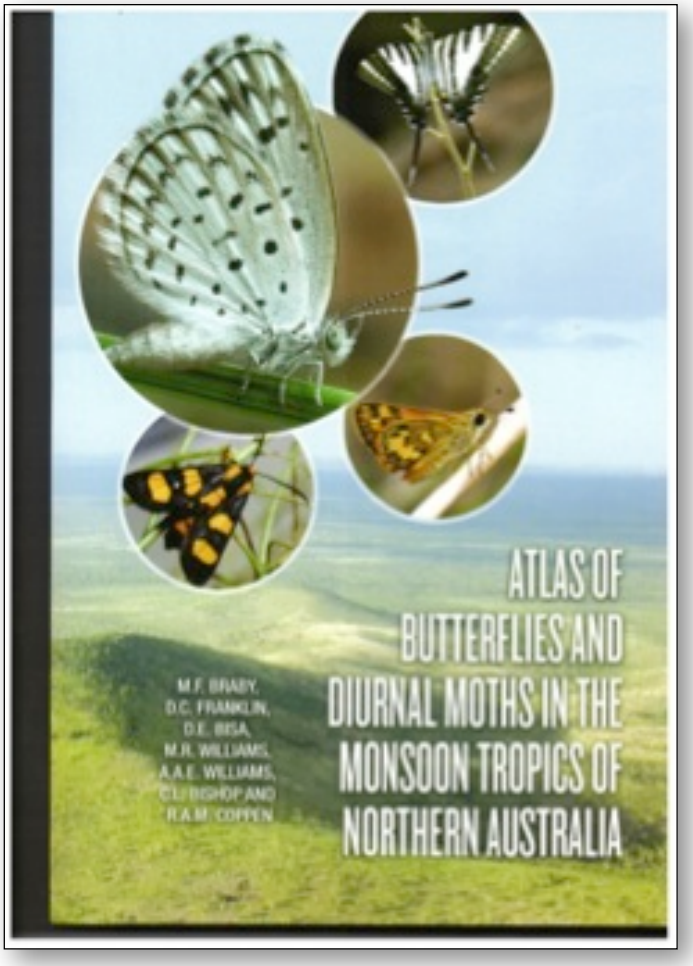
Vale Harold Trevor Clifford OAM

18 April 1927 – 4 May 2019

Almost anyone who studied biology at the University of Queensland between 1958 and 1992 will remember Trevor Clifford for his lectures in botany which were so popular that students not even enrolled in the course often crept into the back of his lectures to hear his fascinating dissertations on every aspect of botany. He lived in almost the last house in Sir Fred Schonell Drive before the University and was a familiar figure as he walked to the campus each morning, often picking flowers overhanging a neighbour's fence that became the props for his first lecture of the day. Trevor trained at university of Melbourne and spent three years lecturing at the University of Ibadan in Nigeria before coming to UQ in 1958 to start a career which saw him rise to Professor, publish 200 research papers and 30 books, and receive many honours. In retirement he became an honorary at both the Queensland Museum and the Queensland Herbarium and worked mostly on fossil plants. He was active until a few weeks before his death at 92 and has papers in press. Charters (2016) gives a short summary of his career at the time he was made a life member of the Royal Society of Queensland. Trevor had wide interests in biology and was a member of the Entomological Society of Queensland from the mid-1960s until his death and gave several talks to the society on relationships between insects and their food plants. A largely academic congregation filled Christ Church at St Lucia to overflowing on the day of his funeral and more than one speaker referred to the fact that Trevor himself greatly enjoyed the spoonerism of his name which was "Clever Triffid"! He was a great and wise man, and an approachable friend to hundreds of his ex-students.

CHARTERS, K. 2016. Award of life member: Emeritus Professor Harold Trevor Clifford OAM. *Proceedings of the Royal Society of Queensland* **121**:87-88

Projection of Geoff Thompson's amazing insect images on the Grey St bridge at Brisbane's Southbank for the World Science Festival. March 2019. Photo: G. Thompson



A dandy dung beetle

Liam Bromley shared a photo that he snapped of the beautiful metallic dung beetle, *Onthophagus dandalu,* spotted near his chicken shed. *O. dandalu* is a fairly common species found in open forest areas around the Brisbane area but also extends south into northern Victoria, New South Wales and north to Mackay. They are daytime active beetles that can be spotted at dog droppings and even chicken poo! Thanks, Liam!

Onthophagus dandalu female. Photo: Liam Bromley

NEW BOOK

Atlas of Butterflies and Diurnal Moths in the Monsoon Tropics of Northern Australia.
By M. F. Braby, D. C. Franklin, D.E. Bisa, M. R. Williams, A. A. E. Williams, C. L. Bishop and R. A. M. Coppen. ANU Press, Canberra. 430pp, 2018.

Price $135.00 for hardcopy or free download of full pdf from https://press.anu.edu.au/publications/atlas-butterflies-and-diurnal-moths-monsoon-tropics-northern-australia

This landmark volume has been compiled by a team of people with decades of field experience in the diurnal Lepidoptera of northern Australia and sets out to establish a baseline body of data upon which future faunal perturbations due to climate change and other factors can be judged. In doing so they have produced an astonishingly detailed and attractive volume which illustrates every species alive in colour, gives detailed maps of every confirmed locality for each species and discusses distribution, habitats, food plants and seasonality for each. Much of the data is presented in maps, bar charts and seasonality boxes which make it easy to visualize the characteristics of each species. The 'monsoon tropics' for the purposes of the book covers the Kimberly region of NW Australia, the northern half of the Northern Territory and the western gulf region of north Queensland. Cape York Peninsula is not included which gives a refreshing emphasis in the book to those western parts of the Australian monsoon zone in NT and NWA which are usually given limited coverage. All 132 species of butterflies located in the region are included as well as a suite of 31 day-flying moths in the families Sesiidae, Castniidae, Zygaenidae, Immidae, Geometridae, Uraniidae, Erebidae and Noctuidae. The book is in large A4 format and is available from the publisher as a soft-covered hardcopy book or as a free downloadable pdf.

Announcements

Design a logo and WIN two great bee books!!

https://www.facebook.com/Australian.Native.Bee.Association/

The newly formed Australian Native Bee Association is looking for a logo. Please help us with your ideas and designs. We would like a design that encompasses the diversity of all Australian native bees (social stingless bees, as well as semi-social and solitary species) and must include the initials ANBA. Ideally it could be used in colour or black & white formats. References to indigenous culture are welcomed. Upon submitting your design, please feel free to explain the inspiration and influences that went into your creation. Please send your design to:

Trevor Weatherhead queenbee50@bigpond.com

by 31 May. The prize for the winner is two stunning books, donated by CSIRO Publishing:

One copy of Bees of Australia (RRP $50)
https://www.publish.csiro.au/book/7786,
AND
One copy of Guide to Native Bees of Australia (RRP $50).

But wait, there is more...

We are also searching for a name for our Newsletter. The winning entrant ALSO wins a copy of each of the two books above.

Best wishes,
Tim Heard,
President, the Australian Native Bee Association
https://www.facebook.com/Australian.Native.Bee.Association/

Job opportunity: Australian National Insect Collection Technician

A new indefinite position has just been advertised for a Research Project Officer (ANIC technician), level 3, to work on the curation of the Diptera collection and support the Diptera research team.
The position is advertised externally on Seek:
https://www.seek.com.au/job/38926765?searchrequesttoken=43de71f5-3dd8-481e-89d6-a87b8138d884&type=standout
Submissions close on the 2nd June 2019.

Insect Cabinet for Sale

I'm a UQ Entomology graduate (finished in 1991). I've got a high quality timber insect cabinet that I've held onto for 30 years but am ready to 'rehome' for the right price (see photos). This was purchased in the late '80s from Australian Ento Supplies. They still sell this model - drawers are foam-lined -for $5231.60 (http://www.entosupplies.com.au/equipment/storage/cabinets/entomological-cabinets-_-timber-_-14-drawer-_-deluxe-model) . I'm listing mine for $2000 (or nearest offer). Some scratches to the timber top (cedar is very soft and easy to scratch unfortunately), but the drawers/glass lids are all in good condition. It needs a clean (sadly my lovely collection was eaten by Psocids), which I'll give it prior to sale. If anyone is interested, I'd be very glad if people drop me an email - tokensmith@gmail.com. Thank you very much for your assistance. Kind regards, ***Ken Smith***

Botany-Art Workshop on Moreton Island: 12th to 14th July 2019

Three days at Moreton Experience Blue Lagoon Camp with Tanya Scharaschkin, a freelance botanist and artist based in Tasmania. She was a full-time academic involved in research and teaching in Queensland until mid-2017. Her research and teaching focuses on the structure, evolutionary relationships and geographic history of plants. Tanya's workshops provide a unique blend of science and art. She hopes her workshops will inspire others to not only admire plants but develop an understanding and appreciation of their biology and diversity. During this workshop you will learn the following:

- the ecology and natural history of Moreton Island
- key features of the more common Australian plant families
- adaptations and growth requirements of plants to different habitats
- structure and function of different parts of a plant
- basic terminology associated with plant descriptions
- botanical conventions involved in naming plants and why names change
- how to press and preserve plants for accurate identification purposes
- how to dissect, observe and document key features of plants

Cost: $520: Includes ferry, transport on island, excursion to The Cape, accommodation and ALL meals. This is an amazingly good deal, when you consider the location and the fact that you can relax and learn without worrying about what to cook!

To book, contact Alan Genninges: text message 0428 783781 or email alan@moretonexperience.com

More details:
http://www.moretonexperience.com/BotanicalDrawing.html

For additional workshop information, contact Tanya scharasc@gmail.com

51st Annual Conference of the Guild of Natural Science Illustrators

June 30 - July 6
University of Queensland, St Lucia
Women's College

Insect illustrating workshop and much more!

Insects in Black and White with Peter Marsack

Date: Thursday, July 4, 2019
Time: 1:00pm - 5:00pm
Length: 4 hours
Price: $95 (includes a materials fee)

Insects vary enormously in size, shape and colour, providing wonderful subjects for the illustrator.
This workshop will focus on attention to structure in the process of building a drawing; use of magnification in a drawing, use of references, especially specimens and photos; and the process of rendering in pencil and ink (including scratchboard). Demonstrations will form part of all practical illustration sessions.
Participants will have the option of working from available specimens, developing an artwork from their own references, or using drawing templates that we provide so that they can concentrate on rendering.
This workshop will help you to see insects with fresh eyes and will establish the importance of drawing as a foundation for your artwork.

Other workshops:

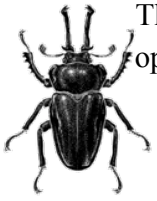
Digital Workshops, Photoshop, Sculpting & Monoprinting

For more details on these workshops and to register see:
https://2019gnsi-conf.org/program/workshops

While the workshops are part of the conference, workshop attendees do not need to attend the conference. You need to register for the workshop but there is no day fee applied for those days.

Pre-conference Photography Symposium with Les Walkling

The photography symposium should be a fabulous day and useful for anyone working with digital colour. AIMBI Qld is sponsoring Les Walkling to come up from Melbourne. This symposium requires a day fee, unless you attend the whole conference.Les will be speaking about some cutting-edge stuff.
See more: https://2019gnsi-conf.org/program/pre-conference-photography-symposium



This is only the second time the conference has been held outside the USA so it's a wonderful opportunity for anyone interested in natural history illustration. https://2019gnsi-conf.org/

Geoff Thompson, Organising Committee Chair
geoff.thompson@qm.qld.gov.au

Meetings & conferences

2019 Genetics Society of AustralAsia Conference
June 30– July 4, 2019
University of Melbourne, Melbourne, AUSTRALIA
http://www.genetics.org.au/

43rd New Phytologist Symposium: Interaction Networks and Trait Evolution
July 1–4, 2019
Zürich, SWITZERLAND
https://www.newphytologist.org/symposia/43

16th International Auchenorrhyncha Congress
2-8 July 2019
Cuc Phuong National Park, Vietnam
http://iac.vnmn.ac.vn

8th International Symposium on Molecular Insect Science
7-10 July 2019
Sitges, nr Barcelona, Spain
https://www.elsevier.com/events/conferences/international-symposium-on-molecular-insect-science

2019 International Congress of Odonatology
14-19 July 2019
Austin, Texas, USA
https://worlddragonfly.org/meetings/ico2019

Society for Molecular Biology & Evolution (SMBE) 2019
July 21–25, 2019
Manchester, ENGLAND
http://smbe2019.org/

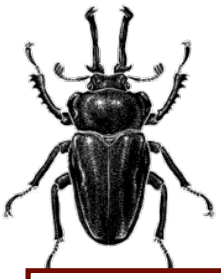
Ento '19
August 20–22, 2019
London School of Hygiene & Tropical Medicine, London, UK
https://www.royensoc.co.uk/event/ento-19

Ecology of Aphidophaga 14
September 16–20, 2019
Montreal, CANADA
https://www.aphidophaga14.uqam.ca/

Entomology 2019
November 17–20, 2019
St. Louis, Missouri, USA
https://www.entsoc.org/events/annual-meeting

Australian Entomological Society's 50th AGM and Scientific Conference
in conjunction with
Society of Australian Systematic Biologists *and* **Australasian Arachnological Society**
1-4 Dec 2019
Brisbane, QLD
https://www.austentsoc.org.au/AES/

International Congress of Entomology
19-24 July 2020
Helsinki, Finland
www.ice2020helsinki.fi



Diary Dates for 2019

Meetings held on the second Tuesday of the respective month

MARCH 12	Mike Muller, ESQ President	AGM and Presidential Address: *"Come in Sucker – A 46-year Journey with Biting Flies"*
APRIL 9	Dr. Phyllis Weintraub (Volcani Institute, Israel)	*"Symbiotic bacteria associated with phytoplasma vector"*
MAY 14	Dr. Nancy Schellhorn (RapidAIM Pty Ltd)	*"The journey to RapidAIM."*
JUNE 11	Notes and Exhibits	Student Award winner and other presentations
AUGUST 13	Dr. Raghu Sathyamurthy (CSIRO)	*"Assessing risk in host-specificity testing for weed biocontrol: juxtaposing scientific and regulatory perspectives*"
SEPTEMBER 10	Susan Wright (Queensland Museum)	"*The Queensland Museum Collection – what we hold and why"*
OCTOBER 8	Perkins Memorial Lecture: Prof. Ary Hoffman (Uni. of Melbourne)	TBA
NOVEMBER 12	Mark Schutze (QDAF)	TBA
DECEMBER 11	Notes & Exhibits	Notes and Exhibits/Christmas Afternoon Tea

SOCIETY SUBSCRIPTION RATES

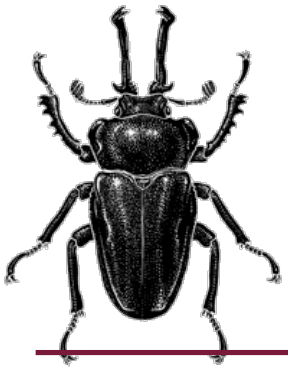
GENERAL	Person who has full membership privileges	**$30pa**
JOINT	Residents in the same household who share a copy of the *News Bulletin*, but each otherwise have full membership privileges.	**$36pa**
STUDENT	Student membership conveys full membership privileges at a reduced rate. **Free the first year**, $18pa subsequent years. Students and others at the discretion of the Society Council.	**$18pa**

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

AUSTRALIA	Individuals/Institutions	**AU$33pa/AU$37pa**
ASIA/PACIFIC	Individuals/Institutions	**AU$60pa/AU$65pa**
ELSEWHERE	Individuals/Institutions	**AU$65pa/AU$70pa**
ELECTRONIC	Individuals/Institutions	**AU$25pa/AU$30pa**

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

Notice of next meeting:

Tuesday, 11 June 2019, 1:00 pm

Notes & Exhibits

"Melaleuca-galling scale insect"
Craig Edwards, ESQ 2019 Student Award Winner, University of Queensland

"Got Milk? An update on the 'milk glands' of viviparous bat flies"
Shannon Close, University of Queensland.

"Minute primitive moths Heliozelidae: a flagship group of reciprocal conservation significance"
Don Sands, ESQ Life member

"Insecta I have dined with"
Joolie Gibbs, Director, Gympie Regional Art Gallery

"Grilo Protein"
Grilo Protein Company, Sustainable protein for environmentally-conscious people!

All welcome! Join us after the meeting for tea and coffee!

Ground floor Library, Ecosciences Precinct, Boggo Road, DUTTON PARK

More venue details available at **http://www.esq.org.au/events.html**

Next News Bulletin: Volume 47, Issue 4 (June/July 2019)

Deadline Friday, 28 June 2019.

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