Entomological Society of Queensland

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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.*

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Entomological Society of Queensland

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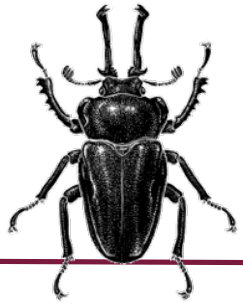
The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News 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.

The issue of this document does **NOT** constitute a formal publication for the purposes of the "International Code of Zoological Nomenclature 4th edition, 1999". Authors alone are responsible for the views expressed.



Entomological Society of Queensland
Minutes for General Meeting

Tuesday, September 10th, 2019

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park.

Meeting open: 1:02pm

Attendance (29):

Members (28): Jessa Thurman, Geoff Thompson, Susan Wright, Andy Howe, Robert Teakle, Bernie Franzmann, Kathy Ebert, Justin Bartlett, Mark Schutze, Vivian Sandoval, Colleen Foelz, Ian Buddle, Mike Muller, Shannon Close, Craig Edwards, Adelaide Power, Matthew Purcell, Don Sands, Owen Seeman, Helen Nahrung, Graham Forbes, Bradley Brown, David Exton, Jane Royer, Cate Paull, Natalia Medeiros de Souza, Andrew Hayes, Penny Mills.

Visitors (1): Katie Hiller.

Minutes: The minutes of the last meeting were circulated in News Bulletin 47[5] August 2019. Moved the minutes be accepted as a true record: Penny Mills; Seconded: Mike Muller; Carried: All.

Nominations for membership approved by council:

A warm welcome to:

General Members:

1. Nicole McMullen
2. Luke Gooding
3. Andy G. Howe

Joint Members:

1. Stephen & Dayana Barker

Student Members:

1. Ethan Beaver (Univ. of Adelaide)
2. Adelaide Power (UQ)

General Business:

The Council recommended Dr David Rentz for Honorary Life Membership of the ESQ for his distinguished service to entomology. Dave's case has been prepared by the society treasurer, Jessa Thurman. Jessa summarised Dave's career and contribution to entomology and the Entomological Society of Queensland, and moved that Dr David Rentz be endorsed as an Honorary Life Member of the Entomological Society of Queensland. Geoff Thompson seconded this motion, and it was carried by all present. Dave's formal induction as an Honorary Life Member will take place at the Perkins Dinner next month and we are saving accolades until then.

Vale Merv Bengston: His funeral was held on September 3. He was a Past President of the Society (1971) and was at DPI for 50 years. An obituary will be prepared and published in an upcoming News Bulletin issue.

Main Business: Susan Wright (QM) talked about "The Queensland Museum Collection – what we hold and why". The vote of thanks was given by Justin Bartlett.

Next meeting: The next meeting is our Perkins Memorial Lecture on 8th October, which will be presented by Dr Ary Hoffmann. A reminder that the Lecture will be held at the Women's College Auditorium at the University of Queensland; parking is available but members are encouraged to use public transport where possible. On the evening of the Perkins Lecture we will have the Perkins Memorial Dinner, which will be at Hillstone, St Lucia Golf Links. Please send your RSVP for the dinner to Penny Mills (secretary@esq.org.au) by September 24.

Meeting closed: 1:56pm.

The Entomological Society of Queensland

presents

2019 Perkins Memorial Lecture: Tuesday 8th October at 1pm

at

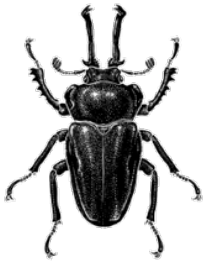
Women's College Auditorium at the University of Queensland (see map, p. 100).
Tea & Coffee following. *All welcome!*

At our next meeting...

"Studying the endosymbionts living inside insect cells: from curiosity driven research to disease control (and beyond)"

presented by
Professor Ary Hoffman
University of Melbourne
Bio21 Institute

Endosymbionts are microorganisms that live inside the cells of insects. Perhaps the most widespread endosymbiont is *Wolbachia*, a bacterium that is maternally transmitted by its host and best known for its ability to affect the reproduction of its host. Reproductive effects of *Wolbachia* include its ability to cause sterility when infected males mate with uninfected females, and its ability to generate parthenogenesis in infected females. Recently, *Wolbachia* releases have started to be used to control dengue and other arboviruses vectored by mosquitoes. These releases take advantage of the ability of the *Wolbachia* to block virus transmission in females and to cause sufficient sterility to suppress mosquito populations. Such early applications of endosymbionts are likely to be supplemented by many others in the coming years, not only for vector control within the context of public health interventions but also in controlling insect pests of agriculture and forestry. In this talk I discuss some of the current applications as well as others that are now starting to emerge.



A bit about Ary...

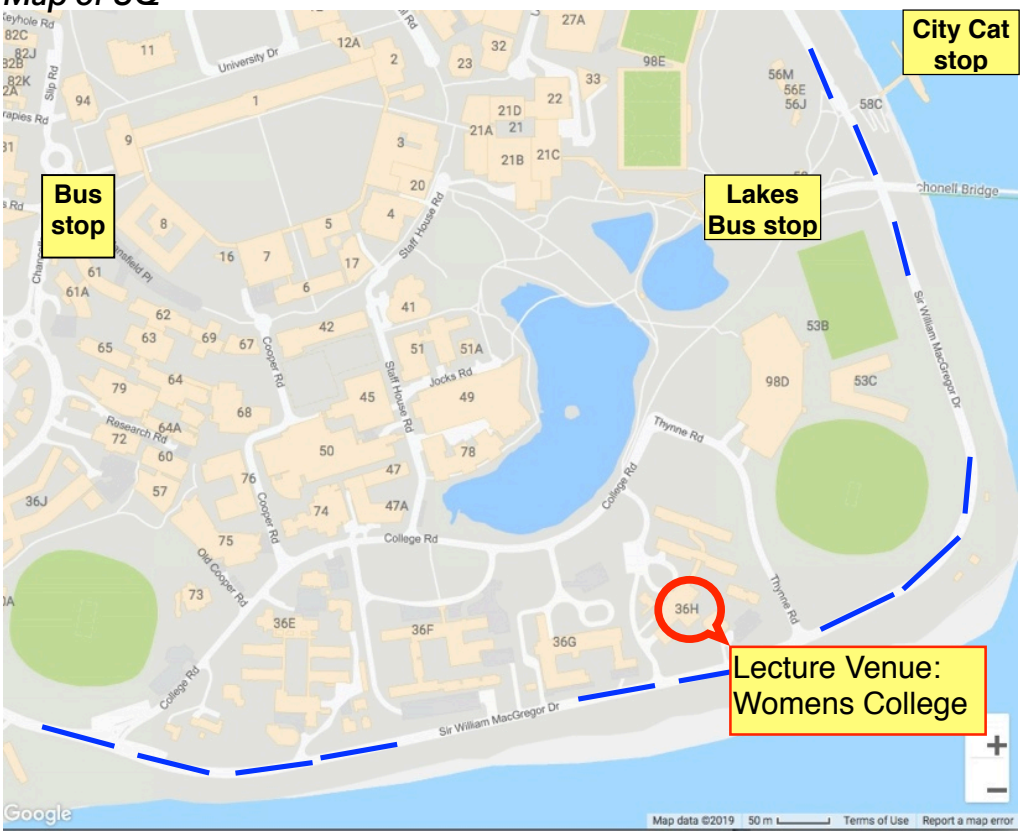
Professor Ary Hoffmann is an entomologist and geneticist who undertakes research on *Wolbachia* bacteria living inside insects, climate change adaptation and pest control. His group is helping to develop novel approaches for suppressing disease transmission in mosquito vectors and for controlling agricultural pests, and his group also examines new ways to predict the adaptive capacity of organisms under climate change. Ary works collaboratively with several mosquito programs and pest control programs around the world on the applied use of *Wolbachia* and other endosymbionts. He is a fellow of the Australian Academy of Science and a foreign fellow of the American Academy of Arts and Science. He is Past President of the Australian Entomological Society and the Australasian Genetics Society. Ary received a Federation Fellowship in 2005 to conduct research at University of Melbourne where he heads a research team located at the Bio21 Institute. He is now a Laureate Professor and NHMRC Principal Research Fellow.

Why do we have a Perkins Memorial Lecture?

Frederick Athol Perkins (1897–1976)

Frederick Athol Perkins was one of the 14 founders of the Entomological Society of Queensland on 14 June 1923 and he gave the inaugural address on "The Queensland Fruit Fly Problem" at its first meeting. He was also the first lecturer in entomology at the University of Queensland (1926), and first Head of the Department of Entomology (1952). Perkins was a stimulating teacher in class and field. He set up the UQ Insect Collection which is now housed at the Queensland Museum and consists of more than 1,000,000 specimens of insects and related arthropods from all Australian states and territories. He was active in the taxonomy of pest fruit flies and stoneflies, and worked on mosquito control during WW2. Athol Perkins was a major influence in entomology in Queensland for half a century. The biennial Perkins lecture celebrates his memory.

Map of UQ



Where is the Perkins Lecture Venue?

The venue of the Perkins Memorial Lecture on Oct. 8 will be at the Women's College at the University of Queensland, College Rd. This map of UQ will assist you in getting to the Perkins Lecture. Public transport is highly recommended.

Red circle: location of Women's College.
Yellow: public transport transit points (Chancellor's Place: buses, taxis; UQ Lakes bus terminal; CityCat ferry terminal).
Blue: $5/day **limited** street parking along Sir William McGregor Drive.

If you have any questions please email:
secretary@esq.org.au

Feature article

The Queensland Museum Collection: What we do and why

presented by
Susan Wright
Collection Manager
Queensland Museum

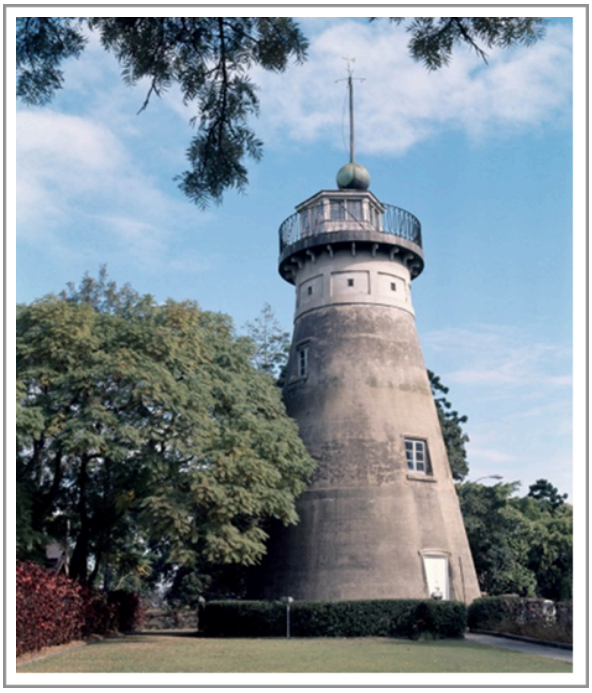
I have worked at the museum for 23 years so it was very difficult to select stories and specimens to share. I decided not to focus too much on the history of the museum, although if you are interested in more detail please see "Time for a Museum" published by the museum in 1986 via the link https://www.biodiversitylibrary.org/item/126532#page/1/mode/1up.

The Queensland Philosophical Society founded the Queensland Museum in Brisbane on 20 January 1862, operating from a room set aside in the Windmill. The windmill tower in Brisbane is the oldest of its type left standing in Australia and further distinguished by having been built by convict labour.

The *Moreton Bay Courier, Jan 1862,* quoted: "*A large room has been set aside in the windmill to receive contributions of specimens of natural history for classification and arrangement. It is hoped this will provide the nucleus of a Queensland Museum*."

In 1899, the museum moved into what is now known as "The Old Museum" and remained there for 86 years. We moved into the current building at Southbank in 1986 with much fanfare, which included trucking large dinosaurs through Brisbane's streets.

The museum of today is a very different institution. In 1912, there were 12 members of staff, but by 2017 this was close to 300. We now hold items of cultural importance as well as natural history specimens. We expanded to encompass a number of branches across the state, which over 2.4 million people visited last financial year. These include:



The Windmill, the first home of the QM.

- Queensland Museum and Sciencentre, South Brisbane

"The Old Museum"

Moving to Southbank.

- The Workshops Rail Museum, Ipswich (TWRM)
- Cobb+Co Museum, Toowoomba
- Museum of Tropical Queensland, Townsville (MTQ)
- Museum of Lands, Mapping and Surveying, Brisbane
- Earth Science Museum at Uni of Qld in conjunction with UQ
- Museum Collections Research and Loans Centre, Hendra

The main branch is, of course, the South Brisbane building, with most of our collections and staff being housed there, including the insect collections. However, the others have their own focus and collections. MTQ is the only other branch with specimens of insects with Steve Johnson's butterfly collection and the Harris Moth and Butterfly collection.

We now conduct research on a broad range of topics spanning biodiversity, geosciences, cultures and histories. We have a state-wide loans service for school education kits at our Loans Centre at Hendra. The Loans Centre services an area from Cape York, west to Cloncurry and south to the border with over 800,000 people/year accessing the kits. We have a regional services program – Museum Resource Centre Network–providing professional and community support for collections and museums across the state. They are particularly busy after events such as floods and fires with information being sought over the salvage of collection items. There is also a state-wide public Discovery Centre answering enquiries on a huge range of topics with over 7000 queries per year of which 1900 are insect based.

The current location at Southbank, Brisbane.

Some of the collection areas with toys and other cultural objects (left) and fossils (right).

Entomology at the QM

Entomology has one of the largest collections within the museum with approximately 3.5 to 4 million specimens. The collection is managed by two Collection Managers: Karin Koch and myself. In addition we have a senior curator, Dr Chris Burwell, whose focus is Hymenoptera, especially ants, and Odonata. Dr Christine Lambkin is our other curator and, as well as being the ESQ permit officer, she focuses on the systematics of Diptera. We also have a number of regular visitors in the form of our honoraries, including Greg Daniels (Asilidae), Peter Allsopp (Scarabaeidae) and Geoff Monteith (dung beetles and many other groups).

We house the collection in an environmentally controlled facility, controlling temperature, humidity and light to limit the possibility of pests, mould or fading of the specimens. We still use naphthalene, although many institutions and collections have removed this from their pest management arsenal.

The naphthalene levels in the collection, after testing, are deemed low enough that it is a low risk compared with the probability of pest damage. Newer institutions have the opportunity to use other structural controls and increased quarantine measures. In our older building these facilities are not available to us, so we have retained the naphthalene.

We hold pinned, papered, slide mounted and alcohol preserved specimens and cover all insect groups and habitats within Qld. We have a comprehensive collection of rainforest insects from all major tracts of rainforest in Qld including the dry rainforests of the Brigalow Belt areas west of the divide. We focus on Qld but also hold material from other Australian states and territories, mainly the east coast, and countries such as New Caledonia, PNG, and the Solomon Islands. We hold a small amount of other exotic material from Europe and the Americas.

Our Insect Giants display drawer.

An original drawer from Murdoch DeBaar's collection.

What we do

As the state museum, we collect, preserve and tell the stories of Queensland. We provide access to the collection both through visitors and loans of material to researchers (we currently have about 1000 loans worldwide) and through digital media: photographs and data via the web. We conduct and facilitate research (mostly taxonomic/ecological) and add value to the collection through collecting specimens and managing donations. We accept material into the collection for many reasons, as each collection is as individual as the person who put it together. Sometimes it is for historic rather than scientific reasons. We do not accept all collections and the reasons why not are just as varied. Mostly it comes down to whether the material relates to our state's story, whether the documentation (or label information) is complete and we have room and the resources to house it appropriately. We can only accept a certain number per year and 1-2 major collections per year is about our limit. We are more likely to accept a donation if it is accompanied by an offer of assistance in incorporating it into our collection.

We also supervise students, produce publications, webpages, and factsheets, contribute to displays, answer enquiries and carry out identifications. We do not tend to deal with biosecurity, medical or agricultural queries but pass these onto the most relevant people, for example Mark Schutze, Justin Bartlett or Bill Crowe for biosecurity issues. We also reserve the right to charge for identification, particularly if there are a large number or there is a commercial interest in the identification.

Some of our collection.

Murdoch DeBaar was a forestry entomologist whose Lepidoptera collection was donated to the museum after he passed away. This Mistletoe drawer perfectly illustrates Murdoch's passion for the role of insects in the natural world and his desire to educate people about them. He set this drawer up to show the variety of insects associated with mistletoes and in fact has dried some mistletoe foliage and flowers and added that to the drawer.

Roger Guard and his wife Jill died in the MH17 Malaysian Airlines tragedy in July 2014. Dr Guard had been head of pathology at Toowoomba Hospital

Part of Roger Guard's collection

and was heavily involved in the Toowoomba community. He had a long-standing interest in Lepidoptera and, over the years, he amassed an impressive specimen collection, including a small collection of moths from Heard Island, where Roger spent a summer season as a doctor with the Australian Antarctic Division. Roger's family donated the collection in his memory. Some of the specimens are now on display in our new Discovery Centre.

University of Queensland Insect Collection

The University of Queensland Insect Collection (UQIC) is now part of the QM Insect Collection since it moved in 2011. The collection was similar in size to the pre-existing QM insect collection, so we installed a compactus system to ensure it could fit in the space available. The collection was a research collection begun in the 1920s by F.A. Perkins, the first lecturer in entomology at the University of Queensland. Well-represented groups include Coleoptera, Diptera and Hymenoptera, mainly due to the lecturers and their students depositing material during their degrees. For example, there is a very good bee collection due to Elizabeth Exley and her students.

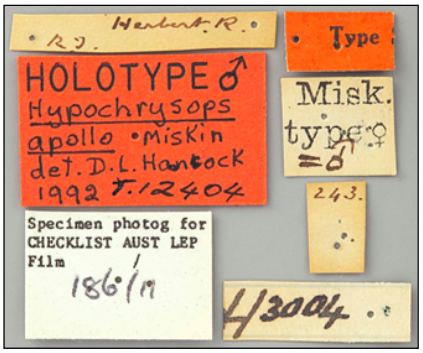
The oldest specimen we have found in our collection so far, is a specimen of the Bright Shield-skipper *Signeta flammeata* (T192859) collected in 1837 in Melbourne. This is very early in Melbourne's history as the city was founded on 30 August 1835. It was incorporated as a Crown settlement in 1837, and named Melbourne by Governor General Richard Bourke on 10 April 1837 in honour of the British Prime Minister, William Lamb, 2nd Viscount Melbourne. We believe this specimen came into the

Two images of the "St Patrick's Day" box of *Calloodes* rutelines which I remember from my UQ days as a student. I rediscovered it when auditing the UQ's donation.

Possibly the oldest specimen in the QM collection, a Bright Shield-skipper *Signeta flammeata* and its label.

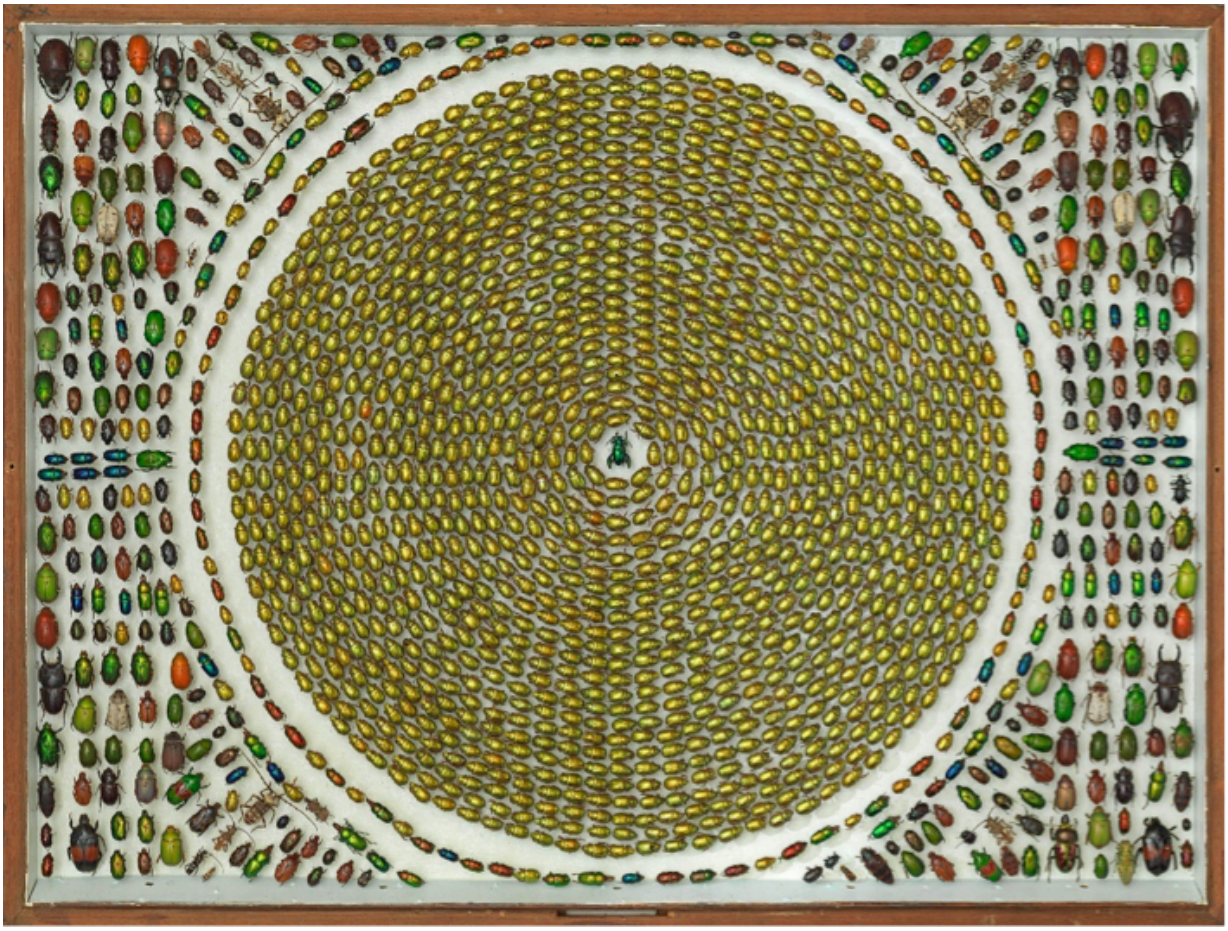
Ex.: 45 mm. Hab.: Herbert River. Coll.: Turner.
The specimen—probably a ♀—from which the above description was made is in the possession of Mr. R. E. Turner, of Mackay, but is in so exceedingly mutilated a condition, being devoid of head and abdomen, and much rubbed, as to be only just capable of being provisionally described; it has, in fact, been preserved by being pressed in a book. Enough, however, remains to show that the finest Australian species of this beautiful genus has hitherto escaped discovery. It approaches somewhat to *Chrysanthis*, *Feld.*

The original description of the Apollo Jewel *Hypochrysops apollo* Miskin, 1891 complete with condition notes.



Label from the holotype of the Apollo Jewel showing a typical Miskin label with an elongate locality label and a code number corresponding to his notebooks. Handwriting and labels can be vital clues to collectors or donors when, as in this case, neither the collector nor the donor used his name on the label. The label L/3004 is our original registration label. All our numbers changed to "TXXXX" when the registers were digitised. The "L" of course stands for Lepidoptera.

The Apollo Jewel holotype in all its glory and what it should look like (a specimen from Murdoch's collection).



Golden Shield case from the F.P. Dodd collection. The central disc of "The Golden Shield" comprises 1350 specimens of *Anoplognathus parvulus*.

UQIC via an old collection previously purchased by a donor.

Another wonderful story held in our collection is that of the holotype of the Apollo Jewel *Hypochrysops apollo* Miskin, 1891. This is my new favourite specimen. I love the fact that despite it being in such dreadful condition, Miskin described it in 1891 and the name is still valid!

Data, Data and more Data

Having a specimen registered refers to the data about the specimen: the label data, the condition of the specimen, any identifications or donor information is available in a database and the specimen given a unique number. The entomology section has about 270, 000 specimens registered and this data is available online through our website or through the Atlas of Living Australia https://www.ala.org.au/ . The ALA allows us to review how many records are being downloaded and what reason for them being accessed and over 5 million downloads of the museum records is an impressive number. It is heartening to see that the data is accessed even though a small percentage of our collection is online. The records in the ALA need to be carefully considered as there have been errors in the original data or in the transfer process but it is a wonderful resource none the less. All major museums have data accessible through the portal.

Dodd Collection

A discussion of the QM collection would not be complete without a mention of the Dodd Collection. The Queensland Museum holds 42 beautifully-arranged showcases made by F.P. and A.P. Dodd and their family from 1917 through to the 1960s. It is QM entomology's single most valuable collection and is, according to the recent valuer, one of the best examples of its kind in the world. It is not

scientifically valuable as few of the specimens have labels but it is important due to its historic value and its potential to illustrate the beauty of insects.

In 1884 Frederick Parkhurst Dodd was a 23-year-old bank clerk who took up butterfly collecting, and soon became so engrossed in natural history that he left the bank in 1895, determined to make an independent living from insects. He began to collect and supply insect specimens to museums and wealthy private collectors overseas. He developed a show collection of spectacular insects in his home and charged admission. These striking display cases gave vent to his appreciation of the beauty of the insects. In 1918 and 1923 he toured the show collection to the southern states, renting halls to display his wonders to the Australian public. He became nationally known as "The Butterfly Man of Kuranda".

A verse from a poem by Longfellow spelt out in small moths. Longfellow's signature is spelled out with small beetles.

"And whenever the way seemed long or his heart began to fail SHE would sing a more wonderful song or tell a more marvellous tale."

Notice to Members: Updated By-Laws

At the August Council Meeting, Council voted on an updated version of the ESQ's By-Laws. The By-Laws were updated to clarify some sections (e.g. the Small Grants Scheme - *see right*), to correct minor errors in other sections, and to include changes that had previously been voted on but not followed through.

Additionally, the By-Laws have been formatted to simplify their layout. A pdf document with a summary of the changes was emailed to members in late August. The updated version of the By-Laws can also be found on the ESQ's webpage. Thanks goes to Mark Schutze, who did much of the hard slog in updating the ESQ's By-Laws.To see a copy of the complete By-Laws, use the following link:

http://www.esq.org.au/pdf/ESQ_ByLaws_13_Aug_2019_updated.pdf

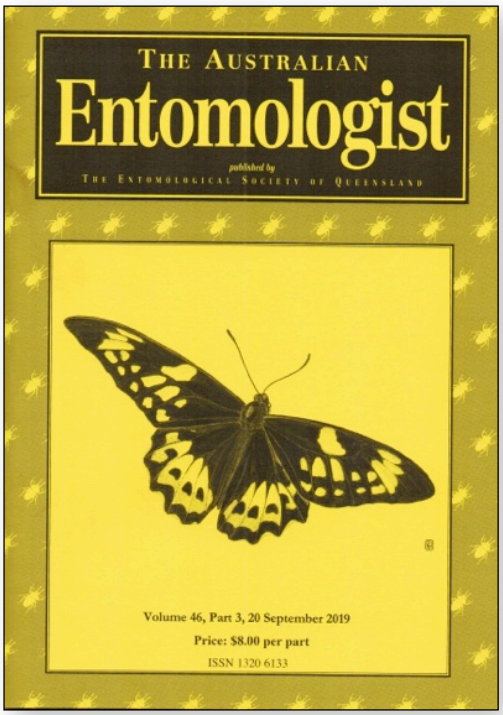
Section 12n.ii (Small Grants Scheme) Section restructured:

ii. Provide a final report at the end of the project. This may take at least one *of three forms:*

1. A summary of project outcomes submitted to the ESQ News Bulletin*; format and issue for publication to be determined in consultation with the* News Bulletin *Editor; once again, a presentation to an ESQ General Meeting is encouraged but not mandatory;*
2. Submission to The Australian Entomologist *of a manuscript generated from the project;*
3. A written document (maximum 5-pages) submitted to the ESQ Council outlining the project aims, methods used, results found, conclusions drawn, and any other relevant information.

An invitation to subscribe

The Australian Entomologist



The Australian Entomologist is a quarterly scientific journal devoted to entomology of the Australian-Pacific Region. This journal was commenced in Sydney in 1974 by Max Moulds and is now published by the Entomological Society of Queensland. It is one of the leading outlets for research on native insects in Australia and adjacent areas. Our regular cover artist is journal subscriber and ESQ member Dr Albert Orr who lives at Currimundi. He has produced an image of the Richmond Birdwing Butterfly in flight for the 2019 issues.

Annual hard copy subscription for individuals is $33 in Australia, $60 in Asia/Pacific and $65 elsewhere. Electronic (pdf) version available for $25 (Institutions: $30). To subscribe, see our website: www.esq.org.au/publications.html

Contents list for the latest *Australian Entomologist:*

Volume 46 Part 3 was mailed to subscribers on September 20. It is a 56-page issue and contains the following ten contributions:

BEAVER, E. P. A new species of *Aenetus* Herrich-Schäffer (Lepidoptera: Hepialidae) from Tasmania, with notes on the *splendens* group of species in South Australia

BRABY, M. F. First record of *Neohesperilla xiphiphora* (Lower, 1911) (Lepidoptera: Hesperiidae) from Western Australia

EBERT, K. M. Book Review: Byrne & Lunn *Dance of the dung beetles*

HUTCHINSON, P. M. and ALLSOPP, P.G. *Bolboleaus houstoni* Howden, 1985 (Scarabaeoidea: Geotrupidae: Bolboceratinae): diagnosis of the female, placement in a key and notes on distribution and habitat

JOHNSON, I. R. and WILSON, P.R. New Australian records for subspecies of Nymphalidae and Lycaenidae (Lepidoptera) from Dauan Island, Torres Strait, Queensland

LAMBKIN, T. A. First record of *Yoma algina netonia* Fruhstorfer, 1912 (Lepidoptera: Nymphalidae: Nymphalinae) from Torres Strait, Queensland, Australia

LAMBKIN, T. A. A further record of *Charaxes marki* Lane & Müller, 2006 (Lepidoptera: Nymphalidae: Charaxinae) from Timor Leste

MACKEY, A.P. A new combination for the New Guinean moth *Euproctis virginea* Bethune-Baker, 1904 (Lepidoptera: Erebidae: Lymantriinae)

ORR, A.G. Book Review: Braby, Franklin, Bisa, Williams, Williams, Bishop & Coppen. *Atlas of butterflies and diurnal moths in the monsoon tropics of northern Australia*

THEISCHINGER, G. *Austrophya monteithorum* sp. nov., a new dragonfly (Odonata: Anisoptera, Libelluloidea) from tropical Queensland, Australia, with notes on its collection and locality

Entomology News

from Queensland and beyond...

Developing Australia's edible insect research and industry to improve environmental, health and cultural outcomes–CSIRO Symposium

By Vivian Sandoval

This exciting symposium was held at the Ecoscience Precinct from the 28-30 of August and organised by Dr. Rocio Ponce-Reyes (CSIRO Land and Water) and Dr. Bryan Lessard (National Research Collections Australia). The symposium was attended by more than 30 people (Fig. 1) including researchers, industry stakeholders and the indigenous community to discuss the best way to support and promote the development of the edible insect industry in Australia.

The main speaker was Emeritus Professor Dr. Arnol van Huis from Wageningen University in the Netherlands (Fig. 2) who gave a general overview about harvesting, farming and usage of edible insects in different cultures. Other speakers spoke about aboriginal uses, public acceptance, environmental benefits, human nutrition, marketing and labelling. I presented a talk about the industry in Brazil representing the Brazilian Association of Breeders of Insects (ASBRACI). The Insect Protein Association of Australia (IPAA) was there to offer guidance and encouragement for new projects and start-up businesses.

Figure 2. The organisers, main speaker and me! From left to right: Bryan Lessard (the fly-guy), Arnold van Huis, Rocio Ponce-Reyes and Vivian Sandoval. (Photo by Geoff Monteith).

Figure 1. The attendees of the Edible Insect Symposium held at the Ecosciences Precinct.

Eight Australian SMEs presented their businesses and the products they sell:

- Leap Cricket Protein: Cricket protein bars and powder. Founder: Jessica Wasteney, VIC.

www.leapcricketproteinbars.com

- Rebel Food Tasmania: Edible insects nut butters and Tenebrio Hommus. Founder: Louise Morris, TAZ. www.rebelfoodtasmania.com
- Grilo: Cricket powder and blends, cricket snack bars and roasted whole crickets. Founders: Lucas, Camila, Pedro and Martina, NSW. www.griloprotein.com.au
- Buggy Bix: Dog treats with black soldier flies and mealworms. Founder: Shaun Eislers, NSW. www.buggybix.com.au
- Goterra: Food and organics waste management for business, households and industry with black soldier flies. Founder: Olympia Yarger, ACT. www.goterra.com.au
- GrubsUp: Whole roasted crickets and mealworms, dukkha, powder and energy bar. Founder: Paula Pownall, WA. www.grubsup.com.au
- Bug Me: Entomophagy nutrition consulting services. Founder: Nicole Senior, NSW. www.bugme.com.au
- Bugs and Beads: Handcraft insect collectibles and jewellery. Founder: Vivian Sandoval, QLD. www.bugsandbeads.com

more

MOTH NIGHT 2019
Cairns, Australia

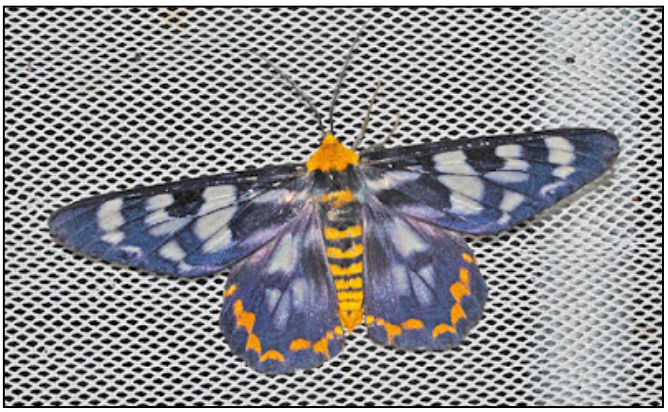
By David Rentz

The annual Moth Night was held in the Botanic Gardens, Cairns, on 28 August 2019. More than 50 members of the public attended, including several children. It was a perfect night--warm, windless and dry. Moth Night is an international event with over a dozen countries taking part. It was organised in the Northern Hemisphere during July. Of course, it is mid-summer in July in those climes and moths are at their peak abundance at that time. We decided to hold our Moth Night a month later this year so it would be closer to Spring and maybe a few more moths than usual would be active. It seemed to be a good move but we feel it would have been even

more productive if it were not so dry. A good rain a couple of weeks prior to the evening might have prompted more insects to emerge from their winter slumber.

Moth-ers assembled at 6.00 pm in the Botanic Gardens Visitor Centre for a short talk, to meet one another and view a couple of drawers of local moth specimens that they might encounter later. Light refreshments were served and then the attendees went out to check the two light sheets. We wandered around observing and photographing insects that were active in the vicinity of the light sheets. Most folks agreed that spiders outnumbered the insects. Several large wolf spiders and huntsmen of various sizes were out and about. Lacewing eggs and a few caterpillars, as well as nymphal katydids were discovered.

Photos were provided by Kylie Brown (KB), Louisa Grandy (LG) and Buck Richardson (BR).



Dysphania numana - Photo: Buck Richardson

Argina astraea - Photo: Buck Richardson

Above: Dave Rentz setting up the light sheet. Photo: Louisa Grandy

Left: Checking out the moths on display. Photo: Kylie Brown

Bugs bloom after big wet in northwest Queensland

by Geoff Monteith
Queensland Museum

In the dry inland of Queensland there are often 'outbreaks' of various insect species following early season rains. Sometimes they fly to homestead lights, or the lights of lonely petrol stations, and build up to such numbers that they become a nuisance. The term 'gidgee bug' is often applied to them by the public and entomologists' phone lines run hot with enquiries when they turn up. Two spectacular examples of massed insects have occurred this year, each of a different species, but not far apart in the arid Julia Creek/Richmond region 500 km inland from Townsville (Fig. 1).

In inland north-west Queensland is a large belt of vegetation known as the Mitchell Grass Downs which extends in a crescent from Boulia through Julia Creek, Hughenden, Winton and south through Longreach to about Charleville (Fig 1). Mitchell grasses of the genus *Astrebla* predominate on extensive treeless plains of black soil, broken only by occasional low trees along creek lines. A freak 10-day weather event on these rolling plains between Julia Creek and Hughenden in January-February this year smashed all previous rainfall records when, after years of drought, a monsoon trough and associated tropical low became stationary in the area and dumped 800 mm of rain on the parched landscape (BOM, 2019). The resulting floods caused massive losses of drought-weakened cattle which were widely reported, but also created perfect conditions for breeding of insects on the flushing new plant growth which quickly followed.

The first insect aggregation arising from this event was reported by Christine Lambkin at the June ESQ meeting (Lambkin 2019). It involved literally "knee-

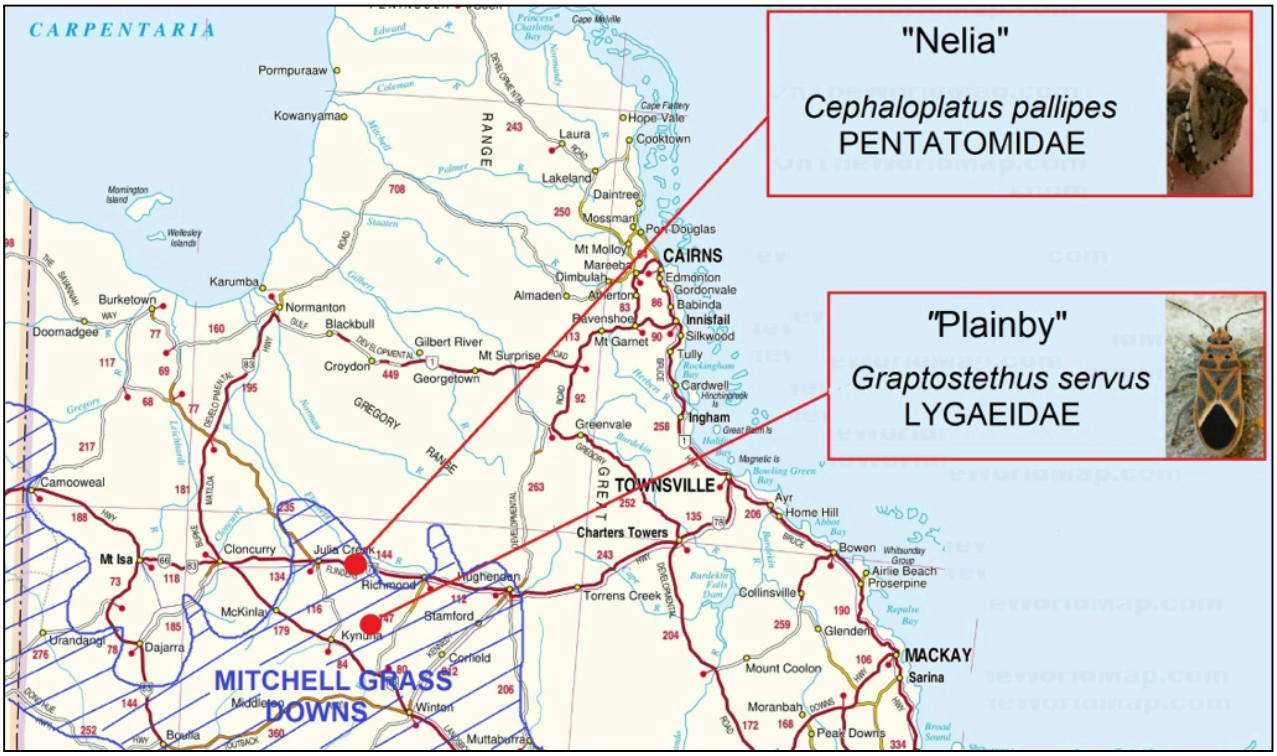


Fig. 1. Map of north Queensland showing extent of the Mitchell Grass Downs biogeographic region and the location of the two insect aggregations discussed.

Fig. 2. *Graptostethus servus* Fab. (Heteroptera: Lygaeidae).

deep" masses of the shield bug *Cephaloplatus pallipes* Walker which were attracted to lights and accumulated in house gardens at Nelia (-20.655^{0}S X 142.213^{0}E) which is 50 km east of Julia Creek (Fig 1). The aggregations commenced in April about 8 weeks after the rains. Since *Cephaloplatus* species feed on grasses it is obvious that they derived from the new growth of Mitchell Grass on the plains surrounding the lonely settlement. Christine nominates this species as the archetypal "Gidgee Bug".

The second aggregation involves a completely different species and is from Plainby Station (-24.40^{0}S X 142.616^{0}E) which is just 90 km SSE of the Nelia aggregation of *Cephaloplatus* (Fig 1). Information, photographs and specimens have been sent by Tricia Batt who lives in one of the houses in the homestead complex of several houses on the banks of a tree-lined creek at the head of the Flinders River drainage, which runs through extensive Mitchell Grass downs. The species is *Graptostethus servus* Fabricius, a large (10-12mm), red, black and white species of Lygaeidae (Fig 2).

The bugs arrived there at the beginning of June which is about 4 months after the rain event, and are still there in mid-September. They occupy a 50 metre diameter area in only one of several house gardens in the complex and no other clusters have been observed in similar shady places along the creek. Within the aggregation area the bugs occur in numerous dense clusters, each of many hundreds of individuals, on stockyard posts (Fig 3), house walls (Fig 4), tree trunks (Fig 5) and shrub foliage (Fig 6). If undisturbed they are completely quiescent with no evidence of feeding or mating. If disturbed by smoke or watering, clusters of bugs drop to the ground or fly up in swirling masses before settling again. Plants, such as hibiscus shrubs, which have borne heavy swarms for long periods show wilted and browned leaves.

Interestingly, and in contrast to the *Cephaloplatus* at Nelia, the *Graptostethus* at Plainby do not come to house lights and show no nocturnal activity. So their aggregation is an intrinsic behaviour rather than one generated by light attraction. An earlier study of

Fig. 3 *Graptostethus servus* on posts of a stockyard at Plainby.

Fig. 4. *Graprostethus servus* cluster on the brick house wall.

Fig. 5 (above). *Graptostethus servus* cluster on trunk of a paperbark tree.
Fig. 6 (left). *Graptostethus servus* clusters beneath leaves of garden shrub.

aggregating insect behaviour in the Northern Territory (Monteith 1982) showed that many species of open forest insects move into the shaded shelter of dry rainforest patches during the hostile dry winter season and form quiescent overwintering aggregations which defend themselves by buzzing flight and defence secretions when disturbed. The *Graptostethus* behaviour at Plainby seems to be the same and indeed similar *Graptostethus* aggregations have been noted in fruit orchards and house gardens in the NT subsequent to the 1982 observations (Chin *et al*, undated).

Graptostethus servus is an almost cosmopolitan bug, occurring on all continents except the Americas. Within Australia it occurs across the north of the continent with a few records down the coast of Queensland as far as Brisbane (Slater 1985). They feed on seeds in the seed capsules of convolvulus vines (*Ipomoea spp*.) (Suzaki & Okada 2016) though there have been a few occurrences on commercial cotton (Schaefer & Panizzi 2000). There are several species of native convolvulus vines known from the broader region around Plainby Station and some of these proliferate as ephemeral ground covers after rain. These are probably the source of the vast numbers of *Graptostethus* currently inhabiting Tricia Batt's garden at Plainby. The fact that these vines will have taken much longer to mature their seed capsules as food for *Graptostethus* than the grasses took to flush as food for the *Cephaloplatus* probably explains why massed adults of the *Graptostethus* did not accumulate until June whereas those of *Cephaloplatus* appeared in April.

It is tempting to speculate that since the prolonged droughts, followed by record-breaking rains, that we see these days are undoubtedly linked to climate

change, then perhaps these spectacular aggregations of post-downpour insects, such as occurred this year at Nelia and Plainby, could also be seen as another product of climate change.

Many thanks to Tricia Batt for all photographs of the clusters.

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UQ Insect Science students get a closer look at the wonderful world of insects

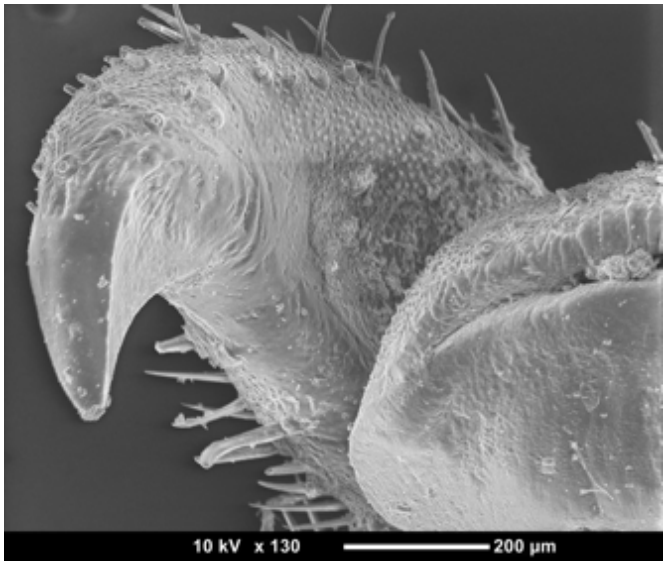
by Kathy Ebert

The Insect Science students at UQ were able to use a Jeol Neoscope Scanning Electron Microscope that was on loan for a week from UQ's Centre for Microscopy. The students, working in pairs, had to choose a particular insect feature to photograph. Each student was required to write up a brief report on their chosen feature, plus write a science blogpost aimed at a more general science audience. The students really enjoyed using the microscope and experiencing a closer look at insects. I thought you might enjoy reading some of their blogposts and seeing their images (and one of mine)!

Sticky Stick Insect Feet?

Kye Chamberlain

Stick insects are known to be able to adhere to and climb smooth surfaces, but how? The image shows half of the bottom of a stick insect's foot. To the left of the image you see one of the large claws that flag either side of the foot. You may think this could be the reason for the insect's incredible climbing skills but scientific literature actually suggests its amazing grip is actually due to the large pad you see on the right. There are three of these pads, two either side



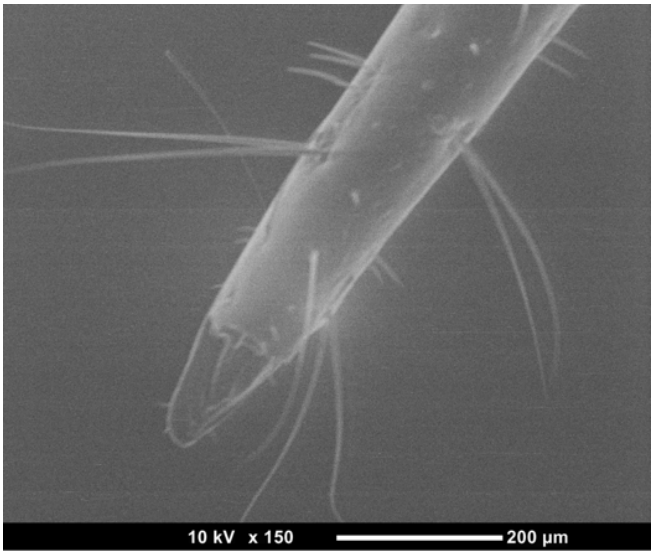
of the foot base and a smaller one behind these two. Fluids are secreted somewhere on the feet and are thought to be used with the pads to help the feet stick to a surface. The suggestion that the fluid actually helps un-stick the feet and the pads do all the gripping themselves has also been made.

That large pad you see below the claw is called the arolium and is the main sticking point for the insect when it is being pulled down by gravity or a person (they are essentially like suction cups). The other little pads I talked about are called euplantulae. The foot of an insect is made of a bunch segments where each of these segments actually has one of these pads. These pads are sticky too, but are more thought to be sticky via friction instead and so stop the insect from sliding down walls. Again I'll say the claws themselves actually do very little for stick insects but that doesn't mean they do nothing. How the claws work together with these sticky pads on the feet just further aids their incredible ability to climb on almost anything!

Stylate-Haustellate mouthparts of the stylish-haughty assassin bug (Hemiptera)

Hao Nguyen Tran

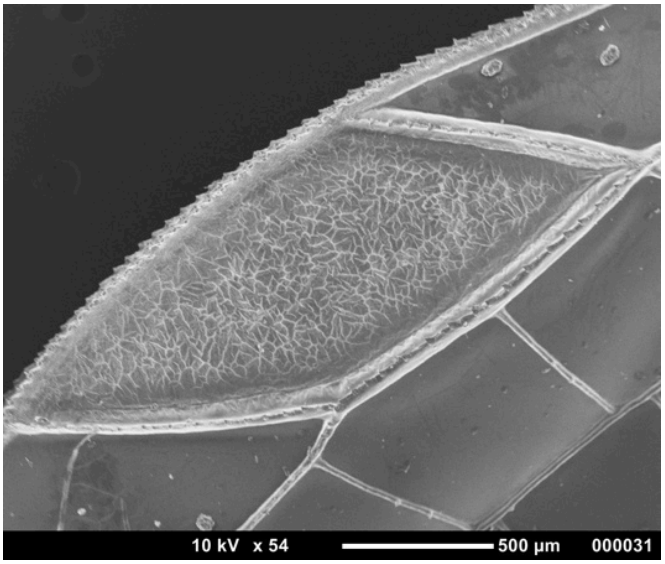
Swiftness, Espionage skills, Lurking... these are the ingredients to create the perfect assassin. However, assassin bug may have obtained its name from its specialised mouthparts. The stylate-haustellate mouthparts indicate the piercing and sucking feeding mode of this insect. The labrum, shortened and attached to the head, is connected to the long labium. Interestingly, the labium acts like a sheath, concealing the insect's weapon inside, the mandibular and maxillary stylets. When the bug is ready to strike the unwary target, the weapon is unsheathed and injected into the body is saliva from the salivary canal that can suppresses the immune system of the target or host for repetitive feeding. See the pictures below and see how similar it looks to a hidden knife! This hidden sword is said to be a specialised mouth in this bug. The butterfly, however, also sucks to feed, but they are not assassins. Why? Because the name butterfly does not sound assassin-like and it only feeds on nectar. Thus, most of the mouthparts are reduced to only a siphon. No piercing, no blood and especially, no 'style'ts.



What makes Odonata such efficient flyers?

Genevieve Durrington

Dragonflies and damselflies are known to be extremely strong flyers, some of the best of all the insects. Looking at a damselfly wing with the SEM was an extremely interesting and informative experience. The photo below is the pterostigma at the top edge of a damselfly hind wing which my partner and I took with the SEM. This was an interesting structure to discover, as I did not previously know about its existence.



From my initial research, I have discovered that a large portion of the damselfly's amazing flying ability can be attributed to their pterostigma. Structurally, the pterostigma is a region of greater mass on the top edge of the wing which confers a reduction in wing flutter and thereby an increase in maximum speed.

The Marvelously Modified Feet of the Australian Cockroach (Blattodea)

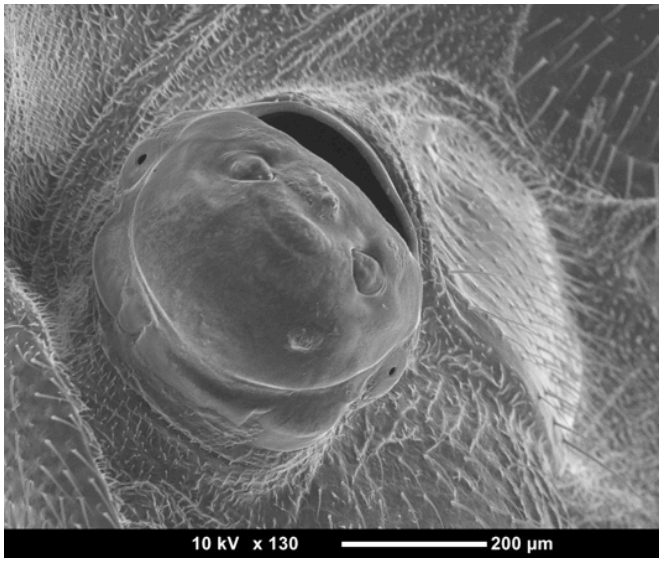
Tyson Thomson

How are cockroaches able to scale walls with ease? Much of a cockroach's ability to crawl up and along walls against gravity can be attributed to a large pad on the end of each of their feet–the arolium. Well-rounded in live specimens, this structure acts like a wet suction cup which attaches to surfaces and helps propel these organisms up and along walls and roofs. Although the arolia are the key mechanisms involves in climbing walls, they are also supported by the sharp, gripping pair of claws positioned behind each of them which aids in adhering to surfaces. These very interesting structures can be found in many other insects, clearly being specialised for organisms with similar lifestyles and supporting their wall-climbing abilities. The versions found in other specimens are often slightly different, and more specialised to benefit them.

Alien or evil Pokemon??

by Kathy Ebert

It's neither alien nor evil Pokemon character, but actually an unusual and elusive insect, commonly called a "stylops" (Order Strepsiptera). Stylops are **endoparasites**, which means they spend most of their lives living in and feeding on the bodies of other insects. The photo shows an adult female stylops protruding from the abdomen of a fruit fly! She has no legs but is permanently stuck protruding from the fruit fly abdomen until she gives "birth". What looks like her 'gaping mouth' is actually a brood canal opening. Her free-floating larvae live inside her body cavity feeding on her own haemocoel (insect equivalent of blood). When the larvae are big enough, they exit her body via the brood canal and disperse to find another host insect to burrow into and begin to feed. When the larva is ready to morph into an adult it protrudes from the host abdomen either as a stationary female or as a puparium from which a free-flying male emerges. What looks like evil eyes and facial features are actually greatly reduced mouthparts! But the adult stylops never eat. The two "earholes" are actually breathing holes (spiracles)! If an insect has been parasitised by one of these creatures, they say it has been 'stylopised' - how freaky is that!!



Thanks to Shannon Close for discovering some stylopised fruit flies to share with the class!

An invitation

The Butterfly & Other Invertebrates Club is extending an invitation to all ESQ members:

Pre-Conference Excursion to the Bribie Island Butterfly House!

We are thrilled that the Australian Entomological Society's 55th Annual Conference is being held here in Brisbane and we look forward to welcoming everyone to our sunny city. The Butterfly & Other Invertebrate Club (BOIC) would like to invite conference delegates to participate in a pre-conference excursion on **Sunday, 1st December** to visit the **Bribie Island Butterfly House.**

The Butterfly House was founded by Ray and Delphine Archer, who were inspired by their love of butterflies and their desire to give back to the world, to develop the Bribie Island Butterfly House in their retirement. With the support of the Moreton Bay Regional Council and a band of willing volunteers, work commenced in 2015. Now, you will be able to walk amongst the butterflies in flight and immerse yourself in the wonders of the butterfly world. One of the purposes of the Bribie Island Butterfly House is to help the less fortunate of the world, so all profits are donated to charities.

The tour will depart at 8.15am sharp from the Convention Centre and return at approx. 3.30pm. (We aim to have everyone back in time to prepare for the welcome drinks at the conference that evening.) Our lunch venue is the award-winning, beautiful Sandstone Point Hotel, located at Sandstone Point overlooking the pristine waters of the Pumicestone Passage and Moreton Bay. Delegates will be able to order from the restaurant menu and pay for their individual meals on the day.

The approximate cost will be $35 per person which includes the coach fare and entry into the Butterfly House. There are 50 seats available in an air-conditioned coach. Please let us know as soon as possible as we don't want you to miss out! ***To register:*** we will need your full name and contact details and we will respond promptly. Payment details will be provided on confirmation of registration.

Butterfly & Other Invertebrates Club, Inc (BOIC)
PO Box 2113, Runcorn
QLD 4113
www.boic.org.au
Email: info@boic.org.au

****We will need final numbers by 11th November and final payment by 16th November.****

For more INFORMATION and to REGISTER
Email or phone: Dawn Franzmann, Secretary, BOIC
0419 786369 or email**: secretaryboic@gmail.com**

Announcements

The Australian Entomological Society 2019 Conference

A combined conference of the Australian Entomological Society (AES), the Society of Australian Systematic Biologists (SASB) and the Australasian Arachnological Society (AAS) will be held at the Brisbane Convention & Exhibition Centre at South Bank, Brisbane, from Sunday 1st to Wednesday 4th December, 2019

For the Australian Entomological Society, this conference will be the **50th** Annual General Meeting and 55th Scientific Conference, and the first to be held in Queensland since 2015!

Conference theme: ***Understanding the Australian Biota in a Changing World,***
Keynote & invited speakers include:

Keynote & Invited speakers	where from	area of research interest
Dr Seraina Klopfstein	Natural History Museum, Basel, Switzerland	Parasitoid wasps
Dr Bryan Lessard	CSIRO National Research Collections, Canberra	Biodiversity of flies and mosquitoes and edible insects
Dr Romina Rader	Universityof New England, Armidale	Pollination ecology
Dr Owen Seeman	Queensland Museum, Brisbane	Mites! species diversity, morphology and relationships with insects

Plus there's an Illustration and Photographic Competition with Cash prizes: Student Illustration, Open Illustration and Photographic; Student events and more! See: https://www.aesconferences.com.au

Early Registration Ends: 28 October 2019

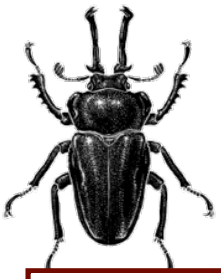
The International Congress of Entomology

returns to Europe in 2020, for the first time in 24 years! The Finnish capital Helsinki is proud to host the ICE2020 – the ICE congress with latitude! 19-24 July 2020

Plenary speakers: *Gene E. Robinson, Segenet Kelemu, Alexey Polilov, Louise E.M. Vet, Janet Hemingway and Jianghua Sun*

Scientific sections include: Arctic/Alpine entomology, Biodiversity & Conservation, Biological Control, Ecosystem services, Insect & microbial molecular biology, Nanotechnology in Entomology, Cyborg insects , Insect navigation, and much more!

Super early registration closes **30 September 2019** **https://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)	*"Studying the endosymbionts living inside insect cells: from curiosity driven research to disease control (and beyond)"*
NOVEMBER 12	Mark Schutze (QDAF)	*"From past to present: origins and purpose of the Qld. Dept. of Ag. and Fisheries insect collection."*
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**

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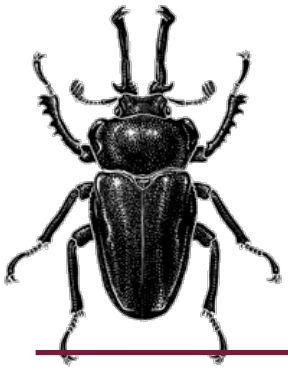
http://www.esq.org.au/publications.html



Entomological Society of Queensland

Notice of next meeting:

Tuesday, 8 October 2019, 1:00 pm

The biennial Perkins Memorial Lecture:

"Studying the endosymbionts living inside insect cells: from curiosity driven research to disease control (and beyond)"

presented by

Professor Ary Hoffman

University of Melbourne

Bio21 Institute

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

Venue:

Women's College Auditorium
University of Queensland (see map, p. 100)

Next News Bulletin: Volume 47, Issue 7 (October 2019)

Deadline Friday, 11 October 2019.

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