



June 2022

Issue

No. 622

CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

This month's member spotlight is Khalid Ahmad, who recently joined the society and immediately put his hand up for the role of Honorary Secretary. Khalid has a varied background in agriculture, professional pest control and the financial sector. He is currently working with Flick Anticimex.

Dinah Hales continues her interesting travelogue of her trips to northern Australia. This time from Darwin, Arnhem Land and Katherine with some accompanying photos.

Dinah has also contributed a series of photos on the metamorphosis of the orchard swallowtail butterfly in Photo Corner – thanks Dinah.

This edition Thomas Heddle has come on board to be co-editor of Tarsus to help this old dinosaur. With his connections into the student world, hopefully we will see more student contributions like that of Nisansala Perera. Nisansala is a PhD Candidate at Charles Sturt University, Wagga Wagga, and has provided an update on the work under the Dung Beetle Ecosystem Engineers program (www.dungbeetles.com.au)

The Presidents report from March 2022 together with the minutes of the 68th annual general meeting and associated reports are included.

Following on from the article in the last Tarsus, readers might be interested in the theme of women in speciation research.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/evo.14444>

We continue providing hyperlinks to entomological stories and research that may be of interest to members.

Kind Regards

Garry Webb

Thomas Heddle

Circular editors

Presidents Report

Dear Members,

In spite of another dreaded COVID year, **2021 was productive** with many achievements by Entomological Society of NSW (ESNSW) members. While still under the cloud of the virus the 69th AGM to be held in person and ZOOM. The good news is ZOOM allows the active involvement of our regional members to attend albeit on-line. The ESNSW Council members are dispersed around NSW: **Tamworth** (Dr Robin Gunning), **Armidale** (Professor Nigel Andrew), **Orange** (Dr Bernie Dominiak), **Sydney** (Robin Parsons, Gitte Strid-Nwulaekwe, Barbara May, Stephen Fellenberg, Garry Webb, Graeme Smith).

ESNSW primary focus is to support a Journal, a Newsletter and to contribute to the science and knowledge of entomology and allied subjects. The General & Applied Entomology Journal (G&AE) continues to attract papers. The honorary editor of G&AE Journal, Dr. Robin Gunning and team ensures the prompt on-line publishing of papers to assist authors' especially academic researchers. Prospective contributors for Volume 50 should contact the Editor: rgunning@bigpond.com. Past issues of the G&AE Journal are available online. I remind members to take advantage of the Council ruling of no page charges for papers published in G&AE Journal if at least one author is a financial member of the ESNSW. The impressive and informative ESNSW Newsletter, Tarsus (**Garry Webb**, Circulation Editor), continues with backgrounds on individual entomologists and provides hyperlinks to entomological stories and research of interest to members and interesting photos of insects. (Tarsus #614 reported that Geoff Monteith, a Queensland-based member is one of the top ten biologists / naturalists in history with respect to the number of organisms named in his honour: 225 species and 15 genera!)

ESNSW website upgrade (\$3,000 budget) was achieved with gigantic input from Dr. Graeme Smith and his subcommittee assisting the NZ consultant, Tristan Claridge who was involved in the design of the original ESNSW website. Authors now have improved process which delivers online availability and early publishing of digital versions of papers. In addition, the reimagined **Informit** became live in 2021 which allows people to explore the new metadata automation services. The Website now also has an on-line 'New Membership' application facility with a PAYPAL payment option for subscription fees.

During 2022 after a marathon effort, Robin Parsons, current Secretary / Treasurer, finalised a non-exclusive data licence agreement with **EBSCO**. EBSCO, a pioneer in the library services industry, provides libraries, health care and medical institutions, corporations and government agencies with access to content and resources to serve the information and workflow needs of their users and organizations.

The winner of the **2021 Ted Taylor Prize** was Hannah Smart (UWS). Congratulation Hannah and a very special thankyou to Marcel Sayre (Macquarie Uni), Elise Oakman (Sydney Uni) and Sunayana Sajith ((UWS) for their impressive contributions. ESNSW offers a prize of \$1000 in memory of our long-standing treasurer, Ted Taylor.

Between lockdowns ESNSW held the **2021 Annual Dinner** again arranged by Mary-Lynne Taylor for 2021 and Quiz conducted by Prof Dinah Hales – competition is fierce because of the highly sought after, winner’s prize.

Ross Rickard, Assistant Director - Principal Entomologist, Biosecurity Plant Division, Department of Agriculture, Water and the Environment, updates ESNSW of Entomologist positions with the NSW government.

Congratulations to ESNSW Vic-President, **Professor Nigel Andrew**, a Fulbright Scholar (Senior Scholar category) recently returned from Knoxville, Tennessee, USA. Nigel is Professor of Entomology at UNE, Armidale

Wishing all an enjoyable 2022 and I encourage your involvement with the Entomological Society of NSW.

Yours sincerely,
Bob Ryan

Robert F. RYAN MSc,ASTC; FRSN; FRACI,C.Chem; FAIFST; FAMI CPM.

President Entomological Society of New South Wales

Hosted on-line via Zoom (id81490128786) by Prof Nigel Andrew; on 31 March 2021

Opened: 6.45pm

Attendance: Members: Nigel Andrew (Host & Vice President), Dinah Hales (member & AES Rep), Robin Parsons (Treasurer), Bob Ryan (Chair/President), Graeme Smith (member & Web Manger), Stephen Fellenberg (Councilor), Bernie Dominiak (Councilor) Non-member/visitor: None. All members present or represented were financial though quorum requirements were short by one member, ie; 7 instead of 8.

Apologies: Gitte Strid-Nwulaekwe (Business Manager), Garry Webb (Circular Editor), Barbara May (Councilor), Robin Gunning (Editor), George Hangay (member), Mike Bouffard (member), Georgina Binns (member), Howard Greening.

Minutes of the 67th AGM of 2020 were presented for acceptance as a true record by Robin Parsons as Secretary and the motion was proposed by Bob, seconded by Stephen and accepted by all in attendance as a true record of proceedings. NB: See PS* following 'Report of Hon. Treasurer' written below.

67th Report of the Council presented by Hon. Secretary; provided by Robin Parsons; was accepted by all in attendance. NB: see PS* below.

67th Report of Hon. Treasurer: The Financial Statements /membership statistics for year ended 31 December 2020 presented by Robin Parsons was accepted by all present. Account records and Books of Account were previously checked by Bob Ryan on the 24 March 2021. NB: see PS* below.

***PS: Minutes and Reports referred to above and the President's Report below were by unintentional omission by the Treasurer, not submitted to the Circular Editor for publishing in the April 2021 Tarsus. Arrangements have subsequently been made (28 March 2022) by the Treasurer with the President and Circular Editor to publish these items in the Tarsus edition for April 2022.**

Funds and membership were noted as being stable although; disregarding TTP complimentary memberships there is still a slow attrition of membership.

However, the on-line membership application facility within the upgraded website has attracted a few applications since early March 2021.

Subscriptions receivable for 2020 were all paid except for two members whose 2020 & 2021 fees remained unpaid as at the AGM of 31 March 2021 with no response to contact efforts; and so considered as lapsed.

Society fees for 2021 were invoiced and issued on the 18 January 2021.

Financial members for 2021 as at 29 March 2021 was 29 (64.44% of total) with 16 un-financial.

Access to the society's net banking needs review ie re-establishing the President's access and Swami (former Secretary) retained as a signatory; Bob and Robin still have signatory and full on-line banking access.

An external accounts audit was not carried out for the year ending 2020.

67th Report of Hon. Editors (Journal & Circular): No separate reports from Editors; The current Journal Editor, Robin Gunning is willing to continue in the role. The current circular Editor, Garry Webb is also willing to continue producing Tarsus; which now is coming out every two months.

67th Report of Hon. Business Manager: No separate report from BM; The number of Private Subscribers (all but one via EBSCO) remain stable at around 12.

The Treasurer rather than the BM will likely be following up and issuing Private Subscriber Invoices for current vol 49 and arrears for vols 43 to 48 of G&AE and continue posting Journals on behalf of the Business Manager.

67th Report of Ent Soc NSW's AES Representative: Dinah advised that responses from AES regarding Myrmecia were slow but finally coming together.

Web-Site Manager: Graeme advised that the Web site testing mode would go live for two weeks with members to receive emails to create User name/password access. Parallel systems will run for a while, with submissions proving to be more cumbersome.

Also note that searches on the website should be done by Title of the abstract and not text.

President's Report: Given by outgoing President Bob Ryan; will be published in Tarsus. (PS *expected Issue for April 2022); Noting the large vol 48th edition of G&AE, the Website upgrade and subsequent on-line publishing submission facility and the increased output of Tarsus under Garry Webb.

Election of the Council for 2021:

POSITION	NOMINEE	NOMINATED by	SECONDED by
Hon. President	Bob Ryan	Self	accepted by all
Hon. Vice President	Prof. Nigel Andrew	Self	accepted by all
Hon. Secretary	Robin Parsons	Not accepting Nomination	Noted- alternative required
Hon. Treasurer	Robin Parsons	Self	accepted by all
Hon. Business Manager	Gitte Strid-Nwulaekwe	Self	accepted by all
Hon. Editor	Dr Robin Gunning	Self	accepted by all
Hon. Public Officer	Robin Parsons	Self	accepted by all
Hon. Circular Editor	Garry Webb	Self	accepted by all
Hon. Councillors (x4)	Bernie Dominiak Barbara May Stephen Fellenberg Mary-Lynne Taylor	Self Self Self Robin P	accepted by all accepted by all accepted by all accepted by all
Website Manager	Graeme Smith	Self	accepted by all
Representative for Australian Entomological Society	Dr Dinah Hales	Self	accepted by all

Selection of Society Emblem for 2021:

Dinah's Ladybird (Coccinelidae) drawings may be used again as the Society Emblem. Alan Westcott's drawings may be used. Nigel suggested he may have someone (Student) or perhaps a drawing competition.

General Business:

- **TTP 2021:** Nigel will run this process (first run in 2020) again later in 2021. Graeme will run essays on line as Submissions.
- **Secretarial duties;** will be done by relief as required by Robin or other, available person. Stephen to canvass interest among Macquarie Uni student members, inquiries to Bob. Also contributions of drawings to be sought.
- **Chau Chak current displays;** Reminder from Fiona (from subsequent Council meeting Minutes) of themes; Weevils, butterflies and Animal Gods.
- The **2021 Ku-ring-gai Festival of Wildflowers** was not expected and would not be planned for due to Covid restrictions.
- The **Annual Dinner for 2021** will again be held at the Epping Club and Mary -Lynne to be asked to assist Robin in its organization and booking.
- **Show and Tell:** Dinah presented some Aphids found on Crepe Myrtle.

- **Next AGM (69th):** accepted for Wed, 09 March 2022; (PS delayed – date may be April /May 2022, not confirmed as at the preparation date of this document.).
- **Vale;** Phil Hadlington passed away 21 March 2021 aged 97.
- NB: Council Issues, New and brought forward are recorded separately on the Council Sub Agenda minutes of 31 March 2021.

Closed: 7:44pm (NB: Council's General Meeting commenced 7:45pm)

This document assembled on 02 April 2022 from AGM minutes by Mr Robin Parsons; Hon. Treasurer/ relief Secretary, Signed as a True and Accurate Record:

Verified as a True and Accurate Record by,

Mr Robert Ryan, Hon. President: _____/_____/_____

HONORARY SECRETARY'S REPORT for 2021

The 68th Report of the Council of the Entomological Society of New South Wales Inc. for 2021

1. The Council for 2021 was:

Honorary President	Mr Bob Ryan
Honorary Vice –President	Prof. Nigel Andrew
Honorary Secretary	Mr Robin Parsons (as casual)
Honorary Treasurer/Public Officer	Mr Robin Parsons
Honorary Business Manager	Ms Gitte Strid-Nwulaekwe
Honorary Editor	Dr Robin Gunning
Honorary Circular Editor	Mr Garry Webb
Councillors	Dr Bernie Dominiak Ms Barbara May Mr Stephen Fellenberg Mrs Mary-Lynne Taylor

Non-Council Officers

Web Site/ Page Manager	Mr Graeme Smith
Australian Ent. Soc. Correspondent	Dr Dinah Hales

2. **Membership** as at 31 December 2021: Please refer to the Hon. Treasurer's report for statistics. There were no resignations or formally lapsed memberships. All members except two, have valid and reliable email addresses. The first TTP winners (four of 2020) were granted Complimentary membership for 2021. The new website's on-line membership application facility attracted six new financial members.

3. **Council members & meetings:** All eight Officer positions were filled for the full year (2021); However the Secretary's and Business Manager's accounting functions being carried out principally by Treasurer, Robin Parsons.

Following the last sub-committee meeting via zoom on the 28 January 2021; the combined AGM/Council meeting on 31st March 2021 was (largely due to covid) held via 'Zoom' noting that the Zoom method allows Regional members of council in particular to attend.

4. **Society General meetings and events:** Again, due to the Covid19 pandemic physical face to face gatherings or events were limited or prohibited. The usual Wild Flower Art and Garden Festival at St Ives for August 2021 was not held though the Annual Dinner was held at the Epping Club on Saturday the 27 November 2021.

5. **The 68th AGM** was held via Zoom on the 31st March 2021; hosted by Prof Nigel Andrew at UNE.

6. **Volume 48 of General and Applied Entomology** was published and issued in March 2021; **Volume 49** pending for late 2021. Individual papers as they pass the editorial process are still being posted to the Society's website (member access) and so are available to members. Notices are sent to all members by the Secretary via general (BC) email.
7. **Circulars:** The Circular Editor (Mr Garry Webb) has again produced a total of six timely issues of Tarsus in 2021.
8. **Website Upgrade:** The November 2020 Council approved Web site upgrade has largely been completed at a total cost to date of \$2670.00; within the approved budget of \$3000.00. The Web site manager Graeme Smith and the Treasurer, Robin Parsons are still making a few refinements to the system with some complementary support from the provider, Claridge. These adjustments and adaptations will continue through 2022. Membership wide email communications will still be provided via individual Councillor's email systems. The support offered by Claridge during the process has been very good.
9. **Proposed Data Access Agreement with EBSCO;** is being assessed and amended via Council review facilitated by the Treasurer Robin Parsons. This will allow EBSCO the same access as members to individual papers as they are posted to the Web site. These papers will then be available to EBSCO's global customer base of teaching and scientific institutions. This is expected to commence from volume 49 in early 2022. There are no financial payments for this service and the Agreement is non-exclusive and may be terminated by reasonable agreement if required. Some royalties may be payable to Ent Soc NSW. At present there are **nine** Private subscribers to the full hard copy of G&AE. Any variations to the number of subscribers following enactment of this agreement will be monitored by Council and reviewed for any changes that may require reporting to membership or action by Council.
10. **Society Emblem:** The Society emblem for 2021 (vol 48) remains as shown on the front cover of G& AE since Volume 46 (varieties of the Coccinellid beetle *Coelophora inequalis* by Artist: Betty Thorn, School of Biological Sciences, Macquarie University for Dinah Hales). Council is still looking out for other sources of drawings, so if any member can assist with this please contact Council via the President.
11. **The Annual Society Dinner:** Despite Covid19, the 2021 dinner was held (again) at the Epping Club (RSL) on Saturday the 27 November 2021. It was attended by members, partners and friends. Dinah again devising a challenging quiz. Prizes provided by Mary-Lynne Taylor were as usual generous and much appreciated. Thank you again to Mary -Lynne and Dinah.

Robin Parsons, Hon. Treasurer / Secretary

10 May 2022

THE ENTOMOLOGICAL SOCIETY OF NSW INC

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 2021

GENERAL FUND (& PAYPAL Account) – INCOME

Subscriptions paid in 2021 (up to & including 2022)	2,190.00	
Plus Subs pd in advance of 2022 in prior year	00.00	
Less Subs paid in advance of 2022*	00.00	
Subscriptions Receivable (arrears @ YE 2021 250.00) less 45.00 unknown payer	205.00	
Less previous year Subs Receivable arrears	-90.00	
Bank interest (+ Term Deposit int \$0.00)	0.00	
Donations (PAYPAL test deposit)	0.04	2,305.04

- **PAYMENTS**

TTP Prizes 2020 (J Whitehead) + TTP2021 (H Smart)	-2000.00	
Public Liability Insurance 28 Jun 2021 to 28 Jun 2022	-861.26	
Website hosting-Claridge - 2021	-120.00	
Website Domain renewal 2020 (2yrs paid in 2020)	0.00	
Members payment to Publication Fund	-2000.00	
DFT Incorporation Annual lodgement fee 2021	-47.00	
Stationary & Postage Nil + T Heddle refund overpaid subs 25.00	-25.00	
PAYPAL Account Receipt & Transfer fees	-9.13	
Website Upgrade-Claridge final of \$2670 (3000 budget).	-1,670.00	-6,732.39
		-4427.35

Result for 2021

PUBLICATION FUND - INCOME

Journal Income Received-royalties 140.76+Page Charges Nil+Priv Subs 1590.00	1730.76	
Journal Income Accounts Receivable (Arrears of payments) Infmit Royalties 2021	130.00	
Less Journal Income Accounts Receivable Credited prior year 2020	-700.00	
Bank Interest	0.00	
Members payment to Publication Fund	2000.00	
Closing Journal Stock 31 Dec 2021 (100% depreciation + Recovery to vol48	5,500.00	
Advances to be Recovered	150.00	
Less supported claims against Advance(s)	0.00	8,810.76

LESS: PF Expenses = Costs of Journal

Opening Journal Stock 01 Jan 2021		-5,500.00	
Postage & Stationary Vol 48		-589.10	
Editorial Software; Adobe AcrobatPro Licence to Oct 2022 for Jnl Editor's PC		-263.87	
Printing Costs (Arrowprint) Journal Vols 48 & 49 published within 2021		-2389.80	
Advance-Business Manager Float 05 June 2017		-150.00	-8,892.77
	Result for 2021		-82.01

BALANCE SHEET AS AT 31 DECEMBER 2021

<u>ACCUMULATED FUNDS</u> ; Balance to 31 December 2020			32,698.22
Results for the year 2021	General Fund	-4427.35	
	Publication Fund	-82.01	-4,509.36
Balance to 31 December 2021			<u>28,188.86</u>
REPRESENTED BY: Cash at Bank	General Fund	19,719.29	
	Publication Fund	2,484.57	
	Term Deposit	0.00	22,203.86
Journal Stock-Committee's valuation			5,500.00
Debtors; Members Subscription arrears 250 less unknown payer 45.00		205.00	
Accounts Receivable (Journal Payment arrears)		130.00	
Advances to be recovered		150.00	485.00
<u>Less CURRENT LIABILITIES</u> Members Subscriptions in advance (>2022)*		0.00	
Uncleared cheques (0), Contras/expenses 2020 paid in 2021 (0)		0.00	0.00
Total Assets at 31 December 2021			<u>28,188.86</u>

Prepared & reconciled by Mr Robin Parsons; Hon. Treasurer 05 May 2022; sgn

HONORARY TREASURER'S REPORT

THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc.

MEMBERSHIP at the 31 DECEMBER 2021

<u>CATEGORY</u>	<u>FINANCIAL</u>	<u>UNFINANCIAL</u>	<u>TOTALS</u>
Honorary Life	1 - n/a	n/a	1
Ordinary	34	5	39
Special (eg Govt Pension);	8	0	8
Student	7	0	7
Company Assoc.	1	0	1
Institutional	1	0	1
Totals	52	5	57

Resigned Members; None

New Members

Miss Jennifer Collins joined May 2021

Dr Robert Martin joined November 2021

Dr Duong Nguyen joined September 2021

Dr Peter Ridland joined March 2021

Dr Murray Fletcher re-joined June 2021

Dr Kevin Wilkinson joined September 2021

The Royal Entomological Society, St Albans UK joined 2021

Ms Sharon Towett-Kirui TTP2020 Complimentary 2021

Ms Georgina Binns TTP2020 Complimentary 2021

Mr Daniel Jin TTP2020 Complimentary 2021

Mr Josh Whitehead TTP2020 Complimentary 2021

Likely to Lapse

Dr Swami Thalavaisundaram

Mr Franz Grossbechler

Lapsed Members;

Dr Colin Bower & Mr Peter Gillespie

Prepared by Robin Parsons Hon. Treasurer, 10 May 2022



ENTOMOLOGICAL SOCIETY of NSW INC.

COUNCIL Members and Volunteer Positions: AGM elections of 19 May 2022;

Dear Members,

Herewith Secretarial confirmation of the Honorary Officers, Councillors and volunteers elected for 2022 as follows;

President: Mr **Robert Ryan**; email Robert.ryan.consultant@gmail.co Ph: Mob. 0458 296 730.

Vice-President: Prof. **Nigel Andrew**; Uni. of New England. email nigel.andrew@une.edu.au

Hon. Secretary: Mr **Khalid Ahmad** Knahmad55@hotmail.com

Hon. Treasurer & Public Officer: Mr **Robin Parsons**; email robinp2@bigpond.com

Hon. Business Manager: Ms **Gitte Strid-Nwulaekwe**;

Hon. Editor: Dr **Robin Gunning**; email rgunning@bigpond.com

Hon. Circular Editor: Mr **Garry Webb**; email garrywebb1@outlook.com

Councillors (4):

Ms **Barbara May**;

Mr **Stephen Fellenberg**;

Dr **Bernie Dominiak**; DPI Orange

Mr **Thomas Heddle**; UNE Co-Circular Editor

Other volunteer roles:

Web Manager: Mr **Graeme Smith**; www.entsocnsw.org.au:

Australian Entomology Society (AES), Myrmecia; Correspondent: Dr **Dinah Hales**;

Events Co-ordinator: Mrs **Mary-Lynne Taylor**;

Prepared by Treasurer, Robin Parsons Secretary (outgoing Asst.) 26 May 2022.

Member Profile

Khalid Ahmad

I graduated in 1993 from University of Agriculture, Faisalabad Pakistan. After completing my M.Sc. in Agricultural Entomology started a career with a company engaged in Pesticide sales, after one year moved to the Pest warning wing of Punjab Agriculture Department and worked on Pesticide application and monitoring systems especially in Cotton and Wheat fields. Two years later I joined Punjab Food Department where I supervised the fumigation process of wheat storage godowns (grain storage warehouse) to monitor and control the stored product insects. In December 1999 I migrated to Australia and later joined the University of Western Sydney (Richmond campus) for a research programme on insect behaviour. For the next 3 years I worked on the effects of petroleum derived spray



oils on oviposition (egg laying) behaviour of *Helicoverpa* spp.. Then I joined a pest control company (Rentokil Initial) as a Commercial Consultant engaged in residential and commercial pests. As a Commercial consultant I visited many commercial and industrial sites in Sydney area carrying out pest infestation site inspections, evaluating any risk situation and advising the client about pest control solution options available. In June 2010 had a serious car accident and was out of work force for the next 4 years. I later setup a pest control advisory service and studied some courses in the financial sector, mostly in the financial education and compliance field in the residential home loans sector. At the same time, I joined a law firm Hutchison Lawyers part time assisting in property settlement & family law matters. I'm now working again in the pest control industry as client retention consultant with Flick Anticimex.

Volatile organic compounds in livestock dung define dung preference by dung beetles

Dung beetles use different volatile cues to locate randomly scattered feeding and breeding sources. These volatile organic compounds (VOCs) emit from fresh dung provide information on the location, type, and condition of the dung pad. It has been shown that several dung beetle species are capable of discrimination among different livestock dung types even though they are considered as generalists. However, the ultimate role of VOCs involved in dung attractiveness is yet to be established. My research work involved identifying VOCs associated with dung attractiveness by introduced *Bubas bison* and *Onthopghagus vacca* in Australia. So far, I was able to confirm the significant attraction of *B. bison* to horse dung volatiles and *O. vacca* to cattle dung volatiles in laboratory olfactory bioassays. Volatilome analysis of horse, cattle, and sheep dung volatilomes revealed the potential involvement of several dung headspace volatiles. Work in progress to screen behaviorally active VOCs using electro-antennography. The results of this study will be published in near future.

Nisansala Perera

PhD Candidate | Dung Beetle Ecosystem Engineers www.dungbeetles.com.au
Gulbali Institute | School of Agricultural, Environmental and Veterinary Sciences
Charles Sturt University, Wagga Wagga, NSW 2678

Travelling North Again

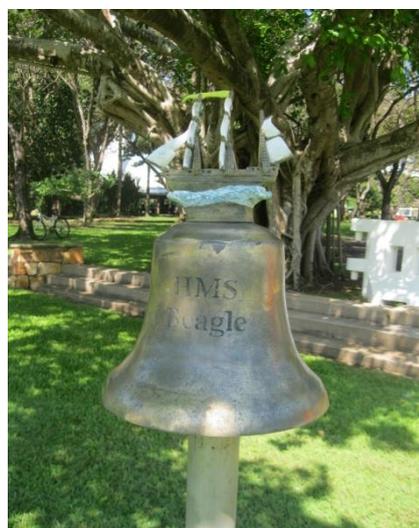
Dinah Hales

We enjoyed our first trip so much that the winter of 2016 saw us on the road, again with APT. This time the journey took us from Darwin, east to Kakadu and then south to Katherine before returning to Darwin. Apologies in advance: there is really almost no entomological content here but it was fun anyway.

We hadn't been to Darwin before, and enjoyed a couple of days sightseeing before the tour. We spotted a couple of unfamiliar birds - the northern form of the masked lapwing, *Vanellus miles*, and the orange-footed scrub fowl, *Megapodius reinwart*, the northern megapod equivalent of the brush turkey (which was once known as the New Holland vulture, surprisingly).



We were fortunate to arrive at the HMS Beagle Ship Bell Chime just as it was about to play: it includes this replica of the Beagle's bell, plus 11 other bells to complete two octaves. The other bells follow European and Asian styles and are topped by bronze castings of different parrot species. The installation was commissioned to celebrate 200 years since Charles Darwin's birth. The music is electronic and members of the public can play their own compositions.



This sculpture of Chinute Chinute by Koolpinyah Richard Barnes represents an Larrakia ancestor figure protecting the waterfront area and sometimes taking the form of a tawny frogmouth.

We enjoyed the Museum and Art Gallery, and a sunset tour on Darwin Harbour. The excellent dinner started with oysters and we were delighted to find that very few of our fellow tourists liked oysters.....

Then it was off on the road to Kakadu. This photo shows a so-called magnetic termite mound. The north-south orientation of the mound has nothing to do with magnetism. It is all about minimising over-heating. See

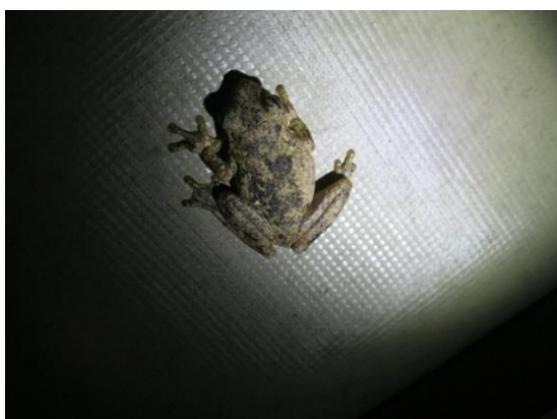


https://www.qm.qld.gov.au/Learning+Resources/~/_media/Documents/Learning%20resources/QM/Resources/Fact%20Sheets/fact-sheet-magnetic-termites.pdf

We had a walk in an area that we were told represented the general vegetation of the area before the time of the missionaries, when indigenous people were removed from their homelands and could not carry out traditional burning, so wildfires became common and destroyed most of the original forest ecosystem.



Our first night's stop had agile wallabies grazing near the up-market glamping tents, bee-eaters among the rosella flowers and a Floodplain Treefrog, *Litoria inermis*, in the bathroom.



The evening took us to a magnificent view of the sun setting over the Mary River flood plain - endless water birds roosting in the trees. Also, many feral pigs and buffaloes.

The next days were spent in Kakadu National Park. This emphasis here was on First Nations culture - rock art, cultural practices, landscape significance, seasonal food sources and so on. Some of the older art features Mountford figures (or Northern Running Figures) said to have been painted some 5000 years ago by the Mimi spirits, according to a notice on site, but otherwise estimated as 50000 years old. Maybe one of the zeros had fallen off the plaque. See <https://www.abc.net.au/science/articles/2014/10/09/4102916.htm> for information on the difficulty of dating rock art, [https://en.wikipedia.org/wiki/Mimi_\(folklore\)_for_a_brief_account_of_Mimi](https://en.wikipedia.org/wiki/Mimi_(folklore)_for_a_brief_account_of_Mimi), and <https://www.goodreads.com/book/show/24476881-aboriginal-paintings-from-australia> for Charles Mountford's book, showing old Mimi paintings on the cover.

We saw black kites patrolling in front of a traditional burn for animals flushed out by the fire.

Here's the obligatory Grevillea, remarkably delicate for a bush growing at the top of a sandstone hill. It's *Grevillea dryandri*. And beside it is a description of the seasons.



We were fortunate also to visit the Injalak Art Centre (<https://injalak.com/>) - they do painting, cloth printing and traditional weaving with plant material.

On a cruise of Yellow Water, we saw crocodiles and many aquatic bird species, including whistling ducks, *Dendrocygna*, and nesting jabirus (no photo).

We passed this burn a couple of kilometres before our night stop in tents at Cooina Lodge. By this time we had full confidence that there was no danger and were lulled to sleep by cane toads. I caught my only aphids here, but they turned out to be the now familiar rusty plum aphid *Hysteroneura setariae*. The first record for Australia for this aphid was from Heron Island. Yep, I was on Heron Island at the time.



The last days of the journey took us to Katherine, where we stayed in the Cicada Ecolodge and had an evening trip up the Katherine Gorge. They assured us that the saltwater crocodiles had all gone north for the dry season. This painting of cicadas was in the lodge foyer.



Then it was time to return to Darwin. We visited some beautiful waterfalls on the way and saw the biggest, best fed feral donkeys you can imagine. Nothing like your typical British donkey. Their pest status in the Northern Territory is discussed in <https://nt.gov.au/environment/animals/feral-animals/feral-donkey>. The ones we saw were similar to the ones in the last shot in the video.

We had the opportunity to visit the Adelaide River War Cemetery, dedicated to civilians and serving personnel killed in the 1942 bombing of Darwin.



Again, a wonderful trip with far more to it than these few pages can cover.

The origins of invasive cockroaches are not reflected in their names

Garry Webb

Many pest insects are named based on where they are first found or sometimes the nationality of the person describing them. This leads to a lot of confusion and detective investigation down the track. Carolus Linnaeus, the famous Swedish naturalist and father of taxonomy, first described the German cockroach from material collected in Germany. In more recent times it was thought that the German cockroach was native to north Africa. A recent paper by Tang, Bourguignon, Willenmse, de Coninck and Evans (2018) has identified that the German cockroach (*Blatella germanica*) was most likely native to south Asia and introduced into Europe around the 18th century. It is similar to other species of *Blatella* occurring in Asia rather than Africa. They suggest that the German cockroach was not originally associated with human habitation but was “domesticated” in Europe where it did become closely associated with humans, and made it the invasive species we know so well today.

The German cockroach is not alone in this regard. Our own Australian cockroach, *Periplaneta australasiae*, is likely native to western Africa according to Tang and colleagues, even though it was described from specimens collected in south Asia. The American cockroach, *Periplaneta americana*, is native to south and west Africa and was probably transported on slave ships from Africa to the Americas, perhaps as early as the 1600's.

These patterns of “confusion” are common to many other species of cockroach now considered invasive urban pests and no doubt to a whole plethora of other insect taxa. I know that many of the earliest descriptions of Cerambycidae (Coleoptera) by Linnaeus and others were ascribed incorrect locations, often incorrect continents. Samples were sent in by paid and amateur collectors from all over the globe to ‘centres of taxonomy’ (mostly European) with either inadequate label data or were subject to “expert bias” in the assigning of localities.

You can find the original article on cockroach origins here:

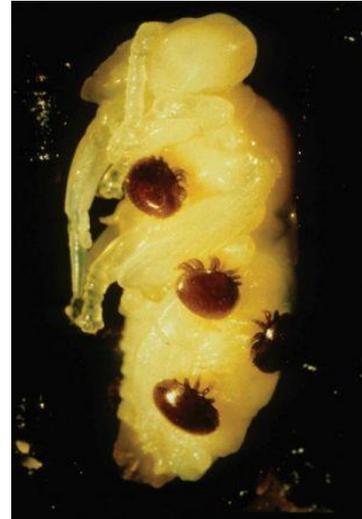
[Tang, Q., Bourguignon, T., Willenmse L., De Coninck, E. and Evans T. \(2018\). Global spread of the German cockroach, *Blatella germanica*. *Biological Invasions* **21**: 693–707.](#)

New Entomological Research

(Right Click on the titles (or CTRL Right Click) to see the full articles)

[Deadly varroa mite threatening honey bees at Newcastle](#)

A statewide emergency order was issued at 6pm last night after varroa mite was detected at the Port on Friday. The Department of Primary Industries is investigating potentially contaminated hives outside the initial 50 kilometre biosecurity zone. The mites are tiny reddish-brown parasites and are easily identifiable to the naked eye. They are the most serious pest of honey bees worldwide and if left untreated varroa mite will kill any bee hive it infects. It has never been detected in Australia, until now. Minister for Agriculture Dugald Saunders says containment and control activities will be carried out today, particularly at a property near Trangie in central west NSW which has hives from the same lot that have had varroa mite detected at the Port. “If varroa mite settles in the state, it will have severe consequences, so we’re taking every precaution and action needed to contain the parasite and protect the local honey industry and pollination.” The statewide order is a fourth tier general emergency zone that has been added to the existing zones, in which no bees are allowed to be moved across NSW. A 50km biosecurity zone is still in place around the port of Newcastle and beekeepers within that area must also notify the NSW Department of Primary Industries of the locations of their hives.



[New biosecurity zone set up after deadly varroa mite discovered at three more NSW properties](#)

Another biosecurity zone has been set up in New South Wales after varroa mite was discovered in beehives on three more properties. It comes as the destruction of hundreds of beehives in Newcastle and parts of New South Wales gets underway as authorities work to control the spread of the deadly parasite. The detection of the *Varroa destructor* — commonly called the varroa mite — in the Port of Newcastle last week triggered a 10-kilometre eradication zone and halt on all movement of bees across the state. The latest zone relates to an infested premises at Bulahdelah on the Mid North Coast, which is outside the previous zones, state Agriculture Minister Dugald Saunders said.



Hear me out – we could use the varroa mite to wipe out feral honey bees, and help Australia's environment

A tiny parasitic mite that lives on the European honeybee (*Apis mellifera*) has breached Australia's border quarantine and been detected in managed bee hives in New South Wales.



This is bad news for Australia's honey industry, with over 300 hives in Newcastle set to be destroyed and biosecurity zones in place. The potential economic impact to the honey industry is estimated at around A\$70 million per year, but the broader impacts to agriculture are not yet known. This is where much of the dialogue on the impact of varroa mite settling in Australia usually stops. But there's another way to look at this pest: as an effective biocontrol for feral honeybees in Australia's natural environment. Honeybees were introduced to Australia almost 200 years ago and out-compete native pollinators, which may have dire flow-on effects for ecosystems. The varroa mite's arrival in Australia was only a matter of time – and with better planning, we could benefit from one pest fighting another.

Another Pest of Pollinators: Small Hive Beetle Management in Honey Bee Colonies

There's been a lot of attention given to pollinators recently, especially native pollinators—which include bees, wasps, flies, beetles, and several other organisms—but also those species used commercially. Yes, I'm talking about European honey bees, (*Apis mellifera*). Their colonies are often moved great distances and are essential to produce many food crops. Like 'em or not, European honeybees are a critical spoke in the agricultural wheel.



Unfortunately, as with any commercial species, there are pest issues. *Varroa* mites and colony collapse disorder are probably the two problems that most folks are familiar with, but a new article published in March in the open-access *Journal of Integrated Pest Management* profiles another pest: the small hive beetle (*Aethina tumida*). Small hive beetles can cause millions of dollars in damage annually to honey bee hives, say the authors of the article, Virginia Tech's Morgan Roth, James Wilson, Ph.D., and Aaron Gross, Ph.D. Native to sub-Saharan Africa (and first observed in Florida in 1998), this invasive species feeds on honey bee eggs and larvae as well as the honeycomb and pollen. Larval frass results in increased growth of a fungus that causes fermentation and creates a slimy substance in the hive. A single female beetle can lay up to 2,000 eggs, so populations can increase very rapidly.

Enzyme of bacterial origin promoted the evolution of longhorned beetles

Larvae of longhorned beetles develop primarily in woody tissue, which is difficult for most organisms to digest. However, longhorned beetle larvae possess special enzymes to break down the various components of the plant cell wall.

Researchers at the Max Planck Institute for Chemical Ecology in Jena, Germany, have now taken a closer look at a group of digestive enzymes found only in this beetle family. They resurrected the primordial enzymes, which first appeared in a common ancestor of longhorned beetles. Horizontal gene transfer from bacteria to the beetle as well as ancient and recent gene duplications promoted the evolution of this family of digestive enzymes and enabled longhorned beetles to degrade the main components of the plant cell wall, which make the bulk of their diet.



Some viruses make you smell tastier to mosquitoes

Zika and dengue fever viruses alter the scent of mice and humans they infect, researchers report in the 30 June issue of *Cell*. The altered scent attracts mosquitoes, which bite the host, drink their infected blood and then carry the virus to its next victim.

Dengue is spread by mosquitoes in tropical areas around the world, and occasionally in subtropical areas such as the southeastern US. It causes fever, rash, and painful aches, and sometimes hemorrhage and death.

More than 50 million dengue cases occur every year, and about 20,000 deaths, most of them in children, according to the National Institutes of Health (NIH) National Institute for Allergy and Infectious Disease. Zika is another mosquito-spread viral disease in the same family as dengue. Although it is uncommon for Zika to cause serious disease in adults, a recent outbreak in South America caused serious birth defects in the unborn children of infected pregnant women. Yellow fever, Japanese encephalitis, and West Nile are also members of this virus family.



Tired mosquitoes would rather catch up on sleep than bite you

Turns out you're not the only one who needs a good night's rest to function well the next day. Researchers with the University of Cincinnati found that mosquitoes whose slumber is disrupted are more interested in catching up on their sleep than looking for food the next day. The research demonstrates how vital this biological function is even among insects.

"It was a bit surprising. Sleep deprived or not, a blood meal should appeal to them," UC doctoral student and study lead author Oluwaseun Ajayi said.

The study was published online on May 3 and in print on June 1 in the *Journal of Experimental Biology*. The phenomenon of catching up on missed sleep, called sleep rebound, has been observed in other animals such as honeybees, fruit flies and people.



Macro portraits reveal the glamor and peril of endangered insects

Photographer Levon Biss captures the exquisite majesty of bugs—and the pressures that threaten them.



Where do all the mosquitoes go in the winter?

Summer evenings by the pool, lake or BBQ mean mosquitoes. But what about during winter when we're mostly indoors? As the weather cools, these bloodsucking pests are rarely seen. But where do they go? Mosquitoes have complex life cycles that rely on water brought to wetlands, flood plains, and water-holding containers by seasonal rainfall. Depending on whether we're experiencing a summer under the influence of El Niño or La Niña, mosquito populations will change in different ways. During warmer months, their life cycle lasts about a month. Eggs laid around water hatch and the immature mosquitoes go through four developmental stages. Larvae then change to pupae, from which an adult mosquito emerges, sits briefly on the water surface, and then flies off to buzz and bite and continue the cycle. Water is crucial but temperature is really important too. Unlike warm-blooded animals, mosquitoes can't control their own body temperatures. The warmer it is, the more active mosquitoes will be. There's usually more of them about too. But once cold weather arrives, their activity slows. They fly less, they don't bite as often, they reproduce less, and their life cycle takes longer to complete.



[Scientists Suggest Killing Ants With Viruses – It's because they're murderers and vandals!](#)

Scientists say they've figured out at least part of North America's invasive, imported fire ant problem by turning a virus that kills them into a weapon. A group of researchers from Tennessee, Florida and North Carolina universities said in their new study, published in the print edition of [the Journal of Invertebrate Pathology](#) this month, that they successfully reduced wild Florida populations of imported fire ants. The ants reduce nearby biodiversity, so the team used a virus called *Solenopsis invicta* virus 3 to kill them. "Laboratory tests have shown that *Solenopsis invicta* virus 3 may be an effective natural control agent against its host, the red imported fire ant," the co-authors wrote.



<https://doi.org/10.1016/j.jip.2022.107767>

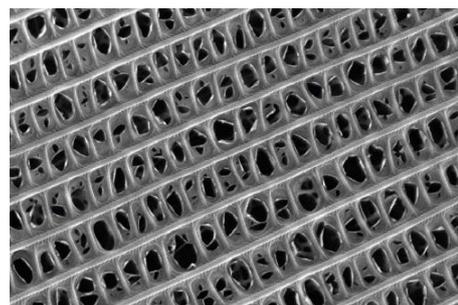
[Clues to bee health found in their gut microbiome](#)

The local environment plays a pivotal role in the health and diversity of the gut microbiome of wild bees which could help detect invisible stressors and early indicators of potential threats, say York University scientists in a new study. Piloting a new frontier of metagenomics, the researchers sequenced whole genomes of three species of carpenter bees, a type of wild bee, in North America, Asia and Australia. This analysis allowed them to gain insights into the bee's gut microbiome (bacteria and fungi), diet and viral load, as well as their environmental DNA. Unlike social bees (like honeybees and bumblebees), the researchers found solitary bees get their microbiome, which is important for health, from their environment where they forage for food, rather than inheriting it from their nest mates. Carpenter bees burrow into woody plant stalks to lay eggs rather than in hives.



[Moth wing-inspired sound absorbing wallpaper in sight after breakthrough](#)

Experts at the University of Bristol have discovered that the scales on moth wings act as excellent sound absorbers even when placed on an artificial surface. The researchers, which recently discovered that moth wings offer acoustic protection from bat echolocation calls, have been studying whether their structure could inform better performing sound absorbing panels, when not moving in free space. Bats and moths have been involved in an acoustic arms race between predator and prey ever since bats evolved echolocation some 65 million years ago. Moths are under huge predation pressure from bats and have evolved a plethora of defences in their strive for survival, but it's the scales, on a moth wing, that hold the key to transforming noise-cancelling technology.



[Australian bee helps illuminate social evolution: Bridge between flying solo or as a colony](#)

Studying the unusual social behaviour of an Australian native bee has enabled Flinders University researchers to obtain a clear understanding about the earliest stages of social evolution. Evidence of how individuals that live a solitary lifestyle can transition to colonial life, involving sterile castes that seemingly defy Darwin's natural selection theory, unlocks a key biological question about evolution, they say.



Organisms living in highly complex and organised societies, such as honeybees, termites and ants, can explain how altruistic behaviour is maintained, but evidence of their early steps into sociality has been eroded over geological time scales. To overcome this obstacle, the Flinders University team has studied *Amphylaeus morosus*, a unique Australian native bee that only recently crossed the threshold from individual reproduction to "selfless" behaviour within a colony.

Also : https://www.theguardian.com/environment/2022/jun/15/strange-bee-haviour-social-life-of-australian-species-offers-insights-on-evolution-scientists-say?CMP=oth_b-aplnews_d-3

[Genetic discovery could spell mosquitoes' death knell](#)

A UC Riverside genetic discovery could turn disease-carrying mosquitoes into insect Peter Pans, preventing them from ever maturing or multiplying. In 2018, UCR entomologist Naoki Yamanaka found, contrary to accepted scientific wisdom, that an important steroid hormone requires transporter proteins to enter or exit fruit fly cells. The hormone, ecdysone, is called the "molting hormone." Without it, flies will never mature, or reproduce. Before his discovery, textbooks taught that ecdysone travels freely across cell membranes, slipping past them with ease. "We now know that's not true," Yamanaka said. Every insect species requires ecdysone for some aspect of their journey from egg to offspring-producing adult.



And every insect that Yamanaka has tested also possesses the ecdysone transporter that he found in 2018, plus a few more found in a new study. But in this new study, he found mosquitoes to be different. Mosquitoes have only three of the four transporter proteins that fruit flies possess. They lack the most important, primary ecdysone transporter. "This primary one is somehow, mysteriously, missing in mosquitoes," Yamanaka said. These findings have now been published in the *Proceedings of the National Academy of Sciences*. The discovery opens the door to a mosquito-specific insecticide that would not harm beneficial bees or other pollinators. It would, however, affect mosquitoes like the ones used in the study, *Aedes aegypti*, which spread Zika, dengue, yellow fever, chikungunya and other viruses.

[This mosquito species from Papua New Guinea was lost for 90 years – until a photographer snapped a picture of it in Australia](#)

There are already plenty of mosquitoes in Australia. They bring pest and public health risks to many parts of the country. Now a new species of mosquito, *Aedes shehzadae*, has been discovered 90 years after the first (and only other observation) of it in Papua New Guinea – and it's thanks to citizen science. Mosquitoes are simple creatures, but they pose complex health risks. The recent widespread arrival of Japanese encephalitis virus, which caused dozens of cases of disease and five deaths, is a reminder of the threat mosquitoes pose in Australia. To address this threat, there are mosquito and mosquito-borne pathogen surveillance programs in states and territories around the country. Our borders are checked by the Department of Agriculture Water and Environment for the arrival of invasive mosquitoes with international travellers, their belongings, or freight. These programs collect valuable information on local and invasive mosquitoes. But they can't be everywhere – which is where citizen science can step in.



[This Australian grasshopper gave up sex 250,000 years ago and it's doing fine](#)

Most animals on Earth have two sexes, male and female, that combine and mix their genes when they reproduce. We are so accustomed to this state of affairs that the existence of all-female species that don't have sex, but instead reproduce by cloning, comes as a great surprise. The beautiful green grasshopper *Warramaba virgo* is one of these rare "parthenogenetic" species, in which an egg can develop into an embryo without being fertilised by a sperm. It lives in the southern parts of the Australian arid zone, where it feeds on mulga trees and other shrubs and bushes in the summertime. The grasshopper *Warramaba virgo* reproduces asexually. We have studied these grasshoppers for the past 18 years to understand how they developed asexual reproduction, and how the change has affected their ability to survive and reproduce. Our [new research published in Science](#) shows *W. virgo* arose about 250,000 years ago from a cross between two different sexually reproducing species of grasshopper, and giving up sex appears to have had no negative repercussions for them whatsoever.



[Silk, Dyes, Jewelry, and More: Insect-Derived Art Through the Ages](#)

Human history has been undeniably intertwined with insects as both a source of annoyance and creative influence. Long before the first microscope was invented, ancient people were depicting insects that they observed. The oldest recorded depiction was a cricket carved into bison bone that was found in a cave in Southern France in 1912 and estimated to be about 14,000 years old. Not only have insects been portrayed in art but they themselves have *become* the art. The Tamamushi jewel beetle shrine in Japan is thought to be the earliest example of beetle elytra being used in a decorative fashion. Other portrayals of insects and artistic utilizations can be found spanning the globe, from Australia to early Mayan civilizations in Central America and



almost everywhere in between. Perhaps the two most popular and widely known forms of insect art include the explicit illustration of insects and the use of insect body parts or whole bodies to create jewelry, resin art, collection displays, and sculptures among others. However, insect art can also be defined to include the use of insect media, in which an artist uses the extracts or products of an insect to create art. Although Charles Hogue defined cultural entomology in 1980, little has been published about entomology and ethnoentomology in direct relation to the arts, specifically insect media.

[Wildfire, Drought, and Insects: Climate Change Increases Risks of Tree Death](#)

Planting a tree appears to be a generally positive thing to do for the environment. After all, trees take in carbon dioxide, offsetting some of the emissions that contribute to climate change. However, all of that carbon in trees and forests worldwide could be released back into the atmosphere again if the trees burn up in a forest fire. Trees also stop scrubbing carbon dioxide from the air when they die due to drought or insect



damage. According to new research in the journal *Ecology Letters*, the likelihood of those threats impacting forests is increasing nationwide, making relying on forests to soak up carbon emissions a much riskier prospect. “U.S. forests could look dramatically different by the end of the century,” says William Anderegg, study lead author and associate professor in the University of Utah School of Biological Sciences. “More severe and frequent fires and disturbances have huge impacts on our landscapes. We are likely to lose forests from some areas in the Western U.S. due to these disturbances, but much of this depends on how quickly we tackle climate change.” The researchers modeled the risk of tree death from fire, climate stress (heat and/or drought), and insect damage for forests throughout the United States, projecting how those risks might increase over the course of the 21st century.

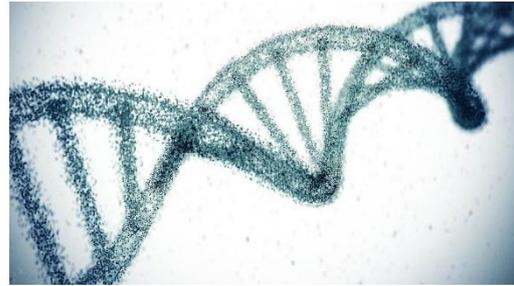
[Spiny ants \(*Polyrhachis lamellidens*\) parasitise *Camponotus obscuripes* in nature](#)

In the short communication “The evidence of temporary social parasitism by *Polyrhachis lamellidens* (Hymenoptera, Formicidae) in a *Camponotus obscuripes* colony (Hymenoptera, Formicidae)” published in *Insectes Sociaux*, the authors H. Iwai, Y. Kurihara, N. Kono, M. Tomita, and K. Arakawa performed various field observations and lab experiments to show that *P. lamellidens* is a social parasite of *C. obscuripes* and not only of *Camponotus japonicus*. They found several lines of evidence for this social parasitism. Here, Nobu Kono highlights the main points and shares some pictures.



[The sci-fi technology tackling malarial mosquitos](#)

"It is extremely worrying," says the director of UK anti-GM pressure group, GM Freeze. "To release something that has been specifically created in a laboratory in order to outfight nature, and spread without exception within wild populations, is extraordinary arrogant.



"And once the genie is out of the bottle, you cannot put it back in." Anti-GM campaigner Liz O'Neill is concerned that gene drives could go wrong if used in the wild.

The way gene drives work sounds like something from a science fiction novel, but they are already being used in laboratory tests. It is complicated stuff, but here is a simple explanation. While standard GM introduces a new, lab-tweaked gene into an organism, gene drive technology goes one stage further. It introduces a gene drive - a lab-created gene that can also automatically replicate itself - that targets and removes a specific natural gene.

This is how it works: if an animal (parent A) that contains a gene drive mates with one that doesn't (parent B), then in the forming embryo that starts to combine their genetic material, parent A's gene drive immediately gets to work.

[Dragonflies use vision, subtle wing control to straighten up and fly right](#)

With their stretched bodies, immense wingspan and iridescent coloring, dragonflies are a unique sight. But their originality doesn't end with their looks: As one of the oldest insect species on the planet, they are an early innovator of aerial flight. Now, a group led by Jane Wang, professor of mechanical engineering and physics in the College of Arts and Sciences, has untangled the intricate physics and neural controls that enable dragonflies to right themselves while they're falling. The research reveals a chain of mechanisms that begins with the dragonfly's eyes -- all five of them -- and continues through its muscles and wing pitch. The team's paper, "Recovery Mechanisms in the Dragonfly Righting Reflex," published May 12 in *Science*. Wang co-authored the paper with James Melfi, Ph.D. '15, and Anthony Leonardo of Howard Hughes Medical Institute (HHMI)



in Ashburn, Virginia. For two decades, Wang has been using complex mathematical modeling to understand the mechanics of insect flight. For Wang, physics is just as important as genetics in explaining the evolution of living organisms.

The book that changed me: how field guides showed me the awe-inspiring diversity of insects

I am an avid reader and have devoured many books over the years, especially science fiction. For me, reading is about escapism; it's an opportunity to explore strange new worlds and discover new ideas and new futures. Yet the book that changed my life wasn't about far away planets or alien civilisations; instead, it introduced me to a strange and beautiful world that existed all around me. Peterson's A Field Guide to the Insects of America North of Mexico by Donald J. Borror and Richard E. White opened my eyes to a hidden world populated by an unimaginable cast of fantastic creatures. In its pages, I learned about the deeply bizarre "twisted wing parasites" (order *Strepsiptera*) who live most of their peculiar lives inside the rear ends of other insects; the web-spinning Embioptera who collectively weave gossamer nests out of silk they shoot from their forelegs; and the tiny and ultra-enigmatic "angel insects" (order *Zoraptera*), which live in small social groups beneath the bark of rotting logs. I learned that the everyday world was full of creatures every bit as bizarre and interesting as science fiction aliens. The Earth was so much more diverse – and weird – than I'd ever imagined.

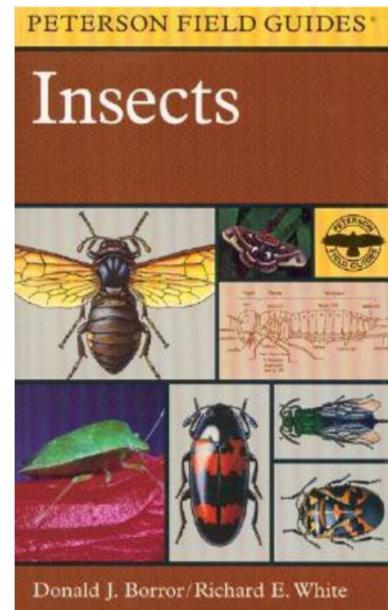


Photo Corner

All Society member are encouraged to submit any entomological photographs of interest together with a short (or long) description of your observations.

Dinah Hales has provided some photos of a rescue caterpillar of the orchard swallowtail butterfly (*Papilio aegeus* Donovan 1805)



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