



ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

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THE AUSTRALIAN ENTOMOLOGIST

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Front Cover Illustration: Illustrations by Bill Haseler, 1964 President of the Entomological Society of Queensland, of four leaf-mining beetles introduced for the biological control of lantana. The beetles are, clockwise from top right, *Octotoma scabripennis* Guerin-Menville, *Uroplata girardi* Pic, *Octotoma championi* Baly and *Uroplata fulvopustulata* Baly (Coleoptera: Chrysomelidae: Hispinae). All species are now established in Australia.

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ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NEWS BULLETIN

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The ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC., 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*: 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, 1885), 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.

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

13 May 2014

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park,
Tuesday, May 13th at 1:00pm

Chair: Bill Palmer

Attendance: Bradley Brown, Weng Chow, Gary Cochrane, Kathy Ebert, Stephen Frances, Alexandra Glauerdt, Andrew Hayes, Andrew Hulthen, Cassie Jansen, Ross Kendall, Chris Lambkin, Simon Lawson, Diana Leemon, Anna Marcora, Penny Mills, Helen Nahrung, Bill Palmer, Catie Paull, Brenton Peters, Steven Rice, Lisa Rigby, Don Sands, Noel Starick, Kathy Thomson, Desley Tree, Federica Turco, Dave Walter

Visitors: Kellie Bilney, Geoff Brown, Tony Cooke, Jan Dean, Marianne Eelkema, Cherie Gambley, Rosie Godwin, Nick Macleod, Andrew Manners, Kate McGlashan, Jacinta McMahan, Andrew Miles, Brendon Missendon, Andre Orenth, Thelma Peek, Denis Penley, Rebecca Roach, Lara Senior, Neil Tripodi, Pauline Wyatt

Apologies: Julianne Farrell, Morris McKee, Geoff Monteith, Nancy Schellhorn, Owen Seeman, Susan Wright

Minutes: The minutes of the last meeting were circulated in News Bulletin Vol. 22, Issue 2, April 2014.

Moved the minutes be accepted as a true record: Bradley Brown

Seconded: Noel Starick. Carried: all

Nominations for membership:

The following nominations for Membership were received and approved by Council and are now presented to the general meeting for approval:

General

1. Dr Jonathan Darbro, Ferny Grove, QLD. Nominated by Simon Lawson.
Seconded by Dave Walter. Carried: all

Joint

2. Dr Dennis and Mrs Leah Tafe, Victoria Pt, QLD. Nominated by Bill Palmer.
Seconded by Kathy Ebert. Carried: all.

General Business:

1. Bill Palmer announced that the recipient of the **2014 ESQ Student Award** was **Gurion Ang** from the University of Queensland (UQ). There were three Honours theses submitted for consideration this year. All were interesting and well done, however, Gurion's thesis on *Species-specific responses of insect herbivores and their parasitoids to temporal changes in host plant volatile profiles* was chosen to receive the award. Gurion will present an overview of his thesis at our next Notes and Exhibits meeting in June. The other contenders, Dylan MacFarlane from UQ, and Jaye Newman from Queensland University of Technology, have been invited to present a brief paragraph about their research for the *News Bulletin*.
2. **Geoff Monteith** has advised that he wishes to scale back his Society activities for the time being while he prepares for a trip to England later in the year. He will relinquish his role as Assistant Editor with the *News Bulletin*, and may not attend meetings regularly, but will attend to business matters for the *Australian Entomologist*. Geoff has been a tireless worker for the Society over very many years in a myriad of capacities including president, librarian, news bulletin editor, secretary and chair of various committees, and we wish him well in his travels while he takes a well-deserved break.
3. Many members have not yet paid their subscriptions for this year, perhaps because the notices were sent out earlier than usual before Christmas. Brenton Peters will be sending out a reminder to those members.

Main Business:

Dan Papacek, from *Bugs For Bugs*, a company that specialises in integrated pest management and is one of Australia's leading suppliers of biological control agents, presented *Confessions of a Professional Entomologist*. We enjoyed his talk about how he got started in his business, a bit about the beneficial insects he rears and the process involved, and some interesting stories from his experiences over the years.

Next meeting: Our **Notes and Exhibits** meeting is next month, 10 June 2014, at 1pm. Anyone is welcome to present an informal "show and tell" of anything entomological. Please let someone on council know if you have something to share.

Meeting closed: 2pm

Hello fellow members!!! Here is an invitation to everybody to participate this year.

June Notes & Exhibits on 10th June 2014

As usual our General Meeting will be held at the **Ecosciences Precinct, Boggo Road, Dutton Park (Ground Floor, Seminar Room 1) at 1 pm**. The Notes & Exhibits will be held after the presentation by this year's **Student Award** winner: **Gurion Ang** *Host Plant Volatiles and Preference in a Specialist and Generalist Parasitoid: To Learn or Not to Learn?*

This year we would like to see more people participating and sharing their entomological stories. It doesn't have to be a 10 minute presentation, you can opt for a shorter one or even no presentation at all, just come along with something you would like to share!

Do you have a favourite picture of an insect (print it with a caption), or something mysterious you have found, or something you know very well, but would like to share? It could be the best of your insect collection (please no more than a box!) or anything else you wish to share with the other members, who ultimately share the same passion for insects!

Notes & Exhibits is a chance to get to know each other a little better and maybe discover common interests and places. So, come along and share!

Please let Bill (bill.palmer@daff.qld.gov.au), Kathy (k.ebert@uq.edu.au) or me (federica.turco@qm.qld.gov.au) know if you intend to give a presentation so that we can have a better idea of the timeframe for our Notes & Exhibits. The rest of the Council and I look forward to seeing you, and your treasures, there!

Federica

Confessions of a Commercial Entomologist

Dan Papacek

Bugs for Bugs, 1 Bowen St, Mundubbera 4626

Introduction and Background

I completed a Bachelor degree in Agricultural Science at the University of Queensland in 1978; during the final two years I specialised in Entomology which gave me an Entomology major. As I was approaching my final exams I contacted Tom Passlow, the then head of Entomology, DPI, to ask him about the prospects for employment. He suggested he wasn't expecting any deaths in the near future but he did put me in touch with one of his entomologists, Dan Smith. That was the start of a 26 year collaborative working arrangement between Smithy and me.

After my final exams, I arrived in Mundubbera on 4 December 1978 with all my worldly possessions. I was employed by Jack Parr of Golden Mile Orchards to develop a working Integrated Pest Management (IPM) program for his large citrus orchard. Dan and I both knew this was going to be a big project, so I committed to sticking it out for five years in Mundubbera. I am still there some 36 years on.

Dan Smith was a very practical biocontrol entomologist. He had a strong interest in IPM and was well-liked by growers for his readiness to 'roll up his sleeves' and get stuck into it.

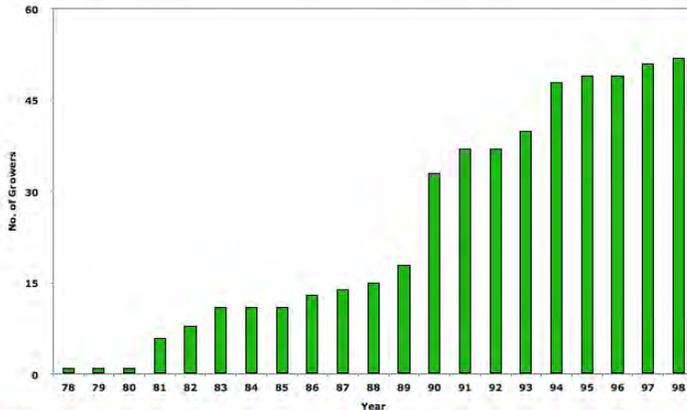
A string of biocontrol successes paved the way for the IPM program we were trying to implement. These included *Anicetus benificus* for pink wax scale, *Anicetus nyasicus* for white wax scale, *Aphytis holoxanthus* for Florida red scale, *Leptomastix dactylopii* for citrus mealybug, and *Diversinervus stramineus* for green coffee scale.



One of the first things we did was to start mass-rearing *Aphytis lingnanensis* to supplant the need for insecticides to control red scale, and to complement both the introduced and naturally occurring biocontrol agents in our citrus ecosystem.

Quite quickly we were able to achieve in the usage of insecticides and very worthwhile reductions of 70-90%

Adoption of IPM in the Central Burnett



miticides while demonstrating no reduction in fruit quality or yield. Over the next 20 years, the Central Burnett citrus growers adopted the principles of IPM to the point where over 95% of all orchards were on-board. This was an era when the OPs were king and Queensland citrus growers were making a lot of money.

From about 2000 onwards, things became more challenging for the industry due to a rising Australian dollar and stiffer competition on the export scene. Also around that time, over a period of 10 years or so, we saw the introduction of several new generation pesticides that proved very effective. These included buprofezin, imidacloprid, spirotetramat, sulfoxaflor and pyriproxifen. IPM took a backward step. Why did this happen?

I have given this a lot of thought, and suggest that:

- when times are tough growers take a conservative approach
- the new compounds were very effective, and drew growers like moths to a candle
- pesticides are considered a form of insurance, and are relatively cheap when compared to a grower's overall costs of production
- ultimately, every grower loves a good poison

In September 2004, Dan Smith, my colleague and mentor for more than a quarter of a century, died in an unfortunate drowning accident at age 59.

Entomological Society of Queensland

Integrated Pest Management

There are many definitions to cover the philosophy of IPM, but essentially I see it as ‘best practice’ pest management. The goal is to develop a strategy that achieves good quality and high yields with minimal pesticides. This necessarily embodies a systems approach incorporating all the best elements of biological control, cultural control and chemical control. Our aim as IPM practitioners is not to criticise pesticides, as these are valuable tools for modern agriculture. I have always believed that the problem with pesticides is not in the chemicals themselves, but in the way they are used. In much the same way that modern medicines (eg antibiotics) have been seriously overused, misused and abused by humankind, so have pesticides suffered the same fate in our agricultural systems. If we manage to reduce our dependence on pesticides, we find that we can maintain excellent productivity while reducing adverse effects on the environment and the associated risks of resistance development and contamination of food.

Biological Control

Biological control is an essential component of IPM. Most pests have natural enemies that will do a great job if we give them the opportunity. All too often our pest management practices are precluding some of our greatest allies. Typically we divide biocontrol into the fields of Classical, Augmentation, and Conservation Biocontrol. These definitions are self-explanatory and I will expand only on Augmentation.

Augmentation Biocontrol

This tool is becoming increasingly popular throughout the world, and in some countries, especially in Europe, is highly developed. This is largely due to drivers for change that encourage growers to seek alternatives to pesticides.

In Australia, we have seen a steady rise in the number and variety of biocontrol agents available to help growers solve their pest management problems in a more environmentally friendly way.

Below is a list of commercially available organisms, which number around 30 species that is growing year by year.

Wasp parasitoids	Target pests	Comments
<i>Anastatus</i> spp.	Fruit-Spotting Bug	In development
<i>Apidius colemani</i>	aphids	Green Peach Aphid <i>Mysus persicae</i> ; Cotton Aphid <i>Aphis gossypii</i>
<i>Aphelinus abdominalis</i>	aphids	Glasshouse Potato Aphid <i>Aulacorthum solani</i> ; Potato Aphid <i>Macrosiphum euphorbiae</i> ; <i>Mysus</i> spp.

<i>Aphytis lingnanensis</i> (Fig 1B,C)	red scale	Subtropics
<i>Aphytis melinus</i>	red scale	Mediterranean
<i>Encarsia formosa</i>	greenhouse whitefly	<i>Trialeurodes vaporariorum</i>
<i>Eretmocerus hayati</i>	silver-leaf whitefly	<i>Bemisia tabaci</i>
<i>Eretmocerus warrae</i>	greenhouse whitefly	<i>Trialeurodes vaporariorum</i> : tomatoes
<i>Spalangia endius</i> (Fig 1A)	nuisance flies	<i>Musca domestica</i> , <i>Stomoxys calcitrans</i>
<i>Trichogramma pretiosum</i>	moth & caterpillar pests	<i>Helicoverpa armigera</i> , <i>H. punctigera</i> ; Diamondback Moth <i>Plutella xylostella</i> ; Loopers <i>Chrysodeixis</i> spp.
<i>Trichogramma carverae</i>	moth & caterpillar pests	Lightbrown Apple Moth <i>Epiphyas postvittana</i> Codling Moth <i>Cydia pomonella</i>
<i>Trichogrammatoidea cryptophlebia</i>	macadamia nutborer	macadamias

Predators	Target pests	Comments
<i>Chilocorus circumdatus</i>	armoured scale insects	
<i>Cryptolaemus montrouzieri</i>	mealybugs	
<i>Dalotia coriaria</i>	fungus gnats, shore flies, thrips pupae	
<i>Mallada signatus</i> (lacewings)	aphids, mealybugs, whiteflies, scale insects, small caterpillars etc	generalist predator
<i>Nesidiocoris tenuis</i>	whiteflies	new predator for greenhouse tomato production
<i>Orius armatus</i>	thrips	capsicums, eggplant, strawberries

Predatory mites	Target pests	Comments
<i>Hypoaspis aculiefer</i>	bulb mites, thrips pupae, fungus gnats	
<i>Hypoaspis miles</i>	fungus gnats	
<i>Neoseiulus californicus</i>	spider mites, Broad Mite, Cyclamen Mite	
<i>Neoseiulus cucumeris</i>	thrips, Broad Mite	
<i>Phytoseiulus persimilis</i>	spider mites	
<i>Transeius montdorensis</i>	thrips, Broad Mite, whitefly	
<i>Typhlodromus occidentalis</i>	spider mites	primarily tree crops

Nematodes	Target	
<i>Heterorhabditis bacteriophora</i>	Black Vine Weevil	
<i>Heterorhabditis zealandica</i>	African Back Beetle, Argentine Scarab, Argentine Stem Weevil, Red-headed Cockchafer, Black-headed Cockchafer	
<i>Stienernema carpocapsae</i>	army worm, cut worm	
<i>Steinernema feltiae</i>	fungus gnats	
<i>Rhabditis necromena</i>	Portuguese Millipede	

The successful use of biocontrol agents requires a different approach from a conventional pesticide management strategy. The trick is to:

- introduce biocontrol agents early in the crop (before pests build up)
- make regular introductions to maintain populations
- implement a range of complementary strategies
- monitor regularly (both pests and beneficials)
- use pesticides sparingly, wisely, and with a clear understanding of any side effects

As an example of how we utilise augmentation biocontrol agents, I will give some insight into our strategy for *Aphytis* in citrus (**see chart at right**):

- make routine releases early in the season (three-four releases, three weeks apart)
- monitor regularly for red scale levels
- commence parasitism assessments in early summer (blocks with >25% fruit infested)
- make follow-up releases in blocks where it is deemed necessary
- aim to achieve target parasitism by critical points in the season

The remainder of the presentation covered a comprehensive description of a rearing method for one of our biocontrol agents, *Trichogramma*

pretiosum, to give some insight into the complexity of these processes.

Time of year	Target <i>Aphytis</i> parasitism
early summer	≥40%
mid summer	≥60%
late summer	≥80%

Finally, I ask the question “is Australia truly ‘clean and green’, as it purports to be?”. While we are seeing a strong increase in interest in alternatives to conventional pesticides, there are still many examples of serious pesticide overuse in common produce lines on Australian supermarket shelves.

Sadly, the greatest driver for change in Australia at the moment is system failure; this occurs when a producer has ‘hit the wall’. Typically when resistance has reached massive levels and all pesticides have been exhausted we get calls for help.

Ultimately, growers are producing what is demanded of them by their customers. In Australia, the customers are represented by two mega supermarket chains that continue to put fruit appearance above edibility and sustainability. Until we see a shift in this ideology, IPM will continue to dwell on the fringes.

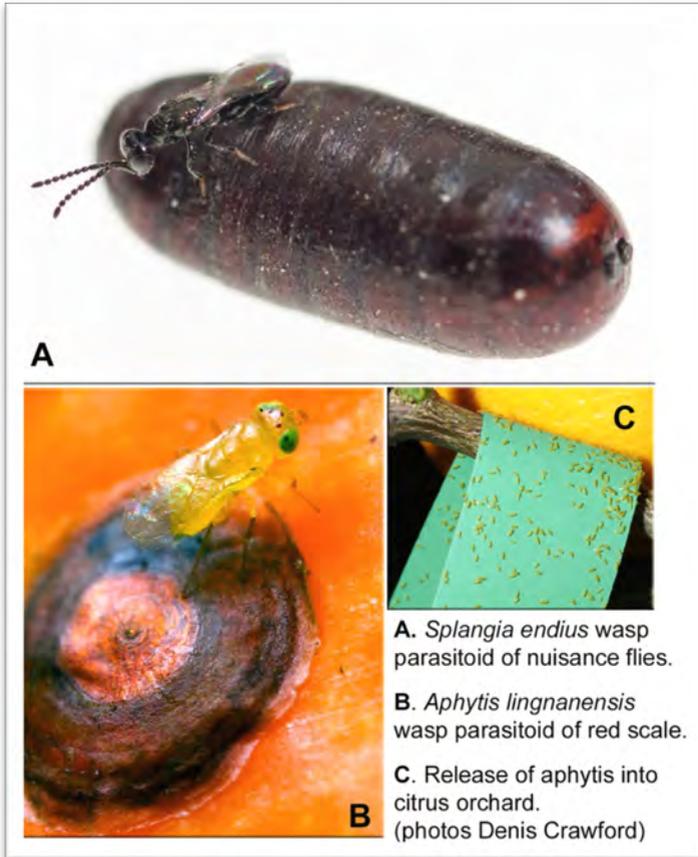


Fig. 1 Some parasitoid wasps used in biocontrol at *Bugs for Bugs*

**International Organisation for Biological Control – Young Scientist Awards
IOBC IS OFFERING SPONSORSHIP TO ATTEND
THE AUSTRALIAN ENTOMOLOGICAL SOCIETY CONFERENCE
28 SEP – 1 OCT 2014 IN CANBERRA**

To qualify for IOBC support, applicants must be:

A member of IOBC; to join now contact: groentemanr@landcareresearch.co.nz

Less than 35 years of age

Presenting a paper or poster on biological control or a related IPM topic

Meet our New Members

(New 2013-2014 members are encouraged to introduce themselves to the Society: send information and images to Dave Walter dwalter@usc.edu.au)

Australian Army Malaria Institute (AMI)

Two new members of the Society are from AMI,

Lisa Rigby enlisted in the Australian Army in early 2012 and has been working at AMI since then. She has a background in insect physiology and is about to commence her PhD studies at QIMR under the University of Queensland, School of Medicine. Her PhD will focus on the impacts of environment and adaptation by mosquitoes on the transmission of vector borne diseases. This project will be completed under the supervision of **Professor Greg Devine, Dr Nigel Beebe and Dr Leon Hugo**.

Weng Chow joined the Australian Regular Army in November 2011 as an entomologist at AMI. He has a background in molecular diagnostics and was previously a scientist at Queensland Health. He has commenced a PhD program under the supervision of **Dr Nigel Beebe and Professor Myron Zalucki** at the Department of Biological Sciences, University of Queensland. The project will focus on aspects of the biology of *Anopheles farauti*, an important vector of malaria in the South West Pacific region. He is currently conducting regular field visits to

Cowley Beach in northern Queensland.



Fig 1. Male 'Flying Spider' *Maratus volans* (from Otto & Hill 2011).

New member **Dr Jurgen Otto** of St Ives, NSW, is a specialist on mites, but loves to photograph and film peacock spiders (Salticidae: *Maratus* spp.).

Unfortunately, peacock spiders seem to find southern Australia more attractive than Queensland, although the spectacular and widely distributed Flying Spider *Maratus volans* (O. Pickard-Cambridge, 1874) (**Fig 1**) occurs from near Melbourne to Thornton Peak in North Queensland (Otto & Hill 2011).

But there is another, more mysterious member of the genus that Jurgen is especially interested in tracking down. *Maratus nigromaculatus* (Keyserling, 1883)

(Fig 2) was originally described from Rockhampton, and later photographed at Wynnum on the Moreton Bay side of Brisbane, but the photographer thinks it may have come with some turf from Fernvale. He has another photographic record from near Caboolture, but again the exact origin of the specimen is unknown.

Jurgen would be most grateful for any help in tracking down a population of *M. nigromaculatus*. He suspects the adults are active from August onwards. Like other peacock spiders, adults are only about 5 mm, but quite worth the thrill of finding.

References:

Otto, J. C. and D. E. Hill. 2011. An illustrated review of the known peacock spiders of the genus *Maratus* from Australia, with description of a new species (Araneae: Salticidae: Euophryinae). *Peckhamia* 96.1: 1-27.

Otto, J. C. and D. E. Hill. 2012. Notes on *Maratus* Karsch 1878 and related jumping spiders from Australia, with five new species (Araneae: Salticidae: Euophryinae), version 2. *Peckhamia* 103.2: 1-82.

http://peckhamia.com/peckhamia_numbers.html



Fig 2. Adult male *Maratus nigromaculatus* from Wynnum, Qld, November 2008. Photo by Chris Martinez (from Otto & Hill 2012).

Celebrating the next 50 years of the Australian Entomological Society

Australian Entomological Society 45th AGM and Scientific Conference
September 28–October 1 2014
Shine Dome, Canberra, AUS

Bugs & Bugcatchers in the News

Feral Moggies like 'Sky Prawns'

Feral cats have long been known to be a threat to Australian small mammals, birds and reptiles, but **Stephanie Yip and her colleagues at the University of Sydney** have recently discovered that moggies in the Mitchell Grass downlands and acacia woodlands near Longreach, Qld, have joined the Entomophagy Craze. Although most of their diet consisted of vertebrates (especially the native Long-haired Rat *Rattus villosissimus*) about a third of the stomachs contained Australian Plague Locusts *Chortoicetes terminifera* (average 2 per cat). At the time of the study, the Long-haired Rat population was in an irruptive phase. Stephanie says that in an upcoming paper she will demonstrate that more arthropods, including centipedes and witchetty grubs, are consumed by cats when rat populations are low.

Reference:

Stephanie J. S. Yip, Chris R. Dickman, Elizabeth A. Denny & Greg M. Cronin. 2014. Diet of the feral cat, *Felis catus*, in central Australian grassland habitats: do cat attributes influence what they eat? *Acta Theriol* 59:263–270.

Acid Mine Drainage (AMD) and Mayflies

The Mount Morgan Mine (1882-1981) was closed in 1991 with the Queensland Government accepting environmental liability for the

disused mine site since 1992. Mount Morgan mine is one of the most controversial abandoned mine sites within Australia with respect to acid mine drainage (AMD). One of the sources of concern is a 43m deep pit filled with highly acidic water with potentially toxic concentrations of several metals (**Fig 1**). Concern about the potential environmental effects of the pit water have been raised for many years, with the first uncontrolled release of AMD from the pit occurring during January 2013.

Aleicia Holland and her colleagues at Central Queensland University

have been investigating the mitigating effects of humic substances on the toxicity of AMD to mayflies (*Atalophlebia* spp.). They have shown that at 20 mg/L humic substances increase survival of mayflies exposed to acid mine drainage by up to 50%. Other experiments have also shown that humic substances also decrease the toxicity of low pH in waters of varying chemistry to the same mayflies (*Atalophlebia* spp.).

Further details can be found in:

Holland A, Duivenvoorden L & Kinnear S. 2014. Influence of Aldrich humic acid and metal precipitates on survivorship of mayflies (*Atalophlebia* spp.) to acid mine drainage. *Environmental Toxicology and Chemistry* 33: 567-572.

Holland A, Duivenvoorden L & Kinnear S. 2014. Humic Substances: the answer to improved mayfly survivorship in acidic environments? *Limnologica* DOI: 10.1016/j.limno.2014.04.003.

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Fig 1. The Dee River contaminated with AMD at 2 sites downstream of the Mount Morgan Pit. (Photos from Aleicia Holland).

Tiny beetles from Queensland

Pawel Jalszynski of the University of Wroclaw has recently published a revision of Australian scydmaenine beetles (formerly considered a separate family, Scydmaenidae, but now treated as a subfamily of the Staphylinidae) in the genus *Microscydmus* and described a new genus *Penicillidmus*. Species of both genera are distributed from Cape York to New South Wales and are among the smallest of known beetles. Species of *Microscydmus* (**Fig 1**) have body lengths in the 0.5-0.65 mm range and *Penicillidmus* in the 0.83-0.86 mm range.

For more details see:

Jalszynski P. 2014. The smallest Cyrtoscydmini of Australia: revision of *Microscydmus* Saulcy & Croissandeau and *Penicillidmus* gen. n. (Coleoptera, Staphylinidae, Scydmaeninae). *Zootaxa* 3774: 1-30.



Fig 1. *Microscydmus* sp. (Image DE Walter)

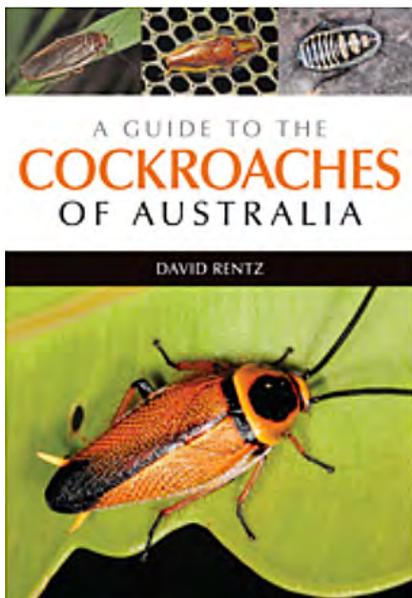
Mozzies in the News



ESQ member Steve Francis and his colleagues at the Australian Army Malaria Institute in Enoggera have recently completed trials of a strong (40%) formulation of a DEET repellent (Bushmann™) vs a 32% formulation of lemon eucalyptus oil (LEO, Mosi-guard®). DEET still gives the best protection against mosquitoes (100% protection for 7 hrs), but the lemon eucalyptus oil did reduce mosquito landings by >95% for 3 hrs and may be an alternative for short-term exposure for those that abhor DEET and don't mind smelling of lemons.

For more details see:

Frances SP, Rigby LM & Chow WK. 2014. Comparative laboratory and field evaluation of repellent formulations containing DEET and lemon eucalyptus oil against mosquitoes in Queensland, Australia. *Journal of the American Mosquito Control Association* 30: 65-67.



Colour photographs, Maps
328 pages, 215 x 148 mm
ISBN: 9780643103207
CSIRO PUBLISHING \$49.95

Society member **David Rentz'** long-awaited *A Guide to the Cockroaches of Australia* has now been published. It is a comprehensive account of most of the 550 described species found in Australia. The book reveals their diversity and beauty, it looks in detail at their morphology, habitats and ecology, and explains how to collect, preserve, and reliably identify most of the common pest species as well as the non-pest cockroaches.

Colleagues farewell **Dr Tim Heard** from CSIRO last month. Tim, retired from his official duties, is off searching for new adventures with his beloved bees. (Photo Geoff Thompson).



Sex-role reversal in the cave barklice *Neotrogla*

Penelope Mills, University of Queensland

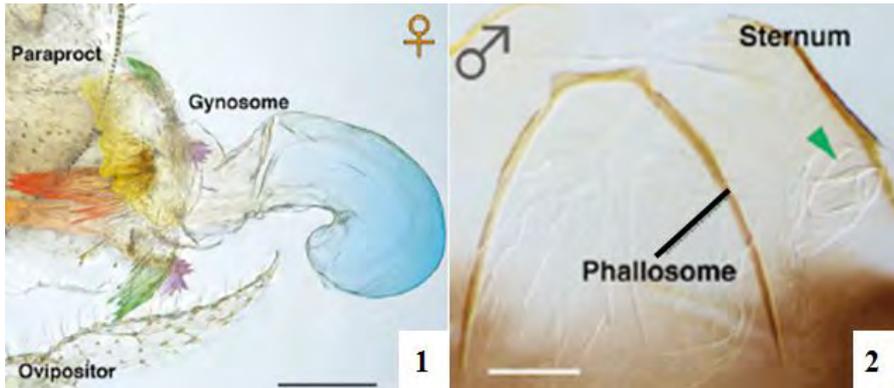


Fig 1. Dorsolateral view of a female gynosome from *Neotrogla curvata*. The different colours represent different structures of the gynosome. Blue: distal sclerotised spermathecal duct; green, red and purple: spiny areas of the gynosome; yellow: membranous area with dorsal lobe; orange: basal gynosome rod. Figure modified from Yoshizawa et al. 2014.

Fig 2. Male phallosome from *Neotrogla aurora*. Modified from Yoshizawa et al. 2014.

A recent article (Yoshizawa et al., 2014) on Brazilian cave barklice (*Neotrogla*) reports on and discusses the elaborate intermittent organ (organ used for the transfer of sperm from male to female) found in females of this genus of barklice.

Although reversed sexual selection has resulted in females evolving masculine features (e.g. some astigmatan mites (Klimov and Sidorchuk, 2012); ground weta (*Hemiandrus pallitarsis*) (Gwynne, 2005)), this is the first example of intromittent organs with anchoring sites being observed in the females of organisms exhibiting reversed sexual selection (Yoshizawa et al., 2014).

Females of *Neotrogla* have an elaborate penis-like structure called a gynosome, which includes a distal sclerotised area used as the spermathecal duct, spines, (sometimes) lobes and a basal gynosomal rod (**Fig 1**) (Yoshizawa et al., 2014). This is in comparison with males, which have a simple phallosome (sclerotised tube), consisting of a thin arc and lack an intromittent organ (**Fig 2**) (Yoshizawa et al., 2014).

By observing mating pairs of *Neotrogla*, Yoshizawa et al. (2014) found that the gynosome is able to transmit copious numbers of spermatophores (a mass of sperm

and proteins) from the male to the female. The spines found on the gynosome allow the female to internally anchor herself to the male. The gynosome for different species of *Neotrogla* is species-specific, varying in the arrangement and location of the spines as well as the curvature of the sclerotised areas, and whether dorsal lobes are present. Although much simpler in design, the male genitalia is also species-specific, matching to fit the shape of the female's gynosome.

Yoshizawa et al. 2014 suggest that the reason for the observed sex-role reversal might be due the environment. The dry caves and paucity of available food (bat guano and carcasses) might explain the reason for the evolution of the elaborate gynosome, by allowing the female to have greater access to nutritional spermatophores. It was also found that copulation was exceptionally long in these insects

(41–73 h), compared with closely related insects (up to 4h), and females are able to store up to 11 spermatophores.

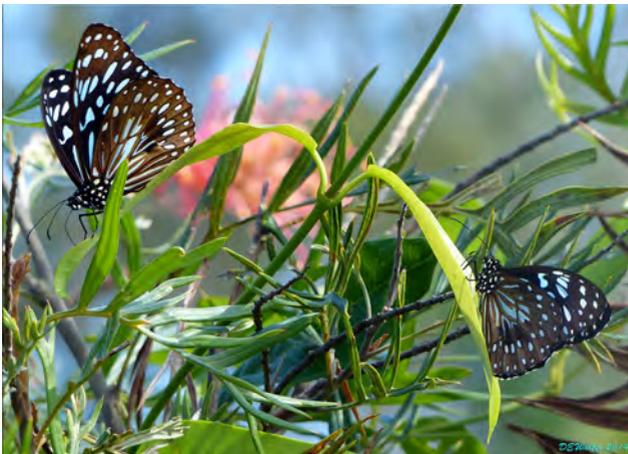
The discovery of elaborate intromittent organs in females of *Neotrogla* will play an important role in further understanding sexual selection in different organisms.

References

Gwynne, D.T., 2005. The secondary copulatory organ in female ground weta (*Hemiandrus pallitarsis*, Orthoptera: Anostomatidae): a sexually selected device in females? *Biological Journal of the Linnean Society* 85, 463–469.

Klimov, P.B., Sidorchuk, E.A., 2012. An enigmatic lineage of mites from Baltic amber shows a unique, possibly female-controlled, mating. *Biological Journal of the Linnean Society* 102, 661–668.

Yoshizawa, K., Ferreira, R.L., Kamimura, Y., Lienhard, C., 2014. Female penis, male vagina, and their correlated evolution in a cave insect. *Current Biology* 24, 1006–1010.



Blue Tigers (*Tirumala hamata*) are on the move again with large migratory populations reported from Gympie and Bundaburg. This pair are probably collecting pyrolozidine alkaloids from the liana *Marsdenia velutina* Pie Creek, Qld, 24 May 2014

Discovery of extant *Titanolichus seemani* on the Orange Bellied Parrot

Owen Seeman, Queensland Museum

I felt a great disturbance in the Force...as if millions of voices suddenly cried out in terror and were suddenly silenced. I fear something terrible has happened.



Fig 1. The endangered Orange Bellied Parrot, *Neophema chrysogaster*. Photo by JJ Harrison http://en.wikipedia.org/wiki/File:Neophema_chrysogaster_male_-_Melaleuca.jpg

While the above *Star Wars* quote referred to the destruction of the planet Alderaan (and establishes that I was a young 70-80s geek before being a bug-nerd), old Obi Wan could well have had such a turn upon the death of the last thylacine as it carried its fauna of innocent symbiotic organisms to its grave: a planet in itself, with its attendant species, all now extinct. I've always dreamt of being allowed to comb or dissolve pelts of thylacines for its likely unique species of extinct mites. As far as I know, whatever symbionts it had have largely been lost, except for a nematode and a cestode both

thought to be generalists and alive today in devils and quolls. The closest I came to my dream was about 12 years ago when the *Tasmanian Museum and Art Gallery* allowed me to pluck the feather mites from birds, including a specimen of the critically endangered Orange Bellied Parrot (**Fig 1**). Currently only about 50 birds exist in the wild and, in addition to its obvious beauty, it is one of the few seasonally migratory parrots, evacuating Tasmania each winter for the south-east mainland.

Feather-mites are curious-looking mites that wedge themselves in the barbules of feathers. A commensal

relationship is likely as they feed on oils (from the bird's uropygial gland) and the tastiest debris that collect on a bird's feathers during their everyday lives, such as fungal spores, hyphae and pollen grains. Several species are implicated in feather-plucking syndrome in poultry and budgerigars, but generally birds can support huge populations of these animals without ill-effect, and they may even be beneficial by cleaning old oils and fungi from the feathers. Most birds are infested with more than one species of feather mite, especially parrots: in fact, the Green Conure holds the record — 25 species — with each occupying its own microhabitat.

Another curiosity is that feather mites (and even many of their distant, free-living relatives) display striking andropolyorphism, which means there are two or more types of male. Heteromorphic males are burly, bearing huge spurs for guarding female mites and/or wrestling other males. In contrast, homeomorphic males are a bit smaller and lack these spurs, perhaps having a more cryptic means of finding their mates.

Back to the Orange Bellied Parrots: the particular parrot I examined was collected in 1886 and the mites were later described as *Titanolichus seemani* by Dabert et al. (2006). As these antique specimens were the only known records of this species, Dabert et al. (2006) speculated that the species could already be extinct. Such an event seemed unlikely, though, as feather mites are

transmitted from their parents to fledgling birds. Thus, as long as parents were responsible for raising their offspring, the mites should be there with them. Spare a thought, though, for symbiotic organisms of endangered animals that rely on horizontal transmission or have life stages off their host: as density crashes, opportunity to find new hosts plummets: these animals can become extinct prior to their host.

What we lacked, though, were mites from an extant population to prove the mite still existed. So it was with some surprise and delight that **Prof. Ian Beveridge** (Faculty of Veterinary Science, University of Melbourne) reported he had been given some specimens of *T. seemani* from **Dr Leanne Wicker**, veterinarian at Healesville Sanctuary, which runs a captive breeding programme for these birds. Before long I had a slide with a heteromorphic and homeomorphic male (**Fig 2**) – fresh specimens of what must also be considered a critically endangered mite. Considering most parrots harbour more than one species of mite, it's likely to just be one of several unique species of feather mite clinging onto the last remaining Orange Bellied Parrots in the wild and in captivity.

Further reading

Dabert, J., Mironov, S.V. & Proctor, H. 2006. A new species of the feather mite genus *Titanolichus* Gaud & Atyeo, 1996 (Acari: Astigmata: Pterolichidae) from the endangered orange-bellied parrot *Neophema crysogaster* (Aves:

Psittaciformes) from Australia. *Australian Journal of Entomology* 45, 206–14.
 Proctor, H.C. 2003. Feather mites (Acari: Astigmata): Ecology, behavior and evolution. *Annual Review of Entomology* 48, 185-209.

Walter, D.E. & Proctor, H.C. 2013. *Mites: Ecology, Evolution & Behaviour*. Second edition. Springer: New York, London. 494 pp.

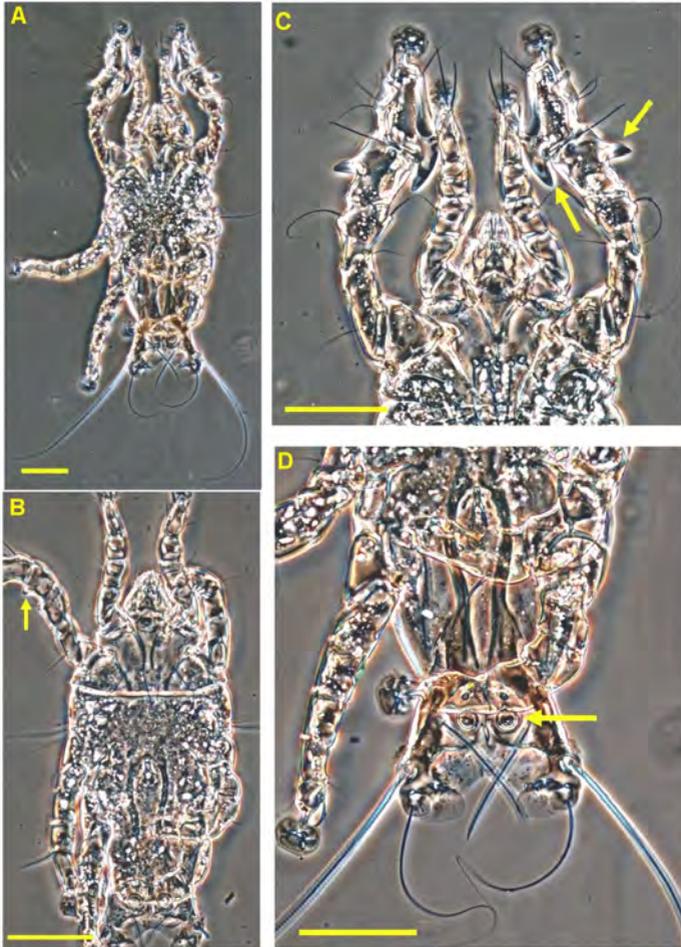


Fig 2. *Titanolichus seemani* (A) the heteromorphic male; (B) the daintier homeomorphic male (arrow points to tiny spurs on leg II); (C) the large retrograde spurs on the second pair of legs of the heteromorphic male; (D) the genital suckers of the heteromorphic male (also present in the homeomorphic male). Scale bar = 0.1 mm. Photos O. Seeman.

Meetings & Conferences



8th International Wolbachia Conference

June 6–11 2014

Innsbruck, AUSTRIA

<http://wolbachia2014.org/>



Genetics Society of AustralAsia 2014

July 6–9 2014

University of Sydney, Sydney, AUS

<http://www.genetics.org.au/>



XXXIII Congress of the Willi Hennig Society

July 6–10 2014

MUSE, Science Museum of Trento, ITALY

<http://www.cladistics.org/meetings.html>



XXV International Congress of Entomology: Entomology Without Borders

September 25–30, 2016

Orlando, Florida, USA

<http://ice2016orlando.org/>

University of Illinois, Urbana-Champaign, USA



Principals in Population Genetics: A coalescence of community to celebrate Andy Clark

July 10–12 2014

Cornell University, Ithaca, New York, USA

<http://www.andyfest.org/Andyfest/Home.html>



Entomology 2014: Grand Challenges Beyond our Horizons

November 16–19 2014

Oregon Convention Center, Portland, Oregon, USA

<http://www.entsoc.org/entomology2014>

<http://www.andyfest.org/Andyfest/Home.html>



Radiation and Extinction – Investigating Clade Dynamics in Deep Time

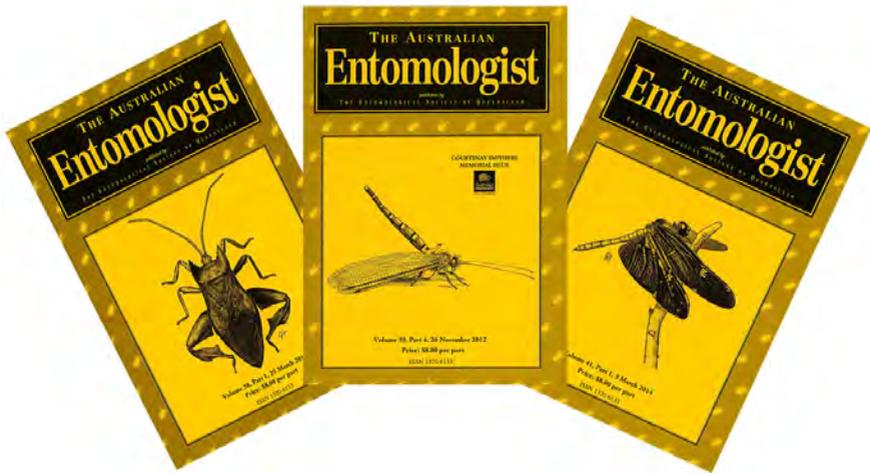
November 10–11 2014

Burlington House, London, UK

<http://www.linnean.org/Meetings-and-Events/Events/Radiation+and+Extinction+-+Investigating+Clade+Dynamics+in+Deep+Time>

[+Investigating+Clade+Dynamics+in+Deep+Time](http://www.linnean.org/Meetings-and-Events/Events/Radiation+and+Extinction+-+Investigating+Clade+Dynamics+in+Deep+Time)

The Australian Entomologist available online for purchase



After a recent agreement between the *Entomological Society of Queensland* and **RMIT Publishing** (Melbourne, Victoria), The Australian Entomologist is now available online in the RMIT website (www.informit.com.au). The journal is more easily found at this link to RMIT search engine: <http://search.informit.com.au/titles> Our journal is listed as “**Australian Entomologist, The**”.

Purchase price is only \$1.98 per PDF!

The agreement covers all issues from 37(3) of September 2010, including the special issue 39(4) dedicated to Courtenay Smithers. Issues currently available online are from 38(3) (Sep 2011) to the last 41(1) (Mar 2014). The remaining four will be uploaded shortly and future volumes will be available soon after publication.

We hope that members, who are not subscribers to the journal, might find it useful to be able to browse the journal contents and buy single PDFs according to their need and interest!

Entomological Society of Queensland



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Procedures for publishing in our journal, *The Australian Entomologist*, are explained with a full *Guide to Authors* plus forms for taking out a subscription to the journal.

MESSAGE FROM THE TREASURER

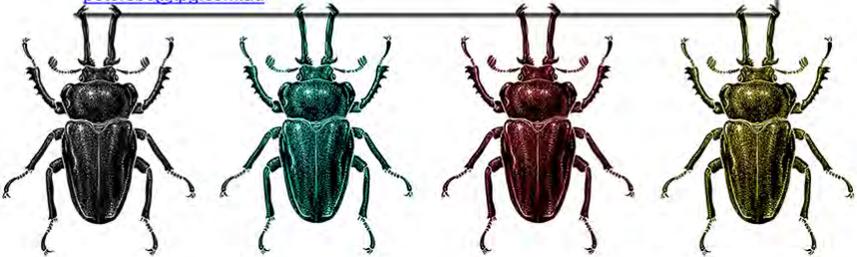
Membership subscriptions were due 1st January 2014 and notices were sent out November 2013.

A friendly reminder to un-financial members was recently forwarded by email and/or postal mail.

We have lost contact with a few members. If you are unsure of your subscription status or have recently changed your email or postal details please contact me.

A Membership Renewal Form is available at <http://www.esq.org.au/>

Dr Brenton Peters
Honorary Treasurer
Box 537, INDOOROOPIILLY QLD 4068
petersbc@tpg.com.au



DIARY DATES FOR 2014/2015

Nine general meetings held per year on the 2nd Tuesday of the respective month

MAR 2014-Tuesday 11th	Dr Simon Lawson	AGM and Presidential Address <i>Australians abroad: eucalypts and their insects</i>
APR 2014-Tuesday 8th	Mike Barnett	<i>Butterfly species and habitats in Africa</i>
MAY 2014-Tuesday 13th	Dan Papacek	<i>Confessions of a Commercial Entomologist</i>
JUN 2014-Tuesday 10th		Student Award Presentation/ Notes & Exhibits
AUG 2014-Tuesday 12th	John McKeown	<i>The Entomologist gets the trout!</i>
SEP 2014-Tuesday 9th	Dr Peter James	<i>Soft lights, black sheets and in-vitro breeding of Buffalo Flies</i>
OCT 2014-Tuesday 14th		
NOV 2014-Tuesday 11th		
DEC 2014-Tuesday 9th		Xmas BBQ/ Notes and Exhibits
MAR 2015-Tuesday 9th	Dr Bill Palmer	AGM and Presidential Address

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NOTICE OF NEXT MEETING

Tuesday 10th June 2014, 1:00 pm

June Notes & Exhibits

Come along and share your favourite arthropod, picture or experience and hear

Student Award winner Gurion Ang

Host Plant Volatiles and Preference in a Specialist and Generalist Parasitoid: To Learn or Not to Learn?

Venue: Seminar Room

Ground Floor, Ecosciences Precinct
Boggo Road, DUTTON PARK. BRISBANE.

More venue details available at
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ALL WELCOME

NEXT NEWS BULLETIN

Volume 42, Issue 4 (June 2014)

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DEADLINE - Wednesday 18 June 2014

Send your stories/notices/complaints to
dwalter@usc.edu.au