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CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

Next Meeting of the Entomological Society of NSW Inc

ANNUAL GENERAL MEETING

Where: Meeting Room 2, Ermington Community Centre, River Road, Ermington

When: 7.30 pm on Wednesday, 3rd March 2010

No speaker is planned for the AGM as we wanted to make sure there was time to discuss any further issues following the Special General meeting held at the beginning of February. Nevertheless we encourage you to bring along any "Show & Tell" items

Synopsis of November 2009 Meeting Talk

PROBING SPIDER VENOMS AS SOURCES OF INSECTICIDES

Prof. Graham Nicholson

Professor of Neurotoxicology
Department of Medical & Molecular Biosciences
University of Technology, Sydney
P.O. Box 123 Broadway
NSW 2007 Australia

The war against arthropod pests

While only a small percentage of the 4-6 million worldwide species of arthropods are classified as pest species, they nevertheless cause major devastation of crops, destroying around 18% of the world annual crop production, and causing around US\$100 billion damage each year. Phytophagous (plant-eating) insect and mite pests are a major threat to food production for human consumption and without the use of chemical insecticides dramatic losses in worldwide crop yield would occur (reviewed in [1]).

Many pests, particularly hematophagous (blood-sucking) insects, also act as vectors for the transmission of previously unrecognised or re-emerging vector-borne human and veterinary diseases. These diseases are experiencing a



Female Blue Mountains funnel-web spider (*Hadronyche versuta*) being milked for venom

resurgence due to a variety of factors, including increased world travel, lack of adequate drugs and vaccines, global warming and the emergence of insecticide-resistant vectors. Mosquitoes are probably the most pernicious example of an insect vector, involved in the transmission of malaria and various other diseases. Malaria, alone, is responsible for up to 500 million new clinical cases worldwide each year, causing 1.5–2.7 million deaths per year (reviewed in [1]).

Factors limiting the efficacy of conventional agrochemical pesticides

The major method of pest control has been the widespread use of classical organic agrochemical pesticides. However, the long-term application of a small group of insecticides that act on a restricted number of invertebrate targets has inevitably led to the development of resistance, especially in malaria mosquitoes. As of 1992, >500 species of insects and mites, including 95 species of mosquitoes, had developed resistance to one or more classes of insecticide [2]. Moreover, the fact that the vast majority of insecticides in current use act on one of just five nervous system targets has promoted the development of cross-resistance to different families of insecticides. Consequently the identification of new insecticide targets is as critical as the elucidation of novel insecticidal agents.

Environmental and human health impacts of insecticides

Unfortunately, because agrochemicals target sites conserved between insects and vertebrates, chemical pesticides tend to be relatively non-selective and have a relatively broad-spectrum of toxicity against non-target species, and thus potential widespread environmental effects. These chemicals can have equally toxic effects on non-target species such as crustaceans and fish (reviewed in [3]).

A variety of insecticides and acaricides have also been implicated in the pathogenesis of movement disorders such as Parkinson's disease [4] and other studies also suggest a number of potentially adverse effects of pesticide exposure including pancreatic cancer, adverse reproductive outcomes, and neuropsychological dysfunction (reviewed in [5]).

As a result of environmental and health concerns driven by the above issues, U.S. Federal reviews of existing registered insecticides, driven by the Food Quality Protection Act (FQPA), this has led to de-registration, use-cancellation or abandonment of certain compounds for safety reasons or demanding re-registration requirements [6]. Thus, there is a critical need to identify insect-selective insecticides or lead compounds.

Natural toxins as sources of insecticide leads

From an agrochemical perspective, the venoms of spiders are of particular interest because of the remarkable diversity of toxins that are expressed in their venom glands. The venoms are complex cocktails, which evolved primarily for the purpose of killing or paralysing arthropod prey, and can potentially be exploited to identify leads for insecticide development. Importantly, spider venoms represent the largest potential source of bioactive molecules of any venomous creature given that there are over 41,000 extant species of spiders [7] and recent mass spectrometry work in our labs that has shown that each venom may contain up to ca. 2000 peptides [8]. Peptide neurotoxins from some of these venoms have been shown to selectively target insect ion channels [9, 10] and therefore ideal leads for the development of "soft" pest control strategies. Some of these peptide neurotoxins interact with insect ion channels not targeted by current chemical pesticides. Thus, in addition to their potential as bioinsecticides, these toxins should enable the identification of new insecticide targets that could facilitate rational insecticide design.

Previous work from our laboratories on Australian spider toxins

To date, we have been involved in the characterisation of insect-selective peptide toxins from four families of toxins (atracotoxins) isolated from venomous insect-predatory funnel-web spiders *Hadronyche* and *Atrax* species [11-17]. The insect-selective peptides are toxic to a broad range of insects of both medical and agronomic importance, but they are harmless to mice, rabbits, chickens and other vertebrates. These would be environmentally friendly insecticides that could be used to control agricultural pest insects as well as medically important vectors of human and veterinary diseases. Indeed, this research was responsible for the U.S. spin-out company Vestaron Corp. (formerly Venomix Inc.) based, in part, upon a patent covering the work done at UTS [17].

We are continuing to identify and characterise novel insect-specific spider neurotoxins with new pharmacologies and novel agrochemical potential. These peptides can then be used in future high-throughput screens of chemical libraries to discover small molecules that recapitulate the desired properties of the peptide toxins on a novel insecticide target. In addition, they can be used directly in a recombinant baculoviral model or perhaps be modelled as a small molecule 'peptidomimetic' for use as foliar sprays.

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Public contact with our web site

www.entsoconsw.org.au

We are receiving a lot more enquiries from the general public (and even journalists) via our contact details on the web site. I certainly struggle to answer their questions so I will now post some of these in the Circular so that members can make contact direct with these people if they have information or are interested in their observations

DRAGON FLY SIGHTING

You may be interested in the following: On 17/12/2009 we saw what I believe to be the Giant Dragonfly (*Petalura gigantea*) at Warrimoo in the Lower Blue Mountains. The dragonfly flew into our house and my 14 year old son took some (not particularly good) photos of it. We eventually managed to catch it and release it unharmed. We then researched it on the internet, to confirm its identity and learn about it. We live at the end of Rickard Rd and there is a swampy area down the hill a few hundred metres behind our house, which I understand is the appropriate habitat. According to the National Parks Wildlife Atlas map there has been only one other reported sighting in the Lower Blue Mountains, and it appears to be in the same general area as us.



Yours sincerely,
Adelle Colbourn.
adellecolbourn@gmail.com

WHERE TO FIND DRAGONFLIES AND DAMSEL FLIES?

My partner and I live on the central coast of NSW and are planning a trip to photograph dragonflies/damselflies.

Would you kindly be able to advise how long their peak season is?

We were on the Gwydir river and at Grafton last Easter and got a few excellent shots but there were hardly any around. This year we're looking at Taree, Nabiac, Mudgee areas...first week in March.

If you don't know the patterns of these lovely creatures, would you please be able to give a NSW contact or an Australian society? I can't find the info on the web.

Thanks so much.

Kate Landsberry
Community Work Experience Consultant
Tel: (02) 4344 9700
Kate.Landsberry@breakthru.org.au

HOW TO SOURCE ANT COLONIES?

Could you please give me some direction with regards to obtaining a queen ant and possibly some ants to go with her for my son's ant farm? We live in Sydney, NSW.

Everywhere I have been able to find online is US or EU based and as such are not Australian ants.

Thanks in advance.

Best Regards,

Jonathan Johnson
jonathan.oet@gmail.com

How the public contact us via our web site

The mailing address used is that at the Museum so would only be checked once per month or so.

The phone number is my home number but I would be happy to let somebody else handle the occasional calls. They usually come during working hours and my son ends up giving them my mobile number.

Sending an email to the contact@entsocnsw.org.au will be automatically redirected to my home email address. We can change this to another address without difficulty by contacting the company that hosts our site.

Graeme Smith
Circular Editor

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MOTH RECORDING GROUPS

I am currently resident in Bellingen and intend applying for permanent residential status later this year. For many years I have trapped and recorded moths in the UK and formed an identification collection of UK moths. I am and have for some years been a member of the Amateur Entomological Society in the UK. I am keen to continue this interest in NSW.

Does your Society cater for unqualified amateurs such as myself? Is there a moth recording scheme in operation in the state or nationally? Does your Society know of any moth recording groups within reasonable reach of the Coffs Harbour area ?

I am keen to obtain advice on the use of moth traps in this country and help with species identification.

Martin Hicks
15 Prince Street
Bellingen NSW 2454
theberea@hotmail.co.uk

Dear Sir,

Thanks you for your time and your letter of 16 October, 2009. The area I study are much the same as your clubs members. I will try to put dates and drawings of the hailstone mounds of ants I have studies next year (2010).



But for now I would like to see what reaction could “the Flying prawn” get as publication and on your web site. Making statements like this can get reactions from both sides of the fence. On the back of this page is my yard and studies from 1974 to 2009. I have seen 3 kinds of legless lizards, 4 kinds of skinks, 3 kinds of geckoes, tiger, black, brown, whip, marsh and blind snakes and 40 kinds of birds in my yard.

Yours sincerely
Colin Hargarty
(walking paraplegic aged 60)
26 Southview Ave
Stanwell Tops NSW 2508

Colin phoned the Ent Soc contact phone number (ie. my home number) to discuss his observations on ant mound at his home and how they change with weather. I was unable to help so asked if he wanted to send me some notes I'd put it in Tarsus to see if any members were interested. I received not only ants mound sketches but a page of drawings on how he has modified water collection and septic systems on his property for the benefit of the environment and also his thoughts that insects and prawns might be related.



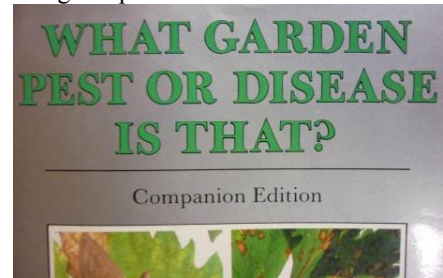
This example shows how close the Thailand prawn can be to the flying insects or bugs.

Show & Tell – November Meeting

Howard Greening brought along a couple of beetle pupae collected 10+cm deep in his garden bed. He'll try to rear them through to adults. Most guessed that they were scarabs. This led to discussion on the abundance of scarabs in potted plants and the damage they do. Mary-Ann finds them in just about all her pots. Robin commented that fiddle-back beetles also like pots.



Dinah Hales was reading about pests on citrus in Judy McMaugh's book on "Garden pests & Disease" and decided to see just how many of the listed pests she could find on her citrus at home. She managed to find just about all of them and bought along a boxed collection of living samples which included white



louse scale, black scale, California red scale, Chinese wax scale, cottony cushion scale, hard scales, mealy bugs, pink wax scale, soft brown scale and white waxy scale, not to mention some steel blue ladybirds. In spite of having to share her citrus with some many other critters, Dinah claims that she gets a good crop each year

Robin Parsons reported on an uncommon mantid he found on mandarin leaves at his home in Greenacre. He identified this as a Snake mantid (*Kongobatha diademata*) and would be interested to hear from other members whether they have seen this mantid about so that he can learn more about its local distribution and abundance.



Graeme Smith showed some photographs of silverfish he had been sent by an entomologist friend in Malaysia (Prof. Lee Chow Yang). One, taken from a colony of the ant *Monomorium pharaonis*, was identified as belonging to the southern African Lepismatid genus *Xenolepisma* while the other, from a colony of the termite *Globotermes sulphureus* has yet to be identified. It belongs to an Atelurid genus group from the Indo-Malay region. He commented how interesting it was to receive examples of insect belonging to subfamilies not known to occur in Australia.



Xenolepisma sp. The white bands are due to scales being lost



New species (new genus?) of Atelurinae

Book Review

Arachnids by Jan Beccaloni,

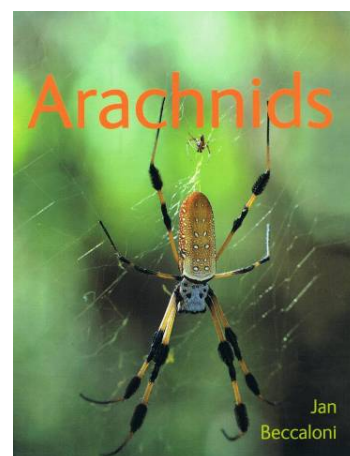
ISBN:9780643096974

Published by CSIRO Publishing, 2009, 320 pages, hard cover

Price \$69.95

Jan Beccaloni is the Curator of Arachnida and Myriapoda at the Natural History Museum in London. She has succeeded in putting together a marvelous book that captures the middle ground between the world of the specialist academic and that of the hobby naturalist.

The book is helpfully populated with clear diagrams explaining the structure of these invertebrates and the terminology used, enabling the interested laymen to reach a new level of understanding. But even more captivating are the high quality colour photographs of these animals in their natural state, bringing their biology to life (e.g. a scorpion with a lizard as prey or a whip spider carrying its young on her back).



Most of us think of spiders when we think of Arachnids, but this book certainly corrects this narrow view. Each of the eleven extant orders is treated in a similar fashion although more pages are devoted to the two largest groups of spiders and mites (each with over 40,000 described species). A description of their general biology follows which could for example include discussions on the evolution of webs, their venom,

Each order is approached in a similar fashion; a short overview is followed by a discussion of their classification and diversity which includes a few paragraphs of text; a review of their internal and external anatomy is accompanied by illustrations of the key taxonomic features as well as some beautiful photographs on each included suborder. Sections on the distribution and habitats give an overview of the types of habitat in which the various orders have been found. General biology and behaviour covers feeding, defensive behaviour and aggression and varies from group to group depending on need e.g. Uropygid resistance to water loss or grooming in the Amblypygi. Life history is then covered including for example courtship behaviour, mating, egg-laying, post-embryonic development and longevity.

Several pages are devoted to the medical and veterinary importance of mites including their role as disease vectors, parasites of honey bees and as crop pests but also includes some information on their use as biological control agents.

Special boxes are used from time to time to illustrate and discuss unusual but interesting aspects e.g. the raptorial palps of the Amblypygi or the unusual legs of the pseudoscorpions. Other more “popular questions” are also addressed such as “which spiders produce the strongest venom” but the trivia buffs will be frustrated by the (justified) lack of a clear answer.

References are not cited in the body of the text but list of references is included at the back of the book, arranged by chapter giving up to about 50 key publications and web sites for further reading. And while there is also an index at the back of the book, the regular structuring of the information within each chapter often allowed me to open quickly to the information I wanted without resorting to the index.

Arachnids is an excellent addition to any naturalists library and the wonderful photographs of rarely encountered groups and easy reading justifies a place on the coffee table.

Review by Graeme Smith
Circular Editor
Entomological Society of NSW

Some invertbrates from Sabah & Sarawak

Over Christmas/New Year I was able to spend three weeks with my family in the Malaysian part of Borneo. This part of the world offers a lot in terms of reasonably priced accommodation, food and adventure/eco activities. We managed to spend a couple of nights in a long house village in the rainforest, go rafting and kayaking, visit caves, climb Mt Kinabalu (4095m asl) and snorkel on coral reefs. Along the way I took the opportunity to enjoy the fauna including the very obvious butterflies and millipedes. Of course I also looked for silverfish and managed to collect three species, 2 atelurids associated with ants as well as one Nicoletiidae.

Unfortunately we missed the chance to see the insects in the museum at Kuching (a very pleasant town that deserves a visit but the Museum closes early). If anybody is going to this part of the world with a view to seeing large spectacular insects, I would have to recommend the National Park at Mulu. Lots of butterflies (including Raja Brooks birdwings that refused to sit still to be photographed) and large lantern bugs. There's still a lot of primary rainforest left around the National Park although the planting of oil palm plantations around the park will ensure this becomes a rainforest island with negative affects on the fauna, especially the larger mammals. The Mulu Resort is a very comfortable place to stay but a beer here will cost you \$6 so BYO.

Graeme Smith



Weevil- Sukau



Natural History Museum- Kuching



Cicada - Batang Ai



Batang Ai



Ant - Batang Ai



Batang Ai



Bee - Batang Ai



Millipede- Mulu



Caterpillar- Mulu



Atelurine silverfish- Batang Ai



Nicoletiini silverfish- Batang Ai



Weevil- Mt Kinabalu



Large millipede-Mulu



Cave earwig- Mulu



Cockroaches on cave on guano- Mulu



Cave cricket- Mulu



Cave spider on guano- Mulu



Mulu



Cricket- Mulu



Hemiptera- Sukau



Lantern Bug- Mulu



Mulu



Mulu



Mulu



Whip-tail scorpion- Sukau



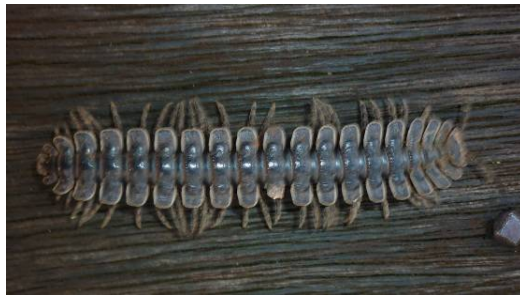
Passalid- Mt Kinabalu



Mulu



Mulu



Large millipede- Sandakan



Millipede- Sukau



Mulu



Mulu



Grass Hopper- Sukau

Society Christmas Function November, 2009



Ted Taylor organised another well-attended Christmas function at The Boat House. Other diners at the restaurant were bemused by the collection of large inflatable insects suspended above our table, but for members of the Society this seemed perfectly in order. The insect quiz proved particularly challenging but entertaining, leaving many of us wondering just how deep our entomological knowledge needs to be to match that of Ted.



Bi-monthly Meetings

The Society meets **BI-MONTHLY** unless otherwise advertised. General meetings with a speaker will generally be held only on the “odd numbered” months (March, May, July, September, November) while the Council will meet more frequently. Speakers tentatively scheduled for the coming general meetings are shown below.

This timing allows us to alternate meetings with the Society for Insect Studies (SFIS) which meets at the Australian Museum at 7.30 on the second Tuesday of the “even numbered” months.

Future Events

Date	Speaker	Title
3 rd March 2010	AGM	AGM
2010	Warrick Angus	Burrowing Bees

Venue:

Meeting Room 2
Ermington Community Centre
10 River Road Ermington

Meetings start at 7:30 p.m. (directly following the Council meeting)

Talks run for around 45 minutes, with 10 minutes for questions, followed by a light supper. Guests are most welcome.

Getting there:

By Car: From Victoria Rd turn into Spurway St (head towards Parramatta River). Turn right into Jackson St then left into River Rd. If heading north on Silverwater Rd, turn right into Victoria Rd then proceed as above. If heading south on Silverwater Rd take the Parramatta off ramp, cross Victoria Rd and proceed into River Rd. If you miss the off ramp, turn left into South St, then left into River Rd.

By Bus: Routes 525, 523 and L20 depart from Argyle St near Westfield shopping centre near Parramatta station. Routes 523 and L20 depart from West Ryde station. Get off at the Ermington shops. River Rd passes between the supermarket and the hotel.

SOCIETY POSTAL ADDRESS

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MEMBERSHIP FEES 2009

ORDINARY MEMBERS	\$50
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