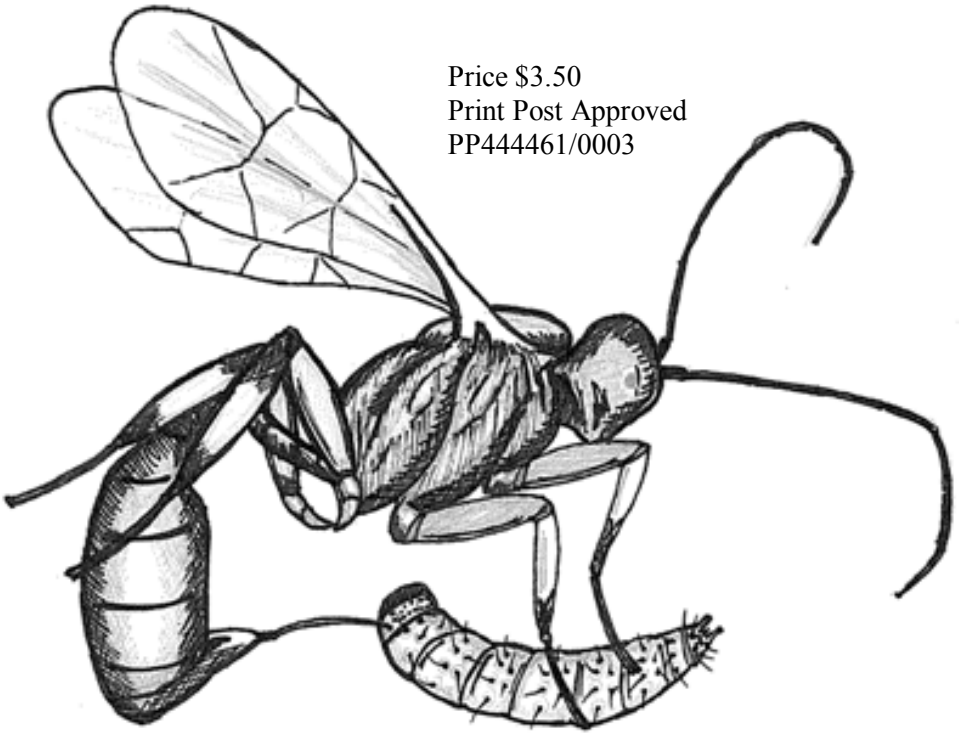
ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

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. Membership is open to anyone interested in Entomology. 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 Monday of each month (March to June, August to December), or on Tuesday if Monday is a public holiday. Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society.

Contributions to the *News Bulletin* such as items of news, trip reports, announcements, etc are welcome and should be sent to the *News Bulletin Editor*.

The Society publishes **THE AUSTRALIAN ENTOMOLOGIST**. This is a refereed, illustrated journal devoted to Entomology in the Australian region, including New Zealand, Papua New Guinea and the islands of the South Western Pacific. The journal is published in four parts annually.

EMBLEM: The Society's emblem, chosen in 1973 on the 50th anniversary of the Society, is the king stag beetle, *Phalacrognathus muelleri* (Macleay), family Lucanidae. Its magnificent purple and green colouration makes it one of the most attractive of all Australia Coleoptera. It is restricted to the rainforests of northern Queensland.

COVER: *Diadegma semiclausum* ovipositing into a larva of the diamondback moth, *Plutella xylostella*. Drawn by Sandra Dennien.

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The Entomological Society of Queensland
Minutes of General Meeting 8 September, 2008

Meeting held in the Large Conference Room, CSIRO Entomology, Long Pocket Laboratories, 120 Meiers Road, Indooroopilly, on 8 September 2008, 12:00 midday.

Attendance:
Mike Furlong, Richard Bull, Geoff Monteith, Shaun Winterton, Tim Heard, Anna Marcora, Ross Kendall, Graham Forbes, Geoff Thompson, Matthew Purcell, Lynita Howie, Helen Nahrung, Mark Schutze, Shon Schooler, Don Sands, Gunter Maywald, Penny Mills, Susan Wright, Andrew Hulthen, Sarah Corcoran, Yen-Po Lin, Federica Turco, J. Grimshaw, Desley Tree, Justin Bartlett, Peter Allsopp, Murdoch De Baar, Hermes Escaler.

Visitors:
Brendan Murphy, Rieks Van Klinken, Simon Lawson, Karen Bell, Kevin Lambkin, Juan A. Villanueva-Jimenez.

Apologies:
Christine Lambkin, Noel Starick, Belinda Walters, Gary Fitt, Judy King, Lyn Cook, John Moss.

Minutes:
The minutes of the last General Meeting of 11 August, were circulated in the News Bulletin Vol. 36, Issue 5, 2008.
Moved the minutes be approved: Don Sands
Seconded: Graham Forbes

Membership Nominations and Elections:
The following nominations for membership were received and approved by Council:
Mr Yen-Po Lin
Miss Kelli O'Neill
The Chairman also announced 3 nominees approved at the August Council meeting but not introduced at the General meeting. These were Andrew Hulthen, Penny Mills and Susan Harvey. Apologies to these members for the oversight.

In accordance with Society rules, the nominees were elected unanimously by a show of hands.

General Business:

Collecting Permits:
Susan Wright, ESQ Permits Officer addressed the meeting and advised General Collecting Permits would be much more difficult to obtain and there would be fewer issued. National Parks authority had given approval for only 10 specified National Parks and 20 State Forests. She would attempt to negotiate for an extension of this number. Members currently in possession of General Permits will be those only eligible for a new one which would prevent overseas visitors from applying after they arrived in Queensland.

Don Sands addressed the meeting and advised he had arranged to have discussions with the National Parks officer concerning the format of new QPWS Protected Species Permits. The new permit would also be more difficult to obtain and that all permit holders would now be required to sign a statutory declaration stating that they had not or were not involved in the commercial sale of insects.

Don moved : 'That he (Don Sands) and the Hon Secretary (Richard Bull) be elected as referees of all new applications for Protected Species Permits'.
Seconded: Susan Wright. The motion was carried by a show of hands with all in favour.

Announcements:

- Geoff Thompson advised the ESQ Website (www.esq.org.au) has been updated and members could now access details of current meetings, recent news items and Society activities, a list of authors of the Australian Entomologist journal, plus an up-dated membership nomination form.
- Geoff Thompson called for expressions of interest from members to take the position of Australian Entomological Society Queensland Regional Councilor. Any interested person should contact him directly for details.

Main Business:

Phylogeny of the mantid lacewings (Neuroptera: Mantispidae): evidence from multiple molecular markers

Shaun L. Winterton[1,2,] & Michael, Ohl[3,]

1. Queensland Department of Primary Industries & Fisheries, Indooroopilly.
2. School of Integrative Biology, University of Queensland, St. Lucia.
3. Museum of Natural History of the Humboldt-University, Berlin, Germany.

Neuropterida comprise the holometabolan orders Neuroptera (lacewings), Megaloptera (alder-flies, dobson-flies) and Raphidioptera (snake-flies) as a monophyletic group sister to Coleoptera (beetles). Mantispidae (mantid lacewings) are a charismatic family of Neuroptera of around 450 species in fewer than 50 genera distributed world wide (Figure 1). Distinguishing characteristics of mantispids are the raptorial forelegs which make them superficially resemble preying mantids (Order: Mantodea). Mantispids differ by usually having similarly shaped fore and hind wings, as well as being nocturnal as opposed to the diurnal preying mantids. All mantispids are predaceous, although they are know to feed on pollen in some genera.

Mantispidae are divied into four subfamilies: Symphrasinae, Drepanacinae Calomantispinae and Mantispinae.

Symphrasinae are distributed throughout southwestern USA to Argentina with 32 species in 3 genera (*Anchieta*, *Plega*, *Trichoscelia*). Larvae of this subfamily are found in wasp and solitary bee nests and in the soil and can be local abundant.

Drepanicinae are known from southern South America and Australia with 36 species in 4 genera (*Ditaxis*, *Drepanicus*, *Gerstaeckerella*, *Theristria*). Two genera (*Ditaxis* and *Theristria*) in Australia are some of the most common species encountered, but the larval biology is completely unknown. Based on the small numbers of eggs produced by adults it is assumed that the larvae are predators of hymenoptera nests.

Calomantispinae are known from 10 species in 2 genera, one found Central America (*Nolima*) and the other in eastern Australia (*Calomantispa*). Larvae of Nolima have been reared in the lab on various sedentary arthropods but the natural habits unknown. It is assumed that they have a similar biology to Drepanacinae and Symphrasinae.

The most diverse and species rich subfamily are **Mantispinae**, with 410 species in 30 genera distributed worldwide. Larvae of this group are specialised predators in spider egg sacs, feeding on the eggs by sucking out the contents. Adults known to be predaceous and/or to feed on plant exudates and pollen.

Mantispid life history is complex and highly specialised. Adults lay eggs on stalks (long or short) in groups of up to several hundred on plants, buildings, etc. Lifetime fecundity in some Mantispinae species may be in the thousands. First instars must locate and feed on larvae of hymenoptera or on spider eggs to develop. First instars are mobile and typical campodeiform in shape. Once they find there prey they then hypermetamorphose during development into physogastric later instars which are grossly engorged and sedentary larvae unable to move as their legs become highly reduced. As the number of eggs in a spider egg sac may vary enormously, then the amount of food is finite, since larvae cannot move to another egg sac. Therefore, larvae are able to develop on differing amounts of eggs and consequently, once food is exhausted, they pupate regardless. This leads to highly variable adult size in many species because of food limitations.

Figure 1. Adult of *Theristria pallida* in Arhnem Land (Northern Territory). Photo: Shaun Winterton.

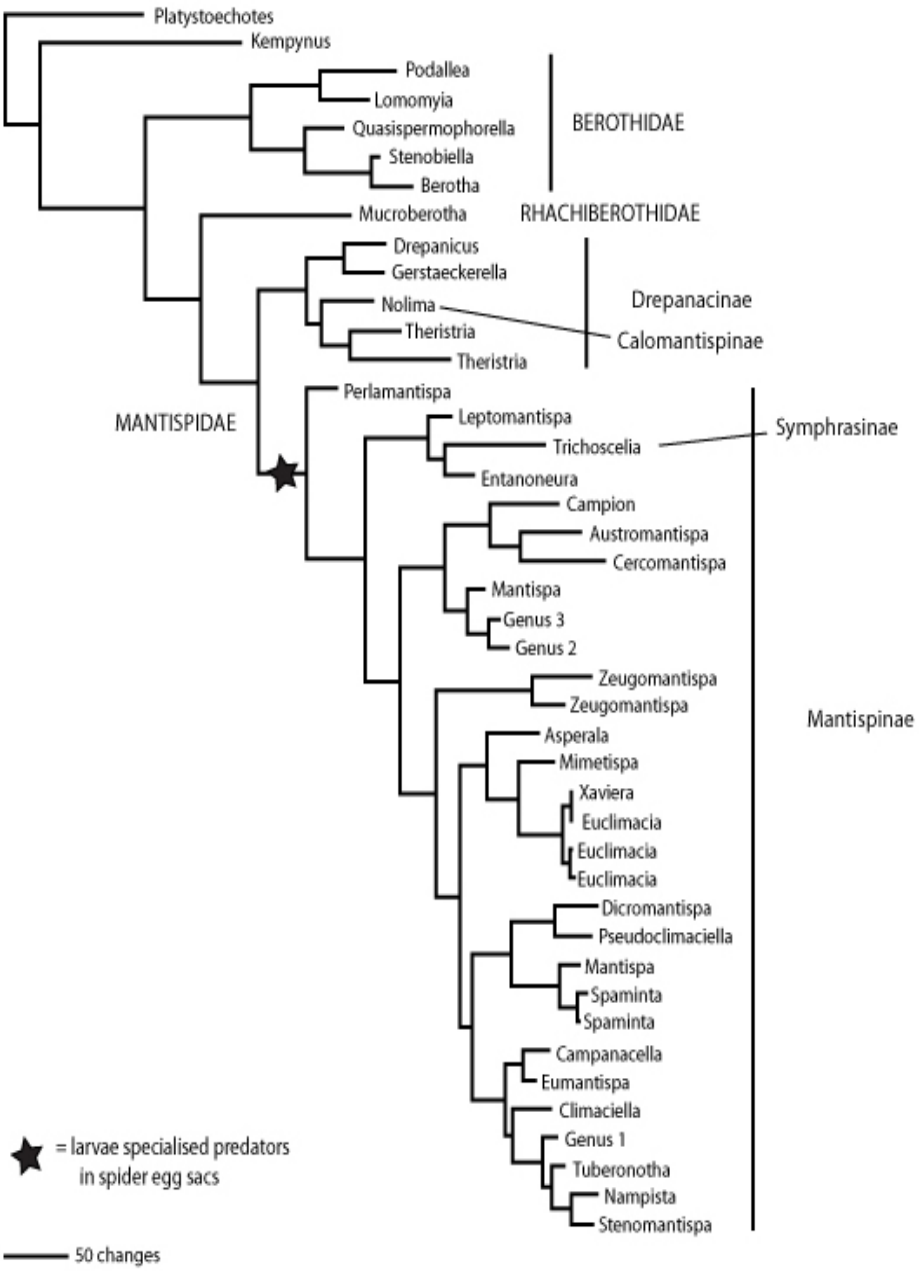


Figure 2. Most parsimonious tree of Mantipidae generic relationships. Star indicates evolution of larvae predating spider egg cases.

Mantispidae are closely related to lacewing families such as Rhachiberothidae from southern Africa, and the cosmopolitan Berothidae (Beaded lacewings) These families also have hypermetamorphic larvae but in the case of berothids, larvae are obligate predators of termites. Larvae live inside termite nests and feed on termites by possibly using a paralyzing chemical allomone. The second instar in quiescent, and does not feed, but the third instar does most of the feeding.

To examine the evolution of this group of lacewings we undertook a simultaneous analysis of Mantispidae and related families using multiple molecular markers. Nucleotide sequences were obtained for three genes (CAD, 16S, COI) from exemplars 35 genera of Mantispidae, Rhachiberothidae and Berothidae, representing all subfamilies mantid lacewings. Sequences were compared in a phylogenetic analysis with outgroup exemplars from Osmylidae (*Kempynus*) and Polystoechotidae (*Platystoechotes*). A parsimony analysis recovered a single tree with a length of 2830 steps (Consistency index= 0.39; Retention index= 0.49). Third positions of amino acid sequences were excluded due to their high rate of evolution and extent of homoplasious substitutions. The final alignment consisted of 587 parsimony informative characters from a total of 2981 (Figure 2).

Conclusions from this analysis include:

- Molecular sequence data provides some evidence of phylogeny in Mantispidae.
- Gene loci with varying rates of evolution were required to cover differing levels of classification.
- Mantispidae are monophyletic (natural group). Phylogeny recovers some previously defined subfamilies (i.e. Mantispinae, Drepanacinae) but not all. Questions remain regarding status of Symphrasinae and Calomantispinae as they were rendered other subfamilies as paraphyletic. More data (sequences, morphology) and more taxa (e.g. *Calomantispa*) are required to clarify this issue.
- Rhachiberothidae status still enigmatic, but appears to be sister to Mantispidae.
- Evolutionary trend towards specialisation in larval biology from social insects to host specific spider egg cases.

The address was accompanied by a slide show of remarkable photographs and generated numerous questions and comments from the audience on various behavioural activities of the life stages of the Mantispidae.

Vote of thanks was given by Geoff Thompson.

Chairman's closing statement:
The next meeting will be held at this venue on October 13 at 12.00 noon with an address by Mr Stacey McLean, BCC Environmental Officer, " Filling Bio-diversity Information Gaps in Brisbane City: Bugs, Birds and Bracket Fungi".

Notice of Next Meeting

Entomological Society of Queensland

Monday 13th October 2008 12pm

Large Conference Room
CSIRO Long Pocket Laboratories
120 Meiers Rd, Indooroopilly

Mr. Stacey McLean

Brisbane City Council

"Filling Biodiversity Information Gaps in Brisbane City: Bugs, Birds and Bracket Fungi"

News from the Queensland Museum

Jenny Beard is still in the USA working on her Smithsonian Fellowship with Ron Ochoa on peacock mites (Tuckerellidae). However, she did take some considerable time to examine the type specimens of several *Tetranychus* species, helping to resolve some questions relating to the diagnostics of several pest species. **Robert Raven** was well travelled in the past month, visiting Western Australia in the quest for brush-footed trapdoor spiders, then heading north to Townsville then onto the McIlwraith Range.

News from the USDA-ARS Australian Biological Control Laboratory

Jeff Makinson returned from Hong Kong in September with more than 100 larvae of a stem-boring moth which attacks *Lygodium microphyllum*, a serious weed in Florida, USA. These larvae will be reared in quarantine and hopefully colonised for further evaluation. **Jeff** and **Matthew Purcell** will be travelling to Hong Kong and China in November to see if this moth occurs in southern China, West of Hong Kong. They will also survey for biological control agents of the submerged aquatic weed, *Hydrilla verticillata*. In late October, **Matthew** will attend and present at a workshop on invasive species at the Chinese Academy of Sciences in Wuhan. In November, **Tony Wright** will accompany Dr. Ted Center, USDA ARS, in Thailand surveying for biocontrol agents of Downey Rose Myrtle, *Rhodomyrtus tomentosa*.

News from the School of Integrative Biology, UQ

Mike Furlong is currently in Samoa (working with entomologists from the Ministry of Agriculture) conducting studies to measure the impact of endemic natural enemies on diamondback moth populations as part of his ACIAR project. **Fereti Atumuvara** recently began his MPhil studies examining the insecticide resistance status of diamondback moth populations in Fiji.

News Bulletin contributions from Entsoc Members
We would love to receive your news, field trip reports, sightings of strange and wonderful beasts, Entomological Notes, Bug of the Month, gossip, concerns, questions and suggestions pertaining to the world of entomology. Please send contributions to the News Bulletin editor or your nearest Entsoc office bearer.
Don't delay, next issue out soon! Thank you, Anna

freetalks
QUEENSLAND CONNECTIONS 2008

http://www.southbank.qm.qld.gov.au/calendar/2008/connections/index.asp

Make a note in your diary for the lively and interesting 2008 Queensland Connections Series. This year there will be 20 fascinating talks covering aspects of cultural heritage and our natural environment. All talks are held in the Theatre, Level 2, Queensland Museum South Bank.

FREE ENTRY

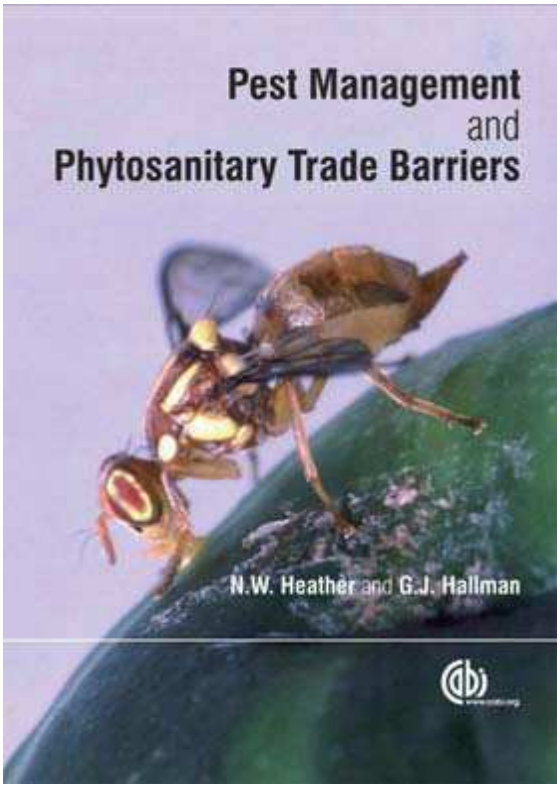
Wednesday 5 November at 1pm

Grotesque spiders:
the Australian Goblin Spider family
Speaker: Dr Barbara Baehr,
Queensland Museum
Mega-diverse and micro-distributed, an unknown spider family in discovery.

New Book Release:
Pest Management and Phytosanitary Trade Barriers

http://www.cabi.org/bk_BookDisplay.asp?PID=2058

N. Heather, University of Queensland, formerly Queensland Department of Primary Industries, Australia, and G. Hallman, USDA
January 2008 260 pages Hardback 978 1 84593 343 2
£65.00/US$130.00/€105.00
Subject Classification: TVP, KNAC
Territorial Market Rights: World



A significant amount of the world's economy is based upon the international trade of agricultural produce. For the producing countries, a growing concern is the potential economic and ecological damage that invasive species could cause. While threats can be decreased through the regulation of items potentially carrying invasive species, the effect of such restrictions on international trade also needs to be considered. A balance must therefore be met that permits the transfer of produce while filtering out unwanted pests.
Drawing on the author's extensive experience, the social and financial implications of phytosanitary trade barriers are reviewed. This book offers valuable and comprehensive coverage of pest related barriers and strategies for their implementation.

Audience:
Researchers and professionals within the regulatory services in plant protection quarantine, entomology, horticulture and agriculture.

ESQ Collecting Permits

An update on the permit situation:

We now have an extension which will cover us until the 31st of October 2008 by which time we should have the new permits covering selected National Parks and Forestry areas. I will only send this extension out to people who have applied for the new permits and who have sent in a return. The application form is again attached for those who will need the new permits.

Thanks to all those who gave me a list of the parks they wish to visit. All areas listed ended up on the application. I haven't heard of any issues so far with any of the areas so hopefully all should be covered by the new permits. Rather than list them all here if you need to check a park then please contact me and I will check for you. Once the permits have been granted I hope to have these various bits of info on our website. We do have the option of amending the forms if we need additional parks through the year. Please make sure you allow me approximately three weeks for any amendment to avoid disappointment.

There have been a couple of issues raised however with our returns. (The bits in bold are from an email from QPWS)

1. **The data return from the previous year contains insufficient detail to enable a large percentage of the information to be usefully incorporated into the EPA's WildNet database. Most records of collected individuals show coordinates of collection but do not include the map datum used to derive those coordinates (e.g. AGD 84, GDA 94) or the degree of precision with which those coordinates were recorded (e.g. plus or minus 100m). Information in these fields of the data return must be supplied for wildlife records to be entered into WildNet.** I realise this sort of information is beyond the experience of a few members but will try to organise both people and references to help anyone who has difficulties in this area. This will be a tricky one to sort out but if members could have it in the back of their minds where they got their coordinates from then we may be able to sort this out to QPWS satisfaction (with a little guesstimation). At the very least we can start to collate this data for new collections.

2. **The return for 2007 does not include any details of institutions at which specimens were lodged nor any museum registration numbers for the specimens collected. Such information is necessary to enable records to be verified and should be provided to WildNet along with other collection details**. For our purposes we are including private collections in this list and have indicated this to QPWS. This should be relatively easy to fix so if members could let me know where the specimens they have collected are held, then we can start work on fixing this problem.

This is the first time we have had feedback on our returns and I will be working with the people in QPWS to ensure that as much of our data as possible is entered into Wildnet. This means I will be asking members to clarify various bits of data they have given me as we have collected over 9000 records and it would be good to see this data available for use.

Keep those permit application forms rolling in and an eye out for my various pleas for information.

Susan Wright

To: **Users of the Entomological Society of Queensland**
QPWS collecting permits

From: **President, Entomological Society of Queensland**

Re: **Use and conditions of collecting permits**

Please note that you are required to follow the conditions as stated on the permit. The permit and membership to the ESQ may be revoked if conditions are not followed. In particular note that:

- you are required to submit a return of operations within 30 days after the end of each 12 month period that the permits are in force;
- specimens may not be given, sold or traded (but a member who is endorsed on the permit may collect specimens on behalf of another member provided that they are also endorsed);
- wildlife habitat must not be damaged, environmental impact must be kept to a minimum;
- this permit does not give you the right to enter any land, you must get prior permission from the agency responsible for administration of the land;
- where possible, collecting activities should be effected away from public view;
- a copy of any resulting reports/activities derived from this research should be provided to the EPA office at which the permit was issued;
- you must carry a copy of the permit that is endorsed by the permit holder (S.Wright) and it must contain your name and residential address;
- you must carry a form of identification that displays a coloured photograph such as a Queensland drivers license.

Complete and return the attached application form to:

Susan Wright
Entomology
Queensland Museum
PO Box 3300
South Brisbane Qld 4101
Ph 07 3840 7704
Fax 07 3846 1226
Email: Susan.Wright@qm.qld.gov.au

Signed applications sent by fax are preferred.

Application Form for use of The Entomological Society of Queensland Collecting Permits

Name: _____

Residential Address:

_____

_____

Postal Address (if different from above):

_____

_____

Phone number: _____

Fax number:_____

Email address:_____

Project outline:

_____

_____

_____

Parks you wish to visit:

_____

_____

Which permit will you be requiring? (please tick)

National Parks: _____
State Forests: _____

Declaration:
I agree that in using the permit I will read all conditions and procedures relating to these permits and will abide by them.

Signed :_____

Dung beetles and the courtship dance

Graeme O'Neill 01/09/2008 14:08:00
Australian Life Scientist
http://www.biotechnews.com.au/index.php/id;1073043092;pp;1

Beetles and crickets offer the perfect model for studying sexual selection and the primacy of female choice. Graeme O'Neill spoke to Leigh Simmons about testes size, sperm competition and the 'sneaky f…er strategy'.

In a tunnel beneath a freshly deposited cowpat, two male *Onthophagus* dung beetles lock their elaborate horns for the right to mate with a female in a nearby nest chamber. But the winner of their physical contest is not assured of exclusive mating privileges.

In a side chamber lurks a third contender – a female look-alike, lacking the elaborate horns of his rivals. His strategy is very different: wait until they are strenuously engaged, then sneak in and mate with the receptive female.

But it's the fourth player in the mating game – the female – who ultimately determines who wins the paternity stakes, according to Professor Leigh Simmons, Federation Fellow and director of the Centre for Evolutionary Biology at the University of Western Australia.

Simmons and his colleagues are investigating how different *Onthophagus* species and grylloid field crickets play the mating game, and how female choice drives the evolution of male morphology, and mating strategies.

Beetles and crickets are convenient, potentially informative models for other, harder-to-study species, including our own. Simmons uses *Onthophagus* beetles as a model because, under laboratory conditions, they can cram six generations into 12 months, they're easy to manipulate experimentally, and their enormous diversity offers many permutations of the mating game.

Female choice imposes selection pressures that can cause males of very different species to converge on similar mating strategies – and even similar physical traits.

Simmons' hornless *Onthophagus* males seem to have independently evolved their own version of a mating gambit observed in red deer on the island of Rum, off the west coast of Scotland, indecorously dubbed the 'sneaky f…er strategy'.

A dominant stag must be constantly vigilant and ready to fight off testosterone-charged raiders intent on mating an unattended doe in his personal harem of does. Zoologists initially wondered why such contests don't result in runaway sexual selection, creating huge, super-aggressive stags with massive antlers.

Their answer came when they observed timid stags with small racks preserving the status quo, by dashing in for a sneaky quickie with any compliant female while the dominant stag is contending with pretenders to his title.

Darwin recognised that sexual selection is a more potent force in shaping species than natural selection, but the elaboration of a male characteristic like antlers or tail features through quirky female preference is not an open-ended process. At some point, the exaggerated trait becomes a liability to the male, and natural selection reins it in.

Naughty boys

Back to beetles: Simmons says that, where a high proportion of males adopt the SF strategy, there will be high levels of sperm competition. Species with a low proportion of sneakers probably invest more of their resources in combat, than in the sperm contest after the main event.

"Not surprisingly, when we looked at testis size relative to body mass, we found species that have a high frequency of sneaky males tend to have larger testes," he says. "That's true of both the sneaks and guards.

"We can explore these comparisons statistically, to see what other traits might be correlated with certain mating strategies. There are other factors out there that can influence testes size and the frequency of sneaking males – we can test predictions flowing from sperm-competition theory, but we can only establish associations."

Simmons and his team have been doing some experimental manipulations of selection by setting up a system in which they can manipulate the mating system of a particular species.

"For example, we allow males and females to mate monogamously, or allow the males to compete to mate with individual females. After 20 generations – about five years, in beetle terms – we compare the size of the testes in the monogamous and polygamous lineages.

"We get evolutionary divergence: males from monogamous lines have smaller testes than those from polygamous lines. Then, if we arrange sperm competitions, males from polygamous lines with larger testes sire more progeny than monogamous males with small testes."

Simmons says many researchers are studying species with alternative male mating strategies, looking for variation in sperm quantity and sperm quality. Such studies indicate that sneakers generally have higher quality sperm than guarders. They produce more motile sperm, and despite the sneaky males being at a physical disadvantage in any contest with guarder males that limits their access to females, they tend to out-compete guarder males in terms of numbers of progeny.

"The maintenance of these tactics is an interesting issue, and there's a lot of theory out there. We're trying to identify mechanisms that help maintain these alternative tactics.

"Theory predicts that sneaker and guarder males should achieve equal fitness – a sneaker may get an advantage through the sperm contest by out-competing other males, while guarders achieve equal fitness by having access to more females.

"There's not much empirical data out there, but game theory has developed broad, conceptual predictions."

Simmons says females are not passive players. "If they don't mate with multiple males, there's no sperm competition. Females create competition by mating randomly and through their preferences for certain male behaviours – for example, they strongly prefer males that invest extra effort in courtship. They want the best male to father their offspring, and the tactics of being a sneak or a guard are not necessarily related to the ability to father the fittest offspring.

"Horned males might not have the best genes, so females increase their chances by allowing sneaks to copulate with them."

Small horns, big …

Simmons and his students have been studying a variety of *Onthophagus* species in which the size and number of horns varies considerably. Some have head horns, others have horns projecting from the pronotum, the body segment behind the head.

Dung beetles: guard to the left, sneak to the right.
Photo Credit: Douglas J Emlen

They found a developmental tradeoff between horn size and number, and sperm production at maturity. By cauterizing the proliferating cells that form the horns during embryonic development, they have shown that no-horned males divert their developmental resources into growing larger testes – revealing a tradeoff in resource allocation.

"The species with more exaggerated horns tend to have much greater canalisation of the development of the testes – they're much less susceptible to environmental perturbation, so selection pressure has somehow broken down the connection between environmental influences and testes size."

Simmons and his students use field crickets to explore the selective pressures that favour the evolution of multiple mating in females – the behaviour that promotes sperm competition among males. Sperm competition is more than a simple game of numbers: quality is also important, for both sexes.

"We're looking at how the fitness of offspring varies between polygamous and monogamous females, and we're finding some evidence that females do gain fitness benefits for their offspring by mating with multiple males."

Male genetic variation seems to be a factor in high survival rates in offspring after fertilisation, as opposed to actual success in fertilisation.

"The offspring hatch two weeks after fertilisation, and there appears to be a critical period of embryonic development when survival is determined by protein components of the male's seminal fluid," Simmons says.

"By mating with multiple males, the female gets a variety of proteins to maximise the viability of her embryos.

"We can't determine in advance what constitutes male quality, but females that mate with multiple males end up with more offspring."

Singing may be a proxy for genetic quality in male crickets, according to Simmons. "Males chirp at night, and females assess the song from a distance, and seem to be more attracted to some songs than others.

"Some US studies have linked song attractiveness to the quality of a male's seminal fluid, so the female is able to assess the male's suitability as a mate from his song.

Simmons says some genetic mechanism appears to link the two traits, but how it works is unclear – genetically superior males may simply have the resources to invest simultaneously in high quality sperm and high quality songs, where lesser males struggle to do both.

Those superior resources may not be exclusively genetic – the male that keeps itself well fed, and out of harm's way, is likely to have a superior phenotype.

Courtship songs

Simmons has been studying the courtship songs of several Australian cricket species. The males advertise their presence at night with long-distance chirping that the female can detect at a distance of five to six metres. If the female is sufficiently interested to follow the song to its source, the male switches to a quieter courtship song with a different temporal structure.

"One indication of male quality is immunocompetence – the ability to mount an effective immune response to pathogens. It confers major fitness advantages on a female's offspring, increasing their chances of developing to reproductive maturity.

"We're trying to determine if immune function correlates with male singing and courtship behaviour, and what song parameters appeal most to females.

"There also appears to be a link between semen quality and male immunocompetence, but we don't yet understand the mechanisms involved. Males from cricket families [experimental lineages] that have to invest heavily in antimicrobial immunity tend to have lower semen quality, so they make fairly poor mates.

"We're looking for patterns of genetic variation that correlate with male quality, including sperm quality. But sperm quality is also very sensitive to environmental perturbation.

"We're looking at the contribution of male genetic variation by taking a series of males and mating each of them to three or four different females, and looking how particular traits vary between half-sib and full-sib offspring, which gives us a quantitative measure of genetic variation."

One of Simmons' research students, Renee Firman, recently completed her PhD study, in which she established a link between semen quality and sperm competition in a mouse model.

"Her project extended our work to vertebrate models. She found that, after 12 generations, semen quality and competitiveness diverged in different mouse lineages.

"Because the mouse genome project has been completed, we have the potential to identify genes coding for fertility factors, which may have important implications for studies of mammalian fertility."

People learning of Simmons' unusual interest in the mating strategies of beetles and crickets inevitably ask him to join the dots between the affairs of beetles and humans, and are politely rebuffed. "The only way to make a statement about mating strategies in humans is to study them in their own right," he says.

That said, Simmons' studies of human semen quality are revealing some remarkable parallels. Men viewing images depicting situations that would promote sperm competition produce ejaculates with faster-swimming sperm.

Cuckoldry has a long and ignoble history in human affairs. In *The Rise and Fall of the Third Chimpanzee*, Jared Diamond reports that anonymous surveys indicate that around 30 per cent of human couplings occur outside long-established pair bonds – close to the maximum frequency predicted by models of human mating behaviour, before the system descends into chaos.

Cuckoldry is not only a sneaky, but potentially fatal strategy. If Simmons is right, even in death, the incautious cuckold has a better than even chance of keeping the genes for his sneaky behaviour alive and swimming just that little bit faster in the human gene pool.

Photo: Leigh Simmons

New Ant Species Discovered in the Amazon Likely Represents Oldest Living Lineage of Ants

September 16, 2008
The University of Texas at Austin
http://www.utexas.edu/news/2008/09/16/new_ant_species/

AUSTIN, Texas — A new species of blind, subterranean, predatory ant discovered in the Amazon rainforest by University of Texas at Austin evolutionary biologist Christian Rabeling is likely a descendant of the very first ants to evolve.

This new species of blind, subterranean, predatory ant, *Martialis heureka*, was discovered in the Amazon by Christian Rabeling at The University of Texas at Austin. It belongs to the first new subfamily of living ants discovered since 1923, and is a descendant of one of the first ant lineages to evolve over 120 million years ago. Image Credit: C. Rabeling & M. Verhaagh.

The new ant is named *Martialis heureka*, which translates roughly to "ant from Mars," because the ant has a combination of characteristics never before recorded. It is adapted for dwelling in the soil, is two to three millimetres long, pale, and has no eyes and large mandibles, which Rabeling and colleagues suspect it uses to capture prey.

The ant also belongs to its own new subfamily, one of 21 subfamilies in ants. This is the first time that a new subfamily of ants with living species has been discovered since 1923 (other new subfamilies have been discovered from fossil ants).

Rabeling says his discovery will help biologists better understand the biodiversity and evolution of ants, which are abundant and ecologically important insects.

"This discovery hints at a wealth of species, possibly of great evolutionary importance, still hidden in the soils of the remaining rainforests," writes Rabeling and his co-authors in a paper reporting their discovery this week in the *Proceedings of the National Academy of Sciences*.

Rabeling collected the only known specimen of the new ant species in 2003 from leaf-litter at the Empresa Brasileira de Pesquisa Agropecuária in Manaus, Brazil.

He and his colleagues found that the ant was a new species, genus and subfamily after morphological and genetic analysis. Analysis of DNA from the ant's legs confirmed its phylogenetic position at the very base of the ant evolutionary tree.

Ants evolved over 120 million years ago from wasp ancestors. They probably evolved quickly into many different lineages, with ants specializing to lives in the soil, leaf-litter or trees, or becoming generalists.

"This discovery lends support to the idea that blind subterranean predator ants arose at the dawn of ant evolution," says Rabeling, a graduate student in the ecology, evolution and behaviour program.

Rabeling does not suggest that the ancestor to all ants was blind and subterranean, but that these adaptations arose early and have persisted over the years.

"Based on our data and the fossil record, we assume that the ancestor of this ant was somewhat wasp-like, perhaps similar to the Cretaceous amber fossil Sphecomyrma, which is widely known as the evolutionary missing link between wasps and ants," says Rabeling.

He speculates that the new ant species evolved adaptations over time to its subterranean habitat (for example, loss of eyes and pale body colour), while retaining some of its ancestor's physical characteristics.

"The new ant species is hidden in environmentally stable tropical soils with potentially less competition from other ants and in a relatively stable microclimate," he says. "It could represent a 'relict' species that retained some ancestral morphological characteristics."

Rabeling's co-authors include Jeremy Brown, also a graduate student at The University of Texas at Austin, and Dr. Manfred Verhaagh of Staatliches Museum für Naturkunde in Karlsruhe, Germany. Brazilian ecologist Dr. Marcos Garcia assisted with the research in the Amazon.

DIARY DATES 2008

Meetings held 2nd Monday of the month
(or Tuesday if Monday is a public holiday)

August 11th	Dr Peter James (Qld DPI&F)	Lousy research & the Integrated Parasite Management Group
September 8th	Dr Shaun Winterton (Qld DPI&F)	Evolution of the Mantid lacewings based on multiple genetic markers (Neuroptera: Mantispidae)
October 13th	Mr Stacey McLean	Filling Biodiversity Information Gaps in Brisbane City: Bugs, Birds and Bracket Fungi
November 10th	Dr Felix Bianchi (CSIRO Entomology)	The landscape context of the ecosystem service of pest control
December 8th	Notes & Exhibits	

IMPORTANT NOTICE

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NOTICE OF NEXT MEETING

The next meeting of the Society will be held at **12:00 pm** on **Monday**, **13th October 2008** in the **Large Conference Room**, **CSIRO Long Pocket Laboratories**, 120 Meiers Rd Indooroopilly. The main business will be a presentation by **Mr Stacey McLean (Brisbane City Council Environmental Officer): "Filling Biodiversity Information Gaps in Brisbane City: Bugs, Birds and Bracket Fungi".**

VISITORS ARE WELCOME

(Please sign in at CSIRO Reception before attending the meeting)

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