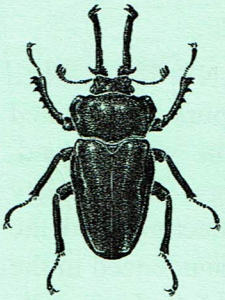
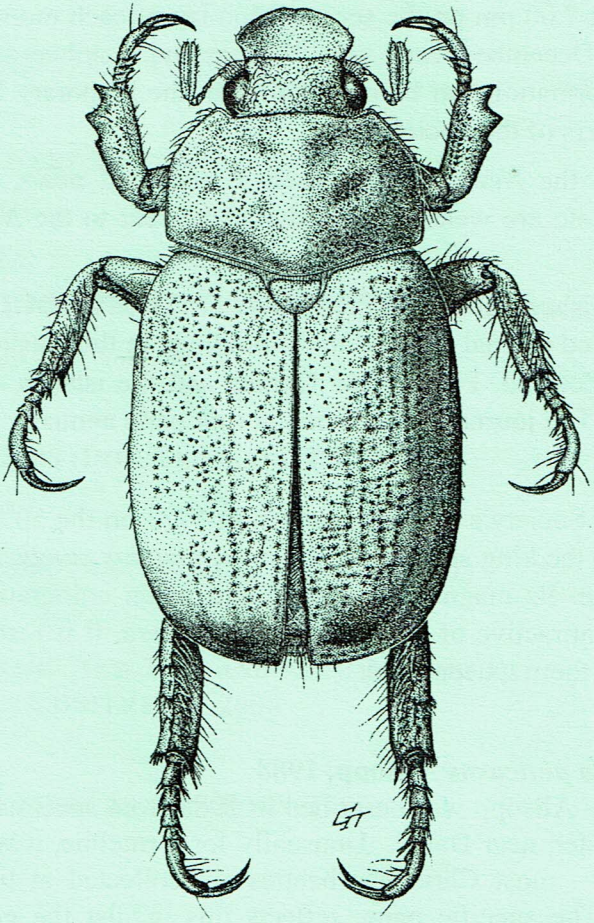


ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.**, since its inception in 1923, has promoted 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 in the Goddard Building, University of Queensland at 7.00 pm on the second Monday of each month (March to June, August to December) each year. Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society.

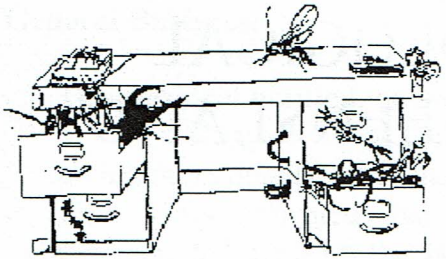
Contributions to the *News Bulletin* such as items of news, trip reports, announcements, etc are welcome and should be sent to the *News Bulletin* Editor.

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: ***Wambo puticasus* Allsopp, 1988**

Wambo puticasus Allsopp was described in 1988 from specimens collected at Lake Broadwater, near Dalby. Unusually for a ruteline, it was collected in a pitfall trap – most Christmas beetles are collected at light or from feeding trees. The specific name reflects this, whilst the generic name honours the shire in which it was collected. Geoff Thompson did the drawing, the original of which is a prized possession of Peter Allsopp.



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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

GENERAL MEETING:

Minutes of the General Meeting of the Entomological Society of Queensland Inc. held in Room 388, Goddard Building, The University of Queensland, on 14 August 2006, at 7pm. Chaired by Peter Allsopp.

Attendance:
Peter Allsopp, Sassan Asgari, Michelle Baker, Richard Bull, Bronwen Cribb, Rod Eastwood, Graham Forbes, Ross Kendall, Peter Mackey, Gunter Maywald, Geoff Monteith, John Moss, Elly Scheermeyer, Owen Seeman, Kyran Staunton, Jeff Wright, Susan Wright.

Visitors:
Lyn Cook.

Apologies:
Stacey McLean, Matthew Purcell, Don Sands, Margaret Schneider.

Minutes:
The minutes of the June General Meeting were circulated in the News Bulletin Vol. 34 Issue 4. It was moved by John Moss, seconded by Richard Bull, that the minutes be accepted without amendment.

Nominations:
The following nominations for membership were received and put to the meeting for election:
Miss Michelle Baker
Ms C. Lange

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

General Business:

- The president notified the meeting of the next International Congress of Entomology (ICE) in Durban, South Africa, in 2008. Brochures giving more details were available for members.
- John Moss indicated that the Brisbane Invertebrates Club was currently talking with the Brisbane City Council about unnecessary removal of mistletoes from trees in regard to developing new policies for this practice.

Main Business:
The main business of the meeting was a presentation by **Owen Seeman**, entitled "**Passalid beetles and the zoo on their luggage**".

Vote of Thanks:
Peter Mackey gave the vote of thanks for this presentation.

As there was no further business, the Chair closed the meeting.

NOTICE FOR NEXT MEETING

Monday 11th September 2006 at 7pm
Room 388, Goddard Building
University of Queensland, St Lucia

"Insects and Fungi"
by Chris Burwell

MAIN BUSINESS:

Passalid beetles and the zoo on their luggage
by Owen Seeman

Passalid beetles ('bess bugs', 'leather beetles' or 'family beetles') are shiny black beetles (Fig. 1), most common and diverse in the world's tropical rainforests. Their charismatic traits are their size (ca. 15 – 55 mm), their habit of living in family groups in rotting logs, and their ability to communicate with sound; although we rarely hear any noise except adults exclaiming their "Flee! I'm being eaten!" alarm squeak. Larvae can make these sounds too – barely audible to our ears – by rubbing their highly reduced third pair of legs on the base of their second pair. Family beetles apparently have one of the widest range of sound communication signals in any insect, with different sounds to communicate various activities, such as their position in wood chambers, requests for assistance in building pupal chambers, aggression among families in the same log, as well as alarm squeaks.

Although charismatic, passalid beetles are fairly unstudied in Australia, as a less-endearing feature is their uniformity. Most of our ca. 35 species look quite similar to one another: some may have tiny horns on their head, others have tiny tubercles, but they are all shiny, cylindrical beetles that begin their adult life as a light-brown colour and gradually become black. However, these beetles have an additional, and exciting, feature: more kinds of life call passalid beetles home than almost any other host. Pick a beetle up and you're sure to find all sorts of mites, and sometimes pseudoscorpions, on its body. Nearly all adults are infested with ectoparasitic fungi and their guts are writhing with nematodes, single-celled organisms and forests of intestinal fungi. How has so much life become associated with passalid beetles? And are they really that unique? These questions intrigued me as a young acarologist and the study of some of these mites became the topic of my doctorate.

Mites on insects

Mites are the most diverse group of arachnids, claiming 45-46,000 described species and a conservative estimate of half-a-million undescribed species (Walter & Proctor 1999). On the whole, mites live anywhere and will eat just about anything, and those that live on insects are no exception. If you find a mite on an insect, there is a chance that it's just there by accident, but usually

the mite and insect have a closer relationship. These relationships can be temporary (e.g., phoresy or species that have a parasitic life stage) or more-or-less permanent (commensals or parasites that spend most, or all, life stages on the host). They may feed directly from the host, or on its food, bodily secretions, other symbiotic organisms, or even catch its own food away from its host.

What kind of insect do mites prefer? And what kind of relationships do they have? I have answered these questions only for one group of mites, the Mesostigmata, as I knew these best at the time of my work on passalid beetles.

Like most major groups of mites, Mesostigmata have an affinity for living on other animals. I surveyed collection records in the journal *Acarologia* (until 2003) and, of 1,511 spp., 27% were on invertebrates, 21% on vertebrates, and the remainder were free-living – although "free-living" mites also included many that probably had a life stage associated with an insect host. Of those on vertebrates, 90% were parasites, while of those on invertebrates less than 12% were parasites. Therefore, at least Mesostigmata on insects are much more likely to be on insects for other reasons other than food: transport (phoresy) is the most common of these reasons.

I also collected as many arthropod-host records as possible and recorded the host Order and Family. Of 1,614 species of Mesostigmata, Coleoptera (57%) and Hymenoptera (29%) are the most common host Orders, with relatively speciose Orders such as Lepidoptera (2.2%), Diptera (1.9%), Hemiptera (< 1%), and Araneae (< 1%) being largely neglected. Of all insect-associated species (1,540 spp.), the three mitiest host families account for over half of Mesostigmata diversity: Scarabaeidae won with 23% of species, followed by Formicidae (20%) and Passalidae (12%). Also-rans were the Scolytidae (8.6%), Apidae (6.6%), Cerambycidae (4.6%), Geotrupidae (2.5%), Carabidae (1.8%) and Curculionidae (1.6%).

The common theme for their hosts is that they use concentrated resources: dung and rotting logs for mite-infested scarabs, nests for ants and bees, rotting logs for passalid beetles. How long these resources last for does not seem to matter, as dung is quite transient while rotting logs can last years. On the other hand, sociality (especially overlap of generations) seems to be important: passalid and scolytid beetles, ants, and social bees all share this

characteristic, making transfer between generations of hosts all the easier for mites. Generally, phoresy is the most common relationship: whether the host is moving from log to log, dung-pat to dung-pat or starting a new nest, the mite must be on their host to ensure its persistence.

Mites on passalid beetles

Over 200 species of mites are recorded from passalid beetles, but this represents a small number from the ca. 650 species of Passalidae. Even the most common species in Australia carry several new species of mite. At least 21 families of mites, perhaps up to 24, use passalid beetles as a host, and few other animals can boast such a diversity of mites living on them. However, only one species is well-known, the USA "bess bug" or "patent leather beetle" *Odontotaenius disjunctus*, that has 16 species of mite in 11 families associated with it.

To discover if Australian passalid beetles sported a similar diversity of mites, and to compare them with other log-inhabiting kin, I collected large (> 1 cm long) arthropods from rotting logs in eastern Australia, especially southeast Queensland. I decided to focus entirely on the Order Mesostigmata, as I understood these mites best at the time. These collections yielded 1,165 large arthropods (67 spp., 21 families) of large arthropod that were host to 10,695 specimens of Mesostigmata (77 spp., 14 families). Of these collections, 49 species of Mesostigmata (11 families) were collected frequently enough to consider them as valid associates of one or more host species.

Passalid beetles were the clear winners in diversity. I collected 580 passalid beetles that brought forth 54 species of Mesostigmata in 10 families (32 species, 7 families as valid associates), and all 585 "non-passalids" offered 26 species in 8 families (20 species, 6 families as valid associates). Australia's mitiest beetle was *Pharochilus dilatatus*, with 15 species of Mesostigmata in 6 families, and I have since acquired enough specimens of Saltiseiidae from *P. dilatatus* to increase this to 16 species from 7 families.

In comparison with other log-inhabiting groups, the Blaberidae come closest to the Passalidae. From *Panesthia* spp., especially *P. tryoni*, I collected 5 species of Mesostigmata in 3 families. Other important groups were the Carabidae (3 spp., 2 families), Tenebrionidae (2 spp., 2 families), Polydesmida (4 spp., 2 families) and Scolopendridae (3 spp., 2 families).

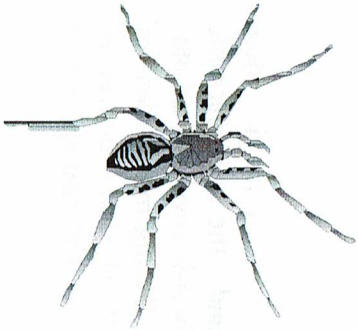
What is it about passalid beetles that make them so attractive to mites? This question is especially difficult to answer, but perhaps it is because they offer a combination of traits found in no other host (Table 1). Passalid beetles are large, persist in logs for long periods of time, they have an overlap of generations, wings to move them quickly between logs, and an elytra to live or hide under. In comparison, the next mitiest host, the cockroach *Panesthia tryoni*, lacks wings and elytra, perhaps making it a less welcoming host. Additionally, passalids have "shoulders" (the space between the head and elytra, formed by the comparitvely narrow prothorax), and many mites seem to find this an appealing place to congregate.

	Surface area mm^2	Persistence in logs	Overlap of Generations	Wings	Elytra
	Microhabitats	Reliability	Reliability	Reliability	Microhabitats
Passalidae	770 – 3308 mm^2	Long	Yes	Present	Yes
Blaberidae	1156 - 4336 mm^2	Long	Yes	Absent or Present	No
Polydesmida	540 - 1190 mm^2	Long	No	Absent	No
Tenebrionidae	164 – 622 mm^2	Long	No	Present	Yes
Carabidae	172 – 1584 mm^2	Short	No	Absent or Present	Yes
Scolopendridae	1772 - 3176 mm^2	Short	No	Absent	No

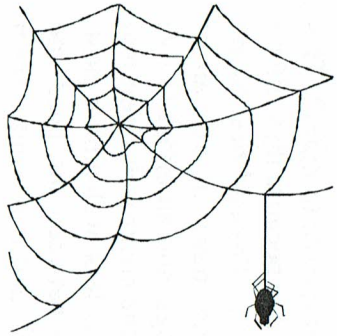
Table 1. Attributes of log-inhabiting arthropods that might make them more likely to form symbiotic relationships with mites. These attributes have been classified into those that offer microhabitats to live in, and reliability as a host.

Fungi on passalid beetles

Passalid beetles are also home to an intriguing diversity of fungi. Most notable are the gut-dwelling Trichomycetes and the ectoparasitic Laboulbeniomycetae. The Laboulbeniomycetae are best-known as parasites of insects, but mites are also host for many species. During my analysis of Mesostigmata on arthropods, I also recorded thalli (fruiting bodies of Laboulbeniomycetae) and recorded six species of *Rickia* and one species of *Dimorphomyces*.

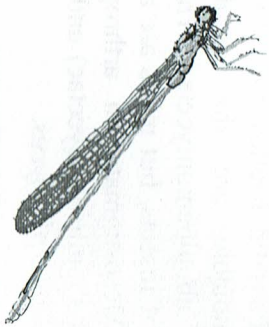


Bug Catch 2006



The other 99% in our Protected Areas ....
What are we preserving?

The Environmental Protection Agency and Queensland Parks and Wildlife Service would like to extend an invitation to the Entomological Society members for three days of collecting at Double Island Point, Great Sandy National Park. Enjoy conducting a preliminary inventory of the invertebrates of the area, and just getting together for a fun and informative weekend. Limited accommodation provided at the lighthouse cottages.



Where : Double Island Point (4WD access only)

When : Friday 20 October to Sunday 22 October 2006

Meals : BYO food (gas cookers provided)

Please fill in the registration form below and forward onto Jenny Greenland, Environmental Protection Agency, PO Box 15155, City East, Queensland 4002. Closing date for registration is 22 September 2006. For further information contact Jenny Greenland on phone 3247 3299 or 0402 952 875 or email jenny.greenland@epa.qld.gov.au

.....

Registration

Name:.....

Address:.....

Contact Phone number:.....

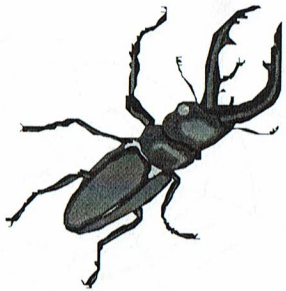
Email:.....

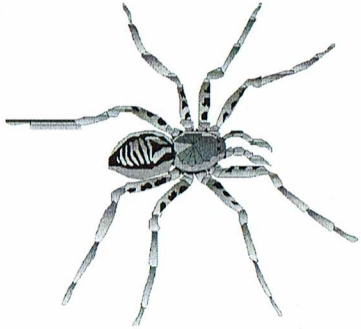
I will attend (please tick):

☐ Friday 20 October 2006

☐ Saturday 21 October 2006

☐ Sunday 22 October 2006





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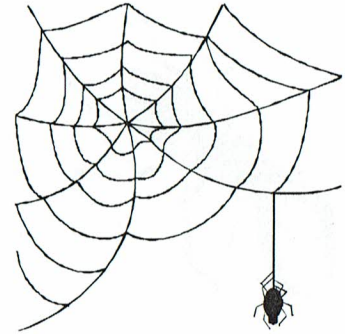
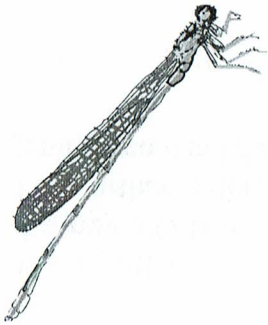


The other 99% in our Protected Areas ....

What are we preserving?

The Environmental Protection Agency and Queensland Parks and Wildlife Service would like to extend an invitation to the Entomological Society members to a flora/fauna survey at Bringalilly State Forest (near Inglewood) . Enjoy conducting a preliminary inventory of the invertebrates of the area, and just getting together with other researchers. Accommodation (limited beds), good kitchens and shower block facilities provided at the DNRMW Robert Wicks Research Station (between Inglewood and Millmerran), or tents/vans can be set up on the grounds.



Where : Bringalilly State Forest

When : Monday 23 October through to Tuesday 31 October 2006

Meals : BYO food

Please fill in the registration form below and forward onto Jenny Greenland, Environmental Protection Agency, PO Box 15155, City East, Queensland 4002. Closing date for registration is 22 September 2006. For further information contact Jenny Greenland on phone 3247 3299 or 0402 952 875 or email jenny.greenland@epa.qld.gov.au

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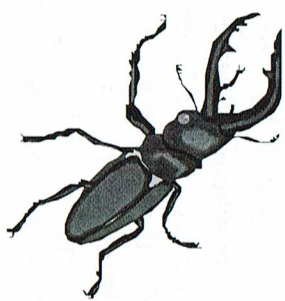


In total, 18 species of Mesostigmata were infested with Laboulbeniomycetae, and of these 14 were associated with passalid beetles. These 14 species of Mesostigmata carried 4 species of *Rickia*. Of these four species of *Rickia*, two species – *R. berlesiana* and *R. leptaulacis* – were also found on their passalid hosts. Thalli were common on the legs of beetles (11.4%), but most thalli occurred on the beetles' "shoulders" (78%), where most mites congregated. Furthermore, more thalli and mites were on *Mastachilus* (25 mites/beetle, 53 thalli/beetle) compared with *Pharochilus* (11 mites/beetle, 9 thalli/beetle). Although not conclusive, this evidence indicates that mites are likely vectors of fungi between beetles.

In conclusion, passalid beetles are one of the liveliest animals on the planet, and the menagerie of mites they bear is testament to this. Pick up a scarab and you're lucky to find two or three mite species; ants rarely reveal more than a few species; but find a passalid and it's unusual not to find all manner of mites crawling on its body and beneath its wings. We know their biology in a general sense, but what these mites actually *do* is a mystery for most.

Figures

Fig. 1. The passalid beetle *Pharochilus dilatatus*.

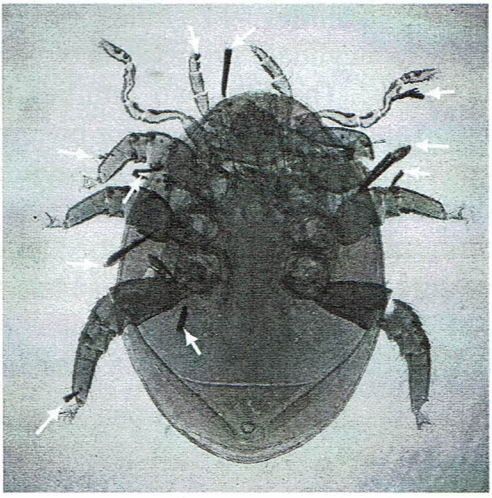
Fig. 2. A large *Megisthanus* sp. and fedrizziid mites (probably *Neofedrizzia camini*) on a passalid beetle.

Fig. 3. A *Fedrizzia* sp. cf. *grossipes* bearing 11 thalli of a *Rickia* sp., probably all *Rickia berlesiana*. The mite's body is just over 1 mm long.

Figure 1.

Figure 2.

Figure 3.



Questions

Q: Do the fungi break down the cuticle of the beetles or mites?

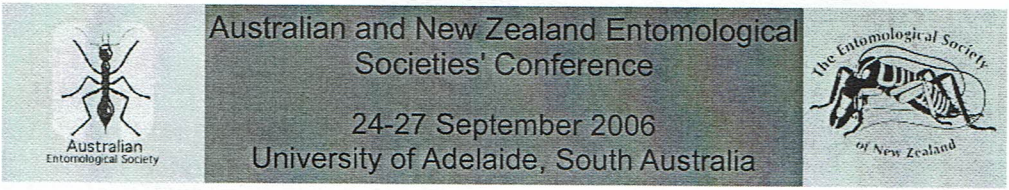
The fungi attach to the insect's or mite's cuticle via the basal cell of the receptacle and they do make contact with host tissues, either through cuticular pores or active penetration. On mites, the fungi seem to grow anywhere (i.e. not on obvious pores), so if they do make contact with host tissues then it should involve active penetration of cuticle.

Q: Do mites parasitize each other?

Mites are not often found on other mites. When they do, the relationship is non-specific: for example, the hypopi of acarid mites (phoretic, non-feeding, nymphal life stages) were common on many long-inhabiting arthropods and also on mites in the Megisthanidae, the largest of the passalid-beetle associated mites. Rarely, parasitic larvae of the Parasitengona are found on very large mites – but I am not aware of any specific relationship where a mite must parasitise another mite to complete its life cycle.

Q: Are there mites that are actually parasitic on the passalids?

Most families of mites on Passalidae don't seem to take any food from the beetle, but three families of mites, the Diarthrophallidae, Canestriniidae and Tarsocheylidae, are associated with passalid beetles for their entire life cycle. The first two families have small, chelate chelicerae that show no apparent adaptation for piercing cuticle, but what they actually feed on is unknown. The Tarsocheylidae live beneath the elytra of passalid beetles and they do have piercing chelicerae and are most probably parasitic. Also, members of the Heterocheylidae (found only as adult female mites on passalids) may also be parasitic. Curiously, some of the largest families of insect parasites (e.g., Erythraeidae, Trombidiidae, Podapolipidae) are not found on passalid beetles.



Welcome to the Australian and New Zealand Entomological Societies' Conference

Biosecurity—Caring for the Environment and Agriculture

INVITATION

On behalf of the organising committee, we extend a warm invitation to you to attend a joint conference of the Australian and New Zealand Entomological Societies to be held in Adelaide, South Australia from September 24 – 27th 2006. The conference will bring together approximately 150 researchers (scientists and students) from a broad range of interests to discuss the latest research in entomology. The conference has the theme of "Biosecurity – Caring for the Environment and Agriculture" and part of the scientific program will be devoted to this area. However, intending delegates are encouraged to submit papers/posters on their own areas of expertise and interest as the overall program will be designed to cover a much broader range of topics than just this theme.

All intending delegates are encouraged to submit an "Expression of Interest Form" from our website (www.aesnzconference2006.com) as soon as possible to assist the organising committee in the early stages of the conference planning.

THE VENUE

The conference will be held on the North Terrace Campus of the University of Adelaide that houses most of its teaching and research facilities. Set in the cultural heart of the city on the northern edge of the city centre, the North Terrace Campus offers excellence in its educational and social facilities. Established in 1874, the North Terrace Campus is home to the schools of Physics & Chemistry and Molecular & Biological Sciences; as well as part of Earth & Environmental Sciences. The School of Agriculture and Wine is located on the Waite Research Precinct in the suburbs of Adelaide about 8 kms from the city centre. SARDI, the Australian Wine Institute and CSIRO are also co-located on this Precinct.

For more information on registration, sponsors and contacts, visit our website www.aesnzconference2006.com or contact Sally Brown Conference Connections, by mail: PO Box 108 KENMORE 4969; Email: sally.brown@uq.net.au; phone: 07 3201 2808; or fax: 07 3201 2809.

THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.

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Incorporated 1971

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Yours sincerely
Matthew Purcell (Hon. Treasurer)

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PO Box 537 Indooroopilly 4068 Brisbane QLD.

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STUDENT:	Students and others at the discretion of the Society Council	**$18pa**

Student membership conveys full membership privileges at a reduced rate. See subscription form on opposite page for details.

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Subscriptions should be sent to the Business Manager, *The Australian Entomologist* PO Box 537, Indooroopilly 4068, QLD.

IMPORTANT NOTICE

The official address for the Entomological Society of Queensland and *Australian Entomologist* and to which all communications should be addressed is:

PO Box 537, Indooroopilly 4068, Qld.

Back cover gives contact details of individual council members.

NOTICE OF NEXT MEETING

The next meeting of the Society will be held at 7pm on Monday, 11th September in Room 388, GODDARD Building, University of Qld. The main business will be a talk by Chris Burwell entitiled "Insects and Fungi". Refreshments will be served before the meeting at 6:30pm in the tea room, Level 2 of the Goddard Building (to the right of the main stairs), with a gold coin donation required. No donation is required to attend the talk alone.

VISITORS ARE WELCOME

DIARY DATES 2006

Meetings held usually every 2nd Monday of the Month

11 Sep	Chris Burwell	Insects and Fungi
09 Oct	Steve Francis	Army Malaria Research Unit
13 Nov	Scott O'Neill	

HONORARY LIFE MEMBERS OF THE SOCIETY

R.A.I. Drew E.M. Exley D. Hancock D.S. Kettle
M.J. Harslett R.P. Kleinschmidt E.J. Reye