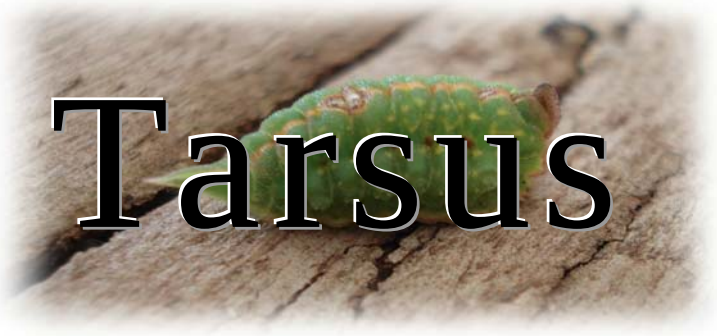


March
2009

Issue
No. 585

CIRCULAR OF THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES Inc

Next Meeting of the Entomological Society of NSW Inc

Where: Meeting Room 2, Ermington Community Centre, River Road, Ermington
When: 7.30 pm on Wednesday, 5 March 2009

AGM
&
Speaker: Garry Webb
PEST ANTS

Garry has an M.Sc. from ANU in Forest Ecology and has worked with NSW Forestry and NSW Agriculture (Regulatory). He now works with Sumitomo Chemical as General Manager (Environmental Health and Pest Control).

In 2001 when Red imported Fire Ant was first detected in Brisbane, the Queensland Dept Primary Industries approached Sumitomo Chemical to supply environmentally friendly baits for control of this highly invasive species. Subsequently local production was established in 2002 using the insect growth regulators Pyriproxyfen and S-methoprene. Sumitomo Chemical has been the backbone of the program ever since and in the subsequent years a lot of work has been conducted on developing baits for other species of ants.

Of the top 100 invasive organisms according to the invasive species database there are 5 ants – yellow crazy ant, argentine ant, African big-headed ant, red imported fire ant and little fire ant – all of which now occur in Australia. Some are particular problems on continental islands of Australia. During the last few years Garry has been involved in developing baits for use in some eradication/control programs on Australian dependent islands. In particular he'd like to single out some work on Christmas Island and Lord Howe Island.

On Christmas Island the story is relatively well known. Yellow crazy ant is causing havoc with the population dynamics of the red crab. On Lord Howe Island the problem is less obvious and publicized. African big-headed ant is spreading across the island, partly due to the recycling policy on the island. Almost everything is recycled at the waste processing plant and then re-used on the island. Unfortunately the redistribution of waste product as compost also recycles the ants. There are concerns that the ants are having an impact on native fauna including the Lord Howe Island land snail. Its decline has been attributed to the ship rat and to some introduced birds but it is also likely that the spread of ABHA has also had an impact.

The council hopes that we can have a good attendance at this years' AGM. We have candidates willing to stand for all positions so don't stay away because you are worried about being press-ganged into service. The Council would however welcome willing nominations for any of the current positions. If you'd like to join the Council for a year just to get a feel for how the Society runs, why not put your hand up to be a Councillor?

TARSUS is prepared by for ESNSW by Graeme Smith Ph: 02 9981 3749 Email: le_gbsmith@optusnet.com.au

Summary of November 2008 Meeting Talk

MUSEUM PESTS

(a synopsis of the talk given at the November meeting)

Heritage Pest Management
PO Box 3066
ERINA NSW 2250
Phone: 0414 663 472
e-mail: alroach@bigpond.net.au

Introduction

Many people do not realise that often behind the items on display in museums or galleries are vast collections in storage. Collections can vary from rare natural history specimens to valuable paintings and irreplaceable artefacts. The objects in storage can be made up of animal or plant-based materials, and/or inorganic materials. The static nature of the collections as well as the organic nature of the collections means that they are often at risk of damage from pest attack.

Anobium damage to timber - it can be several years before there are any outward signs of activity

The damage caused to artefacts by pests in museums and galleries can range from grazing and regurgitation marks on the surface of an object, through to their complete destruction. Unfortunately, many commercially available chemicals used to eradicate pests are not suitable for use within museums as they have the potential to cause damage to objects, or pose health and environmental hazards.

Case-making clothes moth cases include the various fibres of the object they were feeding upon

Within the commercial pest control industry the common goal is to reduce a pest infestation to an acceptable level. This may be measured by a reduction in pest numbers to a level that reflects an increase in profit (i.e. less product lost to insect damage, reduction in product recalls), or customer satisfaction. This 'tolerable level', however, is not acceptable by museum and gallery standards, where any damage is considered a catastrophe.

In recent years a number of low and non-toxic pest control methods have been developed that are more suitable for use in museums and galleries. These methods include:

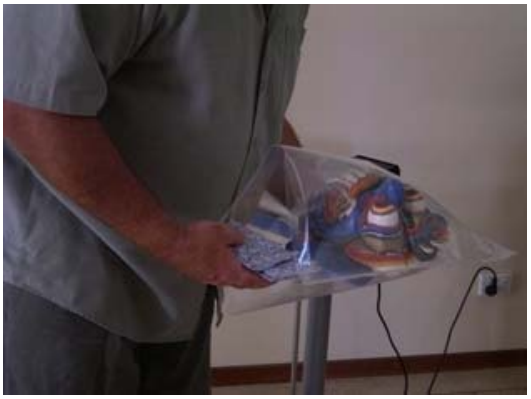
- Thermal fumigation (fumigation using low or high temperatures)
- Controlled atmosphere fumigation (fumigation using a modified or an oxygen-deficient atmosphere)
- Pheromone traps
- Insect growth regulators.

Museum pests

Museum pests are those insects that have found a niche within a museum environment where they can infest the wide range of materials found in collections. The list of pests includes a number of common insects such as silverfish, cockroaches and clothes moths, and a few lesser-known insects such as cigarette beetles and drugstore beetles.

Museum pest infestations can become well established and substantial damage may occur before the problem is

Cigarette beetles and frass



Low oxygen fumigation - bag is sealed

identified for a number of reasons including:

1. Most museum pests are very small, so they are often overlooked. For example, adult cigarette beetles are only 2-3 mm in length.
2. Many museum pests are difficult to find as they 'hide' behind paintings, or in cracks and holes on an object's surface.
3. Most museum pests have a complete life cycle and as many museum pests are 'internal feeders' there may be no external signs of activity for some months or even years, by which time extensive damage may have occurred.
4. Most museum pest outbreaks occur in collection storage areas where, due to the static nature of collections, the damage may not be discovered until an object is accessed (i.e. for exhibition or study purposes).

All these factors mean that by the time a pest infestation is discovered it may have spread throughout an entire collection, and damage could have occurred to several hundred objects.

Pesticides

Caution needs to be exercised in the selection of and use of pesticides in museums and galleries to avoid damage to artefacts. Misuse of pesticides in collections can result in wetting or staining of objects, but many common pesticides contain chemicals which can react with artefacts. For example, dichlorvos is one such chemical that has been widely used in museums and galleries for a number of years. It is available in a variety of formulations including aerosol sprays and as impregnated resin strips ('pest strips'). In recent years, dichlorvos has been replaced because it was found to react with a variety of plastics and resins, and accelerated corrosion in metals.

Low oxygen fumigation - nitrogen flushing is used for larger objects

Non-toxic fumigation

Due to the risk posed by conventional fumigation techniques a lot of research has been conducted into non-toxic methods of fumigation – that is methods that do not involve any pesticide to eradicate pests. The most widely used methods within museum and galleries are freezing and low oxygen fumigation.

With the freezing method the objects to be treated are wrapped in plastic and placed in a freezer at a temperature of -18ºC or lower for 48 hours or more, depending on the insect, object size and composition. The plastic wrapping prevents condensation forming on the object post-freezing, and is left on until the object returns to room temperature.

In low oxygen fumigation, atmospheric oxygen is removed from within a sealed bag or container and the insects die from suffocation. The main methods used are:

- Oxygen scavengers. The object to be treated is sealed in a bag made from a high barrier plastic and sufficient oxygen scavenger is added. This method is used for treating smaller objects (eg: books and paintings).
- Modified atmospheres. The objects to be treated are sealed in a large bag or chamber and the oxygen is reduced or replaced with an inert gas (eg: nitrogen).
- A combination of both of methods. The objects to be treated are sealed in a large bag and oxygen is purged with an inert gas before oxygen scavengers.

Once the oxygen has been removed, it can take up to 2 weeks at 25ºC to kill all stages of the insects present. If the temperature is lower, a longer period of time may be required to achieve 100% mortality.

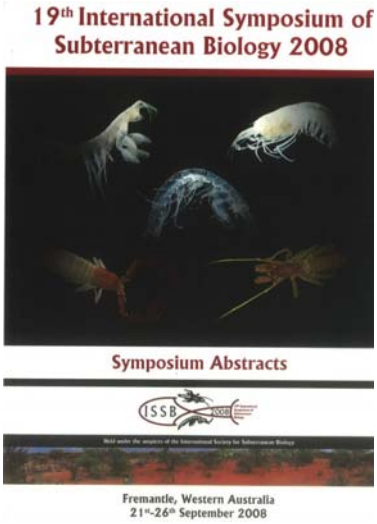
Conclusion

Museum pests can cause significant damage to artworks, artefacts and natural history collections. Their success in museum and gallery collections is due to a range of factors, including the size of collections and the small size of the pests.

Non-toxic fumigation is one of a range of methods employed in museums and galleries to preserve valuable collections. Many of the methods used to protect collections, such as low oxygen fumigation, may take more time, but when the value of some of these collections is considered, the additional time is well spent.

19th International Symposium of Subterranean Biology 2008

Fremantle, Western Australia 21st-26th September, 2008
Graeme Smith



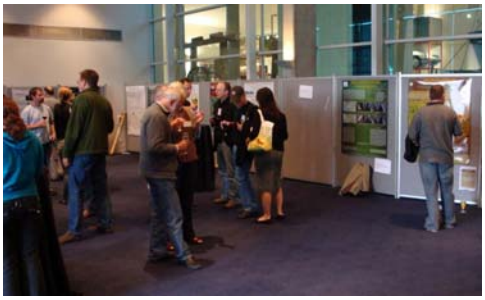
After many years during which life had taken me away from the field of cave biology, I talked myself into attending this symposium and one of the associated field trips. I was stunned by how much had changed over the last 20+years.

It was great to catch up with some old friends and acquaintances not seen for many years- Ian Miller with whom I caved in PNG in 1978, now a kaarst biologist with DoC in NZ, Prof Andrew Austin with whom I studied entomology at Sydney Uni and Dr Stefan Eberhard, a Tasmanian cave biologist now running his own biological survey company, as well as meeting any others for the first time.

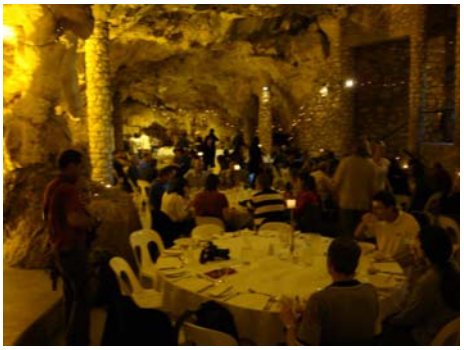
The conference was well organised by Bill Humphries and crew at the WA Museum. It was held at the new and well equipped Maritime Museum in Fremantle. This is a great town for conferences; small enough to walk around and with plenty of venues for socialising. Accommodation costs in the town were a bit high, I guess reflecting the mining boom in WA but there were also several backpacker style hotels of varying quality if funds were tight.


Maritime Museum- Fremantle

Just over 100 people attended, with many from Europe (the birthplace of kaarst biology) as well as the USA and Latin America. The conference was very generously funded by the mining companies who find themselves having to do a lot of survey work in order to comply with the very strict regulations existing in WA. Due to this funding, the quality of food able to be offered by the organisers was exceptional, as were the local wines that accompanied the welcome reception, field excursion and conference dinner.


Poster session with wine and finger food provided

This was the first time that such a conference had been held Downunder as in the past Australia was considered to have been relatively poorly represented by cave adapted fauna (troglobites), presumably because our caves are small and many have dried out. However things had changed incredibly in recent years following the work carried out by the Western Australian Museum, where they have been recovering dozens of troglobitic species, not just from caves but from the exploratory bore holes being drilled by the mining companies.


Excursion to Yenchep National Park where lunch was held in an underground ballroom

So much had changed since I last sat in on a biospeleology conference (in Sheffield UK in 1977- just to show my age) and it was all a little unsettling and exciting just to see how much had changed. Two things stood out:

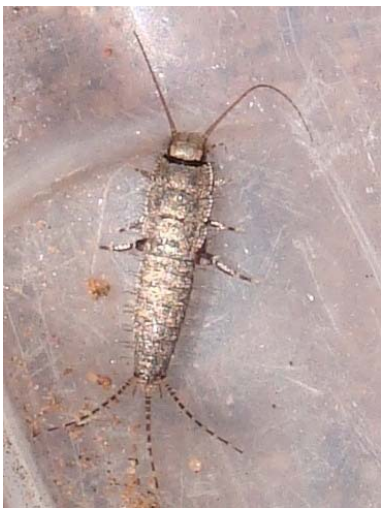
Species definition: Several papers were presented looking at the genetics and morphology of cave fish. Within the cave, the fish are white and eyeless but in the streams flowing into the caves the fish are pigmented with large eyes, yet these vastly different morphological forms are the same species and interbreed with each other freely. The cave environment is however so selective that pigmented forms do not seem to survive long in the cave and the troglobitic forms don't persist in surface waters.

Conversely, gene sequencing data is now ubiquitous! There were not too many papers presented that didn't include analyses of DNA sequence data. This data is showing significant differences between cave populations that are morphologically indistinguishable (at least at the moment) so I now seem to have to use the word morpho-species rather than species when talking about the way I have been describing silverfish. DNA sequencing is clearly becoming the tool of choice, as costs have fallen but it is opening up as many questions as it is answering. We repeatedly heard examples where the DNA data is suggesting that closely related morpho-species had been isolated from each other for some, say 2 million years, yet the caves (in fact the whole volcanic island on which they existed) only rose above the ocean less than 200,000 years ago.

Definition of a cave: I'm used to seeing cavers in their helmets and overalls sifting through leaf litter or bat guano looking for small invertebrates. At this conference I saw so many photos of biologists in the Australian desert, with "fishing lines" down bore holes, connected to leaf litter traps or scraping the walls of the bore holes. It just didn't bear any resemblance to my image of biospeleology, yet they are finding so many species of troglobites. These seem to occur in any rock type with some degree of fracturing and not just in limestone or lava tubes. Aquatic species are being collected where subterranean waters occur but numerous other arthropods including schizomids and nicoletiid silverfish are found above the water table. I am beginning to feel that the troglobitic fauna is actually adapted for life in the small cracks in rocks and only appear in the larger cave passages "by accident". I have no idea where they get their food/energy but they have obviously managed it over millions of years. The presence of such a diverse fauna in unexpected areas is causing problems for the mining companies who now have to survey the subterranean habitats they wish to mine and to reserve areas of the deposits as habits for these species.

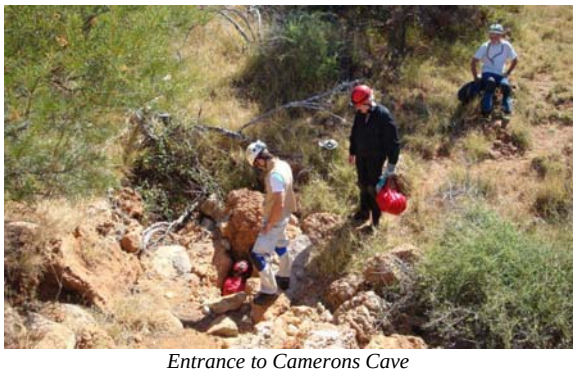
There were also several papers presented on the aquatic troglobitic fauna being extracted from water-bores on river flats in several countries, supporting the view that cave biologists might have been looking at too narrow a definition of "cave" adaptation.

The need for basic taxonomic work by the mining companies has been a boon for taxonomists in WA. There have been some sizable grants to the Museum to study specific groups of arthropods now being found in these mining areas. I even managed to receive enough work identifying silverfish to cover most of my travel costs.



After the symposium, I flew to Exmouth on the Northwest Cape. I had earlier described a species of nicoletiid from caves on the Cape Range (*Trinemura troglophila)* and was hoping to see some live animals. I also took the chance to go looking for some epigean silverfish. The latter turned out to be very common and I managed to collect one or two species from each of the half dozen places I stopped to collect them. They mostly belong to the genus *Acrotelsella* but I did manage to collect a few *Anisolepisma*, a poorly known Australian endemic genus that is in need of re-definition. My attempts to photograph the live insects before they were popped into alcohol were a bit mixed.

About 10 others attended this field trip, organised by Darren Brooks, who has done a huge amount of basic collecting work for the WA Museum and has a fantastic knowledge of the area. Caving in this area is very hot work. Even underground, the temperatures approach 30^{o}C with very high humidity. You had to take it very easy and rest often. I can't even blame my age as we had two cave biologists with us in their seventies who managed to get around quite well in spite of the conditions. In general the caves are fairly small so you get to exercise a lot of different muscles and get a few bruises along the way but the biology in the caves was fascinating especially where there was abundant moisture. Millipedes, centipedes, spiders and cave fish were seen and while I didn't find any *T. troglophila* I was fascinated to see ants active on exposed tree roots more than 20 metres underground (vertically) and travelling along with these ants was a species of inquiline atelurin silverfish (not having a permit I was unable to collect it so further identification is not possible).



Entrance to Camerons Cave

Typical low passage

Large (ca 8 cm) centipede

Millipede (ca 2 cm)

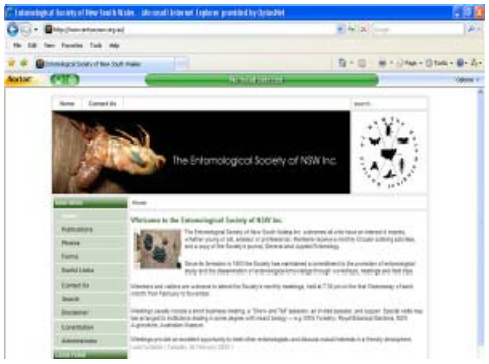
Cave fish (5 cm)

The field of biospeleology is clearly undergoing a revolution due to both new technologies and new understanding. By attending such symposia it is possible to get a much wider view of what is happening outside your own area of special interest. Just as importantly you get to catch up with old friends and meet new ones and have some fun along the way. Don't worry if you're not an expert, there were many amateurs at this conference who enjoyed the opportunity to hear from experts and to find out how approachable they were. So if you hear about a conference that interests you, make the effort to get there – you'll probably get more out of it than you expect.

Society web site

www.entsocnsw.org.au

Total hits on the site are up to about 8800 since inception or about 700 per month and as the site is linked to more other sites, the page comes up higher in the list of hits when searches are conducted.



The journal page is visited regularly, as is Tarsus. We've had a few expressions of interest from potential members so hopefully the site is fulfilling our aim of encouraging membership. We use the member mass mail to let members know about up-coming events or the posting of Tarsus.

Any contributions to the site are most welcome including photos or messages to members.

I would be more than happy to train anyone who would like to learn how to manage the site. It's not that hard once you get used to a few things. I knew nothing about web pages until I volunteered to set this one up and we now have a manual that leads you through the steps.

For any problems (e.g. lost passwords), submission of photos for publication or suggestions for improvement get in contact with Graeme Smith. (0421 617 377) or le_gbsmith@optusnet.com.au

Membership Report

Ted Taylor

THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES

Membership at 31 December 2008

CATEGORY	FINANCIAL	UNFINANCIAL	2008 TOTALS	(2007) (TOTALS)
Ordinary	67	11	78	81
Special (Retired)	3	0	3	3
Student	2	3	5	8
Corporate	1	3	4	4
Company Associate	2	0	2	2
Honorary Life	2		2	2
Totals	**77**	**17**	**94**	**100**

Lapsed Members
Warrick Angus (Stud.)
Julia Humphreys
Greg Holwell (Stud.)
Sue-Anne Rees (Stud.)

Resigned Members
Rita Holland
Neil Mclaren
John Madsen

New Members
Dr Sarah Mansfield

Financial Report

Ted Taylor

THE ENTOMOLOGICAL SOCIETY OF NEW SOUTH WALES INC
STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER 2008

GENERAL FUND		
INCOME		
Members subscriptions received and receivable	$3,805.00	
Wild Flower Garden Exhibit income	$96.00	
Bank Interest	$207.09	
Donations	$100.00	$4,208.09
PAYMENTS		
Web Site development	$720.00	
Insurance – Public liability	$771.01	
Meeting Room hire	$219.45	
Ent. Soc. of Australia affiliation fee	$57.75	
Incorporation Statement lodgement fee	$44.00	
Supper expenses	$173.72	
Speakers' Gifts	$50.97	
Student Presentation Prize	$200.00	
Student Presentation Lunch	$270.00	
Student Presentation Certificates	$11.98	
Wildflower Garden Exhibit Expenses	$4.45	$2,523.33
	Result for 2008	**$1,684.76**
PUBLICATION FUND		
Opening stock at Committee' valuation	$5,320.00	
Journal postage and stationary	$210.10	
Printing J. Vol. 37	$1,949.24	$7,479.34
Plus:		
Closing stock at Committee's valuation	$4,320.00	
Company Associate Members	$120.00	
Bank Interest	$5.48	$4,445.48
	Result for 2008	**($343.40)**

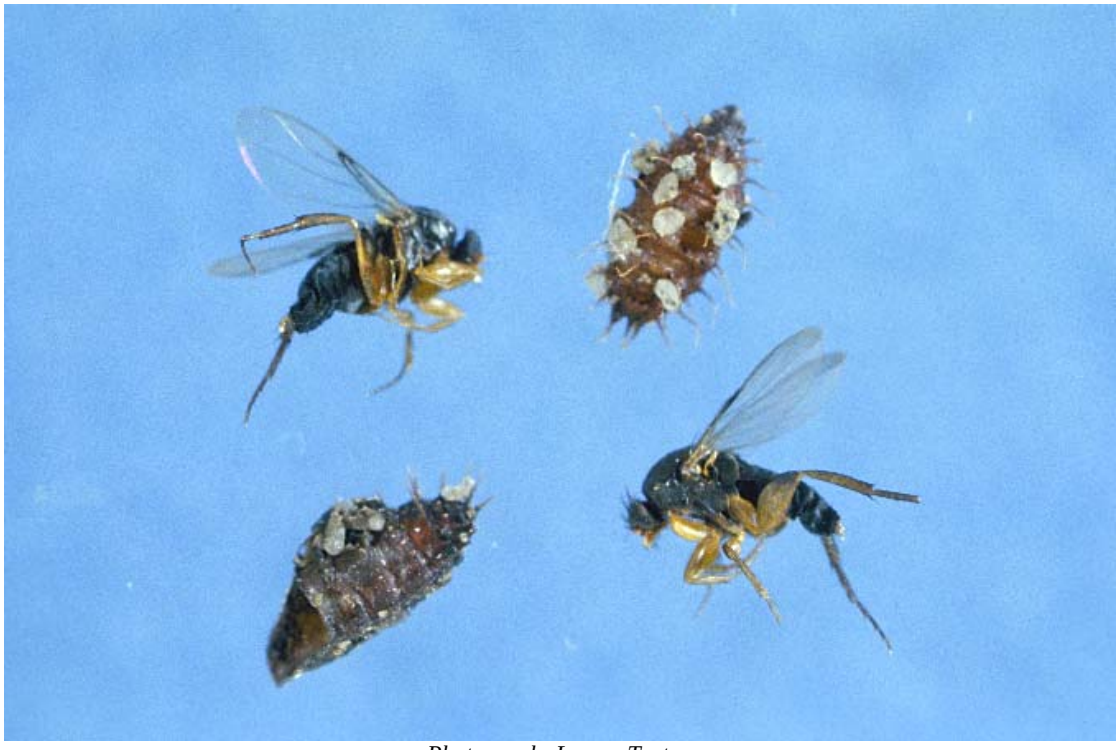
BALANCE SHEET AS AT 31 DECEMBER 2008

ACCUMLATED FUNDS			
Balance to 31 December 2007			$17,901.33
Results for the year	General Fund	$1,684.76	
	Publication Fund	($343.40)	$1,341.36
			$19,242.69
REPRESENTED BY:			
Cash at Bank	General Fund	$5,441.95	
	Publication Fund	$2,610.74	
	Term Deposit	$7,000.00	$15,052.69
Cash on hand			$200.00
Stock of Journals at Committee's valuation			$4,320.00
Debtors	Members subscription arrears	$625.00	
	Journal payment arrears	$800.00	$1,425.00
			$20,997.69
Less:			
CURRENT LIABILITIES			
Subscriptions in advance		$1,665.00	
Advance payments for J. Vol. 38		$90.00	$1,755.00
			$19,242.69

Insect of the Month

***Megaselia spp.* - 'Coffin-flies' – Garry Levot**

Now that common name must evoke some interesting connotations - and they are probably justified. Not much is known about these interesting little flies (Diptera: Phoridae) but what is known is very interesting. *Megaselia* is just one of several genera represented in Australia. All are small to minute flies. The photograph below shows both adult flies and the spiky pupal cases from which they emerge. The pupal cases are the tanned integument of the final larval instar so you can imagine what these larvae look like.

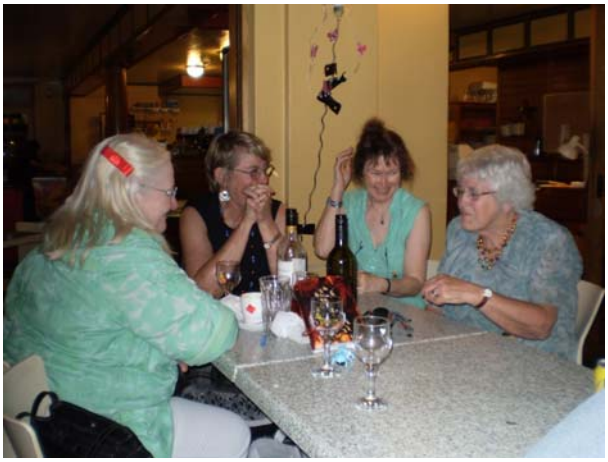


Photograph: Lowan Turton

The wing venation is characteristically simple. Phorids, like *Megaselia*, are not uncommonly encountered in forensic entomology, particularly in situations where the body is enclosed (eg. in a car boot or case) or buried. Little is known of the biology of individual species but phorids are known to burrow down to buried bodies and complete several generations underground. In the future as individual species become better known, phorids may be considered useful for estimating post-mortem intervals but, as a group they are have not been very reliable. Variously, adults have been found emerging from buried carcasses that had been dead for as little as a few weeks or as long as several years.

Christmas function – Saturday 6th December, 2008

The annual dinner held on 6 December 2008, was at the Boat Shed Restaurant at La Perouse. A good turn up of members and guests enjoyed a mainly sea food meal while looking across Botany Bay. The restaurant is right on the beach with the high tides flowing right underneath. Our newest member Sarah Mansfield and invited guest Phil Hadlington were among those present. Alison and Michael Nicholls travelled all the way from Bathurst to be there and, as usual, Dinah Hales and Barbara May knew all the answers to the quiz. Thanks are due to Mary-Lynne Taylor for her efforts in providing an entomological flavour to the table decorations.



La Perouse is an historic site opposite Captain Cook's landing place that is south across Botany Bay at Kurnell. Banks and Solander rowed across to a beach near the restaurant to collect botanical specimens in 1770. One of the questions in the annual dinner quiz was related to the Cook visit. The part asking how many insect species were collected from Australia at that time stumped most of us - it was 212 species.

Ted Taylor

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
4 March, 2009 7.30pm	AGM	
	Garry Webb (Sumitomo)	Pest ants
6 May, 2009 7.30 pm	Debbie Kent	Psyllids and lace bugs
1 July, 2009 7.30 pm	TBA	
2 Sept, 2009 7.30 pm	Bryce Peters	Flea control

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
C/- ENTOMOLOGY DEPARTMENT
THE AUSTRALIAN MUSEUM
6 COLLEGE STREET
SYDNEY NSW 2000

MEMBERSHIP FEES 2009

ORDINARY MEMBERS	$50
COMPANY ASSOCIATES	$60
STUDENT MEMBERS	$25
CORPORATE MEMBERS	$50

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VICE PRESIDENT	Mr ROBIN PARSONS
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HON TREASURER	Mr TED E TAYLOR
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