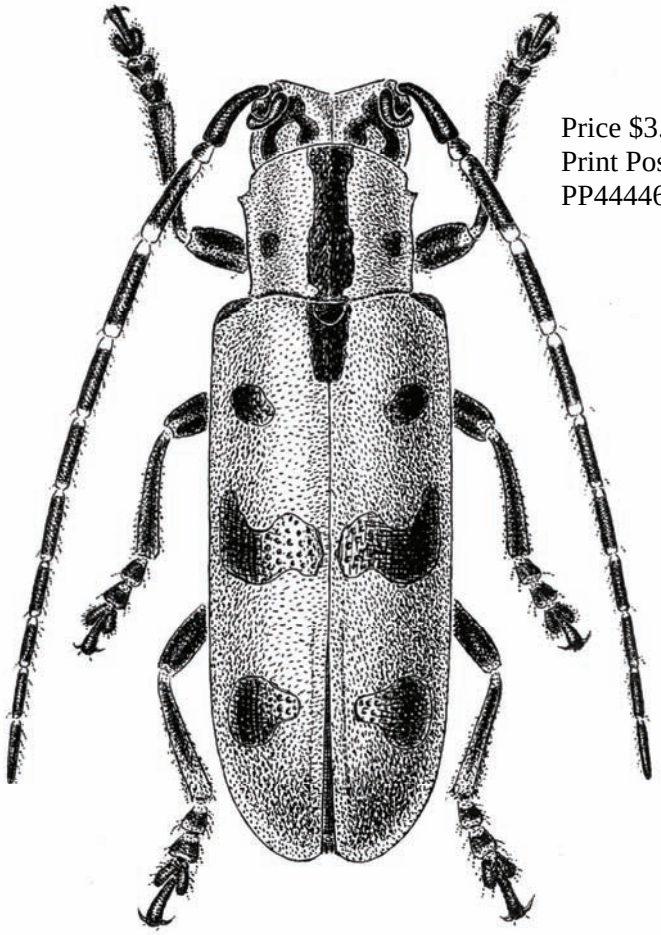
ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

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Front cover illustration: Habitus of *Zygrita diva* Thomson (Coleoptera: Cerambycidae), the lucern crownborer—artist William Manley, scanned from original illustration ©Queensland Department of Employment, Economic Development and Innovation

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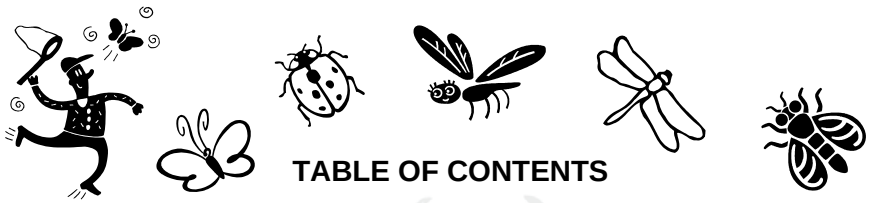

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The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held on the second 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. Membership is open to anyone interested in Entomology.

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

The Society publishes **THE AUSTRALIAN ENTOMOLOGIST**. 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 (Coleoptera). Its magnificent purple and green colouration makes it one of the most attractive beetle species in Australia. It is restricted to the rainforests of northern Queensland.

Minutes of General Meeting

Held in the Large Conference Room, CSIRO Entomology, Long Pocket Labs, 120 Meiers Road, Indooroopilly, on Tuesday June 15, 2010.

Chairman: Matt Purcell.

Attendance: Justin Bartlett, Richard Bull, Lyn Cook, Murdoch De Baar, Gio Fichera, Peter Hendry, David Hughes, T. Kenyon, Judy King, Chris Lambkin, Lance Maddock, Gunter Maywald, Penny Mills, Geoff Monteith, Matt Purcell, Don Sands, Owen Seeman, Desley Tree, Geoff Thompson, Richard Zietek.

Visitors: Karen Bell, Lynne Griffin, Cassie Jansen, Michael Meissle, Peter Wilkinson.

Apologies: Ross Kendall, Helen Nahrung, Federica Turco.

Minutes: The minutes of the last General Meeting were circulated in News Bulletin Vol. 38, Issue 3, May 2010.
Moved the minutes be accepted as a true record: Chris Lambkin.
Seconded: Richard Bull.

Nominations for Membership:
The following nominations for membership were received and approved by Council, and are presented for election:
For student membership: Ms Alyscia Kuypers. Nominated by Desley Tree, seconded Geoff Monteith.
For general membership Mr Phillipe Gonin. Nominated by Geoff Monteith, seconded Desley Tree.
Nominees were elected unanimously by a show of hands.

General Business:
1. The Treasurer again reminded members that membership fees are due.
2. Collecting permits - Chris Lambkin. About 90 collecting permits are being updated. They will be sent out electronically if an email address is recorded. If permits are not received in the next month please contact Chris.

Main Business

Student Award:
The recipient of the ESQ Student Award for 2010 is Ms Penny Mills. The President congratulated Penny and presented her with a cheque for $250.00. Penny then gave the following presentation on her work.

The *Apiomorpha minor* species-group (Hemiptera: Sternorrhyncha: Coccoidea)

Penny Mills, University of Qld

Introduction
Most of the 7,000+ described species of scale insects have been described based solely on the morphology of the adult female. However, all adult female scale insects have reduced morphological characters compared with most adult insects, which makes identification very difficult. This includes reduction or absence of all legs and antennae, mouthparts reduced, no compound eyes, and being wingless. The scale insect genus I focussed on for my Honours research, *Apiomorpha*, is no exception. *Apiomorpha* is endemic to Australia and there are currently 41 described species (Gullan 1984, Gullan and Jones 1989, Cook 2003, Cook and Gullan 2008). Males and females of *Apiomorpha* induce galls on their eucalypt hosts (Myrtaceae: *Eucalyptus*). The galls of the males are small and tubular, and usually found on the leaves or stems, although some do make compound galls which are attached to the gall of their mother (Fig 1). The galls of the adult females of *Apiomorpha* come in a variety of different shapes and sizes and are usually many times larger than the galls of the males (Fig 2).

Interestingly, *Apiomorpha* is one of the most chromosomally diverse of all the

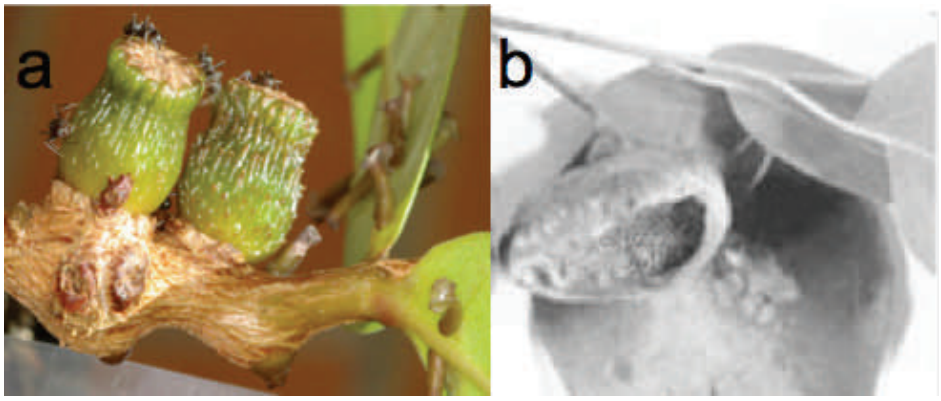

Fig 1. a) Galls of *Apiomorpha annulata* being attended by ants. The small tubular galls are the galls of the males. b) Compound gall of male *Apiomorpha pharetrata* attached to their mother. Photo modified from Cook and Gullan (2008).

animal taxa, with diploid (2n) chromosome counts ranging from 2n=4 up to 2n=~192 (Cook 2000) (Fig 3). Even within some described species there is chromosome variability. This is interesting because it is thought that variation in chromosome number can play a major role in the process of speciation. If individuals with very different chromosome counts (e.g 2n=10 and 84) mate, it is unlikely that proper arrangements of chromosomes during meiosis will occur in hybrid individuals. It is also possible that individuals with similar chromosome counts may have fixed chromosomal rearrangements, i.e. *A. subconica*; 2n=62, 66 and 72 (Cook 2000), which may also act as a barrier to mating and promote speciation.

My particular focus was on the *Apiomorpha minor* species-group. There are currently three described species, all found along the eastern states of Australia. All species appear to be relatively host-specific, being confined to *Eucalyptus* subgenus *Eucalyptus*. One species, *Apiomorpha minor*, has had chromosomal variation reported, with diploid chromosome counts of 2n=10, 42 and 84 (Cook 2000). Even though *A. minor* has been described as a single species, some morphological variation has been noted between adult females and their galls (Gullan 1984, Cook 2001). This morphological variation includes size differences of adult females, and differences in the distribution of spine-like setae on the dorsal side of the body. The variation in chromosome counts, as well as the morphological variation, suggests the possibility that *A. minor* is actually a cryptic species-complex that contains at least three distinct species. Recent studies on other species of *Apiomorpha* with chromosomal variation, including work on *A. munita* (Cook and Rowell 2007) and *A. pharetrata* (Cook and Gullan 2008), have shown that these described morphospecies actually consist of multiple cryptic species. These conclusions were made based on molecular phylogenies, allozymes, host use data and, to a lesser extent, chromosomal variation. For my research I hoped to use similar techniques (however not working on allozymes) on specimens of *A. minor* and related sister species.

Collecting specimens

The first part of my research involved collecting specimens. Only two live specimens of *A. minor* were collected from Queensland during my whole Honours year. Fortunately, however, twenty-seven other specimens, including the putative sister species of *A. minor* were also collected, by

myself and colleagues, from eastern Australia. Only two of these specimens were adult males, which are even harder to find than the live adult females.

Chromosome preparation

Specimens collected during my Honours had some ovarian tissue removed and treated using insect saline solution, before being fixed using 3 parts ethanol to one part acetic acid. The tissue was removed and placed in a 60% acetic acid drop on a slide. The tissue was macerated using a brass rod. To spread the cells evenly across the slide, a few drops of 60% acetic acid were placed on the slide, and moved around. The acetic

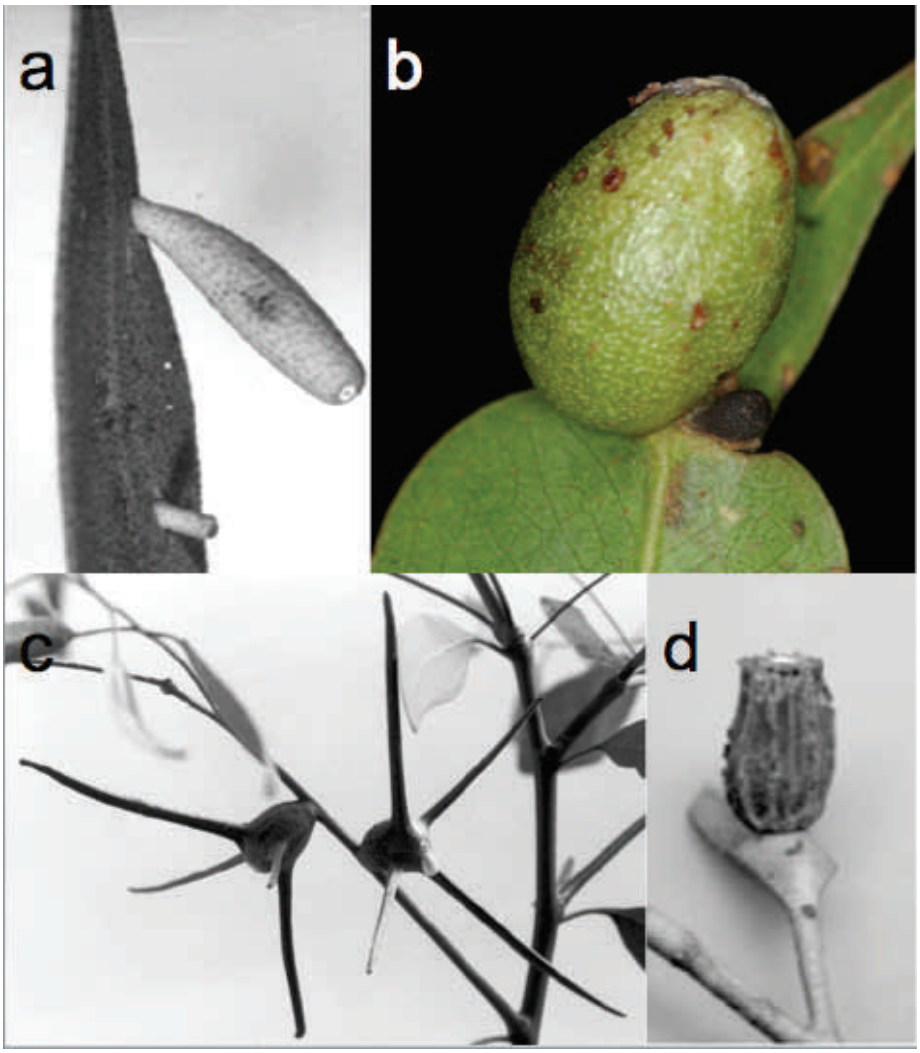

Fig 2. The diversity of galls produced by females of *Apiomorpha.* a) *Apiomorpha gullanea* (modified from Cook, 2003); b) *Apiomorpha minor;* c) *Apiomorpha munita* (modified

Fig 3. Variation in diploid chromosome number in *Apiomorpha*. Modified from Cook (2000). a) *A.* sp. nov. 2n= 4; b) *Apiomorpha strombylosa*. 2n= 32; c) *Apiomorpha spinifer*. 2n= 144.

acid was evaporated using a hot plate set at 60°C. Once the slide was dried, it was stained using 10% Giemsa stain. The slide was left for about 20 minutes, before the stain was removed using distilled water. This protocol was modified from Rowell (1985). This method was repeated for twenty-four females. Counting chromosomes is easiest when cells are in late prophase or metaphase of mitosis. The diploid chromosome count was recorded for each specimen when accurate counts could be obtained. Only twelve females could be assigned an accurate diploid chromosome count, due to the absence of cells in late prophase or metaphase. Specimens thought to be *A. minor* showed variable chromosome numbers, which had been reported by Cook (2000).

DNA sequencing

Forty-nine specimens had DNA extracted for DNA sequencing. Thirty-six specimens which had previously had their DNA extracted for an earlier study were also used. DNA sequencing was used because it is a relatively inexpensive technique and fast to obtain results. Seventeen protein-coding and RNA-coding genes from the mitochondria and nuclear genomes were trialled. Two ribosomal nuclear DNA gene regions were successfully amplified, the first part of 18S (which makes up part of the small subunit of the ribosome) and a part of 28S (which makes up part of the large subunit of the ribosome). These two gene regions showed enough variation between specimens to use for species-level comparisons of the *A. minor* species-group. Specimens that had both ribosomal gene regions sequenced were used to construct phylogenetic trees.

Morphological analysis

Because the species of the *A. minor* species-group were described using morphological characters of adult female, I also looked at the available slide-mounted females. Recently collected females were also slide-mounted and examined. Characters used in the description by Gullan (1984), as well as other possible characters, were measured and scored. These characters included position and number of spine-like setae on the head, thoracic and abdominal segments, density and distribution of pores on all segments, length and number of segments which make up the antennae, length and width of the females' mouthparts, length of each pair of legs, length and width of the spiracles, as well as body length and width. The program GGobi (Swayne e*t al.* 2001) was used to analyse the characters of the adult females.

Conclusion

During this research, there was chromosomal variation found in *A. minor*, even more than what had previously been reported by Cook (2000). There was also morphological variation seen in the morphology of the adult females. The DNA sequence data also

showed quite a bit of variation between different specimens. It does appear that *A. minor* is a cryptic species-complex, however, it wasn't until molecular data (chromosomes and DNA sequences) was used in conjunction with the morphology data that this could be confirmed.

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Notes and exhibits:

The following four Notes and Exhibits talks were presented.

Euploea (Crow Butterflies, Nymphalidae): a picture series

Murdoch De Baar.

A series of pictures of Crow butterflies was presented at the general meeting with the purpose of taking a look at the 54 species listed by Ackery & Vane-Wright (1984) and, in a humorous way, to show that the number of species currently recognised accurately reflects the number of 'actual' species, though with the intention of failing to convince the audience.....Did I succeed?

The distribution of the genus *Euploea*, though restricted mainly to the Indo-Australian Region, also includes Seychelles, Mauritius, Reunion (not Madagascar), up to the Himalayas (as high as 2500 m) and across to China, then out towards Tahiti in the south Pacific Ocean as the most easterly point. In my talk I acknowledged that Ackery & Vane-Wright (1984) had made a magnificent effort bringing together endless years of publications on *Euploea* and other Danainae (descriptions, notes, contradictory opinions, foodplants and such) in a meaningful way, though indicated that many so-called species were more likely

superspecies complexes. Ackery & Vane-Wright (1984) indicated that *Euploea* represented 54 species or species-complexes that would eventually be split up; but this has not happened yet.

Euploea characters of importance (Fig. 1) includes the presence or absence of sexbrands, specialised scale patches and speculum areas or the presence of scattered androconial scales, glazed areas, streaks on the underside of forewings (Fig. 2), whitened spaces of the upper hindwings and lower forewings, bowed or straight forewing dorsum, wing shapes and so on. Species complexes presented include *algea, core, modesta, mulciber, tulliolus, leucostictos, eunice, phaenareta, sylvester* and *climena* complexes. Some of these species are very disjunct across their range (i.e., *modesta, climena*). Some species have been based simply on the length and position of their sexbrands (*algea, core*) and some species (*swainson, crameri*) are recognised only because they are sympatric with their sibling species (*algea, modesta*). This situation has not been rectified for our own *core corinna* which flies with another *algea* and *core* on Bali and Java. *Euploea core corinna* and two Andaman Islands *core* subspecies represent the only taxa within the *algae-core* complexes not to have long spatulate androconial scales embedded in their upper hindwings. I also illustrated that a number of *algea* have conflicting characters.

Of interest also are the two subspecies of *latifasciata.* One is large, strongly white spotted with a straight forewing dorsum (Sulawesi, Fig. 3), the other is small, dark brown without spots and a bowed dorsum (northern Moluccas), seemingly with little in common other than the absence of many characters shown in Fig. 1. This situation also occurs within *redtenbacheri* which has subspecies from Sulawesi and the Moluccas.

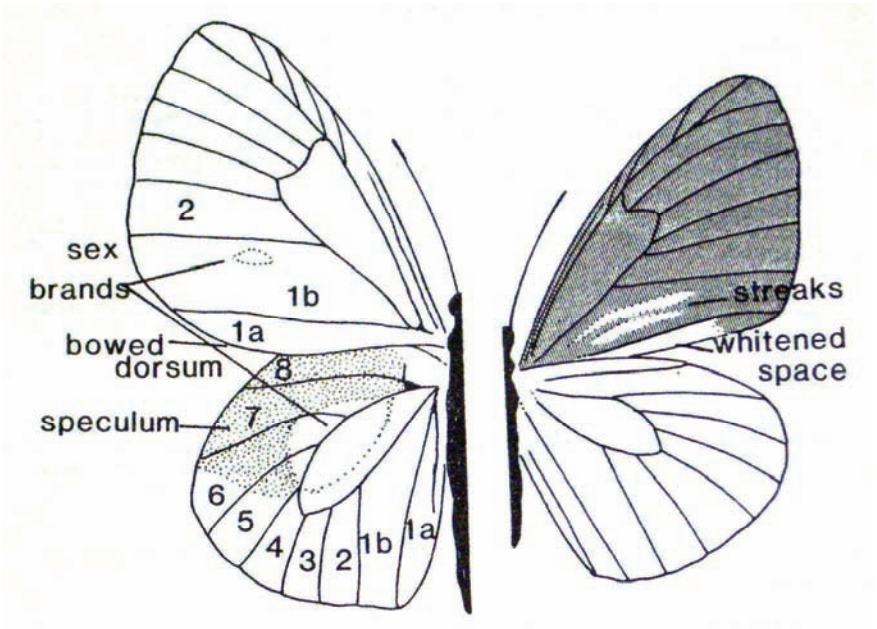

Fig 1. *Euploea* characters of importance: the left half shows the upper male wing characters that may be present or absent; the right half shows a couple of female characters (illustration, Susan Sands).

Fig 2. *E. batesii* female underside shows its characteristic double streaks.

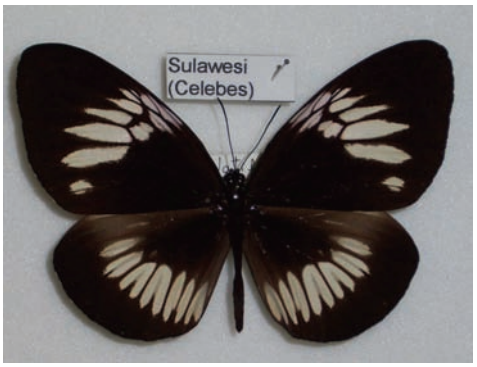

Fig 3. *E. latifasciata latifasciata* male from Sulawesi.

Fig 4. *E. dentiplaga* from the mountains of Ceram (Seram) Island.

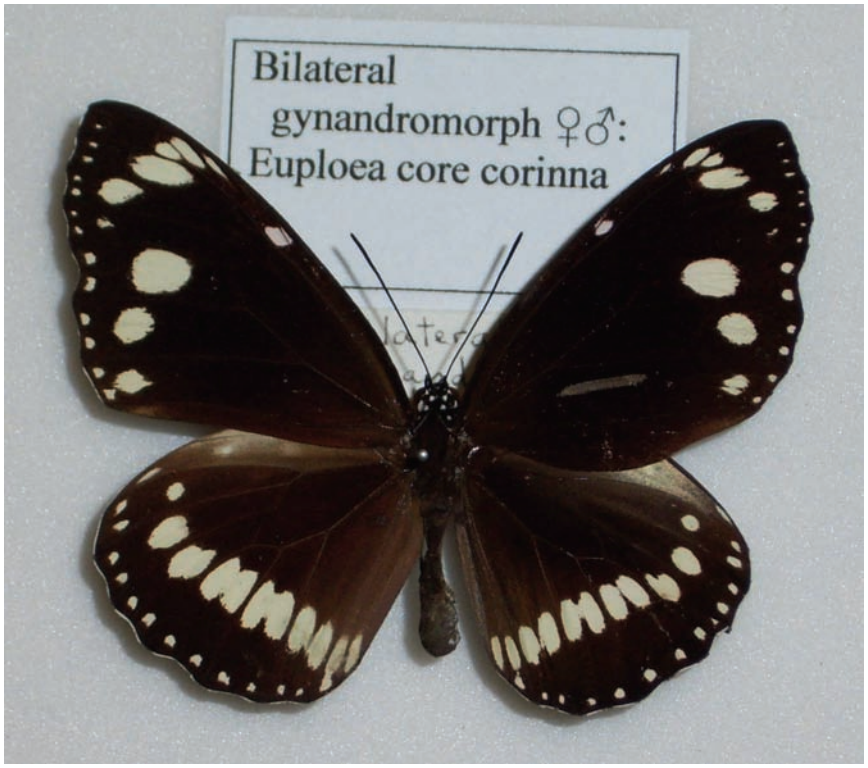

Fig 5. *E. core corinna* bilateral gynandromorph.

Also shown were examples of special distinct species: *dentiplaga* (Fig. 4), *cordelia, gamelia, blossomae, martinii, tobleri, configurata, hewitsonii, doretta, eboraci* and *eurianassa.*

A rare bilateral gynandromorph of *core corinna* (Fig. 5) taken at Corinda, Brisbane, provides an opportunity to compare sex characters and spots.

A number of species that first appeared to be mainly blackish, displayed electric blue when light is focused across their wings; these included some subspecies of *blossomae, eunice, mulciber* and *midamus.* Some species, however, are well-adorned with bright blue spots, blotches and wing edges and includes various *eunice, mulciber, configurata, phaenareta* and *eleusina.* Rich orange-brown is present on *wallacei* and *leucostictos usipetes.* What this shows is that not all *Euploea* are black ugly butterflies as stated in my lead in to the presentation (De Baar 2010).

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Mystropomus carabids from the Mt Etna caves at Rockhampton

Geoff Monteith and Federica Turco
Queensland Museum

The subfamily Paussinae is an unusual group of carabid beetles which includes many highly aberrant species with modified antennae that live in association with ants, as well as some free living species that look like normal carabids. The feature uniting them all in the same subfamily is that their amazing larvae all have the apex of the abdomen expanded into a large, circular disc. This disc is used to block the circular entrance to a chamber in the substrate where the larva resides, and it is opened like a trapdoor for the larva to seize small prey when they walk over the sensitive disc. In some, the disc secretes substances that lure the prey, and the disc can also grip the prey until the larval mandibles close on it. These strange larvae have many characters useful for classification but they are rarely collected and are known for comparatively few of the world's many genera and species of Paussinae. Adult Paussinae also all have the ability to "crepitate", i.e. to produce a chemical explosion from their rear end as a defence, in the same way that the more familiar, but unrelated, bombardier beetles (*Pheropsophus*) do.

The group has been under study on a global basis for some time by Dr Andrea Di Giulio at the University of Roma Tre, Italy (interested in morphology and biology), Dr Wendy Moore at the University of Arizona, USA (interested in morphological and molecular phylogeny) and Professor Peter Nagel at University of Basle, Switzerland (interested in biogeography and systematics). We have been helping Wendy and Andrea by searching for Australian adults and larvae, especially of the genus *Mystropomus*, and we've had some success.

In Australia there are three genera of Paussinae. Two are in the Tribe Paussini which has specialised antennae and are assumed to live at least partly with ants. These are *Arthropterus* (Fig. 1), with about 70 species in Australia and New Guinea, and *Megalopaussus* (Fig. 2), with a single large species in NQ. The third genus is *Mystropomus* (Fig. 3) and it belongs in the Tribe Ozaenini which are, with some exceptions, not ant-associated. It is the only member of a Subtribe Mystropomina and is restricted to eastern Australia.

The larvae of only two Australian paussines are known. In 2004, Andrea and Wendy described first instars hatched from eggs laid by captive *Arthropterus* from Victoria, and in 2009 they described a single 3rd instar *Mystropomus* larva extracted by chance from leaf litter near Coffs Harbour, NSW (Di Giulio & Moore 2004, 2009).

Adults of *Mystropomus* are about 12-15 mm long and look like ordinary, dull black carabids, except that they crepitate, when handled, producing acrid fumes which stain the fingers. There are two described allopatric species: *M. regularis* Banninger, found at higher altitudes in the rainforests of the Queensland Wet Tropics, and *M. subcostatus* Chaudoir which occurs in rainforests along the east coast from Sydney north to Eungella. The larva which Andrea and Wendy described from Coffs Harbour falls within the range of *M. subcostatus* and is assumed to be that species. Since then, Kyran Staunton, PhD student at James Cook University, has collected larvae of *M. regularis* from the summit of Bellenden Ker and we have collected more larvae of *M. subcostatus* from Kroombit Tops. These are all with Andrea Di Giulio in Rome.

Like many other rainforest insects, *Mystropomus subcostatus* occurs right at sea level in the southern part of its range (Royal NP, near Sydney), but further north in Queensland it occurs only as isolated populations on high cool rainforest plateaux (Conondale Range, Kroombit Tops, Eungella). An

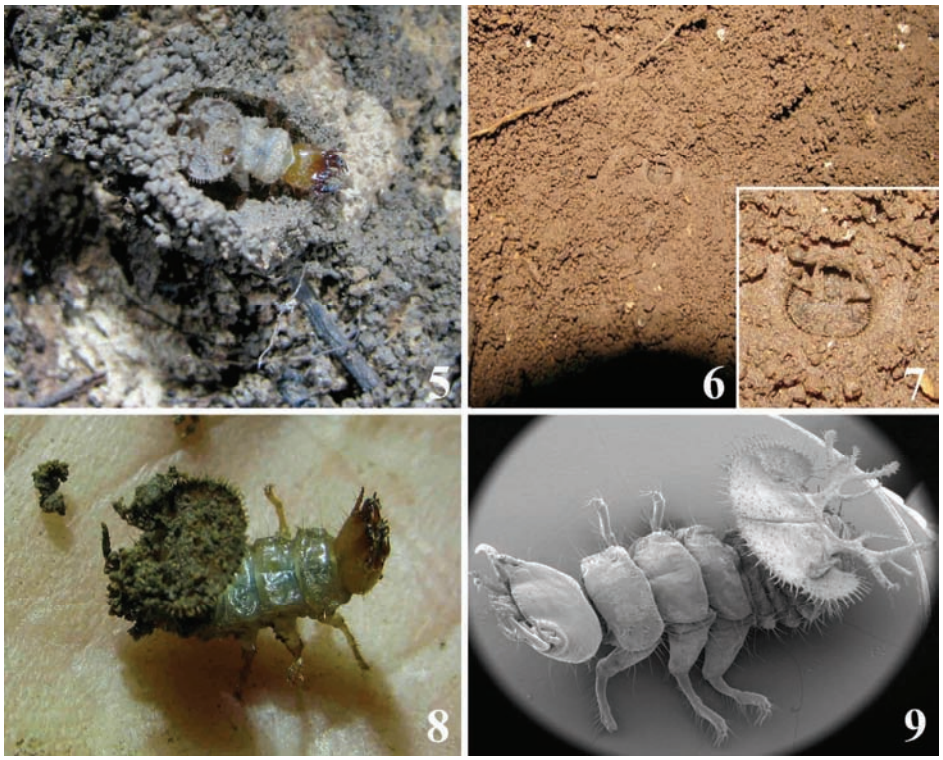
exception to this pattern are specimens that were taken in the limestone caves at Mt Etna, near Rockhampton, by speleologist activists during the conservation battle to prevent the limestone caves being mined for cement in the 1960s and 1970s (Hamilton-Smith, 1970). Some were also taken by speleologist Arthur Clarke in 1989. These have been identified as *M. subcostatus* in the past, but our re-examination show they are narrower, shinier, and with longer legs and tarsi than normal specimens. This is also the only cave population known and the locality is in the hot, dry, Rockhampton

Figs. 1-4: 1) *Arthropterus sp.* (Photo: Geoff Thompson); 2) *Megalopaussus amplipennis* Lea (Photo: Geoff Thompson); 3) *Mystropomus sp* from Mt Etna caves. (Photo: Jeff Wright); 4) Triumphant emergence from Dragon's Head Cave. L to R: Federica, Geoff and Noel Sands. The *Mystropomus* are in the bag! (Photo: Pauline Toop)

lowlands, an enormous contrast to the nearest "normal" population, 150 km away in wet rainforest at 1000 m altitude on Kroombit Tops.

We knew that our fellow vertebrate palaeontologist at the Queensland Museum, Scott Hocknull, was working on rich fossil deposits of mammals and reptiles in the same caves, and that he had found that there had been a diverse, but now-extinct, rainforest fauna living there 250,000 years ago which was related to the modern wet rainforest faunas of north Queensland and New Guinea (Hocknull *et al*. 2009). Could it be that our little cave *Mystropomus* dated from that same ancient period of rainforest in the area, but instead of being extinct like the fossil vertebrates, had survived alive and well for hundreds of thousands of years in the cool, moist refuge of the caves? If this cave population had diverged morphologically to be a separate species, might this be evidence of such a long isolation? Perhaps the larvae might show supporting morphological divergence? Could DNA determine the divergence between this cave population and the nearest normal population at Kroombit Tops?

We visited the Mt Etna Caves for 3 days in April to try to collect fresh material of



Figs. 5-9: 5) A *Mystropomus* larva in an opened soil chamber. (Photo: F. Turco); 6) Surface of the cave floor showing opening to a larval chamber of *Mystropomus.* (Photo: F. Turco); 7) Detail of the chamber entrance in Fig 6, showing the larval tail disc in ambush position; 8) *Mystropomus* larva removed from its burrow to reveal it's enormous tail disk. (Photo: F. Turco); 9) *Mystropomus* larva cleaned and imaged under the scanning electron microscope (Photo: A. Di Giulio).

adults, and perhaps even discover the larvae, so that Andrea and Wendy might be able to answer some of these riddles about this enigmatic Mt Etna *Mystropomus*. We received help from Ann Augestyn and her staff at the Capricorn Caves Resort and were also very fortunate to have guidance into the caves from two local speleologists Noel Sands and Pauline Toop both of whom were involved in the conservation battles 40 years ago. With their help we explored 6 different caves and had the thrill of finding living adults in four of them (Fig 4). Even more exciting was the discovery of larvae in three caves. They lived in small oval chambers in the substrate (Fig 5) with their circular entrances (Figs 6,7) opening to the surface in the squeeze space beneath rocks lying on the cave floor. The adults have been sent to Wendy in Arizona for DNA study and the larvae to Andrea for morphology examination. Already Andrea has produced superb SEMs (Fig 9) of immaculately cleaned specimens which contrast with the soil-coated living larvae (Fig 8). We look forward to the results of their studies on these remarkable creatures.

If readers come across living adults or larvae of any Australian Paussinae it would be wonderful if they could be preserved in 95% ethanol and forwarded to us at the Queensland Museum. Contact us on 07-38407690.

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Bush-Blitz On Culgoa Floodplains NP Qld, Culgoa NP& Ledknapper NR, NSW, May 2010

Chris Lambkin, Noel Starick and Rhys Smith
Queensland Museum

Bush Blitz is the new name for the Australian Biological Resources Study (ABRS) program to expand our understanding of the biodiversity of recent additions to the Australian National Reserve System (NRS) by funding surveys that provide more complete lists of the biodiversity in each reserve and post-survey species discovery science (taxonomy) to sort out the naming and conservation status of key problematic groups across the Australian flora and fauna.

The Queensland Museum was contacted to complete an Bush Blitz survey of newly acquired sections of Culgoa Floodplains National Park (CFNP) Queensland, Culgoa National Park NSW (CNP), and Ledknapper Nature Reserve NSW (LNR), approximately 200 km north-east of Bourke.

In late 2009 Chris and Noel set off from Brisbane and set up 11 Malaise traps (Fig. 1), pitfalls, light sheets, hand collected, and sweep netted across the three reserves. Rangers were given sufficient equipment to

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take the samples from the Malaise and pitfall traps monthly.

Because of rain in December 2009 and January 2010, and the resultant unrecorded levels of flooding in March and April 2010 we were unable to access the survey areas until mid-May. Even the rangers and field officers were unable to access many of the sites and some samples covered a three month time period.

Chris, Noel and Rhys Smith (QM Casual staff, Entomology) returned to the reserves between the 14th and 23rd May to hand collect and retrieve the samples for sorting. Some areas remained boggy, and some roads were still under water. We left Brisbane on the 14th May, staying in Bourke overnight as many of the roads in the Brewarrina area were still cut. We drove up to **Ledknapper Nature Reserve NSW** (LNR) on the 15th May. Accompanied by Ranger Shayne O'Sullivan, we reset some of the traps and spent time hand collecting throughout the park. The light sheet was run each night (Fig. 2) while we pinned out specimens collected during the day.

A major discovery in Ledknapper NR was *Varnia implexa*, a rare moth-like lacewing (Order Neuroptera), belonging to the Family Ithonidae. Noel originally collected a live specimen near the base of a spinifex clump. Another live specimen was seen by Rhys, filmed and collected the next day (Fig. 3). We set up the light sheet that night and collected more specimens. A second live specimen was filmed and collected by Chris from a sand dune site near Old Gerara Spring the following day.

The desert grasshopper, or blistered pyrgomorph, *Monistria pustulifera* (Fig. 4) is quite widespread at Ledknapper NR. The colour variations have caused 4 races to be described, and this pair with black antennae and black body colour marked with yellow

2

spots belong to the Central race that occupies most of the centre of the continent from E NSW to the west coast. About 15% of the adults have long-wings, but most are like this pair – with short wings. When threatened they can display their hind wings, which are bright red. The male is the smaller specimen, and is piggy-backing – essentially sitting there for days, repelling all other males, until the female is ready to mate. Most are recorded as feeding on *Eremophila*, or emu bush, especially the Green Turkey Bush, *Eremophila gilseii*, and are considered to be the most important insect species in the ecology of that plant (Rentz 1996). There were many grasshoppers of all life stages found dead, attached to vegetation at Ledknapper NR, probably due to fungal attack. Many were on a *Callitrus* at Beulah HS. Specimens were taken for analysis.

Piles of dug soil were found across the park, especially in sandy regions (Figs 5 & 6). Noel dug a large native dung beetle from one at Beulah HS, that appeared to be *Onthophagus pentacanthus*, but there are suggestions that this is an undescribed species. Specimens were also collected from light sheets, but only at Ledknapper.

On the 18th May we travelled to **Culgoa National Park NSW** (CNP). The road was under water on the Jobs Gate Road, but easily traversed. We spent the afternoon, accompanied by Field Officer Rick Ohlsen accessing the four sites, taking the final samples, and removing the traps. The grass, grown to over a metre high in all areas, had flowered, and dried, obscuring unused tracks and roads. We spent the days hand collecting at each site and throughout the park, concentrating on the north-western area around the old Toulby Station. While running the light sheet each night at Cawwell HS much of the smaller, more fragile specimens collected during the day were pinned out (Fig. 7).

Due to flooding, we had to access **Culgoa Floodplains National Park Queensland** from Culgoa NP, NSW, via the Toulby Gate. We were joined by RIC Andy Coward and Ranger Megan Simpson early on the 20th May and accessed the three western sites in the Toulby section; taking the final samples, removing the traps and hand collecting (Fig. 8). We spent the next day collecting throughout the CFNP, concentrating on the north-western section of Toulby, but also covering parts of CNP.

3

4

Samples. Through 2007 and 2008 to April 2009, over 100 samples were taken from sites in CFNP, QLD, including 7 sites in the newly acquired Toulby section, as part of unfunded survey work of western Queensland by Chris and Noel. 143 more samples were collected by the end of May 2010 in this survey of all three parks. Thus 254 samples have been taken from 59 sites, across the three parks. Samples range from a single hand collected specimen, to three month long samples comprising hundreds of thousands of specimens from Malaise traps and pitfall traps.

5

Sorting. Many of the earlier samples were sorted between December 2009 and May 2010 by QM volunteers Noel, Jackie Chan, and John Purdie and casual staff Rhys, Kathleen Nugent, Wendy Hebron, and Kathy Ebert. As much material as possible has been sorted into ants, spiders, butterflies, dragonflies, snails, target group flies,

6

7

8

bugs, and residue. This work is ongoing.

Identification. Sorting to species for target groups: Lycosoidea (wolf spiders), Sparassidae (huntsman spiders), Mygalomorphae (trapdoor spiders), Hymenoptera (ants), Therevidae (stiletto flies), Bombyliidae (bee flies), Lepidoptera (butterflies), Gastropoda (land and fresh water snails), Odonata (dragonflies and damselflies), will be undertaken when sorting is completed.

Reference

RENTZ, D. 1996. *Grasshopper Country. The Abundant Orthopteroid Insects of Australia.* UNSW Press, Sydney, 295pp.

Insect Displays, Publications and Childrens' Activities at Queensland Museum

Geoff Thompson, Queensland Museum

"The Butterfly Man of Kuranda" finished its six-month run at Queensland Museum South Bank on 12th July. On Friday 9th July ABC's Stateline played a segment on the collection, recorded in the opening week. It had been bumped by the Queensland floods. So the last three days of the exhibition were very busy.

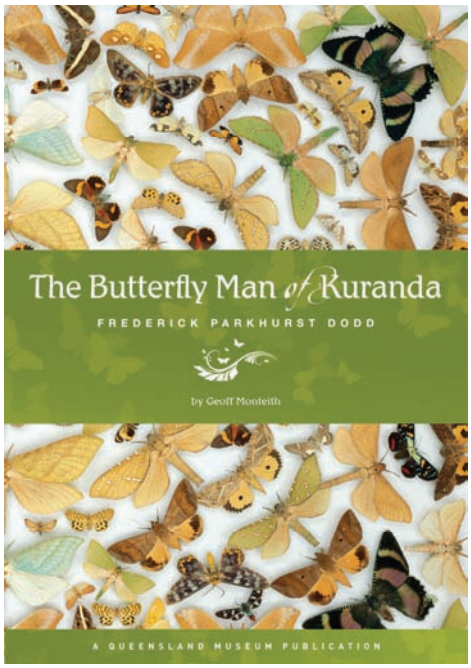
The next six-month phase of the exhibition will be in Toowoomba to coincide with the opening of the new National Carriage Factory at our Cobb and Co. Museum campus in September.

The Brisbane display period finished up with lots of kids activities inspired by the artistry of the Dodd cases along with the symmetry, patterns and colours of the insects themselves. The main activity space was decorated with large butterfly cut outs, lit with coloured lights and graced with Dodd-inspired cases of insects (image right). Tony Hiller supplied and arranged the Lepidoptera, from single specimen cases to A3 size. Geoff Thompson did the final arrangement of four A3 cases of Coleoptera supplied and mostly mapped out by Jack Hasenpusch. A trail of insect cases and stencil stations around the museum allowed children to build up stencilled drawings of insects on supplied paper. The Inquiry Centre had a light table with large half-and-half photos of Lepidoptera for children to match up and discover facts about the insects as they did. They also had a popular activity where children had to separate stick insect eggs from frass.

Firstly there was the "Out of the Box" festival for children under eight, 8th-14th June. Children were asked to make a "Flutterby", a fantasy creature inspired by the insects around them, constructed with cut-out paper; combined with stories, games and songs, this was a great success. Two weeks later "Out of the Box" was followed by "The Insectarium" school holiday activities 28th June – 9th July. Children could construct a butterfly wrist ornament to learn about structure, symmetry and pattern, grab a magnifying glass with a question about the display cases attached, play a large-scale insect "Snap" game, reassemble a large wall-mounted butterfly or sit down and draw a real butterfly specimen in a case in front of them. Organisers were amazed at how long children and adults spent happily drawing detailed renderings of these specimens with great results. General museum visitor numbers were up by 49% on last year and it was great to see so many kids inspired by insects, even in winter.

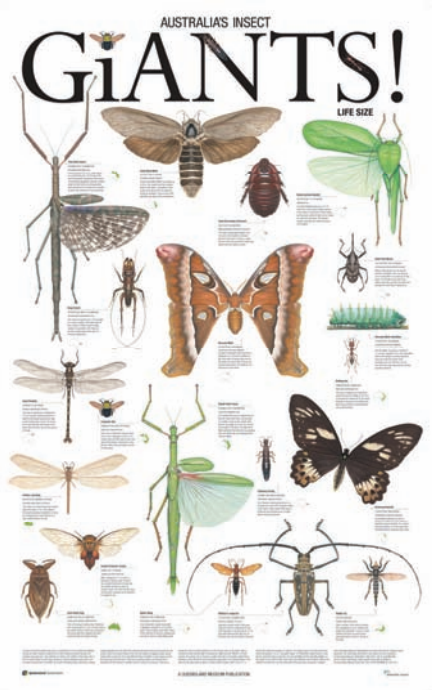
Queensland Museum has produced a set of new editions and brand new insect-related books and posters to complement the exhibition and these are available through the museum shop on site or online at http://qm.qld.gov.au/Shop?page=1. Books include a new edition of *The Butterfly Man of Kuranda*, by Geoff Monteith, a new catalogue with a photo of every case in the current display, *The Dodd Collection of Butterfly and Insect Cases*, also by Geoff Monteith, a new full-colour edition of *The Amazing Book of Insects – Activities for Children* by Michelle Ryan & Robert Brunke and *Amazing 3D Insects* by Geoff Thompson. All are $9.95.

New editions of our well-known posters *Australia's Insect Giants* and *Australia's Insects – a Guide to the Orders*, both featuring Sally Elmer's beautiful watercolours, are also available at $10 each.




The Amazing Book of
Insects
activities for children
A QUEENSLAND MUSEUM PUBLICATION


Amazing
3D
Insects
A QUEENSLAND MUSEUM PUBLICATION


AUSTRALIA'S INSECT
GIANTS!
LIFE SIZE

Notice of Next Meeting

Monday 9th August, 2010, 12pm

~

'Impacts of established natural enemy assemblages on an invasive pest, the soybean aphid, in North America'

a presentation by

Dr Alejandro Costamanga

CSIRO Post Doc., Indooroopilly

~

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

ALL WELCOME
(please sign in at reception before meeting)

Neolucia mathewi in Tasmania

While travelling through the central highlands in Tasmania in mid February, a small lycaenid was accidentally caught while collecting other butterflies adjacent to the Lake Highway 20 kilometres south-east of Miena, Great Lake (42° 05' 44" S; 146° 53' 08" E; WGS 84). The butterfly was flying with other similar lycaenids close to the ground in close proximity to small shrubs with relatively small (approx 3 cm) stiff pointed leaves. Larger shrubs occurred in the adjacent undisturbed native forest.

Assuming the specimen was *Neolucia hobartensis*, the butterfly was papered without inspection. Upon returning home to Bundaberg several weeks later, examination of the specimen established that it was a male *N. mathewi*.

Braby (Butterflies of Australia, 2000) states that *N. mathewi* has not been recorded in Tasmania since 1927. While this specimen confirms that *N. mathewi* occurs in the central highlands of Tasmania, further collecting is required to confirm the extent of the butterfly and the occurrence of the host plant (*Monotoca* sp.).

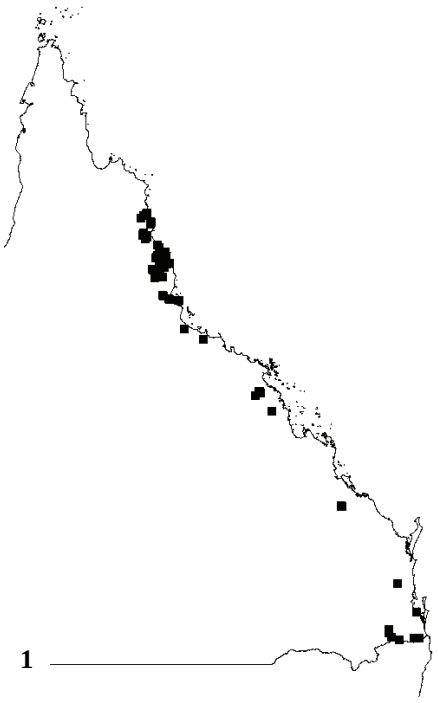
Peter Wilson

Bottles Riches

Geoff Monteith's rainforest sampling has probably generated lifetimes of work for entomologists.

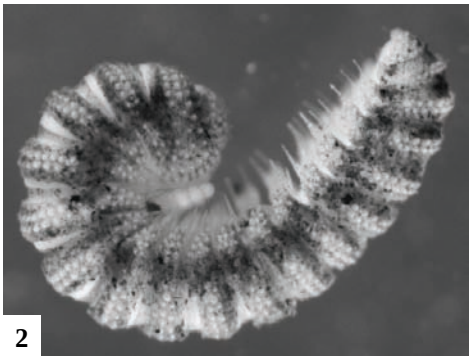
This alarming thought first came to me three years ago, when Canberra's then-Department of Environment and Heritage paid me to sort the Queensland Museum's collection of paradoxosomatid Polydesmida. Those are millipedes, and you can think of the taxa by analogy as 'acridid Orthoptera': a readily recognised family in a readily recognised order.

After pulling out the 20-odd named paradoxosomatids, I found another 199 new ones, nearly all collected by Geoff and colleagues (Mesibov 2008). I also sorted the non-paradoxosomatid Polydesmida, this time to broad categories: Dalodesmidae (my specialty) and "Wee Knobbly" Polydesmida.



1

Having recently tackled Wee Knobblies from Tasmania and NSW, I felt brave enough this year to borrow the QM's material and have a go with it. I'm now losing courage fast. The 620 specimens from 76 localities (Fig. 1) represent at least three families, an uncertain number of genera and a scary number of species. Geoff's done it again.



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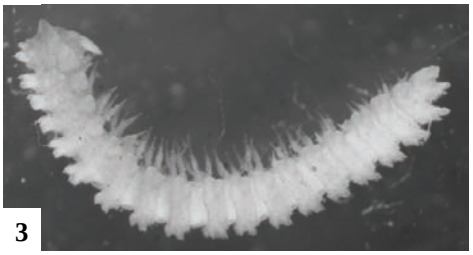

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At least one genus is an old friend, *Asphalidesmus* (Fig. 2). The genus seems to live the whole length of the Great Dividing Range, and has three species in my home state of Tasmania [http://www.qvmag.tas.gov.au/zoology/multipedes/tasmilli/milpod/milpd19/milpdasp.html] Some of the Wee Knobblies from Geoff's berlesates are crested (Fig. 3), while others have dorsal bumps smaller or larger tha those in *Asphalidesmus*. None are longer than 10 mm and one is mature at 4 mm.

There's a bit of a renaissance going on at the moment in Wee Knobbly taxonomy, with several overseas specialists working up tiny, taxonomically difficult species from SE Asia and the Caribbean. The Queensland contribution will be substantial.

Reference

MESIBOV, R. 2008. Diversity of Queensland paradoxosomatid millipedes (Diplopoda: Polydesmida: Paradoxosomatidae). *Australian* Entomologist 35(1): 37-46.

Bob Mesibov
Penguin, Tasmania

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for the ESQ News Bulletin

Register your interest with the Editor today (please mention your preferred review topic/insect group)

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ENTOMOLOGISTS IN ACTION

In this edition .....

Integrated Parasite Management Group (DEEDI, Yeerongpilly)

The IPM group, based at the soon to be vacated Animal Research Institute at Yeerongpilly (yes, we are going to Boggo Road too!) focuses on the integrated control of pests and parasites associated with livestock, principally arthropod, but also helminths. Our work includes better monitoring and detection systems, the development of alternative 'softer' control technologies, strategic approaches to the use of chemical pesticides, and the development of integrated control programs and decision support systems.

We work or have worked with pests of most of the major livestock industries, including current projects with bees, which are considered livestock under State legislation. Work within the IPM group is also very much 'integrated' with most members of the group working across a range of projects and technologies and their potential application in different livestock systems.

Trevor Lambkin

During his early days in the Department of primary industries he was based in the stored grains research group where he undertook research in the biology and ecology of the rust red flour beetle (*Tribolium castaneum*) in whole wheat; developed gas tight phosphine fumigation blankets and silos for fumigating stored grain for management of insecticide resistant beetles; and investigated alternative fumigants for stored grain insect control. In addition, Trevor worked with Mareeba DPI in developing fumigation protocols for stored tobacco which included devising fumigation application rates for phosphine-resistant cigarette beetle (*Lasioderma serricorne*) populations. In 1992, he lead the biological control of spiralling whitefly (*Aleurodicus dispersus*) in Torres Strait, Queensland, resulting in the successful establishment and control of the pest in northern Queensland. This project continued until the late 1990's at which time Trevor commenced the Animal Science project in developing management strategies for lesser mealworm (*Alphitobius diaperinus*) in broiler houses. In the late 1990s, he returned to university studies, completing graduate studies in insect ecology and is currently due to finish his PhD in 2011.

Standing at back, L to R =- Peter James, Judy Gemmell, Rudolf Urech, Maxine Lyndal-Murphy, Geoff Brown. Front: Diana Leemon, Peter Green, Wayne Ehrlich, Gary Everingham, Kate McGlashan, Steven Rice.

Steven Rice
In 1998 Steven graduated from Central Queensland University with a degree in applied science and began working as a technical officer at DPI Indooroopilly. Initially with the Queensland Horticulture institute, Steven supported projects investigating Papaya fruit fly and Queensland fruit fly where he performed fly identification and surveillance. Since 1999 he has been a laboratory technician to an RIRDC-funded project investigating management strategies for lesser mealworm in chicken broiler houses. During this time he has developed expertise in insect culturing and in devising methods for assessing the efficacy of insecticides in the laboratory and field. Steven has particular interest in application of biopesticides for insect control and has recently begun assisting investigation of their use against small hive beetle, a pest of honey bees.

Tina Lambkin
Tina commenced at Indooroopilly DPI in January 1977 as a laboratory technician (cadet) in Entomology Branch working in the stored grains group determining resistance baselines for newly evolved insecticides of the time. She has since worked on resistance testing of banana weevil borer (*Cosmopolitus sordidus*) and as a senior laboratory technician in the stored grains group on devising fumigation protocols for sealed silos. She now works within the IPM group on a part time basis testing resistance levels of broiler house populations of *Alphitobius diaperinus* in the lesser mealworm management project.

Diana Leemon
Diana studied Mycology at the University of Queensland, working in plant pathology and wood pathology on graduation then later teaching science, maths and biology for a number of years. In 2000, Diana took up a temporary (6 month) research appointment with Qld Primary Industries to investigate the fungal control of cattle tick because "they were desperate to find a mycologist". Thus began a close and beneficial relationship with the entomopathogenic fungi *Metarhizium anisopliae* and *Beauveria bassiana*. Ten years on, Diana is a permanent senior scientist with QDPI having in the interim acquired a Master of applied science (QUT), a PhD (UQ), and developed up her own research area investigating the fungal bio-control of livestock ectoparasites. Recent projects include exploring the potential of *Metarhizium* and *Beauveria* to control sheep lice and sheep blowflies, feedlot nuisance flies, cattle tick and buffalo flies, and the small hive beetle that is destroying beehives in Qld and NSW.

Kate McGlashen
Kate undertook a degree on Ecology and Conservation Biology at Griffith University where she developed an interest in insects. She has worked for the IPM group since 2007 on projects including use of entomopathogenic nematodes against livestock pests, organic lice controls, and resistance to insect growth regulator insecticides in sheep lice. Kate currently maintains the small hive beetle colony and is working on possible use of fungal biopesticide against small hive beetle *Aethina tumida*, and potential development of an attractant for the beetles using the volatiles which are produced by the beetles' associated yeast *Kodamaea ohmeri*. She has recently commenced a Masters in Entomology to clarify the relationship between small hive beetle and its associated yeast.

Gary Everingham
Gary joined the IPM group as part of the team investigating population dynamics and biology of nuisance flies in feedlots and developing integrated control systems. He currently works in the fungal biopesticide laboratory and has been involved in projects investigating the use of fungi against sheep lice, sheep blowflies, small hive beetle and, at the moment, use of *Metarhizium* against cattle tick *Rhipicephalus (Boophilus)*

microplus. Laboratory studies towards optimal formulation development are currently in progress and live cattle experiments will begin in October.

Rudolf Urech
Rudolf, a chemist by training, has a particular interest in the chemical ecology of insects and, in collaboration with Australian and overseas scientists, has developed non-insecticidal tools for the control of a number of veterinary pest insects. He was responsible for development of the LuciTrap™ for sheep blowflies, for development of better attractants and trapping systems for Old World screwworm (Bezzilure), now being used in screwworm surveillance programs throughout Australia, and a modified walk through trap for reducing buffalo flies on cattle. His recent project on nuisance flies in cattle feedlots developed integrated systems for control incorporating improved sanitation, augmentative releases of parasitic wasps (*Spalangia endius*), (now produced commercially by Bugs for Bugs at Mundubbera) and fungal biopesticides.

Geoff Brown
Geoff's work in recent years has been in projects towards the control of nuisance flies in cattle feedlots and the development of better trapping systems (Bezzilure) for the detection of screwworm (*Chrysomya bezziana*) Geoff plays a pivotal role within the IPM group and oversees maintenance of a range of insect colonies, principally *Musca domestica*, *Lucilia cuprina*, *Chrysomya rufifacies* and *C. megacephala*, but also *Galleria mellonella* to support maintenance of our entomopathogenic nematode cultures and from time to time pupal parasites for use in feedlot fly studies. Geoff is also running our experimental buffalo fly colonies and working in the ciguatera toxin detection project but also playing the main role in ensuring our new labs meet specifications at Boggo road.

Peter Green
Since retiring from the Parasitology section at the Animal Research Institute in 2002, Peter has maintained his involvement in veterinary entomology, now within the IPM group. Ongoing collaboration with Rudolf Urech has seen the completion of projects on blowflies (*Lucilia cuprina*), buffalo flies, feedlot flies and screwworm flies. This has involved the evaluation of traps and attractants and identification of muscids, calliphorids (particularly *Chrysomya bezziana* and other *Chrysomya* spp.), and hymenopteran parasitoids of nuisance flies (Pteromalidae, in particular species of *Spalangia*). A career-long interest in tick control is continuing in the IPM group with involvement in a project on fungal biocontrol with Diana Leemon.

Peter James
Peter's principal area of work has been with sheep blowflies, nuisance flies associated with poultry farms and sheep lice, in most recent years clarifying the population dynamics and economic impact of sheep lice in extensive flocks. This work 'culminated' in development of the web-based LiceBoss® decision support system for woolgrowers. Recent projects have included investigation of potential for use of entomopathogenic nematodes in the control of sheep lice, development of methods for the detection of resistance to insect growth regulators in lice, E-nose detection of flystrike and a project just finishing which is indicating significant potential for the use of tea tree oil formulations against sheep ectoparasites. With Jim Rothwell and Beth McGraw at UQ and Wayne Jorgensen in DEEDI he is currently working on the development of a non-animal system for rearing buffalo fly, towards the assessment of the potential for use of *Wolbachia* in buffalo fly control. He is also involved in a project with Ian Stewart at Queensland Health examining the utility of assays with Diptera for more rapid detection of the micro-algal toxin ciquatera in reef fish.

Maxine Lyndal-Murphy
Maxine has worked as parasitologist with the Integrated Parasite Management Team for the last 7 years. Her special interest is the diagnosis and control of gastrointestinal parasites of large and small ruminants, but she also has expertise in ectoparasite detection and identification from skills gained in a past life. Maxine was parasitologist for the Queensland segment of the Australian Wool Innovation Integrated Parasite Management sheep (IPMs) project and is currently undertaking research into the better diagnosis of anthelmintic resistance in these nematodes to chemical treatments. This year she published the first findings of anthelmintic resistance in nematode parasites of cattle in Australia. Maxine is also involved in the current Meat and Livestock Australia series of seminars for producers. She is the Queensland representative on the WormBoss national technical committee and a founding member of the industry funded WormBuster project for the sustainable control of gastrointestinal parasites of sheep in Queensland.

Wayne Ehrlich
Wayne is currently involved mainly with work in the Worm Buster lab with Maxine and Judy. However he also sharpened his entomological skills in the Integrated Parasite Management sheep (IPM-s) and E-nose projects and through involvement in a number of sheep lice projects. Current WormBuster projects involve working with farmer clients and groups to improve animal performance and reduce use of, and resistance to, chemical controls. He is currently working on a project to evaluate the level of resistance in weaner cattle to ML drenches in Queensland. Prior to joining the IPM group he was a Research Station manager at various DPI sites in Queensland and also provided research and extension services to the dairy industry over a 25 year career with DPI and now DEEDI.

Judy Gemmell
Judy has worked at the Animal Research Institute for 20 years in the WormBuster lab. She conducts gastrointestinal and fluke parasite identification and assessment of worm egg burdens for clients running sheep, cattle, goats, alpaca and horses. The WormBuster lab also identifies parasites in exotic species such as buffalo but Judy's favourites are small land holders and their pet animals whose photos adorn the lab walls. Of late Judy has been marrying her helminthological and entomological skill in maintaining the *Galleria mellonella* and entomopathogenic nematode cultures.

Book Review:
A Guide to the Beetles of Australia, by George Hangay and Paul Zborowski (CSIRO Publishing, 2010)

After having been consulted by George Hangay last year on the content of the section on Cleridae, I was looking forward to this guide to Australian Coleoptera. Upon receiving the review copy I took the obligatory cursory glance and, with the exception of being acknowledged as Justine Bartlett, was pleased with what I saw. The book, an attractively formatted 238 pages, is heavily illustrated with Paul Zborowski's photographs of beetles, most of which are of high quality (with so many great images the few poorer quality photos can be excused), and includes a sizeable introductory section of 44 pages (covering subjects such as Anatomy, Reproduction and Development, Food and Survival and Higher Taxonomy), a Family Treatment section (covering 91 of the roughly 117 families present in Australia), and a useful glossary slotted in between the Endnote (reference) section and Index.

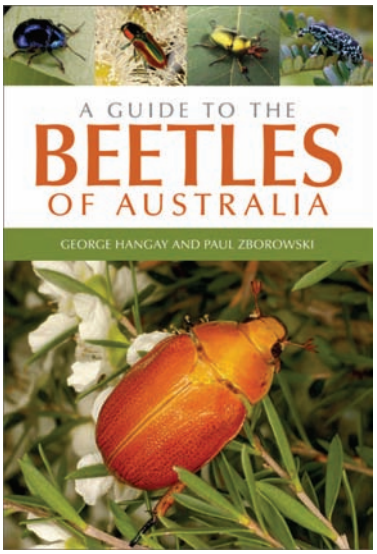
Books on insects are generally written in a technical style (for practicing entomologists and students), in a popular, less-technical, style (for general interest readers), or the language and illustrations are simplified (for younger readers). The degree of technicality of the language used in books such as this will dictate how accessible the book is

to readers of varying familiarity with the subject. With a general Guide [to beetle families] such as this (as opposed to a field guide which this book is not) this gets tricky. Here, the authors have justifiably chosen to predominantly use less technical language in order to enable the general reader easier access to the subject matter, however, professional entomologists (though likely the minority readership) could find this slightly frustrating.

One danger with taking a less technical approach is that occasionally the quality of information suffers. Though specific examples are very often given throughout the introductory chapters, there are a few occasions where information is less informative due to the absence of detail. One example of this is found in the paragraph explaining extraoral digestion (page 33) - 'Some beetles don't chew their food…..[etc]' – at the end of the paragraph I was left asking which beetles, and why? But, perhaps this might serve to provoke the reader to find out more themselves.

Collating broad-ranging information on an animal group as diverse as beetles is a huge task and the occasional error is to be expected to slip through. A couple that I noticed include the incorrect use of the term 'sternite' on page 51 (family Haliplidae, last dot-point) (should be ventrite) and, on page 146 (family Melyridae), the two photos at the bottom of the page show what appears to be the same species of *Carphurus* though the left-hand photo is labelled *Balanophorus*. But for me the most notable errors are associated with the inaccurately illustrated and mislabelled illustrations of beetle anatomy on page 14. The following errors deserve mention — In the top-left frontal view head illustration (incorrectly labelled dorsal view), the area labelled 'frons' is part of the vertex (the frons should be positioned much lower between the eyes); the next points relate to the bottom-right beetle body illustration (ventral view) — The area labelled 'prothorax' appears to be an imaginary somite positioned between the head and prosternum; the area labelled 'mesothorax' is actually the prosternum, which should not extend laterally around the coxal cavities; the area labelled 'episternum' should be more correctly labelled 'proepisternum' and should border the coxal cavities laterally; the area labelled 'metathorax' is actually just the 'metasternum'; the coxae are poorly illustrated without differentiation between the trochanters and coxae (the meso- and metacoxae are particularly unnatural looking); the abdomen of the illustrated beetle appears to have 8 ventrites instead of 6. Here, I can only suggest that those interested in beetle morphology obtain a technical manual written by a recognized Coleopterist as a reliable reference to beetle body parts.

Despite the few shortcomings mentioned, George Hangay and Paul Zborowski's book is a well-presented introduction to the beetle fauna of Australia, full of interesting facts for the general interest reader, and with enough substance to act as a launching pad for those wishing to delve further into this fascinating area of biological science.



A Guide to the Beetles of Australia can be purchased from CSIRO Publishing for AU$44.95.

Justin Bartlett

THE AUSTRALIAN
Entomologist
Volume 37, Part 1, 26 March 2010

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THE AUSTRALIAN
Entomologist
Volume 37, Part 2, 23 June 2010

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DIARY DATES 2010

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

MAR—Monday 8th	Dr Chris Lambkin (QM)	Presidential Address & AGM
APR—Monday 12th	Dr Nancy Schellhorn (CSIRO)	Landscape Scale Pest Management in Vegetable Crops
MAY—Monday 10th	Dr Martin Shivas (BCC)	Brisbane's mangrove-breeding pest midge *Culicoides ornatus*
JUN—Tuesday 15th	Student Award + Notes and Exhibits Session	
AUG—Monday 9th	Dr Alejandro Costamanga (CSIRO Post Doc)	Impacts of established natural enemy assemblages on soybean aphid in Nth America
SEP—Monday 13th	Don Sands	The role of insects in the breakdown of leaf litter: implications for fire management and weed control
OCT—Monday 11th	Ross Kendal (Butterfly Encounters Pty Ltd)	The Evolution of a Butterfly Farmer
NOV—Monday 8th	Bill Crowe (AQIS)	Australia's Most Unwanted
DEC—Monday 13th	Notes and Exhibits + BBQ	

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GENERAL:	Person who has full membership privileges	**$30pa**
JOINT:	Residents in the same household who share a copy of the *News Bulletin*, but each otherwise have full membership privileges.	**$36pa**
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Subscriptions should be sent to the Business Manager,
The Australian Entomologist PO Box 537, Indooroopilly QLD 4068.

THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NEXT MEETING

12:00pm ~ MONDAY 9th August
Large Conference Room
CSIRO Long Pocket laboratories
120 Meiers Road Indooroopilly

Main Business:

'Impacts of established natural enemy assemblages on an invasive pest, the soybean aphid, in North America'

a presentation by

Dr Alejandro Costamanga

CSIRO Post Doc., Indooroopilly

VISITORS WELCOME
(please sign in at reception before meeting)

NEXT NEWS BULLETIN

Volume 38, Issue 5 (August 2010)
due early September

CONTRIBUTIONS WELCOME

DEADLINE - Thursday 26th August
Send your news/stories/notices to the editor
(justin.bartlett@deedi.qld.gov.au)