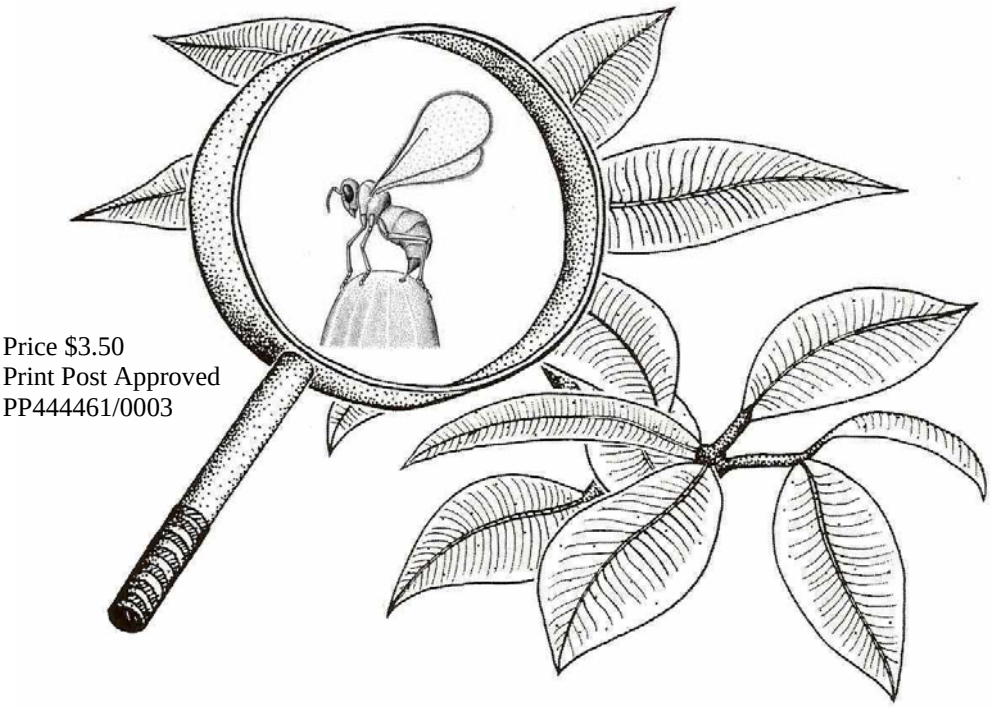
ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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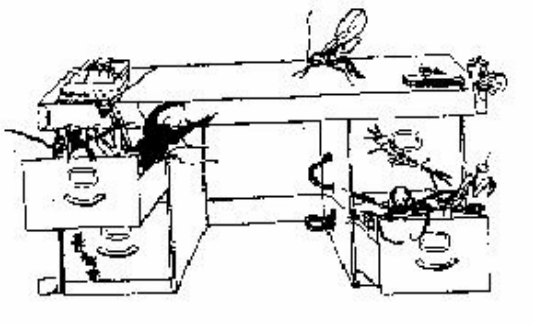
The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. Membership is open to anyone interested in Entomology. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held in the Goddard Building, University of Queensland at 7.00 pm on the second Monday of each month (March to June, August to December). 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: *Trichogramma, sp.*, an egg parasitoid. Drawn by Catherine Bryant.



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The Entomological Society of Queensland

General Meeting 2007

Minutes of the General Meeting of the Entomological Society of Queensland Inc. held in Room 388, Goddard Building, The University of Queensland, on 10 April 2007, at 7 pm.

Attendance:

Sassan Asgari, M. Baker, Richard Bull, Chris Burwell, Lyn Cook, Mike Furlong, Klaus Gottschaldt, Judy Grimshaw, Gunter Maywald, Geoff Monteith, Owen Seeman, R.E. Teakle

Visitors:

Caroline Hauxwell.

Apologies:

Peter Allsopp, Bronwen Cribb, Matthew Purcell, Claudina Rodriguez, Margaret Schneider, Richard Zietek.

Minutes: The minutes of the December ordinary General Meeting were circulated in the News Bulletin Vol. 34 Issue 9. It was moved by Gunter Maywald, seconded by Geoff Monteith, that the minutes be accepted without amendment.

Nominations:

The following nomination for membership were received and approved by Council, and are now put before the meeting for election:

Dr. Stephen J. Richards

Dr. Corrie Moreau

Dr. Alice Wells

Ms. Karen L. Edward

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

General Business:

Geoff Monteith advised the membership that the first BugCatch of the year will be held on Saturday, 28th April, at the forestry barracks at Mt Glorious. There will be collecting during the day, a light trap in the evening with barbecue facilities available for dinner, where participants will be able to cook a steak or similar.

Main Business

Bug wars II: Biopesticides in Broadacre Crops.

Dr. Caroline Hauxwell, Department of Primary Industries & Fisheries, Queensland, Australia.

Email: caroline.hauxwell@dpi.qld.gov.au

It was very pleasant to be asked back to the Entomology Society, and then I realised I had to prepare a new talk! Fortunately, there have been several changes in the last few years.

Most of you will be very familiar with the pesticide treadmill concept. In brief, spraying chemical insecticides leads to selection for resistance, requiring increased application rates and eventual failure to control the insects. The broad spectrum of most chemical insecticides destroys natural enemies (such as beetles, parasitic wasps and spiders) and this leads to more frequent pest outbreaks (and thus to more chemical usage), and to the emergence of secondary pests. This has been shown to occur in Queensland pulse crops, where early season sprays against mirids results in destruction of natural enemies and an outbreak of *Helicoverpa armigera* approximately 30 days later in treated plots.

In Australia we saw a progression of reports of resistance to each group of insecticides as they were introduced, so that by 1996 the broadacre industries faced a major crisis. Chemical control was failing, and the cost of sprays was becoming uneconomic. The cotton and grain industry response was to develop and implement an integrated pest

management and resistance management strategy, and one component of this was the use of biopesticides based on insect pathogens.

There are lots of different pathogens of insects – thousands of them. Some of them are opportunists, making the most of the rich source of nutrients in an insect as an alternative to their otherwise saprophytic lifestyles. Some have obscure and complicated life histories, using sex and stealth to spread amongst their victims. Of the many thousands, only three classes of pathogen have been widely developed as bioinsecticides – a bacterium, one family of viruses, and a few fungi.

The best known is a bacterium. 'Bt' products such as Dipel are based on a toxic protein extracted from a bacterium (*Bacillus thuringiensis*). The toxin is found in bacterial spores, and once eaten the toxin causes death through damage to the gut of insects. It needs an alkaline gut in which to become active, and this is one reason why Bt is specific to a few groups of chewing insects (including Lepidopteran larvae, Coleoptera and Diptera). The damage to the gut can cause the insect to stop feeding in only 20 minutes, though death (from septicaemia or starvation) may take several days.

Bt is a biorational; a chemical insecticide derived from an organism. The bacterium doesn't have to be present, which is why Bt toxin is so useful in genetically modified crops. As a consequence of its saprophytic life history, Bt can be produced easily in fermentation tanks and has been widely produced as an insecticide.

The Nucleopolyhedroviruses (or NPVs) are true pathogens of insects, and are typically specific to larvae of Lepidoptera and sawflies. Again, the insect must eat the virus, but once ingested the infection spreads rapidly through the insect. The hosts take only a few days to die, and on death release millions of occlusion bodies – a protein matrix in which thousands of virus particles are embedded. This protein body makes the virus resilient enough to spread and persist in the environment. Birds and beetles that eat infected cadavers will spread

the virus in their faeces for many days, without themselves becoming infected. Virus may persist for several years in the soil. When rain or a passing bird splashes occlusion bodies onto a leaf, they may be ingested by an insect and begin infection. In this way, disease outbreaks may naturally cause high levels of mortality in pest populations, though usually too late in the season to be of much help to farmers. Spraying NPVs gets the epizootic going sooner.

NPVs are obligate pathogens –they require a living host in which to replicate - so must be produced in live insects or in insect cells. Anyone familiar with maintaining laboratory colonies of insects will appreciate the technical difficulties in rearing thousands of larvae for virus production. Furthermore, NPVs are typically host specific, and must be produced in their host species, or, in some cases, a close relative. NPVs of *Helicoverpa*, for example, are produced in either *H. armigera* or *H. zea*.

Twenty years of work on *H. armigera* NPV at DPI by Bob Teakle and Dave Murray of DPI&F showed that NPV was very effective at controlling *H. armigera* in sorghum. Fortunately, the NPV from *H. zea* was manufactured in the USA, and Dave and Bob showed it to be just as effective as the native isolate. GemStar, based on *H. zea* NPV, was registered in sorghum, cotton, sweetcorn and pulses, and in 2003 around half a million hectares of crops were sprayed in Queensland and northern New South Wales. The market demand was generated by the commercial scale availability of an effective, soft, consistent quality product. An Australian company then set up production of two products, Vivus and Vivus Gold, the latter based on the original NPV isolate tested by DPI&F.

The wide-scale adoption of biopesticides was linked to the implementation of integrated pest management (IPM). Pupae busting, genetically modified cotton (incorporating the Bt toxin) and trap crops keep pest numbers down and reduce the need for chemical control.

Biopesticides are used to control pests but maintain natural enemy numbers for as long into the season as possible. Resistance is managed through a limit on sequential sprays of any class of chemicals.

NPVs may take several days to kill the pest, and typically kill only 60% of the target, but they offer significant benefits as part of IPM, and they can be applied with conventional insecticide spray equipment. They are safe for humans and livestock, are soft on beneficial insects, and can spread through the population as a biological control agent, to the extent that *H. armigera* in sorghum are now frequently infected with NPV from the high levels in the environment due to repeated spraying.

So that was all good, but at the same time as IPM, GM cotton and NPV biopesticides were widely adopted, we noticed a significant change in the pest populations. *H. armigera* outbreaks were significantly reduced, but a number of sucking pests began to be a serious problem. Silverleaf whitefly, *Bemisia tabaci*, type 'B' is resistant to most classes of chemical insecticide and became a serious problem. Mirids (*Creontiades),* green vegetable bug (*Nezara viridula*) and a number of other sucking pests became a more frequent problem.

These sucking pests are not controlled by Bt in genetically modified crops, nor are they susceptible to NPVs, which have to be ingested by chewing insects off the plant surface. They threaten the success of IPM and genetic modification by requiring chemical control. The threat is that early season sprays against, for example, mirids, will destroy natural enemies and lead to outbreaks of a serious pest such as multiply-resistant silverleaf whitefly, which is otherwise heavily parasitised by wasps.

One biopesticide management tool may be the third significant group of biopesticides based on fungi, and in particular *Metarhizium anisopliae* and *Beauveria bassiana*. The spores of the fungi are used as a 'contact' insecticide, infecting the host on germination by penetrating

through the cuticle. After several days, the insect is cocooned in hyphae and many thousands of spores are released, with the potential to spread infection through the population. These fungi are not obligate pathogens and can be produced by fermentation on media based on basic grains such as rice, and sprayed with conventional equipment in oil or emulsified formulations.

We are focusing on *Metarhizium* because it is already registered in Australia. We have tested several isolates and found good results in the field against a number of sucking pests, typically achieving around 65 to 70% kill, with pest numbers declining significantly by 3days after treatment and reducing further by 6 or 7 days. Monitoring of beneficial insects has shown the fungi to be very 'soft'.

Thanks to the success of NPVs, industry interest in biopesticides for sucking pests is strong. Over the next 2 to 3 years we hope to see commercial production and registration of a *Metarhizium* product and integration of sucking pest management with biopesticides into the established IPM on the Darling Downs.

Vote of Thanks: Sassan Asgari gave the vote of thanks for the presentation.

Exhibit: The following was an exhibit at the March 12 meeting but was omitted from the previous bulletin.

Geoff Monteith and Susan Wright exhibited photographs and specimens of two curious moth larvae collected recently at Rochford Scrub, 50 km SE of Charters Towers. The area was visited in January just two weeks after 14 inches of rain. The vinescrub was flushed with new growth and caterpillars of many sorts were in such numbers that the rain of frass was like the constant drizzle of light rain. One small, yet unidentified, shrub was being defoliated by great numbers of an elongate caterpillar which rested in an S-shape with the midbody humped and the tail raised off the substrate (Fig 1).

The tail bore two long tentacle-like processes. When disturbed the caterpillars waved their tail vigorously from side to side with the tail processes outstretched and writhing (Fig 2).

This gave the strong impression of a centipede with its head raised and threatening. During this display the tail processes became longer by the eversion of another third of their length from the apex. While this

occurred the head was depressed and still. The centipede-like impression was enhanced by the presence of dorso-lateral processes on some segments of the caterpillar's body which gave the appearance of legs. Several caterpillars were kept for rearing and one bored into the polystyrene wall of the holding box and pupated in a neat chamber inside. The greyish patterned moth (Fig 3) that emerged was submitted to Ted Edwards at ANIC who advises that it is the notodontid *Porsica acarodes* (Turner), a species known from Arnhem Land in NT and North Queensland from Coen down to Townsville. Its larvae are not previously recorded. Ted says it belongs to a group of genera which have paired tail processes, of which the European "puss moths" (*Cerura spp*) are well known. An illustration of the larva of the Australian *Cerura multipunctata* Bethune-Baker is given in Common's *Moths of Australia.*

Fig 3

Two specimens of a second kind of caterpillar, also with paired, extensible tail processes, but smooth and green in appearance, were also collected at Rochford Scrub on the same occasion (Fig 4). It was not possible to rear the adult from these but they are clearly another species of this same group of notodontids.

Fig 4

Notice of Next Meeting
Monday 14th May 7 pm 2007

Room 388, Goddard Building
University of Queensland,
St Lucia

Introduction and establishment of exotic disease vectors

Andrew van den Hurk

People & Projects

Entomological Notes

Bee-hawks and Bird-hawks (Sphingidae: Macroglossinae) at Corinda, Brisbane.

Some notes and records are here presented for the Bee hawk moths *Cephonodes* spp. and Humming-bird hawk moths *Macroglossum* spp. in suburban Corinda, Brisbane, southeast Queensland. These moths are often noted flying during hot humid days or at dusk, and have a distinctive rapid flight, darting from flower to flower, and hovering above flowers to feed.

Cephonodes hylas australis Kitching & Cadiou

In my garden, this species is a regular visitor and I have specimens dated Jan. and Nov., and sightings during Oct., Dec. & Mar. (however it is important to note the discussion section below regarding "sightings"). Larvae have been noted feeding on Gardenia (*Gardenia augusta*, Rubiaceae) during Nov. in my garden. The subspecies *M. h. cunninghami* (Walker) does not occur in Australia (Kitching & Cadiou 2000, E.D.Edwards pers. com.).

Cephonodes janus janus (Miskin)

This moth was confidently identified (but not collected) whilst flying around Golden dewdrop flowers (*Duranta repens*, Verbenaceae) from 1500 to 1600 hours, 15 Feb. 1998 in my garden at Corinda. This is a rarer species which is not supposed to occur in southern Queensland, but I have netted this species from Brisbane (when I was a schoolboy) at Bowen Hills, Dec. 1956 (see attached photograph), which confirmed its presence in Brisbane. This species is otherwise noted from north Queensland by D'Abrera (1986).

Cephonodes kingii (W.S.Macleay)

Commonly flies around *Duranta* flowers and eucalypt flowers, and I have specimens dated from Oct. to Mar. The larvae of this species feed

on Gardenia (*Gardenia augusta*, Rubiaceae) and I have recorded larvae from Nov. to Apr. In 1976 I bred this species from *Canthium coprosmoides* (Rubiaceae) when these trees were present in the upper part of Sir John Chandler Park, Long Pocket, Brisbane (De Baar, 1979), but this area has since been cleared for housing. *Cephonodes hylas, Macroglossum micacea* and *Macroglossum hirundo* also feed on *Canthium* species.

Macroglossum hirundo errans Walker

This is a regular visitor and I have specimens dated Feb., Mar. and May. Also I disturbed a specimen at 1100 hours 9 July 2001, which flew vigorously around before settling 30 cm from my face. Moulds (1985) records the presence of adults from September to May in the southeast region of Queensland. Is it possible that specimens can survive frosts and overwinter? In Brisbane, this is a distinctive species, as it has orange on the upper hindwings.

Macroglossum micaceum micaceum (Walker)

In Australia, Moulds (1985) lists this species from Torres Strait, Queensland to Ebor, New South Wales. This hawk moth is regularly sighted at Corinda, and I have specimens dated from Jan. to Mar., and sightings during Dec.

Discussion

I wish to flag the possible presence of *Cephonodes picus* (Cramer) in Brisbane, even though it has thus far been recorded as south as Rockhampton (Moulds 1998). This species is extremely similar to *C. hylas australis*, and certainly indistinguishable in flight. *C. picus* has a wide distribution across the Oriental to Australian region, but in Australia it was considered to be confined to the extreme north of Australia (I.F.B. Common, pers. comm. 1970's). *C. picus* differs from *C. hylas*, in having the presence of a strong projecting spine on the fore tibia (I.F.B. Common, pers. comm.). The fore tibia spine of *C. hylas* is poorly developed.

Macroglossum tenebrosum Lucas is recorded southwards to Yeppoon, central Queensland, and a specimen labelled "Brisbane", was considered incorrect by Max Moulds (Moulds 1985). It is similar to *M. micaceum*, and perhaps a specimen could make it to Brisbane during

wet periods, although probably unlikely. Nevertheless it is worth monitoring *M. micaceum* specimens in case one is in fact *M. tenebrosum.* *M. tenebrosum* has bluish streaks on the upper hindwing near its base, whilst *M. micaceum* has yellowish orange.

Murdoch De Baar

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IBISCA-QUEENSLAND

Rainforest biodiversity along an altitudinal gradient.

The IBISCA-Queensland Project (also some times called the BATH Project) is a major international collaborative effort which is surveying the animal, plant and fungal diversity along an altitudinal gradient from 300 to 1100 m above sea-level in south-east Queensland's Lamington National Park. This transect is of undisturbed continuous subtropical rainforest incorporating a gradual transition from the highly diverse mixed broad-leaved forests at the lower elevations to the almost monocultural Southern beech forests at the highest levels. The purpose of this study is to identify, through intensive study of the widest possible range of organisms, which groups or species are responding with greatest sensitivity to the climatic changes currently associated with the different altitudes. In turn this will provide us with a powerful 'predictor set' of ecologically contrasting taxa which can be used for effective monitoring of the impact of climate change on biodiversity. Parallel studies on ecological processes such as pollination, herbivory and decomposition give understanding of what the consequences of these responses might be on the 'ecosystem services' the forest derives from this biodiversity.

The Project gained substantial financial support under the Queensland Government's 'Smart State' granting programme with matching funds from Griffith University and ProNatura International. Other cash grants and donations have come from the Queensland Museum, Queensland Herbarium, the National Parks Association of Queensland, O'Reilly's Rainforest Retreat and the Heritage Assessment Branch of the federal Department of Environment. Many participating scientists also obtained support from their national granting bodies.

Field work began in late 2006 when twenty permanent study sites, four at each of five altitudes, where established and complete botanical surveys made at each location. In October 2006 a team of 31 scientists from 13 countries assembled at Lamington and carried out subprojects at each of the twenty locations. They were aided by about 50 research assistants,

students and community volunteers. Their work included running general sampling using a range of basic trapping techniques such as interception, light, malaise, pitfall and yellow pan traps, bark spraying and canopy knockdown. In January 2007 a smaller set of foundational samples were taken by a team of about 8 Queensland-based scientists with volunteer and student assistance. Finally, to date, an international team of 21 scientists, this time from 8 countries, returned in March 2007 and repeated the entire October programme. They were assisted by about 100 community volunteers over the four week period.

During the October and March segments a group of about 10 high school students participated in the project for a few days - their reward for winning a biodiversity-based essay competition. In the March period the Project was visited by Her Excellency the Governor of Queensland who presented certificates to the winning high school students. This participation complemented the subproject which will generate curriculum material from the IBISCA Project for use by both junior and high schools.

The March field expedition was concluded by a two-day workshop during which future priorities for handling the very large samples obtained were set. In addition a day was devoted to designing and getting input upon proposed management and education related outputs from the project.

In parallel to all this the Queensland Mycological Society have been carrying out surveys of macrofungi along the transect using the same sampling sites. To date they have been hampered by overly dry conditions.

The field work for the project will conclude with a final period of work in January 2008 during which time we will focus largely on canopy biodiversity using the canopy glider - a new lighter-than-air device - to permit novel and exciting access to the canopy for specially designed studies on herbivory, pollination and planta architecture. During this period a professional documentary will be made by the Sydney production Company, Eegenda. This documentary is aimed at a national and international television audience and filming began in the March phase of the project.

Entomological Society of Queensland

A set of priority target taxa were identified in the April workshop and new basic sorting protocols have been designed to 'fast-track' extraction of these groups. We aim to have substantial multi-taxa, multi-scientist results available for preliminary publication in a special issue of the Memoirs of the Queensland Museum by mid-2008. The IBISCA-Queensland project is co-organising a special symposium together with the IBISCA Projects from Panama and Vanuatu to be held as part of the International Congress of Entomology in Durban in mid-2008.

Roger Kitching (GU), Chris Burwell (QM) or Dave Putland (GU) would be delighted to hear from anyone who wishes to participate in the project at any level from volunteering to support samples to taking on an additional taxon for further work from our samples.

Professor Roger Kitching

Griffith University

Volunteers and scientists who participated in the IBISCA project in March 2007.

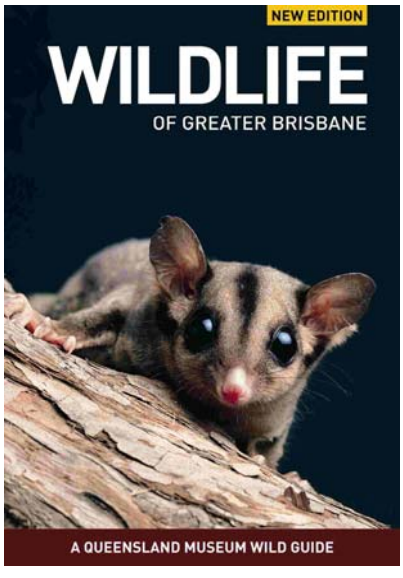
News from Queensland Museum

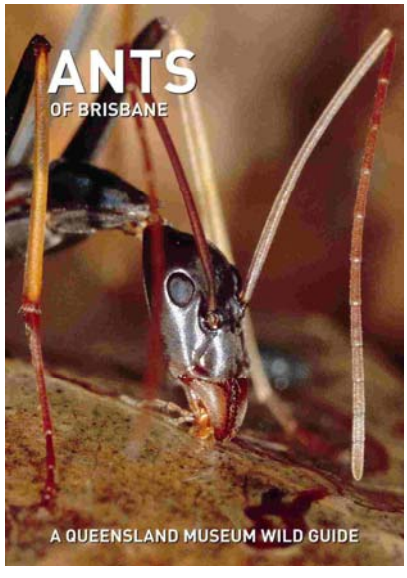
South-east Queenslanders can now better identify its abundant wildlife thanks to a new edition of Queensland Museum's *Wildlife of Greater Brisbane.*

The latest edition includes more than 1000 species, with descriptions, photographs and illustrations for easy identification of local wildlife, from backyard ants to whales. The new edition includes short feature articles on some of the more interesting local wildlife: readers can learn how cicadas sing, find the answer to the mystery of disappearing frogs and discover the friends and foes of termites.

The Queensland Museum has also produced a series of specialist pocket guides on snakes, raptors, ants and freshwater fish. The full colour guides provide information about conservation issues, biology, detailed identification notes, plus photos.

The new publications will be show-cased at the May general meeting and Society members will be able to order copies at considerably discounted prices.





Entomological Society of Queensland

The Mt Glorious BugCatch – 28th April 2007

Fourteen members, 2 visitors, and 3 University of Queensland students collected during the day and night at the old forestry barracks clearing at Mt Glorious. This was the Society's eleventh BugCatch trip and was organized by Geoff Monteith and Chris Lambkin in conjunction with Jenny Greenland from the Environmental Protection Authority. Richard Bull, Anna Marcora, Lyn Cook and her partner Greg, Ted Fenner, Graham Forbes, Klaus and Sophie Gottschaldt, Tony Hiller, Steve Johnson, Chris Lambkin, Geoff Monteith, Michael and Tellene Ramsden, Noel Starick, Geoff Thompson and Richard Zietek were joined by visitors Barbara Sharanowski (Univ. of Kentucky) and Benjamin Normark (UQ) plus UQ students Yuka Nakamura, Luke Ambrose and Rivoldiantoe Basran and his family.

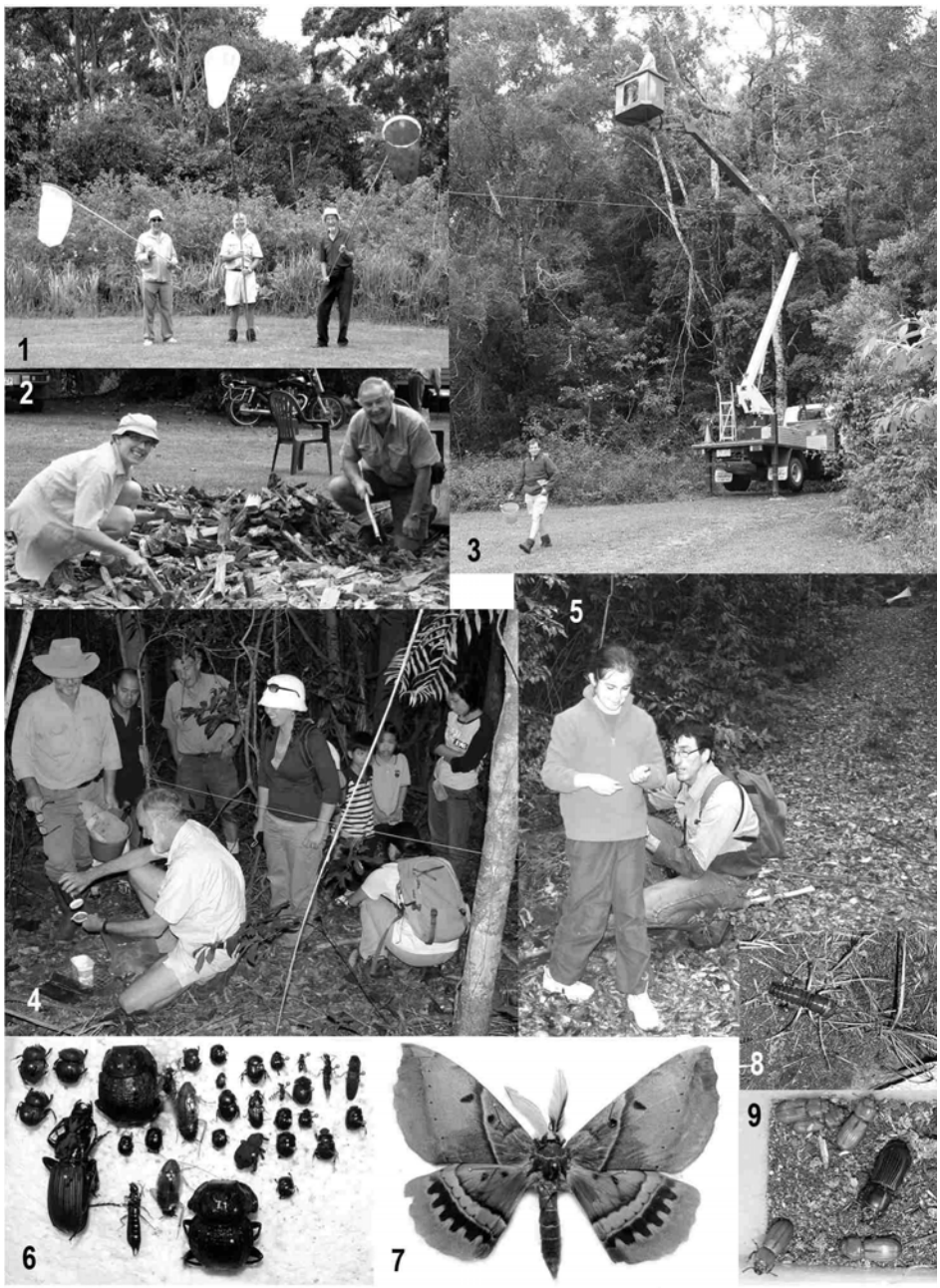
The venue is a non-public area of excellent rainforest and wet sclerophyll on the western slopes of D'Aguilar National Park, just a little beyond the public picnic area for Maiala National Park. Geoff, Chris, and Noel visited the area on the 18th of April to set up 3 Malaise traps, a flight intercept trap, 4 mushroom and dung baited traps, and a bat guano dung trap.

Despite the overcast weather, with intermittent showers, rain, fog, cold, and high winds, the BugCatchers used diverse methods such as sweep netting, beating, baited pitfall traps, fruit baited transects, berlese funnels, light trapping, digging, log rolling, cherry-pickers and direct search, to collect for 12 hours in a spectacular environment. One highlight for the day was Steve's truck-mounted cherry picker that was used by Ben to collect coccids from the canopy, and to give several interested members a novel, canopy-high aspect of the area.

While the usual suspects (carabids, passalids, hepialids, butterflies including hesperiids, Macleay swallowtails, *Delias nysa*) emerged to thrill the students and the children, some unusual groups were collected including coccids, the giant king cricket (*Anostostoma australasiae)* and two specimens of Australia's largest dung beetle (*Aulacopris maximus).* A list for the day will be sent to EPA.

Chris Lambkin and Geoff Monteith

1. Ted, Noel, and Graham collected butterflies from the prolific flowering lantana. **2**. Richard B. explains to Barbara that there will be very few braconids in the wood pile. **3**. Steve took Ben up to the canopy to collect scale insects, while Geoff T. returns from setting the fruit baits. **4**. Richard Z., Rivol, Richard B., Anna, Yuka, and Rivol's family watch Geoff M. empty the baited pitfall traps. **5**. Michael and Tellene collect passalids near the path to one of the Malaise traps. **6**. Specimens including the giant dung beetle from the baited pitfall traps.



7. Anthelid moth, *Chelepteryx chalepteryx* from Malaise trap. **8**. Male giant King Cricket attracted to pineapple baits. **9**. Passalid beetles from rotting logs. Photographs by N.Starick except 1 & 8 by C. Lambkin.

News from DPI&Fisheries Indooroopilly

Pat Collins hosted a 3-day workshop on the detection and measurement of resistance in stored grain insects from 27-28 March 2007. There were 14 participants including 10 from Australia (Qld, NSW, Vic and WA) and three from Thailand. The Australian participants are all active in projects funded by the Grains Research and Development Corporation on resistance or other postharvest issues. The scientists from the Thai Department of Agriculture - Porntip Visarathanonth, Rungsima Kengkanpanich and Duangsamorn Suthisut - stayed another week to learn more about phosphine fumigation and phosphine resistance in general.

News Bulletin Editor

Anna Marcora has joined the editing team and is our News Bulletin Editor (brave Anna)!. Please make her welcome by sending your news, goss, field reports, questions, ramblings and suggestions for future issues of the bulletin.

DIARY DATES 2007

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

May 14th	Andrew van den Hurk	Introduction and establishment of exotic disease vectors
June 12th	Student award, Notes & Exhibits	
August 13th	Nancy Schellhorn	
September 10th	David Merritt	
October 8th	Steve Barker	Why are there so many head lice, *Pediculus capitis*?".
November 12th	Andrew Austin (Perkins Memorial lecture)	
December 10th	Notes & Exhibits	

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.**

SOCIETY SUBSCRIPTION RATES

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**
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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Entomological Society of Queensland

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NOTICE OF NEXT MEETING

The next meeting of the Society will be held at 7:00 pm on Monday, 14th May at Room 388, GODDARD Building, University of Qld. The main business will be a presentation by **Andrew van den Hurk**: "**Introduction and establishment of exotic disease vectors**". Refreshments will be served before the meeting at 6:30 pm 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

HONORARY LIFE MEMBERS OF THE SOCIETY

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