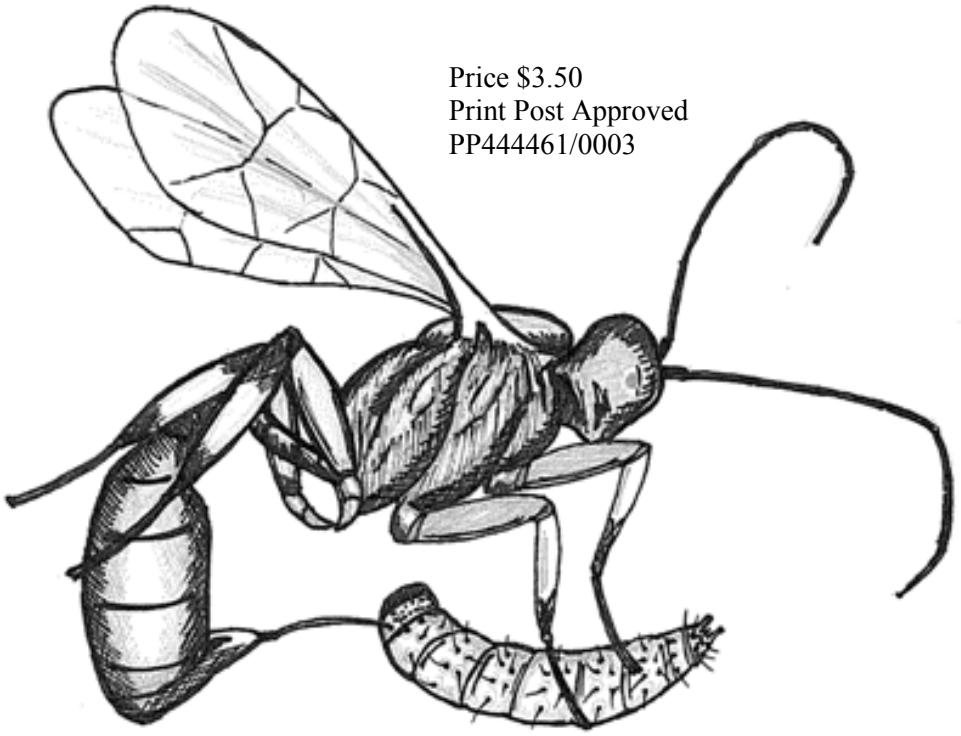
ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN



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The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC.**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. Membership is open to anyone interested in Entomology. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held on the second Monday of each month (March to June, August to December), or on Tuesday if Monday is a public holiday. Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society.

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

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

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

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

TABLE OF CONTENTS

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The Entomological Society of Queensland

Minutes of General Meeting
14 April, 2008

Held in the Large Conference Room, CSIRO Entomology, Long Pocket Labs, 120 Meiers Road, Indooroopilly, on April 14th, 2008, 12.00 midday.

Attendance: Peter Allsopp, Paul De Barro, Christine Neale, Tim Heard, Simon Lawson, Ross Kendall, Anna Marcora, Geoff Thompson, Lyn Cook, Don Sands, Felix Bianchi, Chris Lambkin, Noel Starick, Bradley Brown, Lynita Howie, Gunter Maywald, Judy King, Judy Grimshaw, Helen Nahrung, Graham Forbes, Gary Fitt, Richard Bull.

Visitors: Zara Ludgate, Greg Harper, Andrew Hulthen, Brendan Murphy.

Apologies: Myron Zaluki, John Moss, Matt Purcell, Geoff Monteith, Stacey McLean

Minutes: The minutes of the last General Meeting of November 2007, were circulated in the News Bulletin Vol. 35, Issue 8, 2007.

Moved the Minutes be accepted: Don Sands, seconded Chris Lambkin.

Membership Nominations and Elections:

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

Mr Scott Bourne; nominated Mark Hopkinson, seconded Richard Bull
Mr Brett Holmes; nominated Mark Hopkinson, seconded Matt Purcell
Miss Donella Billett; nominated Susan Wright, seconded Richard Bull
Mrs Phillipa Jordan; nominated D.K Yeates, seconded T.A. Weir

In accordance with Society rules, the Chairman put the nominations to the members and called a show of hands for their election. All were in favour.

General Business:

1. The XX111 International Congress of Entomology is to be held at Durban, South Africa, July 6-12 ,2008 was announced and those seeking further details should go to the website www.ice2008.org.za printed in the December 2007 News Bulletin.

2. The Chairman advised the out-going President had tendered his resignation from Council and as a member of the Society.

3. It had been brought to the attention of Council that ESQ and the Herbarium Society meetings clashed on 2nd Monday (noon) of the month. It had been decided to review the timing of ESQ meetings in November and make a decision to continue. Meeting numbers had increased significantly since adopting the midday meetings at CSIRO.

4. Student Award Announcement
The Student Award was established by the Society to encourage entomological research. It is open to any student that completed an Honours Degree, Postgraduate Diploma or 4-year Degree at a Queensland tertiary institution in the previous calendar year. Students do not have to be Members of the Society. Students may submit their thesis or report on an entomologically related topic. Entries shall be judged by a panel of three Members appointed by the President. The winner will be announced at the May General Meeting and will be invited to present a summary of their research at the June 'Notes and Exhibits' General Meeting of the Society.
The Chairman urged members to contact any possible applicants immediately as entries close end of April.

Main Business

Dr Paul De Barro
CSIRO Entomology
Long Pocket Laboratories, Indooroopilly QLD

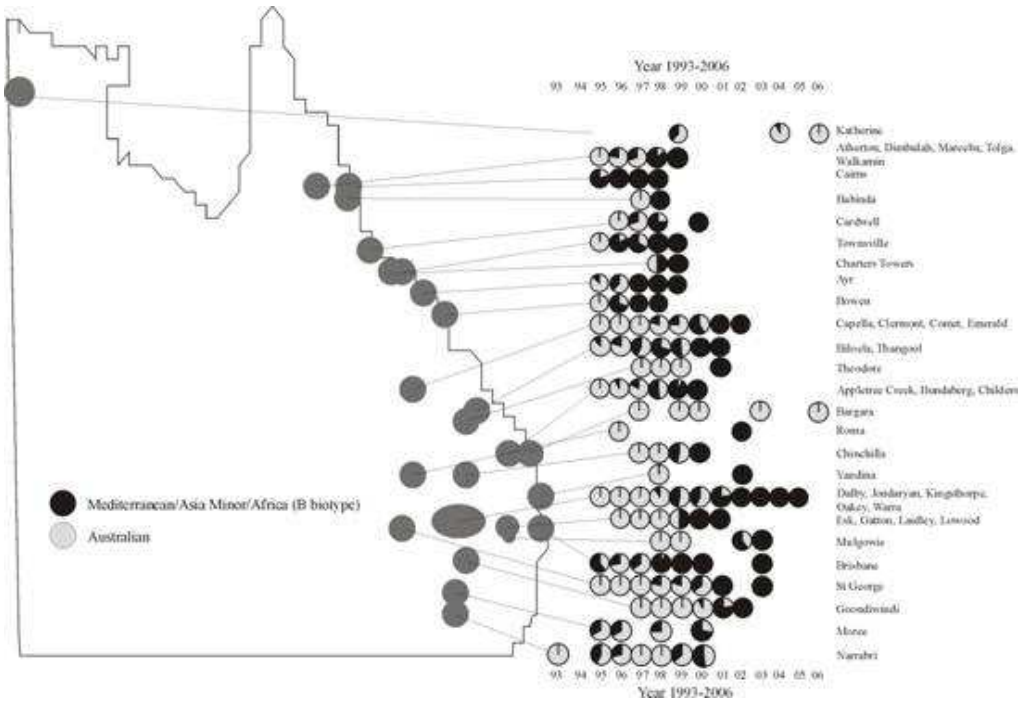
Bemisia tabaci, a global invader

Invasion and Spread

B. tabaci has a well deserved reputation for being invasive, mostly due to biotype B which has spread over the past 20 or so years, principally via the trade in ornamentals from its origins in the Middle East – Asia Minor region to at least 50 countries in Africa, the Americas, Asia, Australia and Europe. Recently, the Q biotype has also begun to invade from its origin in countries bordering the Mediterranean Basin to at least 10 countries in Africa, the Americas, Asia and Europe again via the pathway of trade in ornamental species. The capacity for the B biotype to invade and negatively impact global agriculture has earned it a place as one of the world's top 100 invasive species.

In most instances the history of invasion by *B. tabaci* has been poorly documented, a typical feature of biological invasions. In the USA, the displacement of the indigenous A biotype by B was essentially over by the time it was detected. Similarly scenarios were played out in most other countries where B has invaded. In Australia and China it has been possible to monitor the process of establishment and displacement in part because these invasions occurred later than those in the USA and so the tools and knowledge were available to support a monitoring program. The B biotype was first detected in Australia in 1994, and quarantine trace-back and records of insecticide control failures suggested that it probably entered the country no earlier than mid-1992, as elsewhere its spread was facilitated by the ornamental trade industry.

Analysis of field collections suggested that it took, on average, 3-4 years in northern Queensland and 4-5 years in southern Queensland and New South Wales for B to displace the indigenous population. In Zhejiang, China, the earliest invasions by B occurred in locations with the most frequent transport of ornamentals and displacement of the indigenous ZHJ1 biotype in these areas was complete by 2005.



The B biotype was detected in Australia in Oct 1994 prior to its invasion Australia had an indigenous *B. tabaci* (AN) widely distributed over Qld. Between 1994 and 2006 AN has been displaced by the invading B.

The Invasion Process

In terms of capacity to invade, the allopatric phylogeographical structure of *B. tabaci* raises two questions. First, how has this phylogeographical pattern persisted for most groups and secondly, why have at least two members of the *B. tabaci* complex, B and Q, both closely related sibling groups, shown such a remarkable capacity to spread well beyond their respective home ranges, but with a few exceptions not successfully invaded areas occupied by their immediate neighbors? Geographic barriers explain some allopatry, but the global structure displayed by *B. tabaci* does not correspond to any obvious global climatic regions; thus, it would appear that abiotic factors are unlikely to explain the observed patterns. The failure of genetic groups to invade and establish in neighboring regions and the related strong allopatric phylogeographical structure suggest that for *B. tabaci* in general, the capacity to invade is uncommon. The pattern of global colonization by B and Q tends to suggest that if a *B. tabaci* is transplanted into a neighbouring geographic region it may fail to establish with any long term success, but if transplanted into a non-neighbouring geographic region then successful establishment is more likely. This set of observations suggests that the underlying mechanism for invasion may be connected to biological interactions and draws upon the ideas of local species adaptation. Here, species which co-evolve in the same space tend to better adapt to each other and so are better able to compete. In contrast, species transplanted into a geographic space unrelated to their evolutionary history may bring with them a set of traits which are unfamiliar to the indigenous population and may confer a selective advantage. Further, invasive animals often thrive at the expense of indigenous, closely related organisms occupying the same niche, and insight into the causes of animal invasions often hinges on detailed assessments of behavioral mechanisms.

Mating interactions. The first detailed observation on mating behavior of *B. tabaci* showed that single males were capable of interrupting courtship and that B males actively interfered with the courting and mating of A biotype females, an expected finding as closely related species often have incompletely isolated mate recognition systems. This lack of discrimination during courting and mating is one factor contributing to competitive displacement through reproductive interference.

While mating interference is a normal mate competition mechanism within B. tabaci, it appears that there is considerable variability in the intensity of the interactions when compared across the different genetic groups. This variability sets up the potential for asymmetry in between genetic group interactions. Asymmetrical mating interference has been identified as yet another mechanism for competitive displacement and a number of studies have observed mating interactions of this nature. In a comprehensive study that combined long-term field monitoring of the invasion process, population experiments under caged conditions, and detailed behavioral observations in both China and Australia, demonstrated that changes of sex ratio in both the invader and indigenous populations (biotypes ZHJ1 and AN, respectively) may be a primary mechanism behind invasion and displacement.

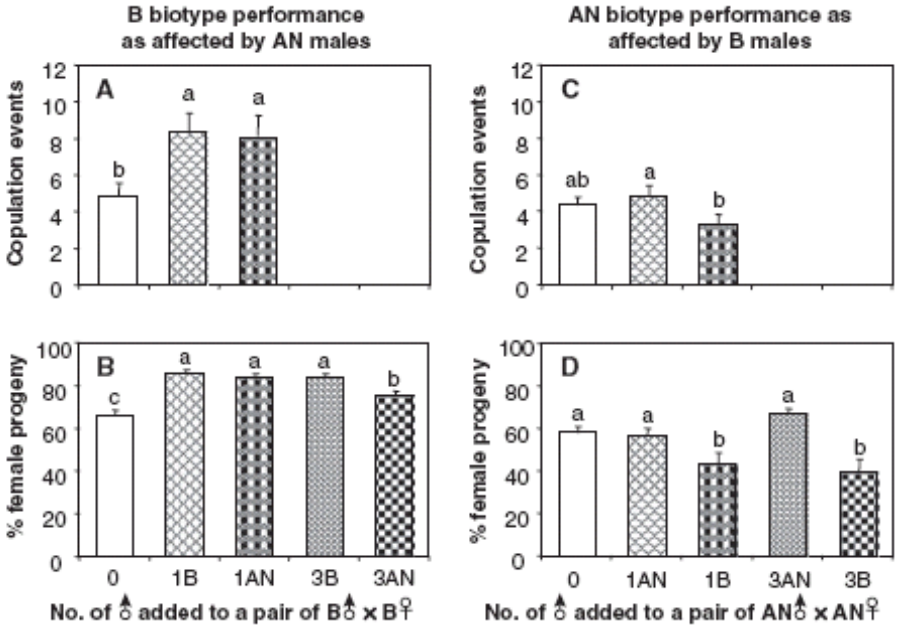
Field studies showed that rapid invasion and displacement by B were associated with significant changes in sex ratio in both the indigenous and alien populations. Populations of B biotype on cotton alone in Zhejiang, had female ratios of 60-70% compared with 50-60% in ZHJ1. During displacement, however, female ratios in B increased to 70-85% while those in ZHJ1 declined to 35-45%. Similar patterns were observed between B and the Australian AN biotype.

Follow-up cage studies showed that when mixed cohorts were initiated with ≈10% of the B and 90% the indigenous biotype and reared continuously for multiple generations on equally suitable host plants that significant changes in sex ratio occurred in both populations and B rapidly displaced the indigenous biotypes.

Through video recording we observed that when individuals of B and an indigenous biotype were placed on the same leaf, they exhibited intensive mating interactions which lead to very different consequences to the biotypes. In essence, when a pair of B was supplemented by an indigenous or B male, the B pair increased their frequency of courtships and copulations but the indigenous male interfered little. In contrast, when an indigenous pair was supplemented by a B or indigenous male, they did not increase their frequency of courtship, but 16-28% of the courtships were interrupted by the B male leading to a significant reduction of copulation events. These changes in copulation events resulted in corresponding changes in sex ratio in the progeny while the numbers of progeny produced remained unchanged. Critical to this interaction is that B responded independently of whether the males are all B or a mix of B and indigenous individuals. Thus, indigenous males as well as invader males help to promote copulation among the invaders and consequently increase the invaders' competitive capacity. In contrast, the indigenous females do not respond to increased numbers of adult males and indigenous copulation is more frequently interrupted by B males.

The consequences of these asymmetric mating interactions leading to skewed sex ratios have obvious impact on the numerical changes of the invader and indigenous populations. Given this mechanism, even a small number of B in a new location may succeed by rapidly producing female progeny and interfering with mating of indigenous individuals leading to rapid population growth in the invader population while driving the indigenous population to local extinction.

Courtship, mating and post-mating



B females increase the frequency of copulation as the number of males increases. This occurs whether all the males are B or a mix of B and AN. AN females do not display this ability. The increased frequency of copulation leads to a greater proportion of B female progeny, but no change in the numbers of eggs produced

Host plant effects. Differential female fecundity is another mechanisms contributing to competitive displacement and is linked to differential resource acquisition allowing one species to have higher growth rates and greater. Host plant range and high variability in reproductive potential as a function of host plant no doubt plays a role in invasion and displacement. The capability of the B biotype to utilize a much wider range of crops and ornamental hosts than the indigenous biotype A of North America may largely explain the rapid displacement that took place there from the mid-1980s onward. The novel infestation on poinsettias and other ornamental crops in Florida by *B. tabaci* was soon followed by squash silverleaf symptoms and other plant growth disorders diagnostic of the B biotype. Within five years, novel infestations on cole crops such as broccoli and cauliflower, cantaloupe, alfalfa and even citrus to a limited extent were noted in the Imperial Valley. The result was the complete displacement of the indigenous A biotype in this region within a short time period. In China, biotype B showed the much greater capacity to use host plants representing five different plant families compared with the indigenous ZHJ1. Biotype B was able to reproduce and complete development on all five species in contrast to biotype ZHJ-1 that could complete development only on cotton and squash but not on tobacco, cabbage or kidney bean. In addition, the host plant can contribute to the rate displacement since with equal numbers of B and indigenous ZHJ1, displacement took six generations on cotton but only two on squash. Similarly, in the case of B and AN a minimum number of invaders relative to indigenous individuals was required for establishment, this minimum propagule number could be relaxed by the availability of *Euphorbia cyathophora* – a host well suited to both B and indigenous AN biotypes and cotton - a host more suited to the invader.

All this suggests that differential host acceptability may influence the capacity for the invader to either interfere or escape interference within a landscape consisting of patches of suitable and unsuitable hosts. This creates a mosaic of host patches which, if more acceptable to the invader, will allow it to escapes interference and permit more ready establishment; although the converse may also be the case.

Bemisia tabaci adult, 4th instars and adults on the underside of a watermelon leaf

Future Invasion Threats

The mechanisms identified provide a construct within which to consider the process of invasions which lead to competitive displacement, and in turn a framework within which to speculate on future potential invasion within the *B. tabaci* complex. The accumulated evidence suggests that individuals from the genetic groups to which B and Q belong both possess similar capacities to invade, although in the case of Q whether it displaces its competitors has yet to be shown. Given their close genetic origins one can pose the question as to whether this capacity to invade is a trait shared by other close relatives i.e. the Indian Ocean and Sub-Saharan Africa silverleafing genetic groups. If so, then there is a case to be made to consider what opportunities these two genetic groups have to access the ornamental nursery plant invasion pathway that has proven such an effective means of invasion and spread.

Questions:

Q: Don Sands: Are there any indications of fixed differences of pheromone differences of biotypes?
A: Appears pheromones are not involved and females detect cuticular hydrocarbons that may be the signaling factor.

Q: Don Sands: How are the biotypes of *B. tabaci* separated if they are morphologically identical?
A: DNA: There is great divergence by the B biotype.

Q: Gary Fitt: Why not call them separate species?
A: If DNA was used – and many agree it should – there would be at least 19 separate spp. that are morphologically indistinguishable, but genetically different.

Q: Gary Fitt: Do Beganovirus replicating in plants change the biology of the plant affecting *Bemisia* responses to it?
A: Most evidence indicates there is no replication in plants, though one Israeli researcher thinks there is.

Q: Chris Lambkin: Has genetic material been looked at from the Middle East from before the N. American strain appeared?
A: No, it all disappeared during the Gulf War when Baghdad University was trashed.

Q: Tim Heard: Does damage to the plant have any effect on success of *Bemisia* ?
A: There is no evidence that fitness of the host plant affects success of the insect.

Q: Geoff Thompson: How did the appearance of *Bemisia B* affect the agricultural industry?
A: Insecticide use increased dramatically and cost of insecticides escalated by about X10.

Vote of thanks:

Mike Furlong thanked Paul for a most interesting presentation.

Closing statement:

The next meeting will be held at 12:00 noon, on 12th May 2008, at CSIRO Long Pocket Laboratories, 120 Meiers Road, Indooroopilly.

News Bulletin contributions from Ensoc Members

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

Thank you, Anna

Notice of Next Meeting

Entomological Society of Queensland

Monday 12th May 2008 12pm

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

Dr Lyn Cook
(University of QLD)
"Biology & Evolution of Australian Gall-Inducing Scale Insects"

Mystery behind the strongest creature in the world

Mon, 10 March 2008

The strongest creature in the world, the Hercules Beetle, has a colour-changing trick that scientists have long sought to understand. Research published today, Tuesday, 11 March, in the New Journal of Physics, details an investigation into the structure of the species peculiar protective shell which could aid design of 'intelligent materials'.

The Hercules Beetle is remarkable, not only for its strength, able to carry up to 850 times its own weight, but also the protective outgrowth of the insects exoskeleton, aka its shell, also changes from green to black as its surrounding atmosphere gets more humid.

Researchers from the University of Namur in Belgium have used the latest imaging techniques to study the shell of the beetle - a scanning electronic microscope to determine the structure responsible for the colour and a spectrophotometer to analyze how the light interacts with this structure.

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The hercules beetle *Dynastes hercules* shows a greenish colouration with black spots. Some specimens may not present these black spots.

(a) The *Dynastes hercules* is greenish with, eventually, black spots under normal humidity conditions.
(b) When put over ebulliant water (in order to produce a level of humidity above 80%) the beetle presents a black colouration all over its body.

Entomological Society of Queensland

The light interferes with the structure to produce the green colour of the shell. When water penetrates through the widely-open porous layers, it destroys the interferences phenomenon leading to a black colouration.

The researchers used dry specimen of the beetles shell to test in laboratory conditions.

The beetle, usually found in the rainforests of Columbia, Venezuela, Peru, Ecuador, Bolivia, and Brazil, is still rather mysterious though. Although dry specimens of the shell could be relied on to change when humid conditions were introduced, the living species that researchers also had in the lab were not as consistent.

As to why the beetle changes colour, question marks also remain. Some have suggested that it is to do with protection – it becomes more humid at night and is therefore good for cover to turn black. Others have suggested that it is to do with warmth absorption at night. Questions remain.

The techniques used to study the beetles morphology included new scanning techniques for electron images which over recent years have been refined to yield great depth and therefore help to create three-dimensional images of miniscule structures.

Marie Rassart, who did the research at the University of Namur, said, "The sort of structural behaviour displayed by the Hercules Beetle could be an important property for 'intelligent' materials'. Such materials could be put to work as humidity sensors. This could be useful for example in food processing plants to monitor the moisture level."

Credit: The Institute of Physics, New Journal of Physics
http://www.iop.org/Media/Press%20Releases/press_28900.html
The paper "Diffractive hygrochromic effect in the cuticle of the Hercules beetle" (2008 New J. Phys. 10 033014) is available online from Tuesday, March 11, at http://stacks.iop.org/NJP/10/033014

ICE 2008

XXIII International Congress of Entomology

July 6-12, 2008 Durban South Africa

"Celebrating Entomology: Contributions to Modern Science"

www.ice2008.org.za

Dear Colleagues: Register now and benefit

For anyone who has not yet registered for ICE2008 now is a very good time to think about doing so. The deadline is still a while away. Delegates wishing to have their oral and poster presentations included in the scientific programme need to pay their registration fees by the 30th of April.

Standard registration closes on 31st May. At the present moment, currency changes are most favourable for people coming into South Africa.

The US dollar has fallen sharply against other countries' currency and the South African Rand has fallen relative to the dollar. This would mean something like a 15-20 % discount if you are paying in US dollars and even more if you are paying in Euros, Australian or Canadian dollars or British Pounds.

Hotels: Book Soon

The hotels close to the International Congress Centre are filling up and delegates are urged to book soon. July is the holiday month for Durban and crowds of holiday makers flock there for the mild sunny weather as well as the International Surfing competition which will be held at the same time.

Abstracts & Posters	When the huge rush to submit abstracts had calmed down we found that 2 700 abstracts had arrived and more continue to trickle in. The process of sorting through the submissions, and accepting those suitable for talks, had to begin immediately after the deadline. The symposia are being finalized. Many folk now know the status of their papers. The chances of submitting an abstract now, and having it accepted for an oral presentation is rather small. However there is plenty of room for poster presentations.
Durban's Successful Easter Spectacle	Durban has just hosted the immensely popular Vodacom Easter Adrenaline Beach Festival for the 6th year running. Over 240 000 beachgoers flocked to the various beaches for jet-ski, volleyball, beach soccer, concerts and many other tournaments and activities. Rated as another huge success, this incident free annual spectacle remains one of the highlights of the KwaZulu-Natal calendar.

Welcome:

We look forward to welcoming you to ICE 2008 and to Durban South Africa

ICE 2008

Entomological Society of Queensland

USDA ARS Australian Biological Control Laboratory

Matthew Purcell will travel to Florida in May to attend workshops on the USDA ARS overseas laboratories and planning future biocontrol research. After considerable research was conducted in Australia, the group was pleased that the Cecidomyiidae stem-gall fly on *Melaleuca quinquenervia*, *Lophodiplosis trifida*, has been approved for release in the United States. This insect should complement the existing agents which have already dramatically reduced flowering and stand densities of the broad-leaved paperbark in Florida. **Bradley Brown** is now colonising another cecid, *Lophodiplosis indentata*, which galls the leaves, while **Jeff Makinson** is working on a third gall-former, the scale insect ?*Sphaerococcus ferrugineus*. **Ryan Zonneveld** has begun host-range testing of a stem-boring *Bagous* weevil on the submerged aquatic weed, *Hydrilla verticillata*.

News from the Queensland Museum

The Acarologists in the Arachnology section at the Queensland Museum have been beavering away on a variety of projects. **Matthew Shaw** and has been preparing a description of a *Mymrozercon* from *Polyrhachis* ants, and **Michelle Baker** and **Owen Seeman** have completed a description of a large *Neomegistus* mite from a giant millipede (*Proporobolus* sp.). Michelle has also been busily illustrating members of the Laelapidae, Otopheidomenidae, Podapolipidae and Discozerconidae - faster than we can write the manuscripts. **Jenny Beard** is preparing for a "Astigmata and Prostigmata of Quarantine Significance" course held at AQIS with **Jurgen Otto** (AQIS), **Barry OConnor** (University of Michigan) and **Ron Ochoa** (USDA) in May, plus a major field trip with Barry and Ron to the Northern Territory and Western Australia.

Island Hitchhikers: Lady Elliot Island

Christine Lambkin, Chris Burwell, and Aki Nakamura from the Queensland Museum completed a survey of invertebrates on the 45 hectare Lady Elliot Island (24°07'S, 152°43'E), off Hervey Bay between 28th and 31st March 2008. The Queensland Museum is now involved in the *Island Hitchhikers* project to identify pest invertebrate species found on islands of the Great Barrier Reef Marine Park, investigate their risk to native species and their potential to be transported between islands through tourist and management activities. This is part of a major pest management program called *Pest Off in CQ* established by Central Region QPWS that aims to maintain, recover and restore the biodiversity of ecosystems of parks and forests across Central Queensland.

The Museum team trained John Olds and Andrew McDougall from QPWS in collecting and survey techniques including Malaise trapping, light trapping, pitfall traps, hand collecting, and sweep netting. The invertebrate survey concentrated on eight sites encompassing the range of vegetation communities found on the island. These included, planted and remnant *Pisonia* 'forest', planted and regenerating *Casuarina* stands, a few old *Pandanus* trees, widespread dense coverage of the Beach bean *Canavalia rosea*, and fringing *Argusia argentea* above the high tide mark.

Lady Elliot Island, the most southern Great Barrier Reef Island, was denuded by guano mining to the point where little of the native vegetation remained. Over the past 35 years there has been a gradual renewal of terrestrial biodiversity, driven largely by re-vegetation including deliberate planting of *Pisonia* and *Casuarina* by those responsible for a small tourist resort on the island. The island today has significant vegetation cover that supports a multitude of bird life and other fauna.

Almost 94 percent of Australia's *Pisonia* forest occurs on the islands of the Great Barrier Reef with the vast majority in the Capricornia Cays National Parks near Gladstone. Since 1993, outbreaks of the scale insect *Pulvinaria urbicola* have been significantly impacting *Pisonia grandis* forests on Australian islands, destroying over 90% of the *Pisonia* at Tryon Island by 2000. Ants, including the introduced Coastal brown ant, *Pheidole megacephala*, have been implicated in exacerbating these outbreaks. Hawk moths (Lepidoptera: Sphingidae) have also been recorded as affecting the *Pisonia grandis* forests.

Also, the little known endemic weevil borer *Achopera isabellina* was found to be significantly damaging *Pandanus tectorius* in the Capricornia Cays. On cays *Pandanus* provides an important part of the strand vegetation behind which *Pisonia* forests typically develop.

The *Island Hitchhikers* project will target scale insects, ants, hawk moths, and weevil borers, while also providing a baseline inventory of the invertebrate fauna of 15 islands in the Capricornia Cays National Parks.

The *Island Hitchhikers* project is a collaboration between QPWS, the Queensland Museum, and the Queensland Herbarium. While the Museum team collected invertebrates a Herbarium team of George Batianoff and David Halford repeated a 10 year old vegetation survey of the Island, providing baseline maps of island vegetation and studying vegetation ecology, including invasive weeds and assessing vegetation conditions and soil nutrition requirements.

Opposite Page:

Figures 1). Lady Elliot Island, Capricornia Cays (24.12°S 152.71°E), Yes, that is a grass airstrip bisecting the island. Photo C. Lambkin. **2).** John, Chris, and Christine hand collecting among the low, dense, coverage of Beach bean that was heavily infested with bird ticks missing their natural hosts. **3).** Christine visiting Malaise set above high tide mark in *Argusia argentea* bordering *Casuarina* stands. **4).** Short-term pitfall trap. **5).** Purple Cerulean, *Jamides phaseli* (Lepidoptera: Lycaenidae) **6).** Long term pitfall. **7).** Some of the surprisingly diverse butterflies and dragonflies collected on the island. **8).** Aki setting pitfall traps near *Pisonia*. **9).** Aki and Chris pursuing ants. Photographs 2-9 A. McDougall. **10).** Andrew and Chris set up a light trap near the *Pandanus* trees. Photo A. Nakamura.


1
2
3
4
5
6
7
8
9
10

Bees clue to the perfect wine

Janelle Miles
The Courier Mail
March 27, 2008 12:00am
http://www.news.com.au/couriermail/story/0,23739,23437205-5003419,00.html

BRISBANE scientists are buzzing about the emerging possibility of using bees to assist winemakers in producing the perfect drop.

The CSIRO hopes Queensland Brain Institute research into bees' acute sense of smell will help form the basis of an electronic nose for the wine industry.

"We're using the bee as a model because it has a simpler brain and a simpler olfactory system to study compared to humans," QBI scientist Judith Reinhard said.

Although bees have a brain 20 times larger than a fruit fly, they do not have a nose. But Dr Reinhard said the insects' antennae were covered in small hairs which contained odour receptors, similar to those in human nostrils.

"On a molecular level, it works the same way," she said.

A bee's sense of smell is so precise it can distinguish between hundreds of aromas and tell whether a flower carries pollen or nectar from metres away, Dr Reinhard said. She said scientists had discovered that, like humans, bees preferred certain smells over others.

Experiments have also revealed bees can distinguish complex perfumes – which may contain dozens or hundreds of compounds – by reacting only to a handful of chemicals and ignoring the rest.

"We take live bees and we put them in little holders so they don't fly away," Dr Reinhard said. "Then we blow a scent . . . across their antennae and give them sugar water as a reward. They very quickly learn to associate the scent with the reward. Every time they smell it, they stick out their tongues expecting the sugar water."

But, when researchers performed similar experiments using individual molecules within the same scent, the bees poked their tongues out for some chemicals but not for others.

If the scientists can work out the neurological basis behind how bees learn some compounds in complex bouquets, but reject others, it may help form the basis for a more sophisticated electronic nose.

The bouquet of the average wine contains about 800 chemicals. If scientists can pinpoint a dozen or so key molecules, these could be programmed into a "cybernose" specific for the wine industry.

"The idea would be to have an electronic nose that you could use during the process of wine-making to detect those key compounds," Dr Reinhard said. "It's a complex thing that will take many years to develop."

DIARY DATES 2008

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

May 12th	Dr Lyn Cook (University of QLD)	Biology & evolution of Australian gall-inducing scale insects
June 10th	Student award, Notes & Exhibits	
August 11th	Dr Peter James (Qld DPI&F)	Lousy research & the Integrated Parasite Management Group
September 8th	Dr Shaun Winterton (Qld DPI&F)	Evolution of the Mantid lacewings based on multiple genetic markers (Neuroptera: Mantispidae)
October 13th	Dr Felix Bianchi (CSIRO Ento.)	The landscape context of the ecosystem service of pest control
November 10th	Professor Hugh Dingle (University of QLD)	
December 8th	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.**

Sustaining associate of the News Bulletin:

TROPICAL FRUIT FLY RESEARCH GROUP, GRIFFITH UNIVERSITY

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**

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See subscription form on opposite page for details.

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NOTICE OF NEXT MEETING

The next meeting of the Society will be held at **12:00 pm** on **Monday**, **12th May 2008** in the **Large Conference Room**, **CSIRO Long Pocket Laboratories**, 120 Meiers Rd Indooroopilly. The main business will be a presentation by **Dr Lyn Cook : "Biology & evolution of Australian gall-inducing scale insects".**

VISITORS ARE WELCOME

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

HONORARY LIFE MEMBERS OF THE SOCIETY

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