ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN

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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

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Front Cover Illustration: Illustrations by Bill Haseler, 1964 President of the Entomological Society of Queensland, of four leaf-mining beetles introduced for the biological control of lantana. The beetles are, clockwise from top right, *Octotoma scabripennis* Guerin-Meneville, *Uroplata girardi* Pic, *Octotoma championi* Baly and *Uroplata fulvopustulata* Baly (Coleoptera: Chrysomelidae: Hispinae). All species are now established in Australia.

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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 Tuesday 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. 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***: 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, 1885), family Lucanidae (Coleoptera). Its magnificent purple and green colouration makes it one of the most attractive beetle species in Australia. Other common names include Rainbow, Golden and Magnificent Stag Beetle. It is restricted to the rainforests of northern Queensland.

The Entomological Society of Queensland

Minutes for General Meeting **September 9th, 2014**

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park, Tuesday, September 9th at 1:00pm

Chair: Bill Palmer

Attendance: Kathy Ebert, Julianne Farrell, Gary Fitt, Alexandra Glauerdt, Manon Griffiths, Andrew Hayes, Tim Heard, Dave Holdom, Chris Lambkin, Simon Lawson, Diana Leemon, Penny Mills, Lance Muddock, Helen Nahrung, Cate Paull, Matt Purcell, Don Sands, Owen Seeman, Noel Starick, Dave Walter

Visitors: Brogan Amos, G. Brown, K. Dhileepan, R. Farrell, Rosie Godwin, Lynne Griffin, J. Kopinski, Andrew Kotze, David Mayer, F. McIntosh, Cathy Minchin, Peter Rothhsberg, Willmot Senaratue, Richard Silcock, Jillian Templeton, Yu Pei Tan

Apologies: Colin Beech, Bradley Brown, Morris McKee, Geoff Monteith, Brenton Peters, Nancy Schellhorn, Federica Turco, Susan Wright

Minutes: The minutes of the last meeting were circulated in News Bulletin 42[5] August 2014.

Moved the minutes be accepted as a true record: Bill Palmer

Seconded: Chris Lambkin. *Carried: all.*

Nominations for membership: No nominations were received.

General Business: Kathy Ebert presented a brief summary of the council meeting:

At the council meeting, Bill Palmer presented a brief overview of the minor constitutional changes that the constitution subcommittee has recommended.

A reminder that the **BugCatch is being planned for Saturday, the 20th of September**. The UQ insect science students will be attending so members are encouraged to come along and share their knowledge. We are planning to go to Mt Glorious forestry barracks. See details on flyer or website. Please let Kathy or Chris know if you are coming so we know how many to expect.

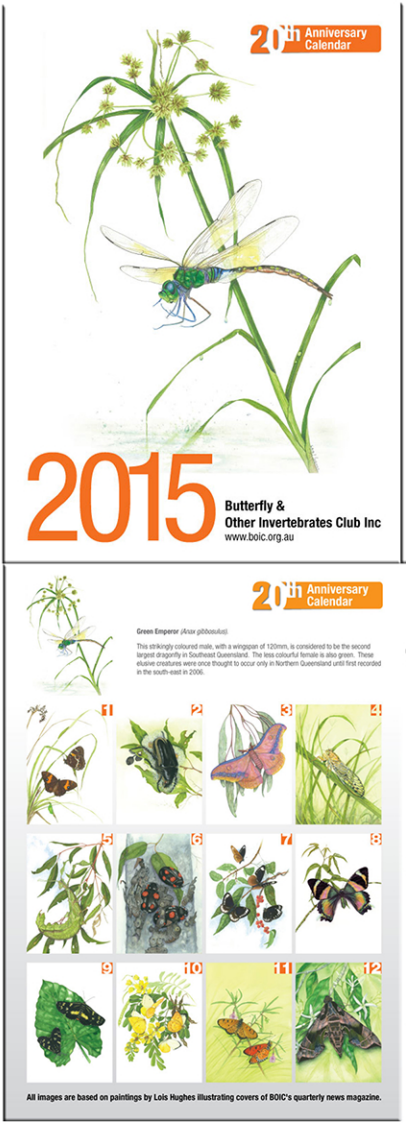
Today's meeting is being video recorded with the hopes that we can add it to the society website to enable our more distant members to see the meetings.

Main Business: Dr Peter James presented a very interesting talk on Buffalo

flies entitled: *Soft lights, black sheets and in-vitro breeding of Buffalo Flies*

Next meeting: Our next meeting will be Tuesday, October 14th at 1pm with guest speaker, Diana Leemon.

Meeting closed: 1:54pm



The Butterfly and Other Invertebrates Club

is celebrating the 20th Anniversary of its founding with a calendar with 13 A4 size reproductions of paintings by Lois Hughes.

Members of the Entomological Society of Queensland can receive the calendar for **$10.00 plus postage.**

To order email Ross Kendall admin@butterflyencounters.com.au or the Club at **info@BOIC.org.au**

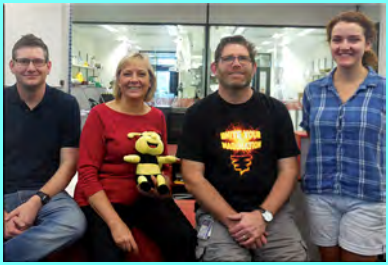
NOTICE OF NEXT MEETING
Tuesday 14 October 2014

A Slimy Solution for a Bad Bee-Hiving Beetle

The Beetle Buster Team

Diana Leemon: Senior Scientist in IPM, DAFF Animal Science; 17 year beekeeper; and nemesis of SHB since it turned up in SE QLD in 2002. Her first interest was fungal control of SHB and that expanded to other areas including yeasts associated with hive "melt down".

Andrew Hayes: Senior Scientist in Forestry Science, DAFF HFS; 19 years experience chemical ecologist with assorted mammals, cane toads and (since 2008) insects.



Small Hive Beetle (SHB) (*Aethina tumida*), an exotic pest of European Honeybee now present in many regions of Queensland and New South Wales. SHB presents a serious economic threat to both beekeeping and free pollination. Adults disperse great distances and larvae feed on brood and stored pollen and turn the stored hive products into a mess of fermenting, odorous slime with the help of a yeast (*Kodamaea ohmeri*) that SHB appear to transmit. The volatiles emitted by the fermenting slime are highly attractive to other SHB causing an even greater increase in egg laying adults within the hive.

Steven Rice: senior technical officer DAFF Animal Science; 16 years experience in control-agent bioassay, insect culturing, poultry pests, nuisance flies and using natural agents for insect control.

Brogan Amos: Honours on control options for SHB, 2013. Experienced in calm and efficient apiculture; rearing SHB in laboratory colonies; lab bioassays and mark and release field experiments.

Venue: Seminar Room
Ground Floor, Ecosciences Precinct
Boggo Road, DUTTON PARK. BRISBANE.
More venue details available at
http://www.esq.org.au/events.html

Soft lights, black sheets & *in-vitro* breeding of buffalo flies

Peter James, Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland

Buffalo Flies (BF) *Haematobia exigua* are functionally obligate parasites of cattle and buffalos, the adults only leaving their hosts when disturbed or to oviposit in newly deposited dung. They are most obvious when they mass along the back and flanks of cattle and numbers on susceptible animals can sometimes reach several thousand. Both the males and females are haematophagus, feeding up to 40 times per day. They have piercing sucking mouthparts with prestomal teeth that they use to tear the flesh and prevent the wound from closing. Their bites are painful and extremely irritating to cattle, causing reduction in weight gains and decrease in milk production. They also transmit a filarial nematode *Stephanofilaria* sp. that causes skin lesions, downgrading skin quality, raising welfare concerns and making cattle susceptible in the event of a screw-worm incursion.

Buffalo Flies are an exotic species, introduced to Australia on buffalo from Timor in 1838. They dispersed to the northwestern border of Queensland by 1928, but did not spread to the east coast until a series of wet years in 1939-41. By 1977 they had moved to the Brisbane Valley and by 1978 into northern NSW. The wet summer in 2011 saw BF spread as far south as Maitland, Dubbo and Narromine and as far west as Bourke. BF were also seen infesting cattle as far south in NT as Alice Springs. CLIMEX modelling suggests that their range will extend significantly with climate change, potentially leading to establishment in the southern mainland states of Australia by 2030. Overseas the distribution of BF extends from India to Malaysia, Indonesia and Papua New Guinea, and as far north as Taiwan. In northern China and Japan BF is replaced by the closely related Horn Fly (*Haematobia irritans*). Horn fly (HF) infests cattle through most of the Holarctic region and North America. It was introduced to Brazil in the 1980s and has since spread through South America to Uruguay, Argentina and Chile.

Control options for BF include traps, breed choice and the promotion of dung beetle breeding, but most properties depend primarily on chemical methods of control. Chemical methods suffer difficulties with the development of resistance, the potential for residues, occupational health and safety issues and environmental contamination. In addition, there are growing price premiums and significant markets for beef and dairy commodities produced in low chemical systems.

Research into the development of new and cheaper controls for BF has been limited by the need for cattle based rearing systems. These are expensive, increasingly suffer animal ethics difficulties and limit the type of research that can be conducted. We have developed two new tools, an *in vitro* BF colony and *Haematobia* cell lines, that will reduce reliance on animal-based experimental systems and significantly assist research towards new control methods, in particular investigation of the possibility of using *Wolbachia* in population-based approaches.

Buffalo Fly Colony

Early attempts at colonisation were based on methods previously used to rear closely related HF in the USA, BF in Australia and African BF (*Haematobia thirouxi*) in South Africa. Despite more than 40 attempts over two years and testing of many different modifications, the colony persisted for more than 3 generations on only one occasion and in this instance only one fourth generation fly was produced.

Field collected flies survived well in the rearing cages and continued to lay large numbers of eggs. The eggs from the founder flies produced a good percentage of pupae, suggesting that the larval rearing system was sound. Flies from the second and succeeding generations also deposited high numbers of eggs and dissection of female flies indicated normal maturation of ovaries and new ova developing in the ovarioles. However, few pupae were produced from the eggs laid by these flies. Dissection of the testes in colonised males indicated the presence of high numbers of motile spermatozoa, suggesting that infertility of males was not the issue. However, dissection of spermathecae of second generation females found that few contained motile sperm whereas motile sperm were present in the spermathecae of most field-collected flies. This suggested failure to mate as the main factor responsible for poor fertility and inability to establish a sustaining laboratory culture. This was supported by observations of flies in the laboratory cages where, despite extensive observations, BF were seldom seen to mate. In contrast, mating is frequently observed in the other colonies of livestock-associated fly species that we maintain.

There were no reports describing buffalo fly mating behaviour in the literature and we did not observe mating in casual observations of flies

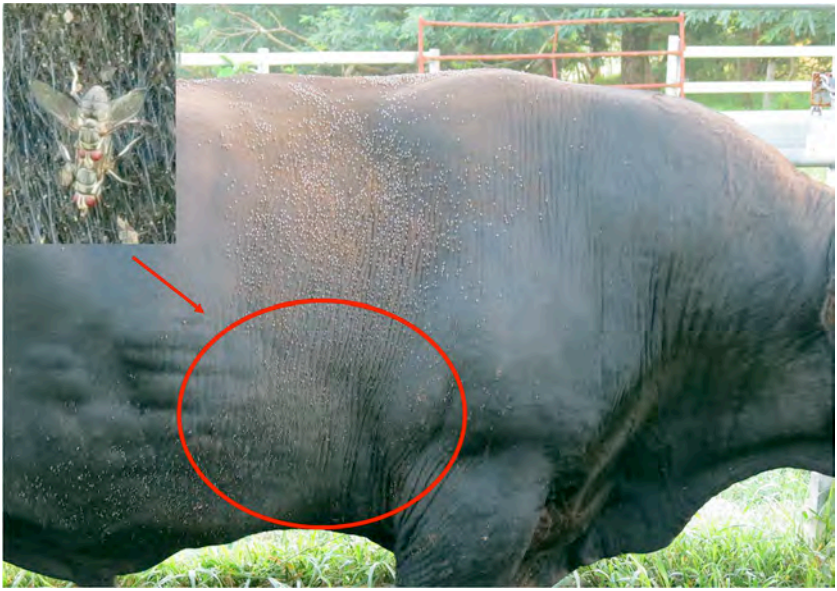


Fig 1. In the field near dusk and dawn, Buffalo Fly (*Haematobia exigua*) were observed 'milling' and mating mainly on the lower flanks on the shaded side of their host.

on cattle. We therefore initiated more intensive field observations. Two sets of observations were made, in mid-summer and in autumn, on a relatively quiet Angus bull that generally carried high populations of flies. The bull was penned in cattle yards and fly behaviour was closely observed from dawn to dusk at hourly intervals for 15 minute periods. As in our earlier observations no mating was observed on any occasion during the main daylight hours. However, slightly before dusk and after dawn an atypical 'milling' behaviour was seen where flies walked rapidly over the surface of the bull. This behaviour is atypical as BF generally relocate in short flights between sites and are seldom seen walking on cattle. The propensity of BF to fly between sites on cattle rather than walk has previously been used as a field diagnostic feature to distinguish BF from another cattle associated species, *Hydrotaea australis*. This species is frequently observed restlessly 'running' over the surface of cattle. The BF milling behaviour was seen mainly on the shaded side of the animal, generally on the lower flanks in the thoracic and cervical regions on the bull (Fig 1), and was frequently associated with the observation of mating pairs of BF.

Interestingly, we saw a similar 'milling' behaviour during laboratory studies of the light response when BF were exposed to a Reptile One® night heat lamp. These lamps are often used in reptile rearing and provide light of a bluish hue claimed to approximate moonlight.

Fig 2. Buffalo Flies responding to dawn-dusk artificial light and cardboard hide.

As a result of these observations a light regime simulating dusk and dawn was introduced in our rearing rooms. The dawn and dusk regime incorporated, sequentially, an incandescent neodymium lamp which does not produce light in the UVb band (as with light at dusk and dawn), red incandescent light (Phillips red 'Partylight') and the Reptile One® night heat lamp. We also included a curved strip of black cardboard in each cage, simulating the curvature of cattle bodies. This allowed the flies to orient to light patterns and provided a mating platform for the flies. Buffalo Flies readily rest on the cardboard, particularly during low light periods (Fig 2) and mating is now frequently observed. These changes, in addition to a number of other modifications, most particularly the use of membrane feeders to provide a continual source of blood warmed to cattle body temperature, have led to the development of a sustaining colony of buffalo flies that has now been maintained in our laboratory for 47 generations (Fig 3).

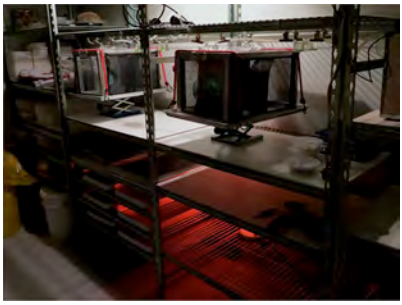


Fig 3. Buffalo Fly colonies.

Buffalo fly and horn fly cell lines

In collaboration with Dr Tim Kurtti and Dr Ulrike Munderloh at the University of Minnesota we have developed an HF cell line. Eight sustaining *H. irritans* lines are currently being maintained or have been cryobanked in liquid nitrogen. We also previously established an *H. exigua* cell line but this was lost during power failures associated with the Brisbane floods. Cells in this line attached and grew well with a cell doubling time of 4-5 days, were grown in the laboratory for six months and were successfully cryopreserved and retrieved after thawing. We expect to re-establish a BF line using the methods successfully utilised for HF. Buffalo

Flies are closely related to Horn Flies (only relatively recently considered a separate species) and HF cells could potentially be used in place of BF cells if necessary.

Implications

The establishment of *Haematobia* cell lines will provide an important resource for future research towards new controls for BF and HF. Insect cell lines are now frequently used for screening for biocidal molecules with new modes of action, production of viruses and baculoviruses used in biological control, vaccine design, studying gene action and adapting intracellular symbionts or pathogens for transfection into new insect hosts.

Development of the laboratory colony of BF will help maintain and improve the efficiency of currently available control methods by providing a characterised and consistent strain of BF for use in resistance detection and monitoring and for testing of candidate control compounds. It will also facilitate research towards new control techniques based on the use of *Wolbachia* and the release of genetically modified strains and will significantly reduce the animal welfare impacts, logistic difficulties and expense associated with the use of cattle-based experimental systems.

Bugs & Bugcatchers in the News

Stingless Bees in the news

Rute Brito and colleagues have recently published an interesting study of the *Tetragonula carbonaria* species complex. They found *T. hockingsi* from northern Queensland more similar to *T. carbonaria* than *hockingsi* populations in the south, with apparent hybirds where northern colonies have been moved south into *T. carbonaria*'s range. Although hybridization is occuring all three species studied (including the rare *T. davenporti* restricted to a small region south of Brisbane) appear to be good species.

Meanwhile Sara Leonhardt along with Tim Heard and Helen Wallace investigated the foraging habits of *T. carbonaria* and *Austroplebeia australis* near Buderim and found the former to be more active and general in its foraging behaviour and that its colonies gained weight faster. *Austroplebeia australis* collected little or no resin and it may be more specialised on high reward flowers than *T. carbonaria.*

References

Brito RM, Francisco FO, Ho SYW & Oldroyd BP. 2014. Genetic architecture of the *Tetragonula carbonaria* species complex of Australian stingless bees (Hymenoptera: Apidae: Meliponini). *Biological Journal of the Linnean Society* 113: 149-161.

Leonhardt SD, Heard TA & Wallace H. 2014. Differences in the resource intake of two sympatric Australian stingless bee species. *Apidologie* 45: 514-527.

A member of the *Tetragonula carbonaria* complex visiting Slug Herb (*Murdannia graminea*) near Miva, QLD. Photo DE Walter.

A new family of bugs

MP Malipatil of AgriBio in Victoria has described a new genus, *Neomeschia*, and combined it with *Meschia* Distant, 1910, to form a new family of Lygaeoidea, the Meschiidae, with species shared between Australia and India. Both genera occur in Queensland, *M. woodwardi* Scudder, 1957, and the new type species *N. queenslandensis*. An additional new species, *M. barrowensis*, is described from Barrow Island, Western Australia,

Reference

Malipatil MB. 2014 Meschiidae, a new family of Lygaeoidea (Hemiptera: Heteroptera) from India and Australia, with descriptions of a new genus and two new species. Zootaxa 3815: 233-248.

A very diverse genus of stiletto flies

David Ferguson, Christine Lambkin and David Yeates have described eight new species of the stiletto fly (Therevidae) genus *Anabarhynchus* from south-east Queensland bringing the total number of described species in Australia to 112!

Reference

Ferguson DJ, Lambkin CL Y& Yeates DK. 2014. Eight new species of Australian stiletto flies in the genus *Anabarhynchus* Macquart (Diptera: Therevidae) from South East Queensland. *Zootaxa* 3802: 553-582.

Anabarhynchus iancommoni after Ferguson et al. 2014 and CSIRO

Meetings & Conferences

Australian Entomological Society 45th AGM & Scientific Conference

September 28–October 1 2014
Shine Dome, Canberra, AUS
http://www.aesconferences.com.au/

Society for Molecular Biology and Evolution
Hofburg Palace, Vienna, AUSTRIA
http://smbe2015.at/

Entomology 2014: Grand Challenges Beyond our Horizons
November 16–19 2014
Oregon Convention Center, Portland, Oregon, USA
http://www.entsoc.org/entomology2014

12th Annual Ecological Genomics Symposium
October 31–November 2 2014
Kansas State University, Kansas, USA
http://ecogen.ksu.edu/

11th Arab Congress of Plant Protection
November 9–13 2014
Amman, JORDAN
http://acpp.bau.edu.jo/default1.htm

Central European Meeting of the International Union for the Study of Social Insects
March 26–29 2015
Schloss Schney "Castle", Litchenfels, GERMANY
https://www.bayceer.uni-bayreuth.de/iussi2015/

2015 Society of Systematic Biology conference
June 26–30 2015 Guaruja, BRAZIL
http://systbio.org/

DIARY DATES FOR 2014/2015

Nine general meetings held per year on the 2nd Tuesday of the respective month

MAR 2014-Tuesday 11th Dr Simon Lawson AGM and Presidential Address
Australians abroad: eucalypts and their insects

APR 2014-Tuesday 8th Mike Barnett *Butterfly species and habitats in Africa*

MAY 2014-Tuesday 13th Dan Papacek *Confessions of a Commercial Entomologist*

JUN 2014-Tuesday 10th Student Award Presentation/ Notes & Exhibits

AUG 2014-Tuesday 12th John McKeown *The Entomologist gets the trout!*

SEP 2014-Tuesday 9th Dr Peter James *Soft lights, black sheets and in-vitro breeding of Buffalo Flies*

OCT 2014-Tuesday 14th Dr Diana Leemon & The Beetle Buster Team *A Slimy Solution for a Bad Bee-Hiving Beetle*

NOV 2014-Tuesday 11th Dr Jeff Skevington *Natural History and Systematics of Flower Flies (Diptera: Syrphidae)*

DEC 2014-Tuesday 9th Xmas BBQ/ Notes and Exhibits

MAR 2015-Tuesday 9th Dr Bill Palmer AGM and Presidential Address

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 discretion of the Society Council **$18pa**
Student membership conveys full membership privileges at a reduced rate.

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	Institutions	**AU$ 37pa**
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	Institutions	**AU$ 45pa**
ELSEWHERE:	Individuals	**AU$ 45pa**
	Institutions	**AU$ 50pa**

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

THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NOTICE OF NEXT MEETING

Tuesday 14th October 2014, 1:00 pm

A Slimy Solution for a Bad Bee-Hiving Beetle

Dr Diana Leemon
& The Beetle Buster Team

Venue: Seminar Room
Ground Floor, Ecosciences Precinct
Boggo Road, DUTTON PARK. BRISBANE.
More venue details available at
http://www.esq.org.au/events.html

ALL WELCOME

NEXT NEWS BULLETIN

Volume 42, Issue 7 (October 2014)
CONTRIBUTIONS WELCOME
DEADLINE - Wednesday 22 October 2014
Send your stories/notices/complaints to
dwalter@usc.edu.au