ENTOMOLOGICAL SOCIETY OF QUEENSLAND INC

NEWS BULLETIN

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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 **October 14th, 2014**

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park, Tuesday, October 14th at 1:00pm

Chair: Bill Palmer
Attendance: Nadine Baldwin, Justin Bartlett, Bradley Brown, Gary Cochrane, Pat Collins, Lyn Cook, Kathy Ebert, Stephen Frances, Alexandra Glauerdt, Rosie Godwin, Andrew Hayes, Susan House, Peter James, Diana Leemon, Lance Maddock, Penny Mills, Mona Moradi, Brenton Peters, Matthew Purcell, Don Sands, Nancy Schellhorn, Owen Seeman, Dave Walter
Visitors: Brogan Amos, Perry Bennion, Nalieeu Cheurodsceyam, K. Dhileepan, Serena Dorf, Wayne Jorgensen, Warwick Nash, Wiyada Nuuhong, Paul Plant, Jane Royer, L. Snow,

Apologies: Morris McKee, Simon Lawson, Geoff Monteith, Helen Nahrung, Federica Turco

Minutes: The minutes of the last meeting were circulated in News Bulletin 42[6] September 2014.
Moved the minutes be accepted as a true record: Bill Palmer
Seconded: Bradley Brown; *Carried: All*

Nominations for membership:
Dr Shannon Smith, Old Toongabbie, NSW 2146. Nominated: Christine Lambkin, Seconded: Kathy Ebert. Carried: All
Dr Rosie Godwin, Kenmore, QLD 4069. Nominated: Peter James, Seconded: Diana Leemon. Carried: All
Mr Jesse Muller, Marsden, QLD 4132. Nominated Mark Schutze, Seconded: Stephen Cameron - *Student Membership.* Carried: All

General Business:

Constitutional changes are still being discussed in council meetings.

Bill Palmer gave a brief account of the highlights from the Australian Entomological Society meeting in Canberra. One of our members and Student Award winner for 2014, Mr Gurion Ang, was elected to be the Director - Student Representative for the AES. Member and Councillor, Dr Nancy Schellhorn, was elected to be Director - Operations. Another Queenslander, Dr Tony Clarke, won the Mackerras Medal for his excellent work in entomology.

The September BugCatch was well attended by members, students and visitors, and the full report will be presented with this month's bulletin.

Main Business:
Dr Diana Leemon presented an interesting talk about her research on hive beetles and what attracts them to hives. She and co-researcher, Andrew Hayes, presented the talk entitled, " *A slimy solution for a bad bee-hiving beetle"*

Kathy Ebert gave the vote of thanks.

Next meeting: November 11th

Meeting closed: 2pm

Insect Specimens wanted for Short Film!

'The Insect & the Alien' is a short film being produced in Brisbane by talented young filmmakers. The film tells the story of Owen, an avid entomologist, and his quest for the elusive 'Madeline Fly'. One of our sets requires a large amount of entomological dressings; preserved insect specimens, insect models, posters and charts. Essentially anything to bring the study of our character to life!
Our fully insured production is shooting in December and we only require the items for a few days to facilitate dressing and shooting the scene.
Any support you could lend would be invaluable.
Please contact the film's Production Designer Lachlan Linton-Keane on 0401 934 164 or via email lachlan.linton-keane@griffithuni.edu.au."

NOTICE OF NEXT MEETING

Tuesday 11 November 2014

Natural history and systematics of flower flies (Diptera: Syrphidae)

Dr Jeff Skevington

Synopsis: Flower flies frequent flowers and interest in them as alternative pollinators is on the rise. They are also proving of value as model organisms for studies of mimicry and the evolution of larval feeding traits. Advances in DNA barcoding are helping to shortcut the tedious aspects of rearing. The barcode library currently includes over 1500 species of the world's 6000 syrphid species. In Australia, almost ½ of the fauna is undescribed. Jeff's and his colleagues' aim is to revise the fauna over the next 3 years. Jeff will be working on the project in Australia until February 2015.

Jeff (PhD University of Queensland 2000) is a scientist at **Agriculture & Agri-Food Canada** with academic appointments at Carelton University and the Universities of Ottawa and of Guelph. His special interests are in the phylogeny of the Diptera and the families Syrphidae, Pipunculidae, Conopidae and Therevidae.

The diverse genera *Psilota* and *Hemilampra* are the focus of complete revisions. Fresh material collected while we are working here will also be used for a large-scale world phylogeny of the family that is using both traditional Sanger sequencing methods as well as hybrid enrichment techniques. Over 500 species have already been included in the multi-gene study and Jeff anticipates to have reached over 1000 species by the time the project is completed.

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

ENTOMOLOGICAL SOCIETY OF QUEENSLAND

BugCatch Report

Mt Glorious QNPWS

D'Aguilar National Park

A beautiful beetle mimic (Neuroptera: Mantispidae: *Calomantispa*). Photo Jeff Skevington

Chris Lambkin (Queensland Museum) and Kathy Ebert (UQ) organised the latest ESQ Bug Catch at the Mt Glorious QNPWS grounds, D'Aguilar National Park on Saturday 20th September, 2014. Sixteen ESQ members attended including Chris, Kathy, Noel Starick, Robert Whyte and Ann Jones, Ryan Norris (student who travelled again from Gladstone with his family), Peter Hendry, Richard Zietek, Jim Pulsford, Susan, Jeff and Olivia Wright, Narelle Power and Damian White, Jeff, Ange, and Alex Skevington (all the way from Canada!), Jason Maté and family, David Merritt, Katie Hiller, Stacey Maclean and family. Eighteen visitors joined us, including Shaun Depper (QM volunteer), Shannon Smith (Univ. Western Sydney), Kate Moffatt and Matt Rees (QUT), Michelle Gleeson (BugsEd) and 25 UQ students. We used many collecting methods including light sheets from dusk. A crew from Totally Wild filmed some of the collection methods and interviewed ESQ members and visitors.

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. Chris, Kathy and Noel visited the area on the 15th September to set up Malaise and pitfall traps.

Zodariidae *Euasteron enterprise* Baehr 2003. Photo: Robert Whyte.

Capusa caterpillar (Geometridae Ennominae) on Eucalyptus collected by Michelle Gleeson (BugsEd). Photo: Kathy Ebert.

Stiletto fly (Therevidae: *Nanexila gracilis*) collected at the light sheet by Peter Hendry. Photo: Chris Lambkin.

Lots of bird watching, talking, laughter, and catching up of old friends. Insect collection, hmmm…. Narelle Power, Ange, Alex & Jeff Skevington from Canada, and Damian White. Photo Noel Starick.

Probably the biggest turn-out ever at a BugCatch. Photo Noel Starick.

Macleay's Swallowtail (*Graphium macleayanus*) Photo: Kathy Ebert

In the morning it was cloudy and windy just like every other year that we have been up to Mt Glorious. Occasionally the sun peeked through, although it cooled down significantly in the afternoon, but as the area is at 660 m elevation it was not unusual. The students observed and used diverse methods such as sweep netting, beating, pitfall traps, Malaise traps, a litter extraction funnel, light trapping, and direct search to obtain specimens for their courses.

While the usual carabids, syrphids, centipedes, pill millipedes, butterflies (including the beautiful, but fast, Macleay swallowtail (Papilionidae: *Graphium macleayanus*) emerged to thrill the students. Some more unusual groups were collected including many unusual spiders, patterned millipedes, the rainforest dung beetle that forms brood-balls from leaves (*Cephalodesmius armiger*), mites on a carabid beetle, a beautiful rare beetle mimic (Neuroptera: Mantispidae: *Calomantispa*), some stiletto flies (Therevidae: *Nanexila gracilis* and *Ectinorbynchus*), and a giant king cricket (*Anostostoma australasiae*).

Chris Lambkin and Kathy Ebert

Cyliosoma sp. (Sphaerotheriida: Cyliosomatidae) Identified by Bob Mesibov Photo: Kathy Ebert

The UQ students were very busy collecting, sorting, pinning, and identifying specimens. Photos: Noel Starick and Kathy Ebert

Phyllocladosoma sp. (Polydesmida: Paradoxosomatidae). Identified by Bob Mesibov. Photo: K.Ebert

External attractant trap for Small Hive Beetle (*A slimy solution to a bad beehiving beetle*)

Diana Leemon, Andrew Hayes, Brogan Amos & Steven Rice

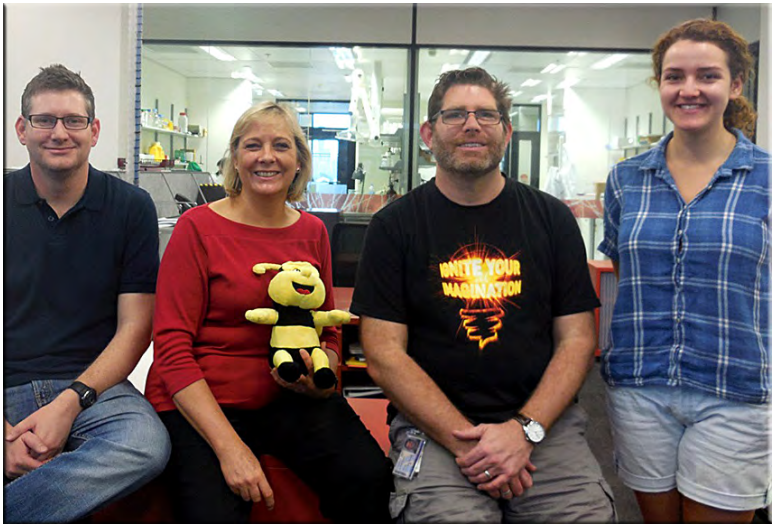


Fig 1. Steven, Diana, Andrew and Brogan

The small hive beetle (SHB) *Aethina tumida* Murray (Coleoptera: Nitulidae) is a pest of European honey bees, *Apis mellifera* (Murray, 1867). The beetle is native to sub-Saharan Africa where it is a minor pest of little economic importance restricted to infesting weak, stressed or diseased African honey bee colonies (Neumann, 2004, Ellis, 2006, Lundie, 1940). However, outside of its native Africa, SHB has proven to be far more destructive. SHB was first reported from Florida, USA in 1998 (Elzen, 1999), although collections of SHB had been made in South Carolina as early as 1996 but remained unidentified (Hood, 2004). By 2004 SHB had spread from the south east of the USA to 30 states and was estimated to be causing US$3 million in losses to the beekeeping industry (Hood, 2004).

In Australia SHB (**Fig 2**) was first reported from an apiary in Richmond, New South Wales (Somerville, 2003). By 2011 it had spread along the east coast of Australia from Mareeba in the north to the Melbourne CBD in the south (Lamb, 2011). The damaging potential of SHB in Australia was realised once the characteristic wet summers returned

to eastern coastal regions in 2008 after a long drought. The minimum value of hive losses attributable to SHB over the following three summers (2008 – 2011) in Queensland, Australia was estimated at A$8 million (Lamb, 2011).

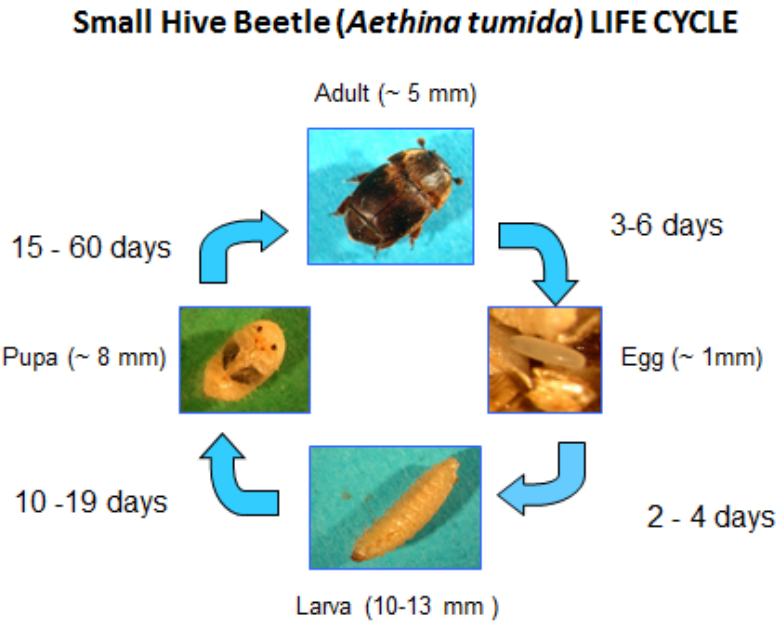


Fig. 2 Small Hive Beetle Life cycle

Adult SHB have been reported to travel kilometres to locate a honey bee hive through olfactory clues (Hood, 2004; Somerville, 2003). Adult SHB are opportunistic scavengers taking advantage of situations that suit their reproductive strategy (Somerville, 2003). However the SHB larval stage can cause extensive damage to hives and stored comb as they feed on bee brood and pollen stores and leave behind waste. Fermentation of honey in the comb has been associated with large numbers of SHB larvae and a yeast (*Kodamaea ohmeri)* has been isolated from both the fermenting combs and all stages of the SHB life cycle (Benda, 2008; Torto, 2007c; Leemon, 2012). It is believed that this yeast is primarily responsible for the fermentation of hive products associated with larval development (Leemon, 2012). The resulting fermented honey (or "slime") is rejected by honey bees and cannot be marketed by the beekeeper. Heavy larval infestations may also result in

total hive collapse after the queen ceases to lay eggs and the bees abscond from their hive (Hood, 2004; Hepburn, 1998) leaving the SHB larvae to turn all hive products into an odorous mess often termed "slime" (Leemon, unpublished, see **Figs 3-5**).

Several methods have been developed to control this pest including in-hive trapping tools (Hood, 2003; Hood, 2006), and light traps (Baxter, 1999); in-hive chemical control using coumaphos, fluvalinate and fipronil (Neumann, 2008; Hood, 2000; Elzen, 1998; Mostafa; 2002; Levot, 2008a,b; Levot, 2009; Levot, 2012) and soil treatments using permethrin to kill SHB larvae and pupae in the soil around the hive (Hood, 2000; Baxter, 1999). The effectiveness of some in-hive traps can be improved with the use of oil or diatomaceous earth as the trapping agent (Buchholz, 2009; Cribb, 2013; Hood, 2006). However, many of the chemicals investigated are also very toxic to honey bees and can lead to the development of resistant populations of beetles (De Guzman, 2011). Entomopathogenic fungi have been investigated as an alternative to chemical control (Muerrle, 2006; Leemon, 2012).

All in-hive trapping systems rely on beetle and bee behaviour; the tendency of beetles to retreat to a harbourage, and the tendency of bees to chase them. These behaviours are not constant through time and space, meaning that the trap-effectiveness is variable. Also, in-hive traps need to be replaced regularly, either because of the persistence of insecticide, or the trapping agent (DE, oil) becomes fouled or a solid mass. Bees will also cover up the entry points to the trap with propolis, reducing trap effectiveness (Leemon, unpublished). The need to be regularly opening the hive for trap checking and maintenance is invasive and stirs up the bees. The commercially available in-hive traps are expensive and for commercial beekeepers a trap is required in each hive. The idea of a "trapping sink", where a limited number of hives in an apiary would be baited with attractant, and draw beetles away from and reducing the populations in control hives was tested in South Carolina. The study showed no difference in beetle density between treatment and control traps, thus demonstrating that in-hive traps must be located in every single hive in an apiary to have any effectiveness in beetle control (Peterson, 2012).

There is clearly a need for a more effective trapping system outside of hives that can be used in addition to the current in-hive trapping systems. Such a system with an effective external trap for SHB would also provide a SHB control option that is economic for commercial beekeepers. In addition to control of beetles in an affected apiary, an external trap would be a useful monitoring and surveillance tool, to demonstrate area freedom in areas where the beetle is not yet known to occur. Olfactometer

and wind tunnel investigations have shown adult beetles are attracted to a range of hive odours, including the odours of adult worker bees, fermenting hive products, and a honey bee alarm pheromone (Nolan, 2008; Suazo, 2003; Torto, 2007a, b; Torto, 2005). The fermentation of hive products was due to the action of the yeast *Kodamea ohmeri*, which has been isolated from all life history stages of the beetle (Benda, 2008; Leemon, 2012) and has been patented as an attractant for use in in-hive traps and investigated for out-of-hive traps (Arbogast, 2009; Arbogast, 2007; Torto, 2007a,b; Boucias, 2006). Although research in the USA has shown that SHB are attracted to a range of hive odours, (Nolan, 2008, Suazo, 2003,Torto, 2007a,Torto, 2005), they have been found to be highly attracted to the volatiles associated with *K. ohmeri* fermented hive products (Arbogast, 2009,Torto, 2007c).

The development of an external attractant trap for small hive beetles is the objective of our current research project funded jointly by the Rural Industries Research and Development Corporation (RIRDC) Honeybee and Pollination RD&E program; Queensland Beekeepers Association (QBA) and the Wheen Bee Foundation. This project builds on our previous laboratory studies that showed an increasing number of mixed-sex adult SHB trapped in traps baited with slime associated with developing SHB larvae through time. Our studies provided strong evidence that SHB find the volatiles in the slime highly attractive and that the volatile profile becomes more attractive with time. In our bioassay system there were no visual or tactile cues to distinguish between traps, and very few beetles made a random choice to enter a trap without odour attractant (7 out of 520 = 1.35 % across all reps in all trials). These results strongly suggested the choice to enter a trap was directed by odour in this study. In parallel to the insect bioassays we used gas chromatography-mass spectrometry (GC-MS) to analyse the volatile organic compounds from the slime that developed over time.

A key driver in the change of attractiveness through time is likely to have been ethanol, a very well known attractant compound for a variety of insects from many different orders (e.g. Byers, 1992; Montgomery, 1983; Casana-Giner, 1999) including other members of the Nititulidae (Bartelt, 2006). The levels of ethanol increased significantly through time, and may well explain at least the early increases in attraction. As the ethanol levels reached a plateau around day 12 of larval development, further increases in attractiveness are likely to have been as a result of the increasing production of other fermentation products.

The compounds detected by the GC-MS analysis were typical compounds produced by yeast fermentation (see for example Nout (1998) including a variety of alcohols, aldehydes and

acetates. These types of fermentation products have been found to be highly attractive to the nititulid beetle *Carpophilus davidsoni* (Bartelt, 2006). Comprehensive studies have reported aggregation pheromones used by species of *Carpophilus* beetles and their application in attract and kill traps. These pheromones are highly effective when combined with fermentation products. Blends of the key fermentation products were synergistic, and essential to maximise trap efficiency (Bartelt, 2006; Bartelt, 2010; Bartelt, 1994; Hossain, 2008). It is possible that SHB (also of the Nitidulidae) may produce an aggregation pheromone that increased the number of beetles in the traps in this study, although we have no evidence for this. We believe an investigation into the presence of an aggregation pheromone in small hive beetles is warranted because of the enormous potential for improvement of an attractant lure if small hive beetles emit a pheromone. Anecdotally many apiarists have noted a huge variation in the numbers of beetles in hives within the one apiary, and some have proposed a variation in the volatiles emitted by the hives, such as the bee alarm pheromone, as a reason for this. However it may be possible that the large numbers of beetles in certain hives are due to beetles in those hives feeding on a preferred food substrate (e.g. pollen) giving off an aggregation pheromone. Thus the attractiveness of hives to SHB could be due to both the status of the available food in the hive as well as a pheromone signal to other SHBs.

The overall aim of our project is the development of an external trap for the small hive beetle, to assist commercial and hobbyist beekeepers in the monitoring, management and control of the SHB apiary pest. To achieve this our specific objectives include:

- Determining which individual component compounds from fermenting hive products are attractive to small hive beetle (laboratory)
- Determining the optimum blend of the above compounds, in terms of attractiveness and longevity (laboratory)
- Developing a suitable attractant lure (using the synthetic blend identified above) for use in a external trap for the small hive beetle (laboratory)
- Investigating an optimal trap design including shape, colour and toxicant (laboratory/field)
- Investigating the occurrence of an aggregation pheromone in the small hive beetle, the addition of which could enhance trap success (laboratory / field)
- Examining differences in hive volatile profiles between hives carrying very high and low numbers of SHB (field/laboratory)
- Evaluating the efficacy of the external SHB trap in apiaries

located in a variety of locations in NSW and Queensland, over two summer seasons (field).

Fig 3. Healthy hive (L) and healthy frame of brood with some capped honey around the perimeter (R)

Fig 4. Hive destroyed by small hive beetle (L), inside destroyed hive showing massive numbers of small hive beetle larvae and slime with dead bees and frames of fermenting honey (R).

Fig 5. Frame of brood destroyed by small hive beetle in 7 days under laboratory conditions (L), Close up view of larvae destroying fame honey (R)

References

Arbogast, RT, Torto, B, Teal, PEA (2009) Monitoring the small hive beetle *Aethina tumida* (Coleoptera: Nitidulidae) with baited flight traps: effect of distance from bee hives and shade on the numbers of beetles captured. *Florida Entomologist* **92**, 165-166.

Arbogast, RT, Torto, B, Van Engelsdorp, D, Teal, PEA (2007) An effective trap and bait combination for monitoring the small hive beetle, *Aethina tumida* (Coleoptera : Nitidulidae). *Florida Entomologist* **90**, 404-406.

Bartelt, RJ, Hossain, MS (2006) Development of synthetic food-related attractant for *Carpophilus davidsoni* and its effectiveness in the stone fruit orchards in southern Australia. *Journal of Chemical Ecology* **32**, 2145-2162.

Bartelt, RJ, Hossain, MS (2010) Chemical ecology of *Carpophilus* sap beetles (Coleoptera: Nitidulidae) and development of an environmentally friendly method of crop protection. *Terrestrial Arthropod Reviews* **3**, 29-61.

Bartelt, RJ, James, DG (1994) Aggregation pheromone of Australian sap beetle, *Carpophilus davidsoni* (Coleoptera: Nitidulidae). *Journal of Chemical Ecology* **20**, 3207-3219.

Baxter, JR, Elzen, PJ, Westervelt, D, Causey, D, Randall, C, Eischen, FAW, W T (1999) Control of the small hive beetle in package bees. *American Bee Journal* **139**, 792-793.

Benda, ND, Boucias, D, Torto, B, Teal, P (2008) Detection and characterization of *Kodamaea ohmer*i associated with small hive beetle *Aethina tumida* infesting honey bee hives. *Journal of Apicultural Research* **47**, 194-201.

Boucias, D, Teal, PEA, Torto, B, Tumlinson, JH, 2006. An in-hive trap and attractant composition for the control of the small hive beetle, *Aethina tumida*. US Patent, USA.

Buchholz, S, Merkel, K, Spiewok, S, Pettis, JS, Duncan, M, Spooner-Hart, R, Ulrichs, C, Ritter, W, Neumann, P (2009) Alternative control of *Aethina tumida* Murray (Coleoptera: Nitidulidae) with lime and diatomaceous earth. *Apidologie* **40**, 535-548.

Byers, JA (1992) Attraction of bark beetles, *Tomicus piniperda*, *Hylurgops palliatus*, and *Trypodendron domesticum* and other insects to short chain alcohols and monoterpenes. *Journal of Chemical Ecology* **18**, 2385-2402.

Casana-Giner, V, Gandia-Balaguer, A, Primo-Yufera, E (1999) Field trial of an attractant mixture for dipterous, including the pest *Ceratitis capitata* (Wiedemann) (Dipt,,

Tephritidae), in Valencia, Spain. *Journal of Applied Entomology* **123**, 47-48.
Cribb, BW, Rice, SJ, Leemon, DM (2013) Aiming for the management of the small hive beetle, *Aethina tumida,* using relative humidity and diatomaceous earth. *Apidologie* **44**, 241-253.
De Guzman, LI, Frake, AM, Rinderer, TE, Arbogast, RT (2011) Effect of height and colour on the efficiency of pole traps for *Aethina tumida* (Coleoptera: Nitidulidae). *Journal of Economic Entomology* **104**, 26-30.
Ellis, JD, Hepburn, HR (2006) An ecological digest of the small hive beetle (*Aethina tumida*) a symbiont in honey bee colonies (*Apis mellifera*). *Insectes sociaux* **53**, 8-19.
Elzen, PJ, Baxter, JR, Westervelt, D, Randall, C, Delaplane, KS, Cutts, L, Wilson, WT (1999) Field control and biology studies of a new pest species, *Aethina tumida* Murray (Coleoptera, Nitidulidae), attacking European honey bees in the Western Hemisphere. *Apidologie* **30**, 361-366.
Elzen, PJ, Baxter, JR, Westervelt, D, Rivera, R, Cutts, L, Randall, C, Wilson, WT (1998) Small hive beetle control: USDA initial lab study results. *Bee Culture* **10**, 19-20.
Hepburn, HR, Radloff, SE (1998) 'Honey bees of Africa.' (Springer Verlag: Berlin, Germany)
Hood, WA, Miller, GA (2003) Trapping small hive beetles (Coleoptera: Nitidulidae) inside colonies of honey bees (Hymenoptera: Apidae). *American Bee Journal* **143**, 405-409.
Hood, WM (2000) Overview of the small hive bettle *Aethina tumida* in North America. *Bee World* **81**, 129-137.
Hood, WM (2004) The small hive beetle, *Aethina tumida*: a review. *Bee World* **85**, 51-59.
Hood, WM (2006) Evaluation of two small hive beetle traps in honey bee colonies. *American Bee Journal* **146**, 873-876.
Hossain, MS, Bartelt, RJ, Hossain, MABM, Williams, DG, Chandra, S (2008) Longevity of pheromone and co-attractant lures used in attract-and-kill stations for control of *Carpophilus* spp. *Entomologia Experimentalis et Applicata* **129**, 148-156.
Lamb, H, Leemon, DM (2011) Small hive beetle damage to Queensland apiaries. In 'Apimondia. Buenos Aires, Argentina'.
Leemon, DM (2012) In-hive Fungal Biocontrol of Small Hive Beetle. Rural Industries Research and Development Council, Canberra, Australia.
Levot, G (2008a) Feasibility of in-hive control of adult small hive beetles Aethina tumida Murray (Coleoptera: Nitidulidae) with an insecticide treated refuge trap. *General and Applied Entomology* **37**, 21-25.
Levot, GW (2008b) An insecticidal refuge trap to control adult Small Hive Beetle, *Aethina tumida* Murray (Coleoptera: Nitidulidae) in honey bee colonies. *Journal of Apicultural Research* **47**, 222-228.
Levot, GW, 2009. Small Hive Beetle control harbourage. NSW Department of Primary Industries, Orange; Rural Industries Research and Development Corporation, Barton, USA. 5.
Levot, GW, Somerville, D (2012) Efficacy and safety of the insecticidal small hive beetle refuge trap APITHOR™ in bee hives. *Australian Journal of Entomology* **51**, 198-204.
Lundie, AE, 1940. The small hive beetle, *Aethina tumida*. Department of Agriculture and Forestry, Union of South Africa. Pretoria, Transvaal Province. Scientific Bulletin 220:
Montgomery, ME (1983) Ethanol and other host-derived volatiles as attractants to beetles that bore into hardwoods. *Journal of Chemical Ecology* **9**, 181-190.
Mostafa, AMW, R N (2002) New record of the small hive beetle in Egypt and notes on its distribution and control. *Bee World* **83**, 99-108.
Muerrle, TM, Neumann, P, Dames, JF, Hepburn, HR, Hill, MP (2006) Susceptibility of adult *Aethina tumida* (Coleoptera: Nitidulidae) to entomopathogenic fungi. *Journal of Economic Entomology* **99**, 1-6.
Murray, A (1867) List of Coleoptera received from Old Calabar. *Annals and Magazine of Natural History London* **19**, 167-179.
Neumann, P, Elzen, PJ (2004) The biology of the small hive beetle (*Aethina tumida*, Coleoptera : Nitidulidae): Gaps in our knowledge of an invasive species. *Apidologie* **35**, 229-247.
Neumann, P, Hoffmann, D (2008) Small hive beetle diagnosis and control in naturally infested honeybee colonies using bottom board traps and CheckMite plus strips. *Journal of Pest Science* **81**, 43-48.
Nolan, MP, Hood, WM (2008) Comparison of two attractants to small hive beetles, *Aethina*

tumida, in honey bee colonies. *Journal of Apicultural Research* **47**, 229-233.
Nout, MJR, Bartelt, RJ (1998) Attraction of a flying nitidulid (*Carpophilus humeralis*) to volatiles produced by yeasts grown on sweet corn and a corn-based medium. *Journal of Chemical Ecology* **24**, 1217-1239.
Peterson, SM, Hood, WM (2012) 'Investigations into "trapping sinks" to control small hive beetles, *Aethina tumida*, in apiaries of honey bees, *Apis mellifera* American Bee Research Conference.' Greenbelt, MD, 7-8 February, 2012.
Somerville, D (2003) Study of the small hive beetle in the USA. Rural Industries Research and Development Council, Canberra, Australia.
Suazo, A, Torto, B, Teal, PEA, Tumlinson, JH (2003) Response of the small hive beetle (*Aethina tumida*) to honey bee (*Apis mellifera*) and beehive-produced volatiles. *Apidologie* **34**, 525-533.
Torto, B, Arbogast, RT, Alborn, H, Suazo, A, van Engelsdorp, D, Boucias, D, Tumlinson, JH, Teal, PEA (2007a) Composition of volatiles from fermenting pollen dough and attractiveness to the small hive beetle *Aethina tumida*, a parasite of the honeybee *Apis mellifera*. *Apidologie* **38**, 380-389.
Torto, B, Arbogast, RT, Van Engelsdorp, D, Willms, S, Purcell, D, Boucias, D, Tumlinson, JH, Teal, PEA (2007b) Trapping of *Aethina tumida* Murray (Coleoptera : Nitidulidae) from *Apis mellifera* L. (Hymenoptera : Apidae) colonies with an in-hive baited trap. *Environmental Entomology* **36**, 1018-1024.
Torto, B, Boucias, DG, Arbogast, RT, Tumlinson, JH, Teal, PEA (2007c) Multitrophic interaction facilitates parasite-host relationship between an invasive beetle and the honey bee. *Proceedings of the National Academy of Sciences of the United States of America* **104**, 8374-8378.
Torto, B, Suazo, A, Alborn, H, Tumlinson, JH, Teal, PEA (2005) Response of the small hive beetle (*Aethina tumida*) to a blend of chemicals identified from honeybee (*Apis mellifera*) volatiles. *Apidologie* **36**, 523-532.

University of the Sunshine Coast's CRN Research Fellow **Dr Helen Nahrung** (GeneCology and Forest Industry Research Centre) taking a core sample from a pine tree in Beerburrum. Dr Nahrung has just returned from the **International Union of Forest Research Organisations World Congress** in Salt Lake City, UT, USA. Along with her colleagues Dr Manon Griffiths and Michael Ramsden (Hancocks Queensland Plantations), they are trying to work out whether inoculating trees with parasitic nematodes will work to suppress the exotic woodwasp *Sirex noctilio* on the hybrid pine trees grown on the Sunshine Coast and further north.

Report on the Australian Entomological Society's 50th Anniversary & 45th AGM

Penny Mills

The annual conference of the Australian Entomological Society was held this year at the Shine Dome, Canberra (**above**) from September 28–October 1. It was a momentous conference because the society was celebrating its 50th anniversary. Approximately 200 entomologists from across Australia and beyond attended. At the traditional drinks and welcoming reception, and during the conference, insect-themed artworks were on display, courtesy of artists from the **Wildlife and Botanical Artists (WABA) Inc.** A popular insect subject was the ESQ's emblem, the rainbow (king) stag beetle *Phalacrognathus muelleri* (**Figs 1–3**). Other popular subjects were lepidopterans, dipterans and cooloola monsters (**Fig 4**).

Each full day of the conference opened with a plenary. The three plenary speakers were **Oliver Niehuis**, who discussed the use of genomes and transcriptomes to investigate deep phylogenetic relationships amongst insects, **May Berenbaum**, who looked at how we can learn from the past to solve the entomological challenges of the present and future, and **Ryszard Maleska**, who talked about going beyond DNA sequences and using genomics to bridge the gap between genotype and phenotype.

The remaining scheduled talks across three full days covered many aspects of entomology, including chemical ecology, systematics, biogeography, information processing, biological control and biosecurity,

phylogenomics, ecosystem services and forensic entomology. The **Phil Carne Prize** to honour high quality entomological research from students was awarded to **Nicholas Fountain-Jones of the University of Tasmania** for his paper entitled "Living near the edge: Being close to mature forest increases the rate of succession in beetle communities" available from the journal ***Ecological Applications***.

Accompanying the talks was a corridor full of posters that were as varied as the oral presentations. Delegates were able to ask questions and discuss the research on display with the poster presenters.

In addition to the talks and posters, a number of workshops were held during and after the official ending of the conference. Attendees could choose to attend a workshops on photography, phylogenomics, PADiL and a student-focused workshop about social networking.

The conference dinner was held at **Old Parliament House**, and the main order of business (apart from enjoying the food and alcohol) was to honour the founding members of the society.

Eight founding members [& wives] were present: **Geoff Bedford, Jo Cardale, Bruce** [& Maree] **Champ, Ted Edwards, Dinah Hales, Max Moulds, Don Sands, Bob** [& Wendy] **Taylor;** and they entertained us with stories of field trips and the early days of the society.

The AES also held its 45th annual general meeting. Issues brought up at the meeting included the potential disbanding of the Conservation Society, the validity of taxonomic names in early view articles, and a rundown of the society's finances. Additionally, two current ESQ members, **Nancy Schellhorn** and **Gurion Ang** joined the AES' board of directors, joining **David Yeates, David Merritt, Phil Weinstein, Michael Braby** and **Murray Fletcher**.

The closing ceremony included the best student talk prize being awarded to **Gurion Ang**, and the CHAEC speaker prize for the best presentation focused on collection-based research awarded to **Andrew Young**. The winner of the **Mackerras Medal** (awarded every two years to a society member under the age of 50 who has shown excellence in entomology) was presented to **Anthony (Tony) Clarke** from QUT.

A special visitor at the closing ceremony, **Alvin Simmons** of the USDA and co-chair of the 2016 **International Congress of Entomology**, invited all delegates and members of the AES to attend the congress in two years' time, which is to be held September 25–30, in Orlando, Florida.

The conference concluded with S**teve Cameron** of QUT extending an invitation to conference attendees to come to Cairns, Queensland for the next AES conference in 2015. I hope to see many ESQ members making

the journey next year for the conference. I would also like to extend my thanks to the hard-working committee of this year's conference, David Yeates, David Rowell, Ian Naumann, Saul Cunningham and Alice Wells, for running an extremely successful 2014 AES conference.

Figs 1-3. The ESQ's emblem, the rainbow (king) stag beetle *Phalacrognathus muelleri*, was a popular motive among the artworks on display. Artists: Cheryl Hodges, Julia Landford and Nilavan Adams. (Photos by Penny Mills).

Fig 4. Coolloola Monster Under the Stars, Artist: Sarah Mitchell. For more information see Wildlife and Botanical Artists (WABA) Inc. at http://waba.net.au

WANT TO JOIN THE SOCIETY ?

Visit our website at:

http://www.esq.org.au/

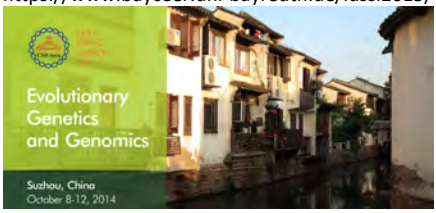
where you will find nomination forms and full details of fees and addresses.

There are also forms for existing members to use to pay their subscriptions. Coming meetings and excursions are listed.

Procedures for publishing in our journal, ***The Australian Entomologist***, are explained with a full ***Guide to Authors*** plus forms for taking out a subscription to the journal.

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

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/



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

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**

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The Australian Entomologist PO Box 537, Indooroopilly, QLD 4068

THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NOTICE OF NEXT MEETING

Tuesday 11th November 2014, 1:00 pm

Natural History and Systematics of Flower Flies (Diptera: Syrphidae)

Dr Jeff Skevington

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

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