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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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. 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.

ENTOMOLOGICAL SOCIETY OF QUEENSLAND

Minutes for General Meeting

10 June 2014

Held in the Seminar Room, Ecosciences Precinct, Boggo Rd, Dutton Park, Tuesday, June 10th at 1:00pm

Attendance: Gurion Ang, Weng Chow, Lyn Cook, Kathy Ebert, Manon Griffiths, Andrew Hayes, David Holdom, Susan House, Ross Kendall, Christine Lambkin, Simon Lawson, Dianna Leemon, David Merritt, Penny Mills, Chris Moeseneder, Helen Nahrung, Bill Palmer, Brenton Peters, Natasha Riding, Lisa Rigby, Jane Royer, Don Sands, Helen Schwenke, Owen Seeman, Noel Starick, Fede Turco, David Walter

Visitors: Teshale Degafu, Hazel Perry, Wilmot Senaratne

Apologies: Bradley Brown, Gary Cochrane, Monce Moradi, Morris McKee, Geoff Monteith, John Moss, Robert Raven, Nancy Schellhorn, Alisha Steward, Susan Wright

Minutes: The minutes of the last meeting were circulated in *News Bulletin* 42[3], May 2014. Moved the minutes be accepted as a true record: Don Sands; Seconded: Christine Lambkin. Carried: all

Nominations for membership:

The following nominations for Membership were received and approved by Council and are now presented to the general meeting for approval:

General

1. Mr Colin Beech, St Lucia Q 4067, Nominated by David Walter, Seconded by Federica Turco, carried: all
2. Dr. George Hangay, Frenches Forest NSW 2086. Nominated by Geoff Monteith, Seconded by Kathy Ebert, carried: all
3. Dr William Harrold, Willowbank, Q 4306. Nominated by Geoff Monteith, Seconded by Kathy Ebert, carried: all
4. Mr Robert Richardson, Blakehurst, NSW 2221. Nominated by Graham Owen, Seconded by Kathy Ebert, Carried: all.

General Business:

The Council has decided to start working on a revision of the constitution and hopes to have this finished by December in order to be ratified by the AGM in March. The changes will be mostly minor updates.

Council has formed a subcommittee to put together *News Bulletin* guidelines. Feedback on the *News Bulletin* is welcomed in order to help us in this

process. After some discussion over the use of capitals in common names, it was decided that it will be up to the discretion of the author.

Council is also exploring ways to encourage new members. Some ideas include photography or educational workshops. Any suggestions are welcomed.

Main Business:

Bill Palmer presented the **2014 Student Award** to Mr. Gurion Ang from the University of Queensland.

Gurion presented a synopsis of his thesis work entitled *Host plant volatiles and preference in a specialist and generalist parasitoid: to learn or not to learn?*

There were several interesting Notes and Exhibits presentations:

Noel Starick and Chris Lambkin presented some interesting information, photos, and specimens of a parasitic tachinid fly that did not immediately kill its host in: "Dining on the army worm"

Natasha Riding presented her current work in lantana control using an eriophyoid bud mite from South Africa that reduces flowering in lantana: "The lantana flower galling eriophyid"

Chris Moeseneder presented an exhibit of specimens and videos of an interesting behaviour in Cetoninae beetles.

Fede & Geoff Thompson displayed specimens and photos of ectoparasitic flies (Streblidae and Nycteribiidae)

Next meeting: 12 August 2014, 1pm, Our guest speaker will be John McKeown with his talk entitled "The entomologist gets the trout".

Meeting closed: 1:55pm

MESSAGE FROM THE TREASURER

Membership subscriptions were due 1st January 2014.

Despite a reminder recently some members are still un-financial.

Subscriptions are cancelled in accordance with *Clause 12. Termination of Membership* of the Constitution

(available at http://www.esq.org.au/constitution.pdf).

We don't want to lose you!!

A Membership Renewal Form is available at http://www.esq.org.au/

If you are unsure of your subscription status or have recently changed your email or postal details please contact me.

Dr Brenton Peters, Honorary Treasurer

Box 537, INDOOROOPILLY QLD 4068

petersbc@tpg.com.au

NOTICE OF NEXT MEETING

Tuesday 12 August 2014

(ESQ does not meet in July)

The Entomologist gets the trout!

John McKeown

BIOGRAPHY. John McKeown retired in 2011 after 39 years in private legal practice. He and his wife Christine share a common love of the outdoors, especially fishing, bush walking, bird watching and, more lately, fly fishing for trout, particularly wary brown trout in New Zealand's South Island.

TALK SUMMARY. John will talk on his fly fishing experiences, particularly in New Zealand, and how a very basic knowledge of stream entomology can enhance the enjoyment of a day's sport on the stream. He will touch on various subjects including insect habitat and behaviour, fish feeding patterns and tying flies to imitate insects.

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

Host Plant Volatiles and Preference in a Specialist and Generalist Parasitoid: To Learn or Not to Learn?

Gurion C. K. Ang, University of Queensland

gurion.ang@gmail.com, www.gurion.wordpress.com

Gurion receives his award from ESQ President Bill Palmer.

Introduction

When herbivorous insects like the caterpillars of various butterflies and moths feed on plants, one response by the plant is to release odours in the form of volatile organic compounds, known as herbivore-induced plant volatiles (**HIPV**s). There is much debate in the literature about the role(s) of HIPVs, but we know that HIPV blends are unique to the plant species and the particular herbivore or the combination of herbivores feeding on the plant. It has been suggested that natural enemies of these herbivores, such as parasitoids, exploit their ability to detect and discriminate HIPV blends to locate their herbivore hosts.

The parasitoid *Cotesia glomerata* is host-specific to pierid butterflies, but a generalist within the genus *Pieris*, which includes the small cabbage white butterfly *Pieris rapae* (life cycle of *Pieris rapae* and *Cotesia glomerata* in **Fig 1**). The cabbage white butterfly is a cosmopolitan pest; caterpillars have a voracious appetite for brassicaceous vegetable and oilseed crops including cabbage, broccoli, cauliflower and canola.

If, as has been commonly suggested, *C. glomerata* relies on HIPVs to detect and locate prey, and if HIPV profiles are unique to the herbivore-plant complex, we would expect that *C. glomerata* can discriminate between the HIPV signature produced from plants in response to feeding by host and non-host caterpillars to maximize its foraging efficiency. In my Honours year, I addressed this question through a series of laboratory experiments, using an olfactometer to evaluate the pre-alighting preferences of *C. glomerata* to various pairwise combinations of plants. The olfactometer comprises a glass Y-tube where a single, female wasp was introduced (**Fig 2**). Each of the arms corresponded to a chamber containing a certain plant treatment.

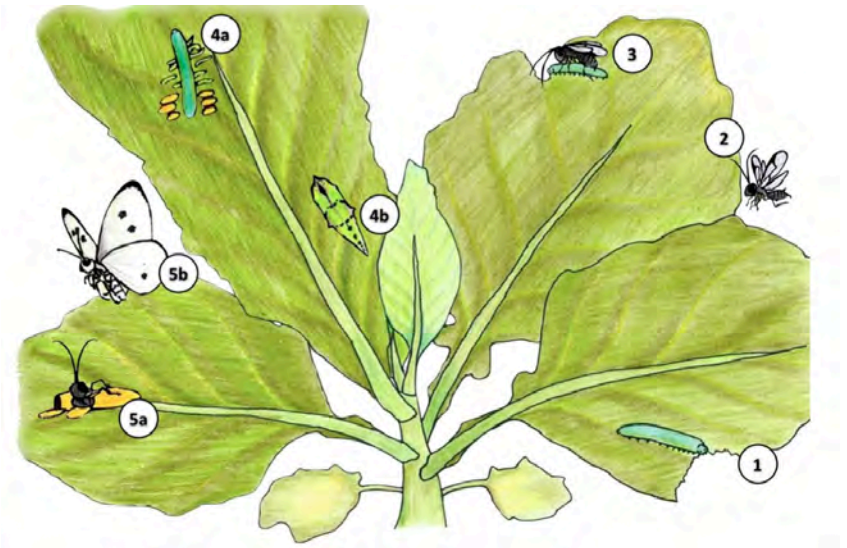

Fig 1. Schematic diagram of the relationship between a *Brassica* plant, *Pieris rapae* and *Cotesia glomerata*. (1) feeding by caterpillar; (2) location of infestation site(s) by mated female *C. glomerata*; (3) parasitism of caterpillar; (4a) emergence and pupation of wasp larvae of parasitized caterpillar (the caterpillar dies); (4b) pupation of unparasitized caterpillar; (5a) emergence of adult *C. glomerata*; (5b) emergence of adult *P. rapae*. Not drawn to scale; illustrated by G. Ang.

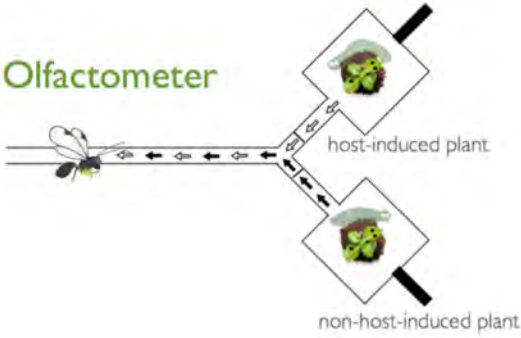

Fig 2. Simplified diagram of the olfactometer, including the glass Y-tube where the parasitoid was released and exposed to two Host Induced Plant Volitile blends from plant treatments (an example shown here of host-induced plant versus non-host-induced plant) as indicated by the black and white arrows. The mark on each arm indicates the point at which if breached, the wasp was scored to prefer a certain plant treatment. Note also that the caterpillars appear translucent; this indicates that herbivory was alleviated prior to testing in the olfactometer.

The Naïve Response

When presented with a choice between a damaged (by host or non-host caterpillar) plant and an intact plant, naïve female wasps preferred damaged plants. This suggests that attraction to a plant is not based on a specific HIPV signature from host infestation, but rather plant damage in general. In fact, mechanical damage also makes a plant more attractive to female wasps. This is further supported since female wasps could not discriminate between host and non-host infested plants. Also, when given a choice between a plant infested with both host and non-host caterpillars, no preference was shown by female wasps. The non-host used was the diamondback moth *Plutella xylostella*, another infamous pests of cruciferious plants.

The Effect of Experience

Parasitoids are particularly proficient at learning. When it encounters a host, it uses the positive parasitism experience as an opportunity to learn cues associated with its host prey. Although the literature is dominated with the learning of chemical cues, parasitoids also enhance their learning through visual, tactile and host behavioral cues. When presented with the same pairwise combinations of plants in an olfactometer, experienced females could discriminate host from non-host infestations, and were more attracted to host-infestations. Interestingly, when presented with a non-host infested plant and a dually-infested plant, experienced females were more attracted to dual infestations. This suggests that experienced females not only learn host-specific cues to get better at locating host prey, but they can also detect hosts from within heterospecific cultures. Such infestations are commonplace in the field and it is hence to a parasitoid's advantage if she can find her host prey in a very complex, heterogenous environment.

Time Changes HIPV profiles

HIPV profiles change over time. Upon the alleviation of herbivory, a plant tends to 'recover' back to its original 'volatile' state. Naïve wasps, not surprisingly, are unable to discriminate between these changes over time. In experienced wasps, the effect of learning also begins to wane. By the third day, experienced wasps are unable to discriminate host from non-host infestations, nor host from within mixed infestations. This suggests that the HIPV profile of plants change significantly over time, and can influence a parasitoid's choice preference in unpredictable ways. I argue that for generalist species like *C. glomerata*, it is important to remain receptive to a broad range of cue types to maximize foraging efficiency of multiple hosts, and so learning of a specific cue and retaining that memory may not be evolutionarily advantageous.

Generalist versus Specialist

It is hence important to contrast preferences of a generalist with a specialist parasitoid, and *Diadegma semiclausum*, a specialist parasitoid of the diamondback moth provided a good model species (note that the host species for either parasitoid is different, **Fig 3**). Again,

unsurprisingly, naïve wasps of either parasitoid species did not discriminate between the various pairwise combinations of infested plants, but responded only to plant damage rather than damage by a specific host. However, experienced specialists were not only able to discriminate host from non-host, and locate their hosts within mixed infestations, that preference was prolonged and female wasps still preferred host-infested (singly or with a non-host) plant treatments three days after herbivory was alleviated. This suggests that there is possibly a cue type (perhaps a single or narrow range of HIPVs) that is still present some time after herbivory is alleviated, and it is this HIPV(s) that a specialist has learned. Similarly, I argue that it is in a specialist's interest to learn host-specific cues and retain that memory for subsequent foraging attempts, since they are limited to a single host prey.

Future Studies

As diverse a host range as some parasitoids may have, host plant ranges utilized by host herbivores are more diverse. HIPV profiles differ dramatically even between plant species of the same genus, so parasitoid responses to these differences remain unpredictable. We have found contrary effects of herbivory on the egg laying patterns of their herbivore hosts mainly between the European and Chinese cabbages, so understanding if these effects extend to a parasitoid's behaviour will be an exciting avenue of future research.

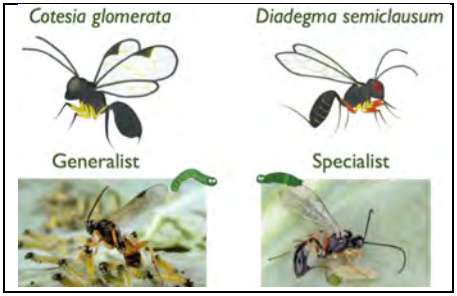

Fig 3. (Right) The generalist parasitoid *Cotesia glomerata*, which attacks cabbage white caterpillars (genus *Pieris*), and (Left) the specialist parasitoid *Diadegma semiclasum*, which attacks caterpillars of the diamondback moth *Plutella xylostella*.

References:

Gurion C.K. Ang, Myron P. Zalucki & Michael J. Furlong. 2012. Menage a trois: the problem with three-way interactions involving predatory wasps. *Macquarie Matrix* 2: 1-13.

Gurion C.K. Ang, Rehan Silva, Sean L. Maxwell, Myron P. Zalucki & Michael J. Furlong. 2013. Contrary effects of leaf identity and position on oviposition and larval feeding in the diamondback moth. *Entomologia Experimentalis et Applicata* 151: 86-96.

Acknowledgements

My Honours year would not have been fulfilling without the guidance and support from my supervisor Michael Furlong. I also acknowledge the following people who have contributed in some way to my thesis: Gimme Walter, Myron Zalucki, Bronwen Cribb, and Simon Blomberg. Thank You ESQ for the 2014 Student Award.

Meet our New Members

(New 2013-2014 members are encouraged to introduce themselves to the Society: send information & images to Dave Walter **dwalter@usc.edu.au**)

Robert Richardson Blakehurst, NSW

I'm an amateur beetle photographer / collector / observer from Sydney. My renewed interest in Entomology has occurred a bit later in life and was started due to the interest my 2 boys had in beetles. I have been a member of the **Society of Insect Studies**, based in Sydney for about 8 years and have enjoyed the friendship and trips over that time.

I really enjoy taking photos in their natural surroundings and have had my photos used in the **Australian Museum** website on mantisflies, 13 photos used in a new book just released called *The Handbook for Royal National Park*, and another book on *Australian Cockroaches* just released by David Rentz has a few of my photos.

My trips into the bush are getting longer and more varied which is my reason for wanting to join the **Entomological Society of Queensland**. I look forward to reading the *News Bulletin* and coordinating some trips to QLD so I may be able to join some of the field trips and meet new people.

Cyrioides imperialis (Fabricius, 1801) Banksia Jewel Beetle, south of Sydney Jan 2014. Photo by Robert Richardson.

Temognatha limbata (Donovan, 1805) found Dec 2013 north of Sydney.
Photo by Robert Richardson.

International Organisation for Biological Control – Young Scientist Awards
IOBC IS OFFERING SPONSORSHIP TO ATTEND
THE AUSTRALIAN ENTOMOLOGICAL SOCIETY CONFERENCE
28 SEP – 1 OCT 2014 IN CANBERRA

To qualify for IOBC support, applicants must be:
A member of IOBC; to join now contact: groentemanr@landcareresearch.co.nz
Less than 35 years of age
Presenting a paper or poster on biological control or a related IPM topic

Bugs & Bugcatchers in the News

Visitors to Queensland

Associate Professor Xiao-Feng Xue of the Department of Entomology, Nanjing Agricultural University, Jiangsu Province, China, is visiting Australia on a fellowship from the Chinese Scholarship Council. His interests are in the systematics, phylogenetics and evolution of eriophyoid mites and the population structure of Western Flower Thrips.

While in Queensland, he is cooperating with **Renfu Shao** (University of Sunshine Coast, Sippy Downs) in research on the mitochondrial genome of eriophyoid mites. Eriophyoid mites include a number of important plant parasites and vectors of plant disease. Xiang-Feng and Renfu are using nucleotide sequences to evaluate the current taxonomy system.

Australian Entomological Society Awards

Nominations are open for two awards presented by the AES

Mackerras Medal

To nominate a person, please provide the following information by 31 July:

Full name, date of birth and current position of the nominee.

Your name and contact details.

Maximum 2 pages: provide details of the nominee's contribution to entomology which you believe qualifies him/her for this award.

A copy of the nominee's current curriculum vitae.

Send your nomination to **admin@austentsoc.org.au**

Please mark clearly, **"Nomination for the Mackerras Medal".**

Phil Carne Prize

The prize is open to any **honours** or **postgraduate student** enrolled in an Australian University, either full-time or part-time, who has not submitted their thesis by the closing date.

Entrants have to be members of the **Australian Entomological Society**.

Entries for the prize should be in the form of a scientific paper that deals with research on any entomological topic (or allied group of terrestrial organisms such as mites or spiders). The paper can be in the form of a scientific manuscript ready for publication, a paper that has been accepted for publication or a paper published since the beginning of the previous year to the closing date, but must result from the student's higher degree studies.

Send a pdf of the paper and a scanned copy of the completed application form to **admin@austentsoc.org.au no later than the 31st July 2014.** Please mark clearly **"Entry for Phil Carne Prize"**

Brown Dog Tick Bounty

Wanted alive & hungry with all 8 legs

Turn irritating parasites into cash. Brown dog ticks are in high demand by Vetx Research, a contract veterinary research organisation in NSW. Several thousand are needed for an upcoming study that will benefit the health of dogs. Chrissie Jackson, the resident Entomologist/Parasitologist is appealing for dog owners, vets and kennel owners to hunt for the common pest in exchange for a bounty of 50 cents per tick. They must be live, un-engorged, in good condition and able to reattach to a host. Paralysis ticks are in equally high demand and command a higher price at a whopping $2.50 per tick. Anyone interested should email **cjackson@wrc.net.au** or call **02 6663 7255**. Collection tubes can be provided and postage paid for.

Fruit-piercing Moths Wanted: Dead, Dried, Papered

Eudocima materna (L) & *E. phalonia* (L), Pie Creek, Qld. Photos DE Walter

Wanted for taxonomic studies: dried, dead, papered specimens from any world location for an ongoing planned world revision of this genus. Please contact me if you can provide moths of the genus *Eudocima* for my research. These species are agricultural pests and are not protected species, but shipments from Australia should be to a CITES registered institution.

Purchase or exchange. Contact: vabrou@bellsouth.net. Vernon Antoine Brou Jr., 74320 Jack Loyd Road, Abita Springs, Louisiana, USA 70420

A Winter Migration of Caper White Butterflies in Queensland

by John V. Peters, Ryde, NSW email: drumhill11@bigpond.com

Fig 1. Caper White *Belenois java teutonia* (Fabricius). Photo by Vanessa Bugg.

Migrations of Caper White Butterflies (*Belenois java teutonia*) are usually an annual occurrence in Australia but there are very few records of these migrations during the last 50 years (Peters, 2012). Very recently my granddaughter Emma Bugg (18) reported to me, on 5th June, 2014, that she had been observing a migration of Caper White Butterflies, "for a week now". The butterflies were flying in a northerly direction in sufficient numbers to be very obvious. Emma was reporting from Amby which is located on the Warrego Highway between Roma and Mitchell, where she works on a local property. The butterflies were common as far east as Roma but were not observed by her during a trip to Bollon which is south west of Amby.

At my request Emma sent me photographs of the butterflies to confirm their identity. These were taken on 8th June suggesting a migration lasting at least eleven days.

Records of Caper White migrations from Queensland all refer to the migrations taking part in spring i.e. from September through to December (Williams 1930, 1958). One record quoted by Williams refers to a report by Dodd, "it is said to breed in South Queensland in thousands and then to move north, appearing in the Cairns district at the end of October".

I am reporting this migration because of its strange timing as I have not come across any previous migrations of this species occurring in winter. I would appreciate hearing from anyone who observed this migration because of its unusual occurrence at this time of the year.

References

Peters, John V. 2012. A tribute to Courtenay Smithers and his butterfly migration studies. *Australian Entomologist* 39(4): 239-246

Williams, C.B. 1930. *The Migration of Butterflies*. Oliver and Boyd, Edinburgh and London; 473pp.

Williams, C.B. 1958. *Insect Migration*. Collins, London; 235pp.

MESSAGE FROM THE TREASURER

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Despite a reminder recently some members are still not financial.

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Dr Brenton Peters, Honorary Treasurer

Box 537, INDOOROOPILLY QLD 4068

petersbc@tpg.com.au

Fig 1. Mural at Sherwood station with several colourful butterflies. All Images P. Mills.

Insects in Art: Sherwood and Chelmer train stations, south-west Brisbane

Penelope Mills, University of Queensland

This is another installment of the irregular “Insects in Art” segment for the ESQ *Bulletin*. By driving the "scenic route" to The University of Queensland several times, I came across some insect-inspired art on some of our local train stations. For the past several years there has been a QR initiative in place to beautify railway stations with the help of local communities. Both Sherwood and Chelmer train stations have insect-inspired art created by Sherwood State School, Sherwood Respite Centre, Oxley Creek Catchment Association (Sherwood station) and Milperra State High School (Chelmer station).

Fig 2. Bees, including one painted with a corbicula covered in pollen (Sherwood station).

Fig 3. Glasshouse surrounded by a large ladybug and large fly (Sherwood station).

Figs 4-5. Colourful dragonfly hovering above a creek and Science Centre painted (Sherwood station).

Sherwood station includes colourful-butterflies (**Fig 1**), bees with pollen collected on a corbicula (**Fig 2**), a glasshouse with a large ladybug and fly nearby (**Fig 3**), a hovering dragonfly above a representation of

Oxley Creek (**Fig 4**), and even a science centre which shows a cage of invertebrates and caterpillars that resemble *Cactoblastis cactorum* feeding on *Opuntia* (**Fig 5**).

The Chelmer station is Lepidopteran-themed, with many colourfully-painted butterflies and butterfly wings. Although many of the painted butterflies at Chelmer (**Figs 6-8**) appear to represent "new and never before seen" species, several of the paintings portray known species, particularly the monarch or wanderer butterfly *Danaus plexippus*, although with 'swalowtails' and absent antennae, as seems to be the general theme).

The murals at both train stations are bright and colourful, and I hope other members of the society are able to stop by to enjoy the insect-inspired art.

I would be keen to hear about any other insect-inspired art at our local train stations.

Fig 6 -8. Colourful "new to science butterflies" at Chelmer station, the bottom one resembling *Danaus plexippus*.

All issues starting from 37(3) Sept. 2010, including the Courtenay Smithers special issue 39(4), are now available online

The Australian Entomologist available online for purchase

The Australian Entomologist is now available online on the RMIT website (www.informit.com.au) or at this link to RMIT search engine: http://search.informit.com.au/titles
Our journal is listed as "**Australian Entomologist, The**".
Purchase price is only $1.98 per PDF!

Autumn Cluster Moth 10th Anniversary

Fig 1. Aggregation of Autumn Cluster Moths *Dichomeris capnites* (Meyrick, 1904) in the Mary River Valley south of Gympie 19 May 2014. Photo DE Walter.

Ten years ago Chris Burwell and Susan Wright of the Queensland Museum published an article in the *News Bulletin* on large aggregations of the Autumn Cluster Moth *Dichomeris capnites* (Meyrick, 1904) (previously in *Ypsolophus*, Gelechiidae, Dichomeridinae). They also reported that the lepidopterist Jefferis Turner had long ago (1919) described a 20m long aggregation along a creek near Gympie where "the total number of insects must have been beyond computation". Aggregations have been reported at least from Brisbane to Bundaberg (see references), but the reason for these aggregations is still a mystery.

In contrast to the better known summer aestivation masses of the Bogong Moth (*Agrotis infusa* (Boisduval, 1832), Noctuidae) in high elevation caves and crevices, the Autumn Cluster Moth aggregates on vegetation in autumn and winter, but takes flight readily during the day and shows up at lights at night. When disturbed during the day, the fluttering mass resembles smoke and presumably this behavior gave rise to the species name (from the Greek for smoke [*capn*] and belonging to [-*ites*]). ESQ member Robert Whyte has additional pictures and a video clip on the *Save Our Waterways Now* website.

References:

Burwell CJ & SG Wright. 2004. Autumn aggregations of *Dichomeris capnites* (Meyrick) (Lepidoptera: Gelechiidae). *News Bulletin of the Queensland Entomological Society* 32(4): 90-93.

Gardner D. 2013. The Darling Downs Naturalist Newsletter #679 October 2013.

Turner AJ. 1919. The Australian Gelechianae (Lepidoptera). *Proceedings of the Royal Society of Queensland* 31: 108-172.

Whyte R. *Save Our Waterways Now* (accessed 23 June 2014) http://www.saveourwaterwaysnow.com.au/01_cms/details_pop.asp?ID=965

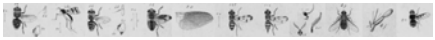
Meetings & Conferences

5th International Conference on Phthiraptera
August 2–7 2014
Canyons Resort, Utah, USA
http://www.conferences.utah.edu/icp5/index.html

10th European Congress of Entomology
August 3–8 2014
University of York, York, UK
http://www.royensoc.co.uk/meetings/20140803_ece2014.htm

51st Annual Conference of the Animal Behavior Society
August 9–14 2014
Princeton University, Princeton, USA
https://abs2014.princeton.edu/

15th Congress of the European Society for Evolutionary Biology
August 10–15 2014
Lausanne, Switzerland
http://www3.unil.ch/wpmu/eseb2015/symposium-information/



8th International Congress of Dipterology
August 10–15 2014
Kongresshotel Postdam, Postdam, GERMANY
http://www.icd8.org/

7th International Conference on the Biology of Butterflies
August 11–14 2014
University of Turku, FINLAND
http://nymphalidae.utu.fi/icbb2014/index.html

The International Firefly Symposium: Illuminating Discovery
August 11–15 2014
Hilton University of Florida Conference Center, Gainesville, USA
http://www.conference.ifas.ufl.edu/firefly/

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

XXV International Congress of Entomology: Entomology Without Borders
September 25–30, 2016
Orlando, Florida, USA
http://ice2016orlando.org/
University of Illinois, Urbana-Champaign, US

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

NOV 2014-Tuesday 11th

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

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

SOCIETY SUBSCRIPTION RATES

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THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND

NOTICE OF NEXT MEETING

Tuesday 12th August 2014, 1:00 pm

The Entomologist gets the trout!

John McKeown

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 5 (August 2014)
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DEADLINE - Wednesday 20 August 2014
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