Welcome to our second newsletter!

With the middle of 2015 now well and truly upon us, I am sure that many of you – like me – are wondering where the year has gone. It’s difficult to believe that it’s been four months since we put together the first TAAO newsletter!

First off, it is with some regret that I inform you that Prof. Keng Hong Tan has respectfully relinquished his position on the TAAO Steering Committee. I take this opportunity to sincerely thank Hong for his enthusiastic involvement in the reinvigoration of TAAO, and for his valuable experience and contribution to date. While no longer officially on the SC, I hope that we can nevertheless draw upon Hong’s extensive knowledge and expertise into the future. In his stead, I officially welcome Dr. Suk-Ling Wee to the SC. I have known Suk-Ling for a few years now, and can vouch for her enthusiasm, friendliness, expertise, and energy which I am sure she will bring to the role. A short bio of Suk-Ling is included in this issue.

Also included are contributions from TAAO members from across our region, together with some important upcoming dates. Our friends in China report on tephritid meetings as well as activities relating to *Drosophila suzukii*; while not a tephritid, this species is unusual in that it attacks fresh fruit, unlike most other *Drosophila* species that are attracted to fermenting fruit. In that respect, it is similar to our pest fruit flies and represents a major threat to food security.

On a more sombre note, this year we have lost some widely respected fruit fly researchers from our community: Peter Teal, Serge Quilici, and most recently, Cheslavo Korytkoyski. Each of these gentlemen, from the USA, La Reunion, and Panama (resp.), have made significant contributions to the fields of fruit fly ecology, taxonomy, and chemical ecology over many years and will be sorely missed by the many friends and colleagues who knew them.

Finally, I encourage contributions for the next issue that we will be preparing for distribution in another four months at the beginning of December. We welcome news of meetings and events, articles on fruit fly biology and research, and opinion pieces that may provoke discussion. Please send your contributions to me by early November.

Best regards,

Mark Schutze (TAAO Steering Committee Chair)

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Scientific Advisory Services (SAS) now has available a range of resin-embedded blocks containing a variety of important pest fruit fly species from around the world. Species available include a number of genera including *Anastrepha*, *Bactrocera* and *Ceratitis*. At present species represented are *A. fraterculus*, *A. ludens*, *B. cucurbitae*, *B. dorsalis*, *B. tryoni*, *B. oleae* and *C. capitata*.

A number of Australian species will be added to the range shortly including *B. cucumis*, *B. frauenfeldi*, *B. jarvisi*, *B. kraussi*, *B. neohumeralis* and *B. tryoni*. An exotic species, *Bactrocera correcta* is also available for embedding. Flies intercepted in monitoring traps can be compared with the reference specimens mounted in the resin blocks. Quarantine agencies use the blocks for this purpose, in addition to their use as a training aid for quarantine inspectors. These blocks are also used by school and university students.

The clear resin enables the flies to be examined under a microscope while protecting the integrity of the specimens. As reference specimens no special storage requirements are required unlike pinned specimens which are subject to fungal decay and damage. Each block is unique and so each block can be viewed at the SAS website. SAS would like to receive samples of other pest species for embedding. Species we are keen to obtain are *Toxotrypana curvicauda*, *Rhagoletis* species and *Ceratitis* species other than *C. capitata*. We are happy to pay any freight costs. We have recently, also been embedding tramp ant species for quarantine agencies and can embed a range of specimens along with your organization logo.

Blocks are currently available in several different languages including English, Portuguese and Spanish. Please visit the website www.saspl.com.au/fruit-flies-in-resin-blocks/ for more information and to order. If you require advice on sending specimens or have any questions please contact Richard Piper at Richard@saspl.com.au or 04176 44660.
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The Queensland Department of Agriculture and Fisheries (DAF) Market Access Teams based in Cairns and the Ecosciences Precinct in Brisbane and the fruit fly group from Mareeba had a very productive few days at the Sunshine Coast at the end of May. DAF fruit fly research includes pre and post-harvest fruit fly control and the Cairns and Brisbane labs maintain cultures of eight endemic fruit fly species.

The group met to discuss procedures and protocols, project updates, and future planning. All three laboratories work independently and collaboratively on projects so this was a great opportunity to align methodologies and ensure that they are clearly understood by all team members and to be updated on each other’s research. There were some fairly ‘heated’ discussions on the merits of different methodologies but through comparing individual experiences, agreement was reached on when standard methods can be used and when methodology specific to a crop, location, fruit fly species, laboratory or other factor was more appropriate.

The session on pre-harvest included a walk through the tropical fruit block at Maroochy research station with a practical discussion of pre-harvest projects currently running in that block.

It wasn’t all hard work and it is an indication of how well our teams interact, in that all staff participated in the games events after dinner on both evenings - who knew Balderdash could be so much fun? The meeting ended with a group session at the Archery range. Fortunately there were no stray arrows and we all eventually hit the target. Obviously, a major outcome from this meeting was just getting to know each other better so that we perform better as a team and this was definitely achieved.

Photo. From Left to Right: Stef De Faveri, Pauline Wyatt, Liz Hall, Claudio De Faveri, Lara Senior, Marianne Eelkema, Peter Leach, Gail Lowe, Thelma Peek, Kellie Bilney, Brendan Missenden and Jacinta McMahon. (Missing Sybilla Oczkowicz and Trish Chay).
Suk-Ling Wee obtained her PhD in Applied Entomology from Universiti Sains Malaysia, Penang, in 2002. She started her career as a lecturer in Universiti Malaysia Terengganu in 2002 before joining Plant and Food Research in Lincoln, New Zealand (formerly known as HortResearch) a year later. Her kiwi stint of 4 years has benefited her research skills and career greatly. She joined Universiti Kebangsaan Malaysia in 2007 and was appointed as an Associate Professor of Entomology in 2012. Her research interest is on insect behaviour and insect chemical ecology - identification of behaviour modifying semiochemicals that mediate insect-insect, plant-insect and plant-insect-predator interactions, as well as use of sterile insect technique in area-wide control and management of insect pests. She has worked on pheromones, allomones, kairomones and synomones and their effects on the behaviour of fruit flies; radiation biology and cytological studies on moths in relation to sterile insect techniques; pheromone, behavior and electrophysiological studies on weevils and currently is focused on plant-insect interactions on tephritid fruit flies, diamondback moth and calliphorid flies. She is currently a council member of the Asia-Pacific Association of Chemical Ecologists, a sister society of the International Society of Chemical Ecology.
Biocontrol of Tephritid Fruit Fly with Entomopathogenic Fungus, *Metarhizium guizhouense*

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Narit Thaochan has been involved in tephritid fruit fly research ever since starting his Ph.D. in 2004, where he studied the gut bacteria community of Tephritid fruit flies in Australia and Thailand. Now, he and his students are working on biological control of Tephritid fruit flies i.e. *Bactrocera cucurbitae*, *B. latifrons* and *B. dorsalis* with the entomopathogenic fungus, *Metarhizium guizhouense*. This fungal strain is similar to *M. anisopliae* and virulent to insect pests. His team tested this biocontrol agent in a number of applications to control fruit flies such as inoculation directly on to the insect, mixed with botanical pesticides, soil application and auto-dissemination techniques. These applications not only focused on the adult stage but also on other stages of the fly (egg, last instar larvae and pupae). His team also provide help and support to farmers by providing information and technology to control fruit flies. He has published the following paper on the auto-dissemination of *M. guizhouense* on *B. cucurbitae*.


Currently, he is supported by the Endeavour Research Fellowship 2015 to carry out research on the role that gut bacteria play in the nutrition of larval Queensland fruit flies. The research is also supported by a grant from Horticulture Innovation Australia Ltd. For this research he is working under supervisor by Associate Professor Phillip Taylor, Discipline of Brain, Behaviour and Evolution, Department of Biological Science, Macquarie University, Australia.

Figure 1. Narit and his student observing mating behavior of an infected male *Bactrocera cucurbitae*, with *Metarhizium guizhouense* under field cage conditions at the Department of Pest Management, Faculty of Natural Resources, Prince of Songkla University, Hat Yai, Songkhla, Thailand.

Figure 2. (A) Infected male *Bactrocera cucurbitae*, transferring the biocontrol agent *Metarhizium guizhouense* to female fly through mating. (B) Pupae and (C) adult stages of *B. cucurbitae* infected with *M. guizhouense*. 

TAAO Newsletter Issue 02 (July 2015)
Fruit Fly Networking: Three Recent Events in China

Dr. Zhihong Li, Dr. Chandra Shekhar Prabhakar, Dr. Zihua Zhao, Mr. Ntweleni Singo

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German-Chinese Workshop on Prevention and Control of Spotted Wing Drosophila

Spotted wing Drosophila, Drosophila suzukii Matsumura (Diptera: Drosophilidae), originates in Asia and invaded Germany in 2011. It is regarded as the most serious problem for fruit production in Germany, especially in 2014. The German-Chinese Workshop on Prevention and Control of Spotted Wing Drosophila was held on June 16-17 in Beijing, and organized by German-Chinese Agricultural Center (DCZ) and Foreign Economic Cooperation Center (FECC). More than 30 scientists and officers from both sides took part in this workshop, including Dr. Puyun Yang (National Agro-Tech Extension and Service Centre), Prof. Zhihong Li (China Agricultural University), Prof. Chun Xiao (Yunnan Agricultural University), Prof. Changying Niu (Huazhong Agricultural University), Prof. Qinge Ji (Fujian Agricultural and Forestry University), Prof. Feng Zhang (MOA-CABI Joint Laboratory of Bio-safety, Chinese Academy of Agricultural Sciences) and others Chinese experts. During the workshop, questions about this research, upcoming projects and collaborations were discussed in detail.

Dr. Prabhakar visited Prof. Zhihong Li at CAUPQL

Dr. Chandra Shekhar Prabhakar visited CAUPQL (Plant Quarantine and Invasive Biology Laboratory, China Agricultural University) from June 5-19, 2015. During his visit, Dr. Prabhakar participated in lab activities on molecular identification of fruit flies. He also delivered a lecture titled “Diversity, Spread and Management of fruit flies (Diptera: Tephritidae) in India” and discussed the state of molecular research work on fruit flies in India. The team of Prof. Zhihong Li including Dr. Zihua Zhao, Ms Yujia Qin & Ms Fan Jiang (Both PhD Scholars) and Dr. Prabhakar discussed future collaboration on fruit fly research between CAUPQL and Department of Entomology, Bihar Agricultural University, Bhagalpur.
Main members of CAUPQL visited the Fruit Fly Laboratory at GD-IQTC

Members of the China Agriculture University Plant Quarantine and Invasion Biology Lab (CAUPQL) embarked on a trip to visit Guangdong Inspection and Quarantine Technology Center (IQTC). Seven members of the lab including three international students from South Africa visited the most compressive Quarantine institute/center in China. The Guangdong IQTC consists of 22 branches.

The Guangdong IQTC provides important technical supports to the Chinese inspection and quarantine authority (CIQA) and has had many achievements in scientific research. Services rendered includes product testing, inspection & verification services, proficiency testing, consulting & training and quarantine services which are more relevant to CAUPQL. Quarantine services focuses on both animal and plant quarantine as well as health quarantine for humans.

Prof. Li, Dr. Wu and Mr. Singo all gave presentations on different topics. Prof. Li gave a presentation on the mandate of the CAUPQL while Dr. Wu gave a presentation on plant quarantine in Guangdong and Mr. Singo gave a presentation on Fruit fly and plant quarantine in South Africa. Participants were given time to ask questions and received feedback from presenters.
The visit included a fieldtrip to the Botanical garden. Infested fruits were collected with the purpose of culturing fruit flies at the CAUPQL. A few traps were inspected to see how effective the new lure used by Prof. Liang is. Four different green houses were visited where members enjoyed taking group pictures. The visit was a success for both parties; CAUPQL and IQTC.

Group photo during the visit to a quarantine exhibition at GDCIQ (Photo: GD-IQTC)
Mr. Jian Geng (fifth from left) is a quarantine officer of GDCIQ who graduated from CAUPQL in 2008.
**UPCOMING EVENTS AND DATES TO REMEMBER**

FAO/IAEA Interregional Training Course on The Use of the Sterile Insect and Related Techniques for the Integrated Area Wide Management of Insect Pests (under Interregional TC Project INT5151), 3–28 August 2015, Metapa de Dominguez, Chiapas, Mexico and Antigua/El Pino, Guatemala


Workshop on Microbial and Processing Criteria for Industrial Production of Probiotics or Bacteria as Source of Protein to Improve Fruit Fly Quality and SIT Efficiency, 23-25 October 2015, Guatemala City, Guatemala

Regional Training Course on Taxonomy and Identification of Fruit Fly Pest Species for Southeast Asia (under FAO/IAEA Regional TC Project RAS5067), 16-20 November 2015, Brisbane, Australia. Deadline for nominations 31 August 2015. See details in the IPCL Newsletter No.84 (pg. 28) for how to submit applications to attend FAO/IAEA training courses: [http://www-pub.iaea.org/books/IAEABooks/10850/Insect-Pest-Control-Newsletter-No-84-January-2015](http://www-pub.iaea.org/books/IAEABooks/10850/Insect-Pest-Control-Newsletter-No-84-January-2015)

3rd meeting of the Tephritid Workers of Europe, Africa & the Middle East (TEAM 2016), 11-14 April 2016, Stellenbosch, South Africa


9th meeting of the Tephritid Workers of the Western Hemisphere (TWHH 2016), tentatively October 2016, Buenos Aires, Argentina

Meeting of the Technical Panel on Phytosanitary Treatments (TPPT), International Plant Protection Convention, FAO. 26-30 October 2016, Tohoku, Japan

9th International Congress on Dipterology, 25-30 November 2018, Stellenbosch, South Africa

10th International Symposium on Fruit Fly of Economic Importance (ISFFEI 2018), Tapachula, Chiapas, Mexico


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**1st TAAO Symposium**

Save the dates of August 15-19 2016 for the Inaugural TAAO Symposium!

The organizing committee in Kuala Lumpur, Malaysia, are finalizing details in the lead up to the first announcement, which will be released soon.

**Stay tuned!**

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**Tephritid Workers Database (TWD)**

Tephritid Workers Database link: [http://nucleus.iaea.org/sites/naipc/twd/Pages/default.aspx](http://nucleus.iaea.org/sites/naipc/twd/Pages/default.aspx)

Please keep your TWD profile updated to stay connected with the whole tephritid fruit fly community in the world.
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TAAO NEWSLETTER

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