PhD Opportunity
Fruit Fly Microbiome

Dynamics of the Queensland Fruit Fly Microbiome under changes in host environment

Closing Date: midnight on **Sunday 17th January 2016**

A PhD opportunity is available on a project investigating the microbiome of the Queensland fruit fly (*Bactrocera tryoni*; Tephritidae) ('Q-fly'). Investigations will focus on the composition of the gut microbiome and how this changes when a fly transitions from its native environment to the laboratory environment. This will cover both comparisons of life stages and tracking changes through the multiple generations of various domestication processes.

This project is part of a $20.5 million multi-institution 'SIT Plus' collaboration that aims to develop a detailed understanding of Q-fly biology to improve the quality of fruit flies for Sterile Insect Technique (SIT) applications. In SIT, millions of sterile male flies are released to disrupt reproduction of wild populations as an environmentally benign approach to managing this major pest. A substantial component of this overall program entails detailed investigations of the many changes to physiology, behaviour and microbiome that occur in concert through the domestication process, and how deleterious changes might be ameliorated. Hence, this PhD project is part of a much larger program and team, and a high level of interaction with diverse disciplines is anticipated. This is an opportunity for robust fundamental research into the interplay between hosts and microbiome through rapid environmental changes in, but not exclusive to, host nutrition, reproductive schedules, immunity, and environment, and is also an opportunity for involvement in a large, diverse and capable research community that is working toward a paradigm-changing initiative in Australian sustainable pest management.

Although part of a larger project there is freedom within this PhD candidature for scientific exploration in conjunction with the core objectives. The PhD project will include genomics (next-generation sequencing), microscopy, molecular microbiology, bioinformatics and insect ecology to investigate several research questions to investigate the key objectives:

1) Is the Q-fly microbiome plastic, and is it dependent on life stage?
2) Is there a base gut microbiome and does it change with different environmental conditions?
3) What influences can the microbiome have on Q-fly physiology and behaviour?

The project will be carried out under the supervision of Drs Toni Chapman and Ania Deutscher of NSW Department of Primary Industries (NSW DPI) and Drs Fleur Ponton and Darrell Kemp of Macquarie University.

NSW DPI has considerable experience with Q-fly, bacteria and gut microbiota, with a large network of contacts. The Macquarie group includes a large research community working on diverse aspects of Q-fly behaviour, physiology, and genetics. In addition, we will be working closely with collaborators from Commonwealth Scientific and Industrial Research Organisation (CSIRO) who have experience in genetics/genomics and have in-house facilities required for high throughput sequencing and bioinformatics.

This scholarship is available to eligible candidates to undertake either:

- Research Training Pathway (RTP/iRTP) Masters of Research (MRes) Year 2 followed by a Macquarie University Research Excellence Scholarship (MQRES/iMQRES) for a 3 year PhD. This is referred to as an MRes/PhD 'bundle offer'.

OR

- Direct entry into a 3 year PhD program.

The value and tenure of the scholarship is:

- $30,849 pa (2016 rate, subject to indexation, tax free) for up to four years for an MRes/PhD bundle offer or for 3 years for direct entry to PhD. This includes an MQRES stipend of $25,849 pa plus a scholarship 'top up' of $5,000 pa.
- International candidates successful for these scholarships are also awarded a tuition fee scholarship covering tuition fees at Macquarie University for up to four years.

To be eligible for a scholarship, applicants are expected to have a record of excellent academic performance and preferably, additional relevant research experience and/or peer-reviewed research activity, awards and/or prizes in line with the University's scholarship rating guidelines. Refer to the Rating Scholarship Applicants section for more information about these guidelines.

Students on scholarships are not obliged to contribute to teaching, but may do so to supplement their income if desired. In addition to substantial financial resources to draw on for research, several generous schemes are available to fund travel to visit overseas laboratories or to attend overseas conferences.

Enquiries are welcome, and interested applicants are encouraged to make initial informal contact before applying. Interested applicants should email a letter of interest, academic transcripts, curriculum vitae and the names and contact information of three referees to Dr Toni Chapman (Toni.Chapman@dpi.nsw.gov.au).

Expressions of interest close at midnight on **Sunday 17 January 2016**