



TRAVEL, CONFERENCE or SCIENTIFIC EXCHANGE REPORT 2017

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: DAQ 1805

**Project Title: TRAVEL: Participate and present at Australian
(International) Whitefly Symposium 2018**

Project Commencement Date: 15/09/2018 Project Completion Date: 20/09/2018

CRDC Research Program: 2 Industry

Part 2 – Contact Details

Administrator: Stuart Makings
Organisation: Department of Agriculture & Fisheries
Postal Address: PO Box 102, Toowoomba QLD 4350
Ph: 0745294286 **Fax:** **E-mail:** stuart.makings@daf.qld.gov.au

Principal Researcher: Dr Richard Sequeira
Organisation: Department of Agriculture & Fisheries
Postal Address: LMB 6, Emerald, QLD 4720
Ph: 0749910810 **Fax:** **E-mail:** Richard.sequeira@daf.qld.gov.au

Supervisor: Emma Colson
Organisation: Department of Agriculture & Fisheries
Postal Address: PO Box 2282, Toowoomba QLD 4350
Ph: 0745291299 **Fax:** **E-mail:** emma.colson@daf.qld.gov.au

Signature of Research Provider Representative:

Date Submitted:


9/10/18

Part 3 – Travel, Conference or Scientific Exchange Report

(Maximum two pages)

1. A brief description of the purpose of the travel.

The purpose of this travel was to participate in and present results of Australian whitefly research at the 3rd International Whitefly Symposium 2018, Perth WA. This meeting presented a unique opportunity for Australian researchers to attend an international gathering of prominent whitefly researchers from all over the world on home ground. The primary objectives were: (1) to enable professional relationships to be developed with researchers from the United States, Asia-Pacific countries as well as Africa where whitefly is a problem in field crops such as cotton; (2) to scope out the latest research on whitefly genetics and use of novel technologies to develop alternative approaches to whitefly control in cotton and gauge applicability and transfer potential of such technologies to Australian cotton production systems; (3) to enhance knowledge, professional development and potential for future collaborative research.

2. What were the:

a) major findings and outcomes

The symposium program was a reasonable mix of whitefly genetics/genomics and ecology/management. The focus of the research on genetics/genomics was split between theoretical and/or academic discussions on species and subspecies differentiation, molecular aspects of virus-vector-plant interactions, and the use of genomics and molecular techniques to develop novel approaches to whitefly control.

A highlight of the genetics/genomics research was the advances made in RNAi (interference) technology, also referred to as selective gene silencing, which is well past the proof-of-concept stage and into the field testing stage. Although this is just one of several genetics/genomics technologies that are being researched, the focus of presentations at the symposium was largely on RNAi. There are several groups of researchers in a race to develop the first commercially viable and effective RNAi. Two groups of researchers from India, one from the Indian Institute of Toxicology Research (IITR), an institution with the Indian Council of Scientific and Industrial Research (CSIR), and another from Punjab Agricultural University, have developed transgenic cotton plants expressing RNAi that target specific whitefly genes. A likely development in the near future is that transgenic cottons expressing RNAi against whiteflies will be developed and made available to Indian cotton farmers.

Of greater relevance to whitefly research and control in Australian cotton production systems is the pace of RNAi technology development by groups such as that of Dr. William Wintermantel of the United States Department of Agriculture – ARS (Salinas, California). Dr. Wintermantel's group is now field testing RNAi technology that can be used either as foliar sprays and/or transgenic plants expressing RNAi. Their preferred pathway to commercialization is for a commercial entity (e.g. Bayer/Monsanto) to pick up the rights to the technology and deploy it in the tradition of Bt cotton technology.

An outcome of attending the symposium and discussions with Dr. Wintermantel is that he has a better understanding of the opportunities for collaborative work and field testing of material from his research program in Australian cotton production systems.

b) other highlights

Dr. Hazel Parry (CSIRO – Brisbane) is an ecological modeller who is now working on modelling viral and vector (whitefly) host plant resistance mechanisms and crop management scenarios for cassava in sub-saharan Africa. One component of her work is the development of a whitefly population dynamics model.

Dr. Peter Ellsworth (University of Arizona) presented a paper on predator induced mortality informed thresholds for SLW in Arizona cotton. An interesting bit of research that has practical value in Arizona cotton systems but limited relevance to Australian cotton systems wherein different approaches may be required, given the inherent differences between cotton systems in Arizona and Australia.

3. Detail the persons and institutions visited, giving full title, position details, location, duration of visit and purpose of visit to these people/places. (NB:- Please provide full names of institutions, not just acronyms.)

On the metric of international meetings/conferences/symposia, this was a relatively small one with about 55 delegates in attendance. The Australian contingent was the largest (16 delegates) followed by the US (10 delegates), the remainder being mostly from the Asia-Pacific region. The high cost of flights and accommodation was the single biggest factor listed by delegates as being a significant impediment to travel to Australia. Notable attendees with research relevance to Australia were Dr. Peter Ellsworth (University of Arizona) and Dr. William Wintermantel (United States Department of Agriculture – Agricultural Research Service).

4. a) Are there any potential areas worth following up as a result of the travel?

Dr. Hazel Parry (CSIRO – Brisbane) presented a population dynamics model for whitefly on cassava in sub-saharan Africa. Her model could be adapted to SLW in Australian cotton and would provide an important tool for researchers and agronomists to explore region-specific and variable climate scenarios in management of SLW populations in cotton.

Richard Sequeira has opened a dialogue with Dr. Manisha Mishra from IITR-CSIR (India) on the possibility of using one of their products, an insecticidal protein isolated from the fern *Tectaria macrodonta*, which is highly specific to whitefly, as a foliar applied insecticide. Background information on the protein and its characteristics provided by Dr. Mishra has been forwarded to the CRDC and to Bayer Australia to gauge their interest in commercial development of this protein for use as an insecticide against whitefly.

b) Any relevance or possible impact on the Australian Cotton Industry?

Australia has the MEAM1 biotype (SLW) of *Bemisia tabaci*. MEAM1 has superior bionomic characteristics which makes it difficult to control but does not have the exceedingly high fixed levels of insecticide resistance of other biotypes, e.g. MED (Q) biotype, which is currently not in Australia. Both biotypes are highly efficient vectors of cotton leaf curl virus which is a devastating pathogen of cotton that has decimated the cotton industries of the Asia-Pacific region where it occurs. Entry of the virus and/or the MED biotype of whitefly into Australia would make an already complex pest management situation in cotton much more difficult.

5. How do you intend to share the knowledge you have gained with other people in the cotton industry?

1. Assist CRDC, Cotton Australia and other relevant industry bodies/organisations with identification and development of future research priorities, plans.
2. Maintain and develop relationships established at the symposium for future collaborative research and information/technology transfer