



Australian Government
**Cotton Research and
Development Corporation**

TRAVEL, CONFERENCE & SCIENTIFIC EXCHANGE REPORT

Part 1 - Summary Details

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

CRDC Project Number: DAQ1406

Project Title: Attend Beltwide Cotton Conference 2014, New Orleans

Project Commencement Date: 3 January 2014 **Project Completion Date:** 10 January 2014

Select Research Program (from CRDC Strategic R&D Plan 2008-2013):
- Please Select One -2. Farming Systems

Part 2 – Contact Details

Administrator: Helen Kamel (Principal coordinator external funding)
Organisation: Department of Agriculture, Fisheries and Forestry
Postal Address: PO Box 102 Toowoomba Qld 4350
Ph: 0746881286 **Fax:** **E-mail:** Helen.kamel@daff.qld.gov.au

Principal Researcher: Linda Smith (Senior Plant Pathologist)
Organisation: Department of Agriculture, Fisheries and Forestry
Postal Address: EcoSciences Precinct GPO Box 267 Brisbane Qld 4001
Ph: 0732554356 **Fax:** **E-mail:** Linda.smith@daff.qld.gov.au

Supervisor: (Name & position of senior scientist overseeing the project).
Organisation:
Postal Address:
Ph: **Fax:** **E-mail:**

Researcher 2 (Name & position of additional researcher or supervisor).
Organisation:
Postal Address:
Ph: **Fax:** **E-mail:**

Signature of Research Provider Representative: _____

Part 3 – Travel or Scientific Exchange Report

(Maximum two pages)

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

The reason for travel is to attend the 2014 Beltwide Cotton Conference to be held from the 6 – 8 January at the Marriott Hotel in New Orleans, LA, USA. Coordinated by the National Cotton Council (NCC) and its cooperating partners, this annual forum is recognised as the global champion for cotton technology transfer. The purpose for attending is to form collaborative relationships and gain the latest information on management of diseases and pests that are relevant to Australian cotton production.

2. What were the:

a) major findings and outcomes

Outcomes for the conference participation:

- Established contacts with pathologists working on *Fusarium* and other cotton pathogens and pests (Reniform nematode) in the US. Learnt the latest research results on *Fusarium* and other cotton pathogens and pests thus enabling researchers to be up to date with the latest strategies, trends and techniques related to disease management in cotton. Key findings are briefly described below.
 - **Fusarium:** Alois Bell, Robert B. Huttmacher, students of R. Davis, Amanda Cianchetta
 - **Efficacy of Hot Water and Fungicide Treatments on Viability of *Fusarium oxysporum* f. sp. *vasinfectum* race 4 in Infected Cotton Seed – Hung Doan student project.** Bolls were inoculated 1-3 times with a 5µL of a 10⁴ spores/ml, hand harvested boll. Acid-delinted cottonseed of both Upland and Pima varieties, which had been stored for various lengths of time, was used. Seed of all tested varieties remained viable and lost no seedling vigour after immersion in hot water at 60°C for 20 minutes. Best method to reduce Fov was a combination of at 60°C for 20 minutes followed by Topsin fungicide slurry. This method is not being used by seed companies at present.
 - I found the methodology of interest because even from a very susceptible cotton variety of Siokra 1-4, when grown in a high Fov infested site, the level of Fov infection into the seed is low (4%). This method of boll inoculation/seed infection could be used if further trials were to be conducted investigating the efficacy of fumigants to reduce viability of Fov in seed.
 - **2012-13 survey of Fov distribution - Amanda Cianchetta.** Using molecular characterisation races 1, 2, 3 and 8 were identified in southern states. Race 4 was limited to California. In 2012 a unique genotype with EF similarity to race 4 was found in Mississippi. In 2013 the unique Mississippi isolate was found to be more widely distributed.
 - Amanda works with Mike Davis who will be an invited guest at the International Fuscom in Toowoomba this year. These scientists are good contacts for information regarding molecular characterisation of exotic Fov.
 - **Screening for resistance – Robert B Huttmacher.** A wide range of commercial varieties and experimental germplasm from seed companies were screened for relative susceptibility to *Fusarium oxysporum vasinfectum* (race 4) in both naturally-infested grower field sites and artificially inoculated greenhouse evaluations. Talk focussed on evaluation methods – field assessment correlated to glasshouse results. Australia's breeding program is superior to work being conducted in the USA.
 - **Comparison of virulence between vascular competent and vascular incompetent Fov pathotypes – Jinggao Liu, Alois Bell etc.** The new inoculation protocol is highly effective for the new emerging vascular incompetent group isolates. Injury to the root is minimal compared to the root dip assay so the inoculation procedure better mimics the natural infection process for the vascular incompetent isolates which causes disease without nematodes. Australian biotype isolates had two week delay on foliage wilt symptom onset but caused higher extent of disease severity and vascular staining than California race 4 isolates, resulting in similar shoot weight reduction by both isolates 9 weeks after inoculation: Australian isolates are aggressive late invaders while California race 4 isolates are milder but early invaders. **Note:** Alois Bell has previously included Australian isolates in virulence studies in the glasshouse and inoculated plants by stem puncture. Plants inoculated with Australian Fov did not result in vascular infection therefore they were classified vascular incompetent (California race 4 isolates are also vascular incompetent). Australian pathologists believe this is an invalid assessment as Australian Fov is highly competent at invading the vascular tissue when fungal invasion is via the roots (as Fov is a soil-borne pathogen not a stem-borne pathogen!). It was encouraging to see this group has decided to inoculate plants via natural infection in the roots and found Australian Fov to be infective and vascular (although Alois Bell still refers to Australian Fov as vascular incompetent). Not all US pathologists agree with this classification.

- Establish international contacts with the potential for collaboration on future projects.
- Four cotton pathologists were selected as potential guests at the International Fuscom Workshop scheduled for Oct/Nov 2014 in Toowoomba.
 - Mike Davis, Fusarium expert, University of California, Davis, CA
 - Jason Woodward, Verticillium expert, A&M AgriLife Extension Service, Lubbock, TX
 - Craig Rothrock, Pathologist, Seedling disease expert, University of Arkansas, Fayetteville, AR
 - Terry Kirkpatrick, Nematologist, University of Arkansas, Hope AR

b) other highlights

Target leaf spot caused by the fungus *Corynespora cassicola*, was a hot topic at this conference. This fungus causes a foliar disease. There have been recorded yield losses of 400+ lb lint/A. The disease is moisture and heat driven and develops after canopy closure. Factors increasing risk of disease include no-or strip-till cotton fields where cotton follows cotton, frequent showers and/or irrigation and high nitrogen fertility levels (hits high-yield cotton hardest). There are some varietal differences so management is focussed on variety selection and fungicides.

Findings:

- Phytoen499 tends to suffer heaviest defoliation.
- Most DPL, Stoneville, and Fibermax varieties are subject to less defoliation but can suffer yield losses under ideal conditions
- No variety has a high level of Target Spot resistance
- Fungicides were effective
- Recoverable yield from fungicides in cotton up to 300 lb/A lint cotton on selected cotton varieties, less on others (100-150 lb/A)
- Headline applied at week 2 and 4 of bloom most effective timing

In the past two years, outbreaks of target spot have occurred in cotton in Alabama, Arkansas, Florida, Louisiana, Mississippi, South Carolina, North Carolina, Virginia.

Note: Target leaf spot is not a problem in Australia.

Stephen Allen and Linda Smith were invited to attend the Nematode and Seedling Disease Committee meeting. We presented the pathology issues the Australian cotton industry faces and the research we are conducting to manage these issues.

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.)

No persons or institutions visited. Attended the Beltwide Cotton Conference at the New Orleans Marriott Hotel, New Orleans, Louisiana only.

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

Yes.

1). Investigate the possibility of using conductivity maps to help determine low, medium and high risk areas for reniform nematodes. In the USA they use this information to determine where nematicide application is needed. In Australia we could use this information to apply other management strategies such as growing a non-host summer rotation in high risk areas and cotton in the low risk areas.

2). Further contact with Terry Wheeler and Jason Woodward to discuss results of trials looking at manipulating irrigation to reduce wilt and improve yield. The development of a predictive measure for irrigation and wilt and yield would be beneficial for the Australian cotton industry given the increase in Verticillium wilt in recent years.

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

The only leaf spot that is observed in Australian cotton is caused by *Alternaria macrospora* and is not of major concern in Qld or NSW. If significant defoliation due to leaf spot is observed then isolations of the causal agent will be undertaken to ensure we don't have a target leaf spot problem developing.

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

This information will be shared via personal communication over the phone and email plus discussion at FUSCOM in 2014.

6. Please list expenditure incurred. (*Double click inside the table to enter the data*)

Please email your report at least 30 days after travel/conference to:
research@crdc.com.au