Cotton Catchment Communities CRC

# FINAL REPORT 2006

## *Part 1 - Summary Details*

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

**Cotton CRC Project Number:** **1.02.11**

**Project Title:** Instrumentation for comparative water requirement and optimal scheduling of bollgard and conventional cotton systems.

**Project Commencement Date:** 1/12/05 **Project Completion Date:** 30/06/07

**CRC Program:** **Farm**

## *Part 2 – Contact Details*


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## *Part 3 – Final Report Guide (due within 3 months on completion of project)*

(The points below are to be used as a guideline when completing your final report.)

### *Background*

1. Outline the background to the project.

The widespread adoption of Bollgard II varieties on Australian cotton farms has the potential to direct management requirements away from insects to other details such as nutrition and water. At present a wide range of conflicting accounts of the water requirements and irrigation scheduling for Bollgard II exists. For example, do Bollgard II varieties require more frequent irrigation early in growth to counter potential reduced plant size due to higher fruit retention and if this is the case will changing to narrow row spacings provide a water efficient solution?

Experiments conducted in the 2004-05 season began to address these questions. Two experiments were conducted, one at ACRI and one at Keytah, Moree. Due to insufficient instrumentation (flow metres, flumes and odyssey probes) full measurement of water use efficiency only occurred at the ACRI site and required a high labour input. In the 2005-06 season these experiments (described below) are being repeated and fine tuned.

However, due to funding reductions the water balance can only be accurately measured for selected treatments in the experiments in 2005-06. Additional funds, provided in this project, will enable adequate instrumentation and labour for both the experiments which will permit measurement of the water balance of all treatments. This will provide scientifically rigorous comparison of the water use efficiency of conventional and Bollgard II varieties.

### *Objectives*

2. List the project objectives and the extent to which these have been achieved.

- To purchase additional instrumentation which will enhance existing experiments such that the rigorous scientific measurement and comparison of the water use efficiency of transgenic and conventional cotton systems can be made.

### *Methods*

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related research.

Additional instrumentation, including odyssey sensors, flumes and siphon flow meters, will be purchased and used in two studies described below in 2005-06:

1. A replicated experiment covering 42 ha at ACRI, Narrabri, where the Bollgard II and conventional versions of the same genotype will be compared using 4 different irrigation schedules. Water use as ET and net irrigation water applied will be measured for each plot and treatment water balances will be

calculated.

2. An on farm comparison at 'Keytah' Moree, where Bollgard II in 15" and 1m rows will be compared with conventional in 1m rows using 2 irrigation schedules. Measurements will be as for 1.

In 2006-07 experiments will be set up as above with the addition of RRFlex (with BGII) to the experiment to evaluate water use between conventional, Bollgard II and Bollgard II plus RRFlex varieties. These experiments required additional instrumentation

***Results***

4. Detail and discuss the results for each objective including the statistical analysis of results.

The following equipment has been purchased and installed in experiments.

2005-06
42 Odyssey probes $8316
1 complete Irrimate set (siphon meter, advance meters, flume and flume meter, PC) $ 8158

12 flumes $9504

2006 -07

20 Odyssey probes $3650

Ceptometer $7228

Theta probe $1785

12 Flumes $ 9504

***Outcomes***

5. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

This work supports projects – CSP 164 'Delivering science to Agribusiness' and CRC 1.02.3 'Optimal production and water use of high retention cotton and other new technologies'. The outcomes from the capital item purchases will be reported with these projects.

6. Please describe any:-
   a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);
   b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and
   c) required changes to the Intellectual Property register.

***Conclusion***

7. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

See section 5.

***Extension Opportunities***

8. Detail a plan for the activities or other steps that may be taken:
   (a) to further develop or to exploit the project technology.
   (b) for the future presentation and dissemination of the project outcomes.
   (c) for future research.

8. A. List the publications arising from the research project and/or a publication plan.
   (NB: Where possible, please provide a copy of any publication/s)

   B. Have you developed any online resources and what is the website address?

See section 5.

## *Part 4 – Final Report Executive Summary*

Provide a one page Summary of your research that is not commercial in confidence, and that can be published on the World Wide Web. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

The equipment has been purachesd as planned and experiments at ACRI and Keytah used the equipment to measure the water balance in 2005/06. Experiments have been established in 2006/07 and measurements started using equipment. These experiments will continue for at least a further 2 seasons and will be reported and extended as part of the associated projects (CSP 164 and CRC 1.02.03).