



Australian Government

**Cotton Research and
Development Corporation**

FINAL REPORT 2016

For Public Release

Part 1 - Summary Details

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

CRDC Project Number: CSP1308

Project Title: Agronomic Management for Better Fibre and Textile Quality

Project Commencement Date: 01/07/2012 **Project Completion Date:** 30/06/2016

CRDC Research Program: 1 Farmers

Final Report Executive Summary

The project successfully captured interactions between cultivar (genetic) x season (environment) x field management x post processing (ginning) variables. It demonstrated that targeted irrigation at flowering in combination with growth regulator applications, affected fibre length and the amount of entanglements (neps) in cotton lint. It also showed that the level of trash (leaf matter) in ginned cotton had a strong influence on colour grades and premium and discount levels, compared to other fibre quality parameters which played a more important role in determining yarn performance. While 'premium' cultivars have relative merits for some markets, the typical negative association between higher quality and lower fibre yield, was supported, with yield ultimately having the largest influence on production gross margins. Further, a fully integrated operation (e.g. controlling farm, gin, mill) would potentially benefit by producing more premium fibre with less intensive ginning. A novel management approach for influencing fibre quality was also assessed. A field experiment that used the growth regulator ethephon was used to remove fruit to shift the timing of the fruiting period. The approach was successful in influencing quality and shows promise for moving the fruiting period to improve quality in stressed environments.

Micronaire is a combined measure of fibre fineness and maturity and significantly influences the valuation and performance of cotton. New research was able to better define the environmental and genetic influences that effect fibre perimeter (inherent fineness), and better models for micronaire were developed, which in-turn allowed better predictions for neps. In addition, the boll cutting technique was validated, which assisted in understanding the influence that defoliation has on fibre quality. In light of this, the 'CottASSIST' on-line

management tool was updated to: 1. Improve the predictability of micronaire from average temperature during the boll filling period. 2. Estimate the neps risk linked to the predicted final micronaire generated by the micronaire predictor. 3. Situations where total neps are greater than 250 neps/g are flagged. 4. Highlighted the impact of changes in defoliation timing on final micronaire and neps, and 5. Predict the impact of lint cleaning passages on nep level. The last effective flower tool was updated to highlight risks of delaying cutout on the time for the last harvestable boll to mature in time for harvest.

Some new sensor technology and portable instruments were listed and reviewed that had potential to assist in measuring crop status components to be subsequently used in modelling fibre quality. This was undertaken to assist in the development of future project ideas. Linked to this outcome we were able to properly validate techniques that estimated fibre quality at maturity as well as identifying the risk of neps at defoliation.

Research assessing some modifications to gin saws and the removable rib inserts, showed that a standard saw surface finish in combination with a Teflon coated CSIRO v-shaped modified insert, improved gin out-turn.

Using cotton fibre width ('ribbon width') data collected by the Cottonscope instrument enabled the modelling of the change in fibre ellipticity for developing Upland and Pima cottons. This gives new insight into how cotton fibre pack together in a yarn structure, and how these new objective data from Cottonscope can contribute to predicting the processing performance of cotton.

The natural wax layer on the surface of cotton is an impermeable barrier that needs to be caustically scoured to allow effective dyeing. Significant work was undertaken characterising this wax.

A review of the FIBREpak book was undertaken and areas of improvement identified. Research undertaken in this project was also included for a potential republication.

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