



Final Report

Off Farm Series | Cotton Research & Development Corporation

*If you are participating in the presentations this year, please provide a written report and a copy of your final report presentation by 31 October.
If not, please provide a written report by 30 September.*

Part 1 - Summary Details

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

CRDC Project Number: CTFT0003

Project Title: Classification of Cotton

Project Commencement Date: 01/07/2008 **Project Completion Date:** 30/06/2011

CRDC Program: Value Chain

Part 2 – Contact Details

Administrator: Jo Cain, Administration Manager, Cotton Management & Improvement

Organisation: CPI

Postal Address: Locked Bag 59, Narrabri, NSW, 2390

Ph: 02 6799 1513 **Fax:** 02 6793 1186 **E-mail:** jo.cain@csiro.au

Principal Researcher: René van der Sluijs, Textile Technologist

Organisation: CMSE

Postal Address: Henry Street, Belmont, Victoria, 3216

Ph: 03 5246 4000 **Fax:** 03 5246 4057 **E-mail:** rene.vandersluijs@csiro.au

Supervisor: Stuart Gordon, Stream Leader

Organisation: CMSE

Postal Address: Henry Street, Belmont, Victoria, 3216

Ph: 03 5246 4000 **Fax:** 03 5246 4057 **E-mail:** stuart.gordon@csiro.au

Signature of Research Provider Representative: _____

Part 3 – Final Report Guide

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

Background

1. Outline the background to the project.

Cotton, being a natural agricultural product, differs widely from growth to growth, crop to crop, lot to lot, bale to bale, within a bale and even fibre to fibre. In view of this and the important effect which variations in fibre properties have on processing performance, cost and product quality, it is of crucial importance that such variations in fibre properties be determined and quantified.

Originally, cotton was 'classified' by a classer's subjective assessment, using the United States Department of Agriculture (USDA) standard grade boxes, of fibre length, colour and foreign matter, and then assigning such cotton to a certain established standard grade. As the 'Classer' was not able to assess various important textile quality related fibre properties, such as strength, elongation and fineness, a number of instruments were developed which could measure the required properties. Due to the greater demand by modern spinning, the cost of raw material, and the increasingly competitive global market there was a need to rapidly and accurately determine those cotton fibre quality parameters which affect processing performance and yarn quality (fibre length, uniformity, strength and Micronaire) in a cost effective way on large numbers of bales of cotton. This led to the development of high volume automatic testing systems. These systems, termed High Volume Instruments (HVI), not only supplement, but are increasingly replacing the traditional ways of cotton fibre quality determination and classing. In fact since 1991, the entire US cotton crop is evaluated and classed with the help of HVI systems. It is estimated that currently 30 to 40% of the world's cotton is tested objectively on approximately 2640 HVI instruments. In Australia the colour and trash grades of the entire crop are still classified using the USDA standard grade boxes. There are currently twenty HVI instruments installed in Australia and these instruments class about 33 % of the Australian crop. The HVI instruments installed in Australia cover a wide range in model age, model type and operating system and it is thus understandable that a number of technical and operating issues exist which need to be overcome before objective instrument measurement of fibre properties is accepted with confidence by the cotton trade.

If Australia is to maintain its reputation as a consistent supplier of high quality cotton it will need to ensure that merchants and classing facilities consistently specify their cotton. To do this the Australian industry will need to allow its classing sector to be assessed independently so that individual classing facilities can correct technical and operational shortcomings in their practices. To this end, the Cotton Classers Association of Australia (CCAA) with funding from the Cotton CRC, Cotton Research and Development Corporation (CRDC), CSIRO Textile and Fibre Technology and CSIRO Materials Science and Engineering have been conducting a program since 2004 that entails independent assessment via formal round trials, check tests, investigating HVI colour reports and facility audits so that individual classing rooms can make technical and operational corrections to their practices and so that ultimately the industry can work towards better prediction of classing grade by HVI measurement.

The Australian Cotton Shippers Association (ACSA) has also requested that the subjective measurement of colour be discontinued and replaced by the objective measurement of colour by HVI.

Objectives

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

The aims of the project are to:

1. Conduct formalised local round tests to determine and measure the significance of any differences between classing house values of HVI colour and trash.
2. Conduct and analyse check test cottons on a weekly basis during ginning season. Analyse and monitor results from Australian Instruments in the International CSITC Round Trials.
3. Analyse HVI colour results and with the help of Uster Technologies, the largest manufacturer of HVI systems, develop a specific colour chart for Australian cotton.
4. Conduct audits of commercial classing houses to finalise the BMP plan for classing. Audits to determine compliance of BMP classing practice and identify possible reasons for outlier HVI (colour and trash) results during check testing.

Methods

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

See descriptions under '*Results*' of each of the initiatives taken during this project.

Results

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

The various initiatives undertaken will be discussed separately.

1) CCAA Check Test Program

The CCAA Check Test Program involves forwarding two samples of cotton, collected by a classing facility at random from a bale or gin run, to all classing facilities that are members of the CCAA. The classing facilities test these samples both subjectively and objectively on a weekly basis throughout the ginning season. The results are then forwarded to the author of this report for analysis and reporting back to the Association and individual members. The main aim of the Check Test is to measure and compare the long term reproducibility of each HVI. If a particular instrument is found to be out of tolerance the classing facility is notified and corrective action is taken.

The reproducibility of the instruments are judged using the following CCAA recommended tolerances; length +/- 0.02 inches, uniformity index +/- 1.0 %, Micronaire +/- 0.1 units, strength +/- 1.5 gpt, Rd +/- 1.0 units and b+ +/- 0.5 units. These tolerances

are similar to the ones used by the USDA and suggested by CSITC, with the exception of Rd which is +/- 1.5 units.

During the 2007/08 ginning season five classing facilities as well as CSIRO Plant Industry in Narrabri (CPI) participated in the Check Test program. Nine check tests were conducted, each test including an average of 11 HVI instruments. During the 2008/09 season five classing facilities and CPI participated in the Check Test program; on an average of 10 HVI instruments. During the 2009/10 ginning seasons all classing facilities in Australia; for the first time since work began in this area in 2004, participated in the Check Test program. Ten Check Tests were conducted on an average of 10 HVI instruments.

Table 1 is a list of participating classing facilities in each of the years

2007/08	2008/09	2009/2010
Auscott	Auscott	Auscott
ACS ¹	ACS	ACS
Queensland	Queensland	Queensland
Weil Brothers	*	*
Proclass	Proclass	Preoclass
CSIRO PI	CSIRO PI	CSIRO PI
*	Northern Rivers ²	Northern Rivers
*	*	1ST Class ³

*Not operational or not a member of the CCAA

¹Australian Classing Services; ²Northern Rivers Independant Cotton Classing; ³1st Class Independent Cotton Classing Services

The reproducibility results for the past 10 years are shown in Figure 1. Prior to 2005 the reproducibility results were calculated by the CCAA; as from 2005 the results were independently collated by the author.

The results show the reproducibility of fibre length, uniformity index, strength and colour (both +b, which is the yellow/blueness and Rd which is the reflectance of the cotton) consistently improved over the three years. Reproducibility for all fibre properties, with the exception of colour (Rd) were above 90%. The reason average reproducibility of the Rd values is below 80% is mainly due to the current colour charts used by HVI instruments reflecting values from US cotton, which is creamier than Australian cotton. After a slump in 2005 to 2007 the reproducibility of Micronaire returned to previous results achieved prior to 2005.

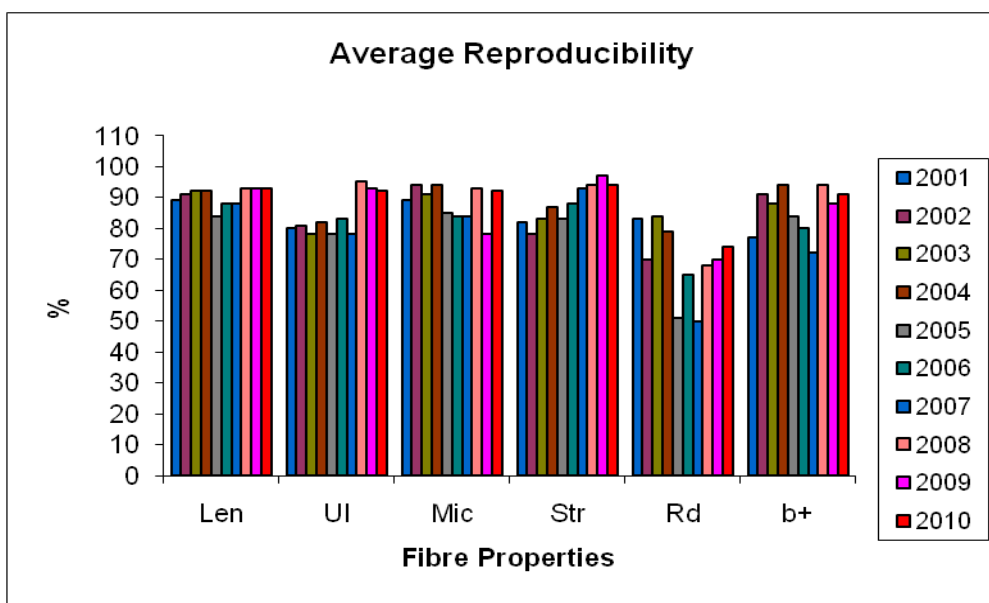


Figure 1 – Reproducibility for last 10 years

The Check Test program for the 2010/11 season is currently underway with six of the Check Tests already completed. The results for these Check Tests will be reported at a later stage.

2) CSITC Round Trials

The International Cotton Advisory Committee (ICAC), with strong support from the International Textile Manufacturers Federation (ITMF), the International Cotton Association (ICA), and major trading countries including Australia, established a task force in 2003 on the Commercial Standardisation of the Instrument Testing of Cotton (CSITC). The objective of the Task Force is to facilitate widespread use of instrument testing systems at the producer level while upholding the standards and tolerances that maintain the integrity of high-quality testing. The Task Force is trying to facilitate the adoption of instrument testing standards and procedures utilized by the United States Department of Agriculture (USDA) by all testing centres around the world, and to introduce the use of instrument testing language in the trading of cotton so that traditional descriptions of grade or type are replaced with objective instrument values. As the accuracy of data given by the USDA HVI Check Test or the Bremen Round Trial are not comprehensive enough the CSITC has conducted its own round trials as a measure to achieve international standardisation. After a number of pilot trials in 2005 and 2006; the CSITC has conducted four round trials a year since 2007.

Four cotton samples of Upland cotton with known values are sent and tested by each testing facility six times each day for five days. Each testing facility tests for the six CSITC fibre properties of Micronaire, strength, length, length uniformity and colour (Rd and b+). This means that 900 separate test results (150 tests of 6 parameters) from each instrument are evaluated. The tolerances used for the various fibre properties are as follows: Strength - +/-1.5 (grams/tex), Length (UHML) - +/- 0.02, Length Uniformity (UI) – +/- 1.0, Micronaire - +/- 0.1, Colour (Reflectance) Rd - +/- 1.5 and (Yellowness) +b - +/- 0.5.

Results for all the tests are collected by the USDA and evaluated by the Bremen Fibre Institute. Instruments are given an overall ranking (combining all fibre properties to indicate the level of performance in comparison to all other instruments). A ranking of their performance for each of the six fibre properties is also performed. These rankings are based on how close the mean value of each instrument is to the grand mean value of all participating instruments. A score of zero would be perfect. A detailed explanation of the ranking method used can be found at <http://www.icac.org>.

Tables 1 and 3 provide an overview of the number of facilities, instruments and the results for the various fibre characteristics measured by HVI, as well as the overall result for all Round Trials since 2007. Australia is the only country that collects the results of its instruments for analysis as an industry. Tables 2 and 4 provide an overview of the performance of the Australian instruments that participated since 2007.

Table 1 – Overall ranking for all HVI instruments in Round Trials 2007-1 to 2009-4

	Average for 2007 - 1	Average for 2007 - 2	Average for 2007 - 3	Average for 2007 - 4	Average for 2008 - 1	Average for 2008 - 2	Average for 2008 - 3	Average for 2008 - 4	Average for 2009 - 1	Average for 2009 - 2	Average for 2009 - 3	Average for 2009 - 4
Overall	0.61	0.57	0.57	0.58	0.57	0.59	0.60	0.66	0.57	0.62	0.63	0.57
Micronaire	0.61	0.75	0.62	0.65	0.50	0.57	0.60	0.72	0.62	0.70	0.64	0.61
Strength	0.76	0.61	0.63	0.59	0.64	0.64	0.58	0.65	0.61	0.52	0.57	0.50
Length	0.63	0.47	0.53	0.49	0.61	0.51	0.58	0.61	0.50	0.61	0.63	0.46
Uniformity	0.43	0.40	0.41	0.45	0.46	0.58	0.48	0.52	0.47	0.53	0.45	0.37
Rd	0.53	0.54	0.61	0.62	0.58	0.53	0.58	0.77	0.53	0.66	0.77	0.78
b+	0.63	0.60	0.61	0.70	0.63	0.58	0.71	0.64	0.66	0.72	0.71	0.72
Number of Facilities	70	54	54	58	51	63	60	69	58	57	62	63
Number of HVI's	55	74	69	79	72	85	81	95	77	75	89	88

Table 2 - Overall ranking for Australian HVI instruments in Round Trials

	Average for 2007 - 1	Average for 2007 - 2	Average for 2007 - 3	Average for 2007 - 4	Average for 2008 - 1	Average for 2008 - 2	Average for 2008 - 3	Average for 2008 - 4	Average for 2009 - 1	Average for 2009 - 2	Average for 2009 - 3	Average for 2009 - 4
Overall	0.44	0.46	0.69	0.72	0.48	0.57	0.57	0.50	0.50	0.76	0.49	0.32
Micronaire	0.30	0.36	0.51	0.88	0.88	0.40	0.52	0.90	0.51	1.15	0.50	0.42
Strength	0.52	0.40	0.54	0.82	0.81	0.89	0.76	0.41	0.40	0.66	0.52	0.39
Length	0.34	0.36	0.31	0.79	0.20	0.49	0.46	0.41	0.47	0.72	0.46	0.36
Uniformity	0.32	0.31	0.48	0.40	0.36	0.66	0.50	0.42	0.36	0.46	0.32	0.24
Rd	0.52	0.37	0.54	0.58	0.31	0.50	0.50	0.36	0.34	0.66	0.47	0.23
b+	0.61	0.95	0.58	0.84	0.34	0.54	0.67	0.48	0.95	0.94	0.69	0.30
Number of Facilities	2	3	4	3	2	4	4	2	2	4	4	2
Number of HVI's	4	6	7	6	3	6	6	3	3	6	7	4

Table 3 - Overall ranking for all HVI instruments in Round Trials 2010-1 to 2010-3

	Average for 2010 - 1	Average for 2010 - 2	Average for 2010 - 3	Average for 2010 - 4	Average for 2011 - 1
Overall	0.58	0.55	0.61	0.73	0.55
Micronaire	0.70	0.56	0.71	0.86	0.60
Strength	0.57	0.54	0.51	0.67	0.61
Length	0.47	0.52	0.49	0.62	0.53
Uniformity	0.43	0.49	0.37	0.57	0.43
Rd	0.67	0.58	0.79	0.76	0.58
b+	0.66	0.59	0.75	0.88	0.54
Number of Facilities	68	70	77	80	76
Number of HVI's	87	93	123	127	115

Table 4 - Overall ranking for Australian HVI instruments in Round Trials 2010 – to 2010-3

	Average for 2010 - 1	Average for 2010 - 2	Average for 2010 - 3	Average for 2010- 4	Average for 2011 - 1
Overall	0.40	0.49	0.48	0.47	0.28
Micronaire	0.75	0.39	0.53	0.19	0.16
Strength	0.36	0.41	0.29	0.36	0.36
Length	0.33	0.36	0.34	0.42	0.24
Uniformity	0.29	0.44	0.28	0.49	0.23
Rd	0.30	0.34	0.47	0.19	0.77
b+	0.31	0.99	0.99	1.21	1.23
Number of Facilities	1	3	3	1	1
Number of HVI's	2	5	5	2	2

As can be seen from Tables 1 and 3 the average range of most fibre properties and the variation by participating instruments have remained fairly consistent since 2007. It is however apparent that with the increase in the number of instruments the variation in colour both Rd and +b has increased.

Tables 2 and 4 show facility and instruments numbers, and results for Australian HVI instruments from 2007 to 2011. It is noted that the number of instruments participating in the first and last (1 and 4) round trials of each year has dropped off since 2007. The reason for this being that the trials are conducted outside our ginning/classing season, with some classing facilities not conditioning and testing the samples with the necessary care resulting in results far above the world average (2007-4 being a good example). The areas highlighted on Table 2 and 4 are results that are above the world average. With the exception of the results for 2007-4 and 2009-2, the Australian instruments generally performed better than the world average, the exception being the results for yellowness (b+). On numerous occasions a number of Australian instruments ranked in the top 20 for accuracy in a number of fibre properties.

3) CSITC Guide

During an International Cotton Advisory Committee (ICAC) Plenary Meeting it was agreed to develop a universally acceptable and comprehensive manual covering best practices for commercial instrument testing of cotton fibres from sampling to data reporting. The CSITC Task Force and the International Textile Manufacturers Federation (ITMF) International Committee on Cotton Testing Methods (ICCTM) agreed to jointly work on this important topic, together with representatives from the United States Department of Agriculture, Agricultural Marketing Service (USDA-AMS), instrument manufacturers and a number of industry related people. To this end Greg Parle, Ralph Schulze and the author of the report were invited to make recommendations and submissions. The CSITC Guide is currently being drafted and it is hoped that it will be finalised in due course.

4) Other Round Trials

Apart from the CCAA Check Test and CSITC Round Trials a number of the classing facilities also participate in the USDA HVI Check Test and the Bremen Round Trials to ensure that their HVI instruments are providing accurate, reliable and consistent results. The results for these Check Tests and Round Trials are directly forwarded to the classing facility so the results cannot be reported. It is however encouraging to note that some classing facilities are participating in all these checks to ensure that they provide reliable data to their customers.

5) Best Management Practice and Audits

The Best Management Practice (BMP) Handbook for Classing has been extensively updated over the last three years. The current version is version 11.0 dated February 2011. This new version was used to audit the classing facilities during the 2011 ginning and classing season. Over the last three years, BMP audits were carried out to determine the compliance of the classing facilities to the current version of the BMP Handbook for Classing. All the classing facilities that were operational during the three years were audited and certified by Cotton Australia (CA).

6) Colour Chart

As mentioned earlier ACSA requested that the subjective measurement of colour be discontinued and replaced by the objective measurement of colour by HVI. In preparation to develop a colour chart classing results were received for just under 2 million bales of the 2008/09 crop with some results from the 2007/08 crop as well as 960,798 bales or 56% of the 2009/10 crop. As can be seen in Table 5, the colour grade obtained by the various HVI instruments were compared to the visual grade. The data shows generally that HVI instruments tend to record a grade lower (i.e. worse than) as compared to the visual grade, e.g. HVI measures two to three times more 41 cotton than visual classers. There is a significant financial impact on growers at this end of the grading scale.

Table 5 – Comparison of HVI and Visual Colour Grades

	HVI*	Visual*	HVI	Visual
Grade	2008/09	2008/09	2009/10	2009/10
11	10.6%	2.1%	3.7%	7.8 %
21	37.4%	53.5%	22.0%	50.0%
31	39.4%	38.2%	43.9%	31.0%
41	10.3%	4.3%	23.2%	7.6%
51	0.9%	0.2%	2.2%	0.2%
Light Spot (12-22-23-32-33-34-42-43)	0.4%	1.5%	3.5%	2.0%
Other (52-53-61-62- BG)	1.15%	0.14%	1.5%	1.4%

*Incorporates values from 2007/08

A draft colour chart (see Figure 2) was formulated for the 2009/10 classing season using the colour data obtained from the various classing facilities and the USDA Look up charts.

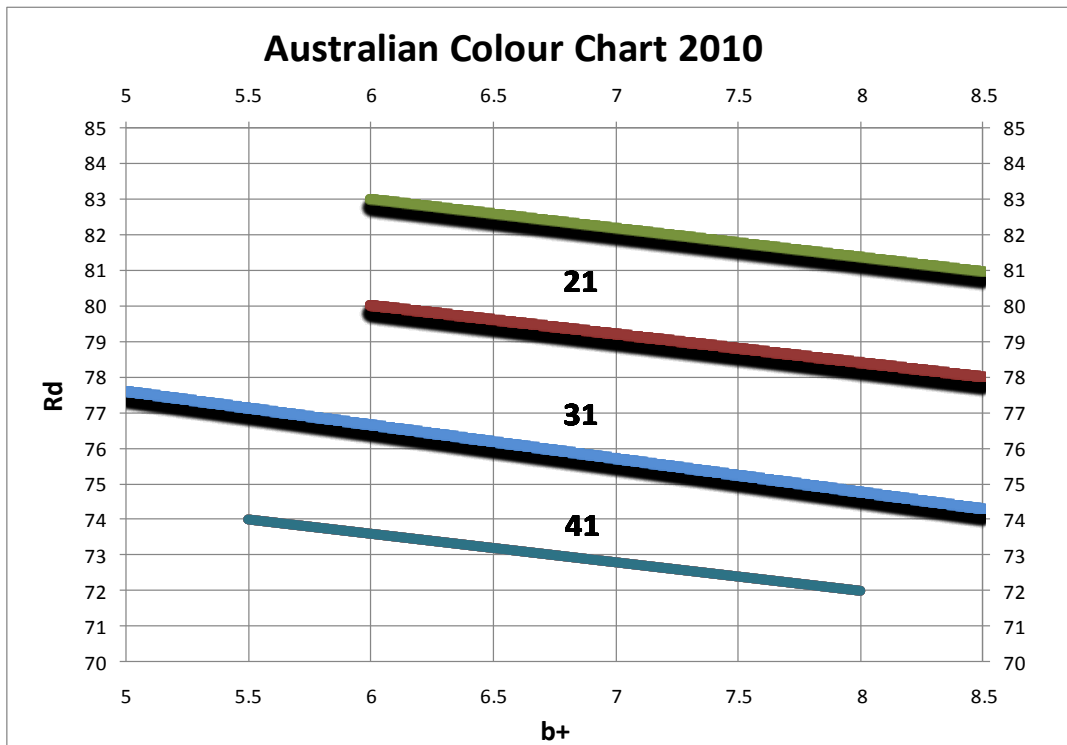


Figure 2 – Australian colour chart 2009/2010

As can be seen in Figures 3 to 5, the results from the 2009/10 crop show that despite all efforts of the previous years, there are still large variations in the colour results.

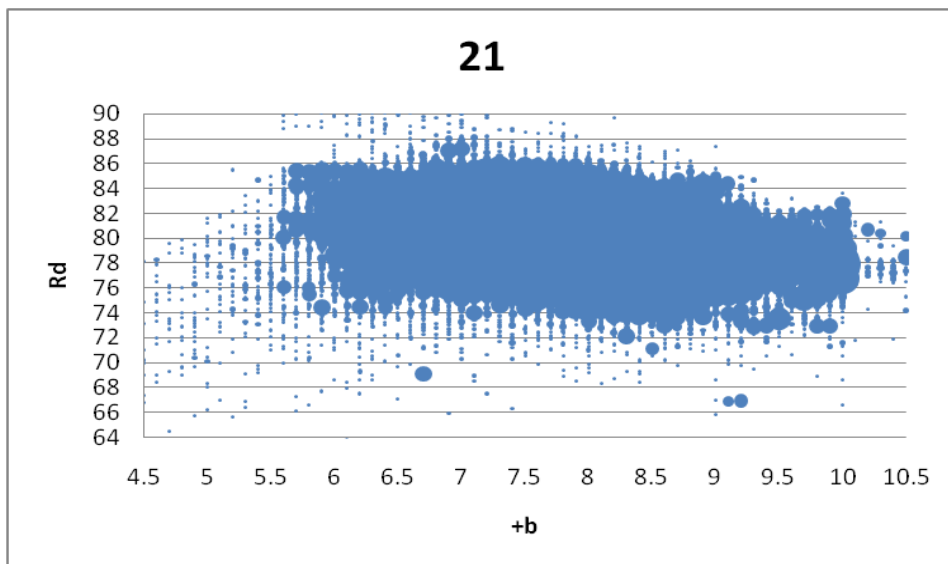


Figure 3 – HVI colour results compared to 21 visual grade for 2009/2010 crop

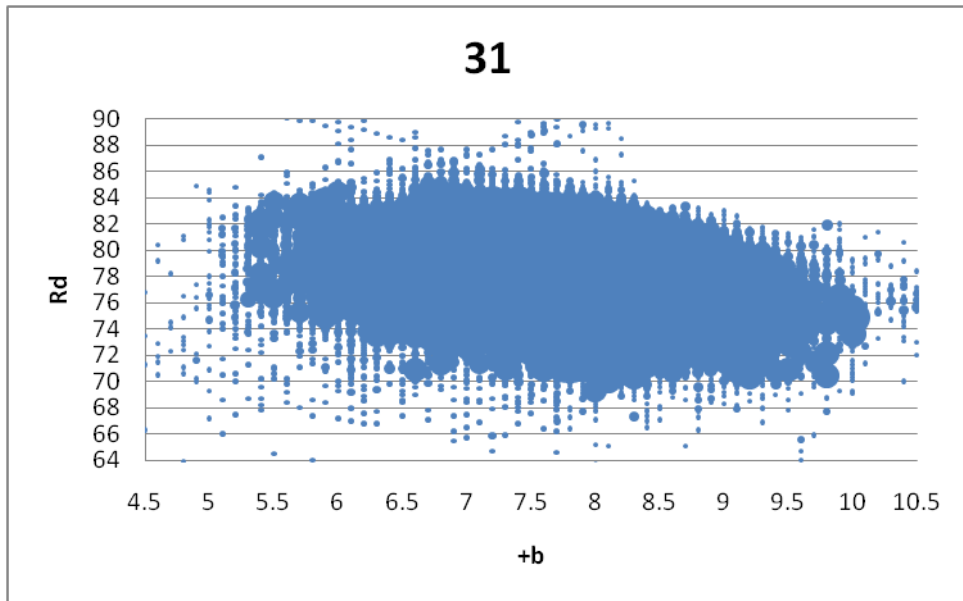


Figure 4 – HVI colour results compared to 31 visual grade for 2009/2010 crop

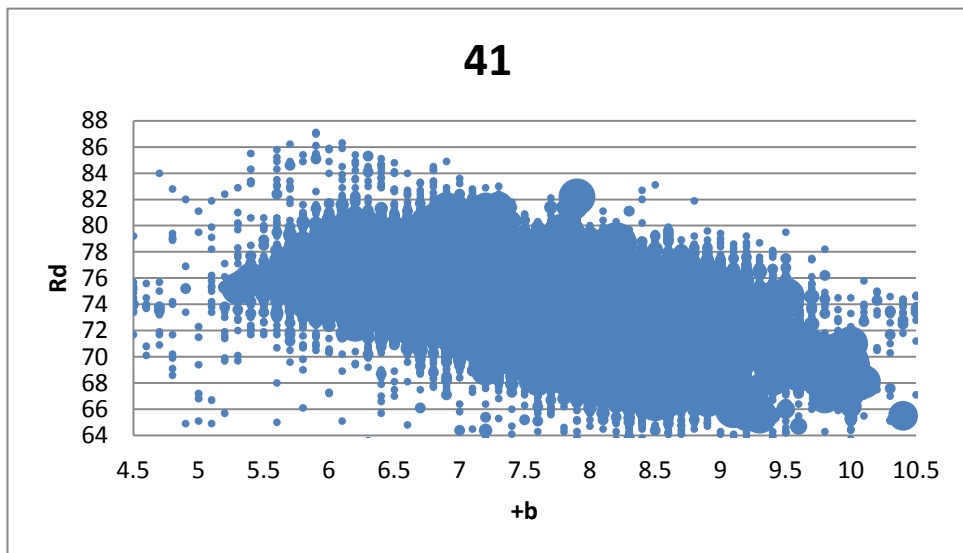


Figure 5 – HVI colour compared to 41 visual grade for 2009/2010 crop

As can be seen in Figures 6 to 8 only when removing the top and bottom 25% of the results do the Rd and +b results better reflect the visual colour grades. The reasons for these variations are in all likelihood due to the size of the cotton samples shown to the instrument and also that some HVI instruments are not measuring the colour properly, as seen in the CCAA Round Trials.

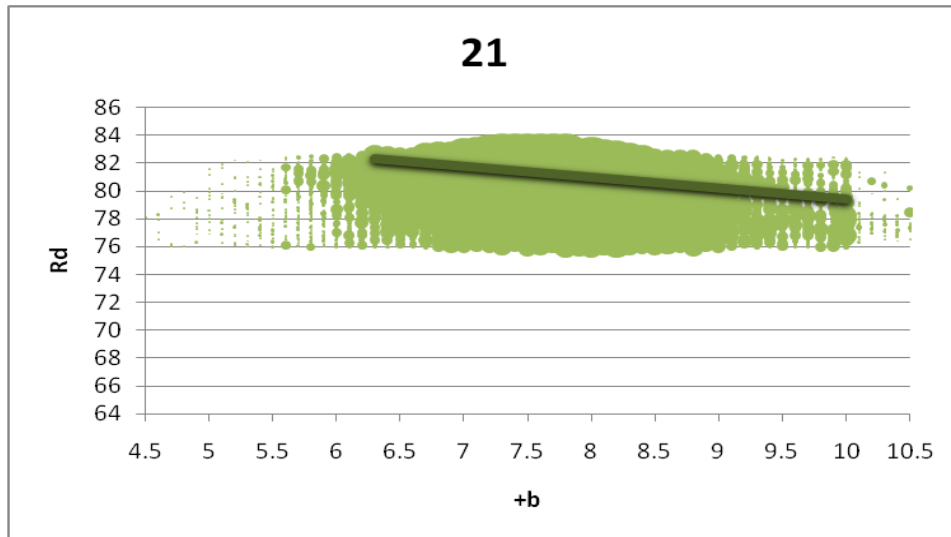


Figure 6 – HVI colour compared to 21 visual grade, after removing top 25 and bottom 25 % of results, for 2009/2010 crop

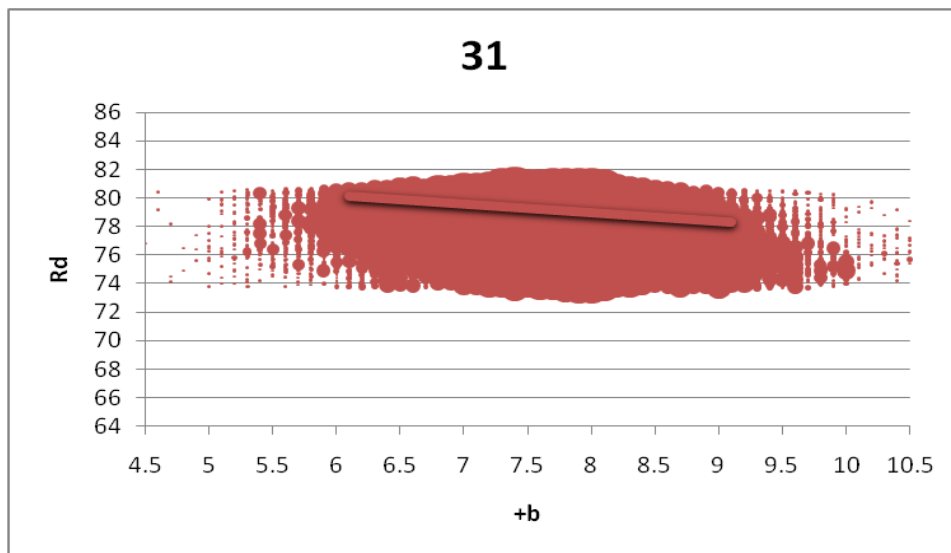


Figure 7 – HVI colour compared to 31 visual grade, after removing top and bottom 25% results, for 2009/2010 crop

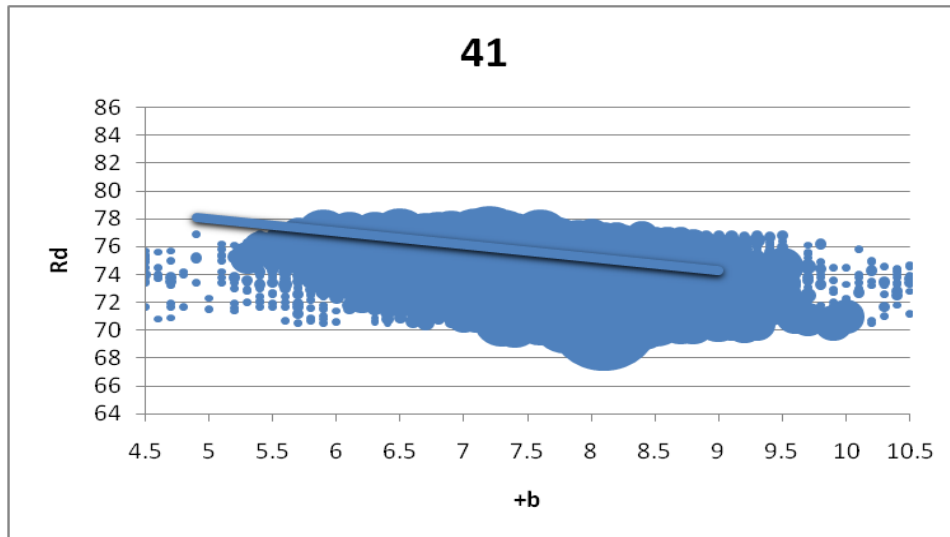


Figure 8 – HVI colour compared to 41 visual grade, after removing top and bottom 25% results, for 2009/2010 crop

Work in this area will continue in the follow up project.

7) Quarantine Treatments

The Australian Quarantine Inspection Service (AQIS) plays a critical role in ensuring that Australia remains free from many serious pests, weeds and diseases present in other parts of the world. Australia places great importance on quarantine and has among the strongest quarantine measures of any country in the world. Measures employed include inspections of cargo, the issuing of import permits and quarantine treatments. Import permits and treatments are used to control the danger posed by the large volume and diverse number of plant and animal-based commodities imported into Australia each year.

Whilst a permit is not necessarily required to import cotton lint, all imported cotton lint into Australia needs to be treated (sanitized) to ensure the consignment is free of live insects, soil and other debris (faeces, animal materials etc), or verified that any quarantine risk material present will be dealt with during processing. The quarantine treatments used by AQIS are either chemical (fumigation), using either ethylene oxide or methyl bromide (being phased out as it depletes ozone) or by radiation (normally gamma irradiation), the preferred option, using a dose of 25 or 50 kGray (kGy).

Anecdotal information, which was confirmed by the CRDC Quarantine Treatment project, which showed that fumigation treatments by either ethylene oxide or methyl bromide had little or no significant effect on the physical properties of the cotton fibre. However gamma irradiation even at lower dosages did have an effect on the physical properties (strength, elongation, length and colour) of the fibre, with these effects becoming more apparent and significant as the dosage strength increased.

The results from this study have allowed the CCAA to lobby AQIS to amend their procedures. AQIS have subsequently agreed that samples will now only be treated by fumigation by ETO provided that the facility has an import permit.

The description on the Permit and incoming documentation must say
“Gossypium spp. – Cotton – Unprocessed (Samples for Classing)”

http://www.aqis.gov.au/icon32/asp/ex_casecontent.asp?intNodeId=8045824&intCommodityId=581&Types=none&WhichQuery=Go+to+full+text&intSearch=1&LogSessionID=0

The cotton must undergo ETO treatment at an approved facility

http://daff.gov.au/aqis/import/general-info/qftp/onshoreproviders/qap_class_4.6_fumigation_facilities

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.

During the last three years of this project a number of initiatives, as described above, have been undertaken to improve the consistency and reliability of the classing data supplied from Australian cotton. Due to the BMP audits and both international and domestic check tests, a number of classing facilities have made major improvements to their infrastructure. This has included phasing out of older/problematic HVI instruments and replacing them with the new HVI 1000 (of which there are now nine in the country) and upgrading and improving moisture and humidity controls. Feedback from international spinners gathered during the 2009/10 Mill Survey project has suggested that Australian cotton is one of the most consistent and accurately specified cotton on the world market. Over the three years there been only six reviews conducted by the CCAA on request of growers who were contesting the quality results of their cotton. During the 2009/10 ginning seasons all the classing facilities, the first time since work began in this area in 2004, participated in the Check Test program and were audited to determine their compliance to the BMP handbook for Classing.

There still remains however some issues that need to be addressed in the follow up project; objective measurement of colour by HVI and the uptake by the industry of the Round Module pickers are posing a number of challenges, which will need to be investigated further.

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.

N/A

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?

Work in this area has resulted in a number of classing facilities investing in the upgrading of plant and equipment in the last three years. This has led to the installation of six new

HVI 1000s at the expense of older/outdated instruments as well as improvements in laboratory infrastructure. This together with the BMP program has assisted the industry in improving reproducibility between HVI instruments, with Australian instruments also performing well in international Round Trials. This is further highlighted by the fact that the CCAA only conducted six reviews over the last three years, and feedback from international spinners suggesting that Australian cotton is one of the most consistent and accurately specified cotton on the world market. There remains however issues with HVI colour that needs to be further investigated before the transition from visual classification of cotton to objective measurement by HVI can be finalised. The CCAA have successfully lobbied AQIS to amend their procedures with calibration cotton now only treated with fumigation by ETO provided that the facility has an import permit.

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?

N/A

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.

It is a well known fact that Australian cotton has a reputation as a consistent supplier of high quality cotton, which needs to be accurately and consistently specified. In order to do this the Australian Industry has, since 2004, assessed it classing sector independently to allow individual classing facilities, of which there are six, to correct any technical and operational shortcomings in their practices. This work has over the last three years been conducted by CMSE in conjunction with the CCAA with funding from the CRDC. This assessment has included; conducting formal Round-robin Trials, Check Tests, both local and international, Colour Trials, updating the BMP and conducting certification audits which will ultimately assist the industry in better predicting the quality of our cotton.

The reproducibility results from the local CCAA Check Test program, whose main aim is to determine the long term reproducibility of all HVI instruments, has been consistently improving over the last three years that. The reproducibility for fibre length, uniformity index, strength and +b (greyness) are all above 90%, with the exception of Rd (reflectance) which is below 80%. This is mainly due to the fact that the current colour chart loaded in the HVI instruments reflects US cotton which is creamier than Australian cotton.

A number of classing facilities also participate in a number of international Round Trials with most classing facilities preferring the CSITC Round Trial. Australia is the only country that collects the results of its instruments for analysis as an industry. The performance of the Australian instruments in the CSITC Round Trials has been encouraging, with the Australian instruments, with a few exceptions, generally performing better than the world average, the exception being the results for b+.

The Best Management Practice (BMP) Handbook for Classing has been extensively updated and expanded over the last three years and also linked to the BMP Handbook for Ginning. All the classing facilities that were operational over the last three years have been audited and recommended for certification by CA.

ACSA have requested that the subjective measurement of colour be discontinued and replaced by the objective measurement of colour by HVI. In preparation of developing a colour chart classing results of a large number of samples from the 2008/09 and 2009/10 crop were analysed with a draft colour chart formulated for the 2009/10 classing season. Work in this area is still in its infancy and will need further work to ensure that growers are not negatively affected due to the change from visual to objective classing of colour grade.

The results from the CRDC Quarantine Treatments project have allowed the CCAA to successfully lobby AQIS to amend their procedures regarding the treatment of calibration cotton imported into the country. AQIS have agreed that samples will now only be treated by fumigation by ETO provided that the facility has an import permit and not gamma irradiation.