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making every drop count

RRDPI606

Grower led research in irrigation system comparison in the Gwydir Valley

Optimised Irrigation Row Configuration Trial Update 2017

Grantee

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Abstract:

The Gwydir Valley Irrigators Association (GVIA) 2016-17 Optimised Irrigation Row Configuration was the fourth commercial trial investigating water-use efficiency optimisation techniques of siphon irrigation. The trial was initially conducted in 2014-15 with CRDC grassroots grant funding, further work was conducted in 2015-16 as part of the CRDC1302 project and the final set of data was supported by the RRDP1606 CRDC and the Australian Government Department of Agriculture and Water Resources as part of the Rural R&D for Profit program.

The objectives were to investigate water-use efficiency optimisation techniques of siphon irrigation under different row configurations and to investigate the relative yield potential of different row configurations under optimal irrigation conditions. Siphon is the standard industry irrigation system currently in use despite recent moves to other irrigation systems such as bankless channel.

The row configurations assessed in the trials included the standard 40inch (1m), as well as areas of 30inch (75cm), 60inch (150cm) and 80inch (200cm). The project evaluated the trial in terms of yield and applied irrigation water relative to the standard 40inch row configuration.

The information from the trials will enhance the understanding of the potential of each of these row configurations to produce under optimal water. In addition, it will be beneficial for growers considering practice change associated with progress towards true control traffic farming. Adoption of control traffic farming reduces the area of paddocks wheeled by machinery, this is beneficial for growers working to improve water use and nutrient use efficiency.

The standard 40inch configuration uses machinery with two-meter wheel spacing. In contrast the typical dryland cropping system uses machinery with three-meter wheel spacing. Where farming operations include both irrigated cotton and dryland cropping compaction from using machinery with both two and three meter wheel spacing can be significant.

Through the project the GVIA was able to collect data which increased the level of understanding of the benefits and possible disadvantages associated with different row configurations under siphon irrigation. The trial suggested that the yield reduction from a fully watered 60inch spacing would be around 20 percent, and on average would use two percent less water. While the 80inch cotton would be expected to yield 37 to 27 percent less than the 40inch spacing and use on average 14 percent less water. The results from the 30inch spacing are encouraging. They suggest that three percent less water would be used with an average of a three percent yield drag. This finding however, included a 30inch plot which was replanted and rewatered in 2014-2015, the results from Keytah in 2014-2015 suggest that there may be possible yield advantages over 40inch.

RRDP1606

Grower led research in irrigation system comparison in the Gwydir Valley

Optimised Irrigation Row Configuration Trial Update 2017

Introduction:

In 2012/13 the Gwydir Valley Irrigators Association (GVIA) was successful in sourcing funding through the Cotton Research and Development Corporation (CRDC) to continue to investigate water use efficiency in the Gwydir Valley. A component of the project was to conduct an off-season trial to further explore ways to optimise water use efficiency and help growers adapt to less water. This project was further supported through the Gwydir Valley Cotton Growers Association (CGA) with a CRDC Grassroots grant. In 2016-2017 it was incorporated into the RRDP1606 part of the Smarter Irrigation for Profit Grower-led Project made possible with funding from the CRDC and the Australian Government Department of Agriculture and Water Resources Rural R&D for Profit Program. This report summarises the four sets of data collected over the three years of the project.

Irrigation application methods are essential to maximizing yield and water use efficiency in the irrigated cotton industry. The Optimised Irrigation Row Configuration project investigated water-use efficiency techniques of the siphon irrigation system which is the standard industry practice. The trial investigated the relative yield potential and irrigation Water Use Efficiency (WUE) of different row configurations under optimal irrigation.

The trial will provide growers more detail of the maximum potential yield of each of these row configurations under optimal water. Additionally, it will provide information on the water savings which may be achieved from each of the row configurations compared to 40inch (1m). This greater understanding will help growers determine which row configuration is best suited to their operations especially when faced with mixed dryland and irrigated farming systems, or in seasons where water availability is limited at planting.

Project Objective:

To achieve a more resilient and competitive cotton farming system through increasing the understanding and awareness of the benefits and disadvantages which may be associated with different row configurations, and the practices that help to optimise siphon irrigation systems.

Specific Aims:

1. Increase the understanding and adoption of practices that optimise the furrow irrigation system.
2. Increase the awareness and understanding of the yield potential and water requirements of various furrow irrigation row configurations.
3. To help growers to maintain productivity in mixed irrigated and dryland system.
4. Increase the number of irrigators that assess their own irrigation performance through demonstrating practical methods to assess irrigation performance on farm.
5. Increase grower ownership of research by developing grower and industry partnerships throughout the project.

Goal of Optimisation Trial:

This trial is intended to investigate the relative yield potential of a number of row configurations under optimal irrigation. Providing irrigators, a more detailed understanding of the potential of each of these different row configurations to produce under optimal water will assist irrigators to make informed decisions on planted area, crop rotations and water during times of limited water.

Objectives of Optimisation Trial

1. Investigate water-use efficiency optimisation techniques of furrow irrigation under different row configurations.
2. Demonstrate best practice and optimisation techniques of furrow irrigation.
3. Evaluate in terms of water-use efficiency.
4. Increase the level of understanding of the pros and cons associated with different row configurations under furrow irrigation.

Location and Trial Design

The trial was planted at two locations, Keytah and Auscott. Keytah is approximately 35Km West of Moree, while Auscott is approximately 35Km north of Moree.

Figure 1: Trial location map

The trial involved the comparison of four different row configurations; 30inch (0.75m), 40inch (1m), 60inch (1.5m) and 80inch (2m). In 2014-2015 the sites were set up as split plot randomised block design with 12 by 24m plots, 3 replicates per row spacing. This proved difficult to manage on a commercial basis and made measuring water on and off more difficult. In 2015-2016 the trial was not replicated, however in 2016-2017 it was again replicated.

Each of the row configurations was watered as required with the aim to maximise the yield of each treatment. Measurements were made of total water applied and total water off each of the row configurations. In each of the three seasons the applied water and yield for each of the row configurations were combined as it was not possible to measure water applied separately for each plot.

Field Layout and Trial Design

Figure 2: Keytah 2014-2015 trial location design

Table 1: Keytah trial

Plot	Treatment	24 Meters
1	30inch	32 rows
2	60inch	16 rows
3	30inch	32 rows
4	60inch	16 rows
5	60inch	16 rows
6	30inch	32 rows
7	80inch	12 rows
8	40inch	24 rows
9	40inch	24 rows
10	80inch	12 rows
11	80inch	12 rows
12	40inch	24 rows

Figure 3: Auscott Watervale 2014-2015 trial location

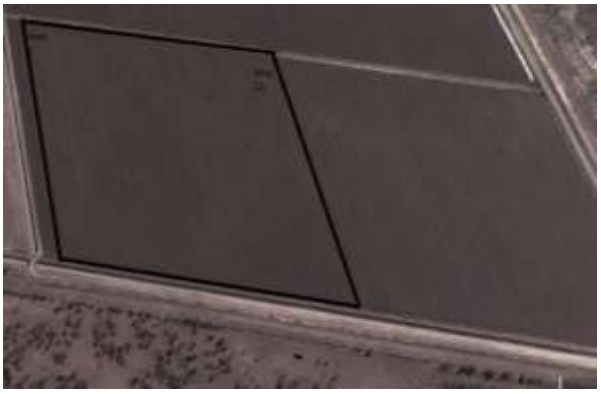


Table 2: Auscott Watervale trial design

Plot	Treatment	Meters
1	30inch	32 rows
2	80inch	12 rows
3	40inch	24 rows
4	60inch	12 rows
5	60inch	16 rows
6	40inch	24 rows
7	40inch	24 rows
8	30inch	32 rows
9	60inch	16 rows
10	80inch	12 rows
11	30inch	32 rows
12	80inch	12 rows

Figure 4: Auscott Watervale 2015-2016 trial location

Table 3: Auscott Watervale trial design

Plot	Treatment
2	60inch
3	30inch
8	40inch
11	80inch

Figure 5: Auscott Midkin 2016-2017 trial location

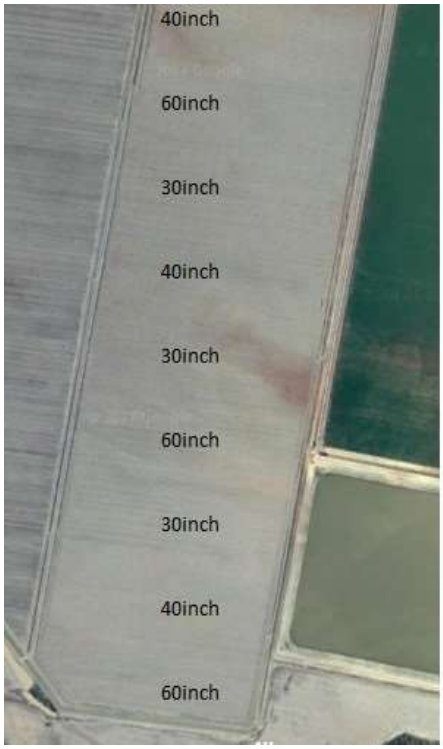


Table 4: Auscott Midkin trial design

Plot	Treatment
1	40inch
2	60inch
3	30inch
4	40inch
5	30inch
6	60inch
7	30inch
8	40inch
9	60inch

Trial Features and Variables

The trials were made possible due to the support of our trial partners Auscott Limited and Sundown Pastoral Co. Of importance was the difference in the row configuration on each farm; Keytah utilises a 30inch system with 1.5m beds, while Auscott utilises the industry standard 40inch system with 1m beds. Both organisations developed areas of the trial to represent the alternate bed structure not typically used in their operations. The alternate bed structure was more difficult to manage for both organisations in 2014-2015. In 2015-2016 and 2016-2017 the Auscott staff were more confident in the field preparation and the watering of the 30inch configuration. In both years field preparation was initiated well in advance of the season to ensure that bed had stabilised prior to planting.

Where ever it was practical all treatments were watered as they required. The timing of irrigations was determined by the on-farm agronomy team based on information from C-probes and crop observation. To streamline irrigation management across the farms the broader row configurations and the narrow row configurations where generally irrigated at similar timings.

Canopy temperature sensors were installed in the trial in 2014-2015 but were not used for scheduling as data was not readily available at a farm level.

Monitoring method and equipment:

Total water on and total water off was measured for each treatment for each irrigation using Mace meters. To achieve this with the small size of the irrigated plots both farms had to design and fabricate drop boxes specifically for the trial. This enabled the most accurate measure of the water off each treatment. Individual replicates could not be measured separately.

The trial required careful management and observations by the irrigation managers. The timing of siphon start-up and observation of when water finished flowing from the field were some of the details which had to be recorded by the irrigation teams. Additionally, they recorded Mace readings for all irrigation steps. This coupled with downloaded Mace meter readings enabled the determination of water use by each treatment.

Water Assessments

- All treatments were planted dry and watered up
- C-probes were installed early season and used by the irrigation teams to monitor crop water use.
- C-probes were removed prior to picking.
- The sum of all water on each treatment less all water off totalled the water used.

Rainfall and Temperature:

Rainfall information was collected on farm using Irrisat rain gauge at Keytah.

Auscott had access to C-Probes with rainfall measuring capacity in trial.

Temperature and humidity information was sourced from the Moree Bureau of Meteorology (BOM).

Meters:

All water on and water off for each treatment was measured with Mace meters at the head and tail drain of the field.

The tail drain Mace used in conjunction with rainfall data measured rainfall runoff.

There were some issues with the Mace meters at Auscott, and some early season measures were not as accurate as we had hoped.

C-Probes:

C-probes were installed in each treatment. These were used throughout the growing season by the on-farm agronomy teams to schedule irrigations and monitor the plants uptake of water.

All probes were positioned, and soil core samples taken from locations using EM and topography maps. Only post season soil cores were taken from Auscott as past experience has found the information of little value.

Agronomics:

Farm agronomists optimized management for each treatment with the objective to maximise the potential with regard yield and water.

Results:

Seasonal Data:

Figure 4: Accumulated Day Degrees

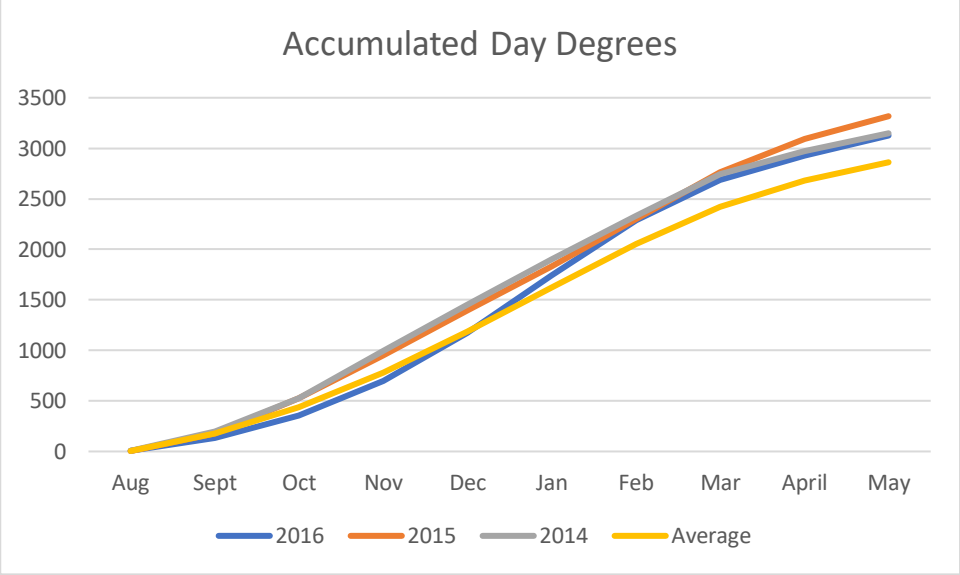


Figure 4 shows the accumulated day degrees over the three trial seasons. 2014-2015 and 2015-2016 were consistently warmer than the 61-year average from the 1st of September to the end of May. There were cold shock days through to early October in 2014 and 2015, and through to mid November in 2016. Keytah was planted in late October and Auscott was planted in November, January and February in 2017 saw a run of hot conditions which cause significant issues for the crop.

Figure 5: Keytah 2014-2015 Rainfall

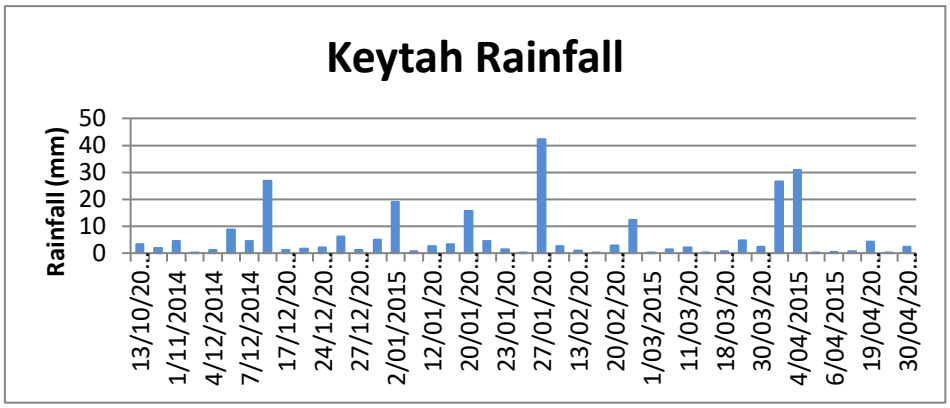


Figure 6: Auscott Watervale 2014-2015 Rainfall

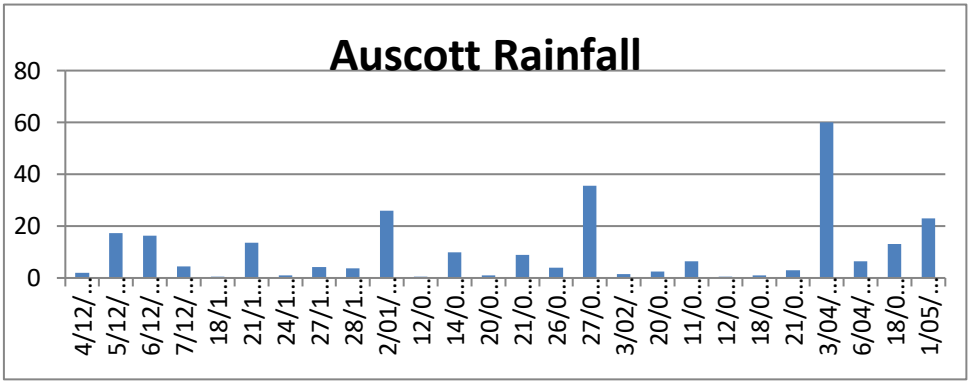


Figure 7: Auscott Watervale 2015-2016 Rainfall

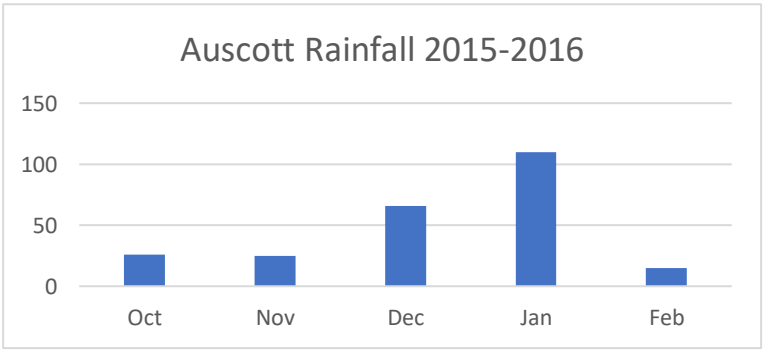
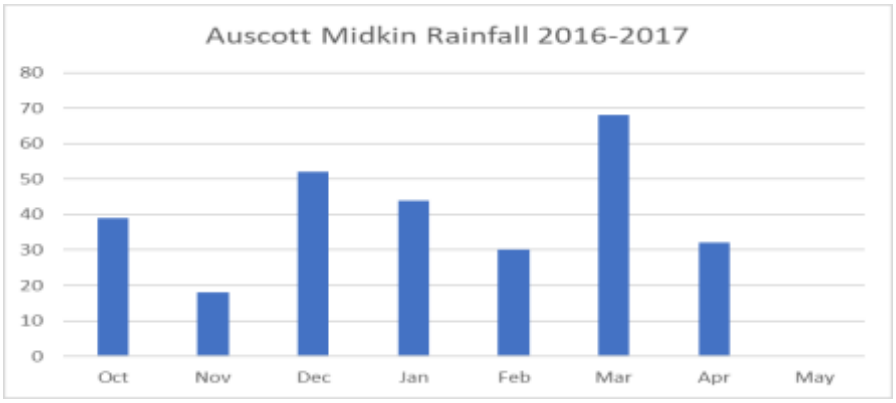


Figure 8: Auscott Midkin 2016-2017 Rainfall



Figures five to eight show the seasonal rainfall for each of the sites; in 2014-2015 Keytah received 254 mm and Auscott Watervale received 266mm, in 2015-2016 Auscott Watervale received 242mm and in 2016-2017 Auscott Midkin received 283mm.

Agronomic Summary

Table 3: Irrigation and management

	Keytah	Auscott	Auscott	Auscott
Year	2014-2015	2014-2015	2015-2016	2016-2017
Standard farm row spacing	30inch on 1.5m beds	40inch on 1m beds	40inch on 1m beds	40inch on 1m beads
Soil type	vertisol	vertisol	vertisol	vertisol
EM survey soil variation	<9%	<5%	<5%	<5%
Planting date	27th October 2014	9th November 2014	18th October 2015	12th October 2016
re-plant		60inch: 21 Nov 30inch: 27 Nov		
30inch irrigation	6.62ML/Ha	6.99ML/Ha	6.62ML/Ha	7.96ML/Ha
40inch irrigation	7.37ML/Ha	7.38ML/Ha	6.86ML/Ha	7.28ML/Ha
60inch irrigation	5.17ML/Ha	6.75ML/Ha	5.17ML/Ha	7.17ML/Ha
80inch irrigation	5.53ML/Ha	5.88ML/Ha	4.83ML/Ha	
Rainfall	254mm Oct - April	266mm Dec - May	242mm Oct - Feb	283mm Oct-May
Picking	18th and 19th May 2015	1st to 3rd June 2015	4th and 5th April 2016	12th May 2017

Table 3 provides a summary of the four sites. Included in the table are details of the soils and standard on farm systems. Additionally, it provides planting, rainfall, irrigation and picking information for the trial sites.

Yield and Water Use

Figures 9 to 12 following provide a summary of the yield and irrigation water use efficiency for the four trial sites. In 2014-2015 at both Keytah and Auscott Watervale the standard row configuration used on farm produced both the highest yield and the best irrigation water use efficiency (WUE).

Figure 9: Keytah yield and WUE

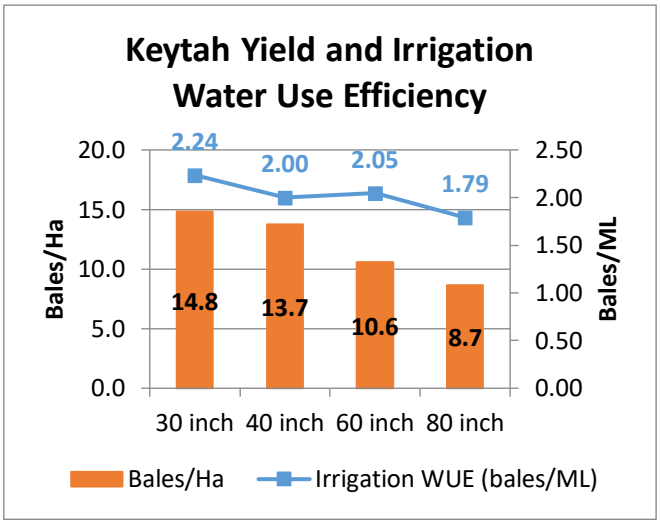


Figure10: Auscott 2014-2015 yield and WUE

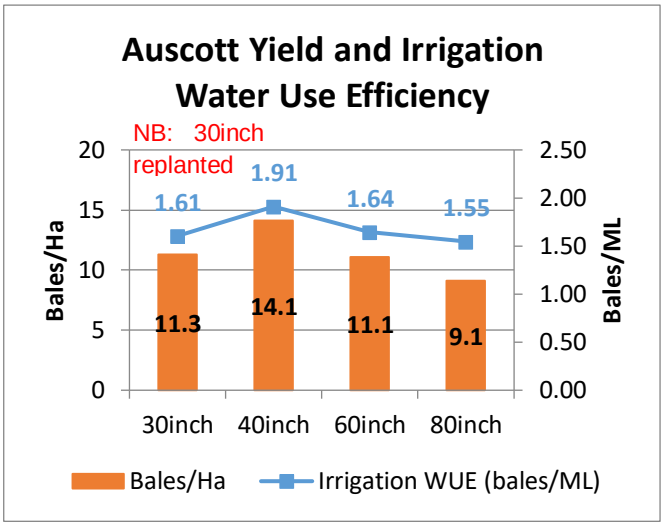


Figure 11: Auscott 2015-2016 Yield and WUE

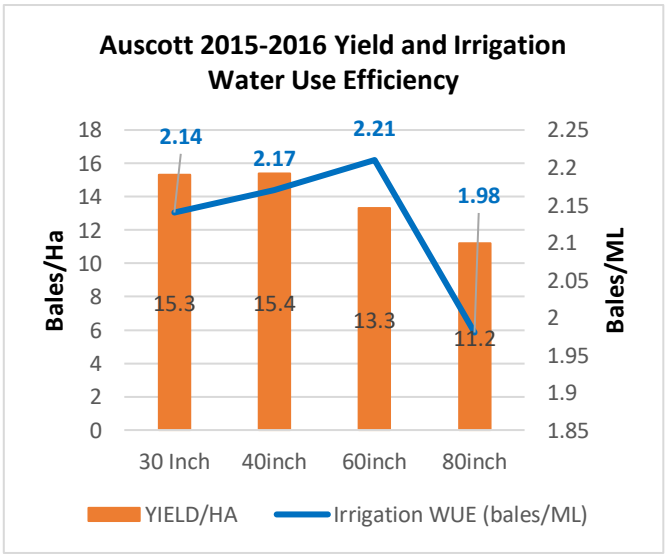


Figure 12: Auscott 2016-2017 Yield and WUE

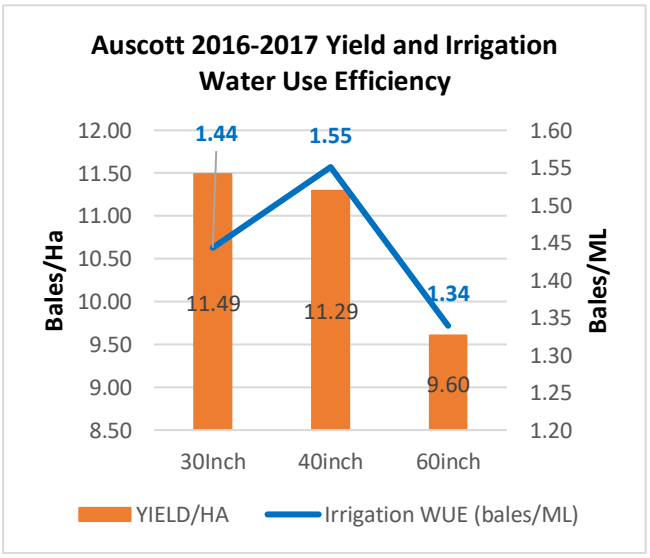


Figure 13 below depicts the yield of all row configurations at the four trial sites relative to the industry standard 40inch. It shows that at Keytah the 30inch yielded eight percent more than the 40inch, and that on average the yield from 30inch is 97% of the 40inch; this includes the 2014 -2015 replanted plots at Auscott. The 60inch yielded on average 18 percent less than the 40inch, while the 80inch yielded an average of 33 percent less than the 40inch.

Figure 13: Yield relative to 40inch

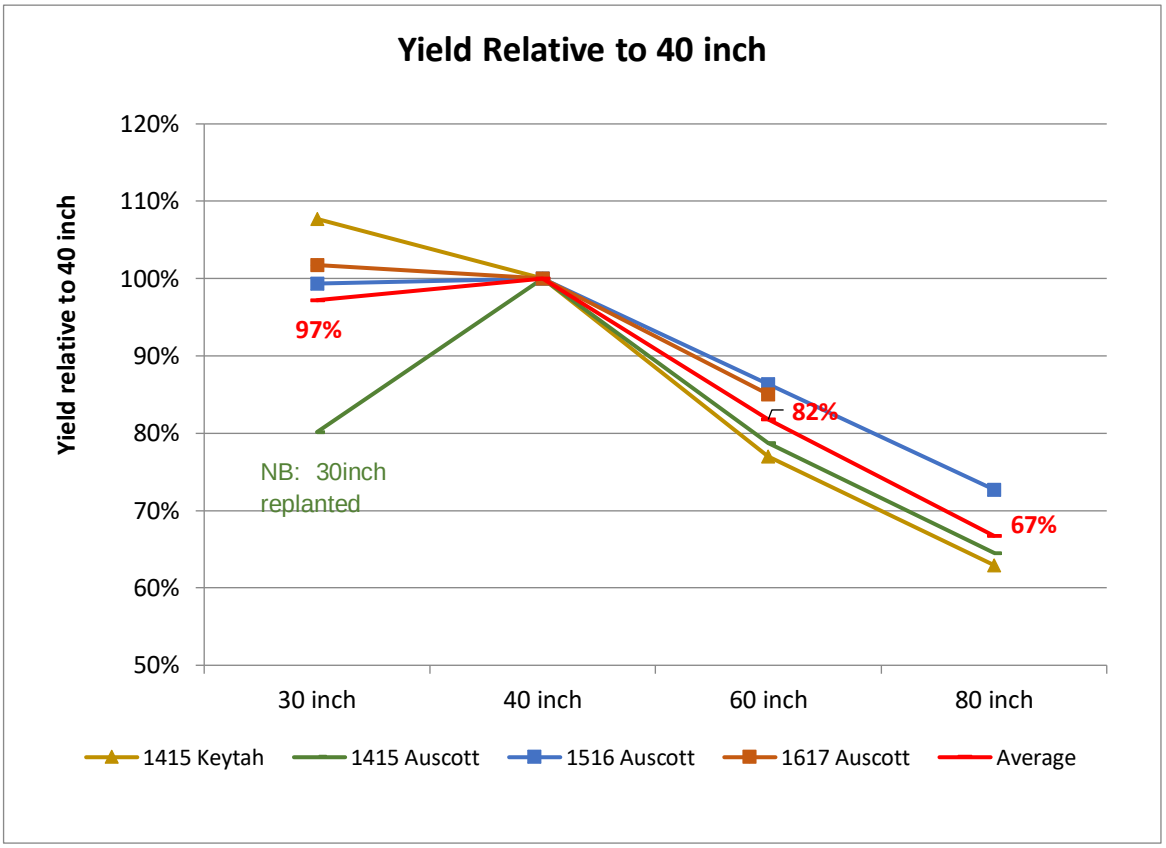
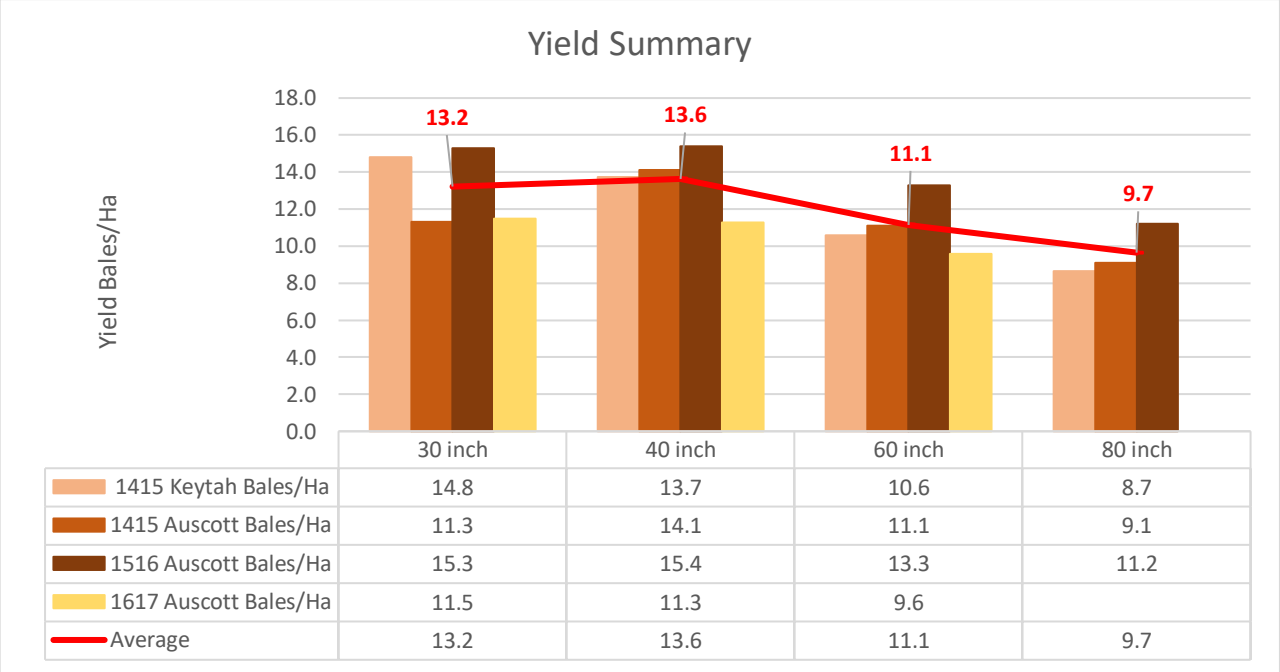


Figure 14 provides a more detailed yield summary which shows that the yield difference between the 30 and 40inch is very minimal. The 60inch with 33 percent less green hectares and the 80inch with 50 percent fewer green hectares have markedly reduced yields.

Figure 14: Trial yield summary



	30 inch	40 inch	60 inch	80 inch
1415 Keytah Bales/Ha	14.8	13.7	10.6	8.7
1415 Auscott Bales/Ha	11.3	14.1	11.1	9.1
1516 Auscott Bales/Ha	15.3	15.4	13.3	11.2
1617 Auscott Bales/Ha	11.5	11.3	9.6	
Average	13.2	13.6	11.1	9.7

Figure 15: Irrigation Water Applied

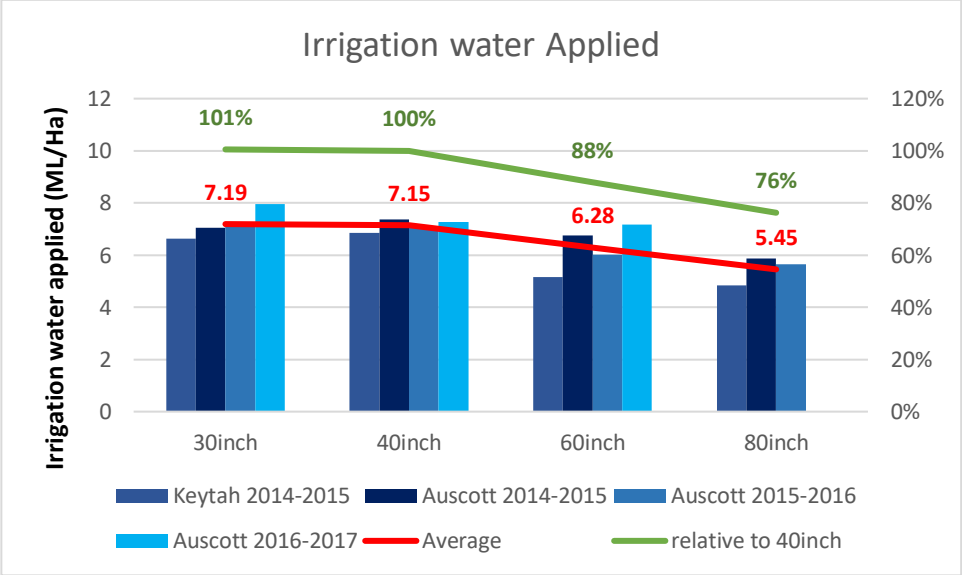
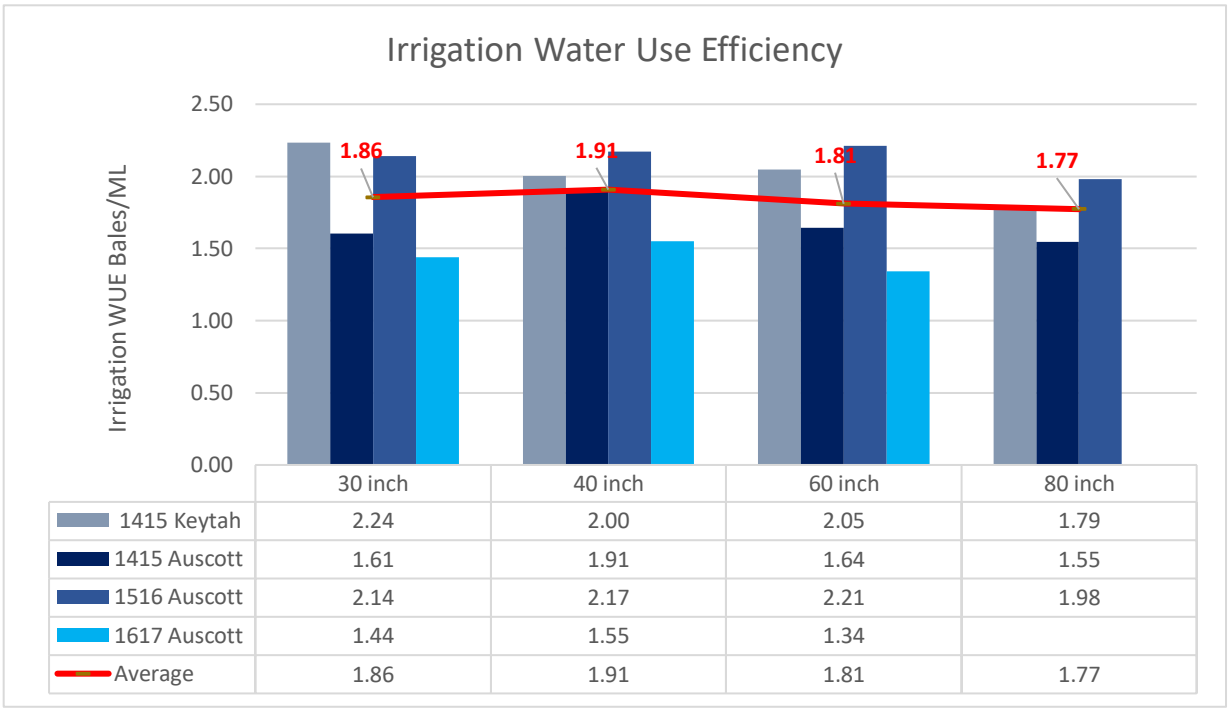


Figure 15 above provide more detail of the irrigation water applied in the trials. The 30 and 40inch received on average 7.19 and 7.15 mega litres per hectare respectively. The 60inch received 12 percent less water with an average of 6.28 mega litres per hectare and the 80inch 24 percent less with 5.45 mega litres per hectare.

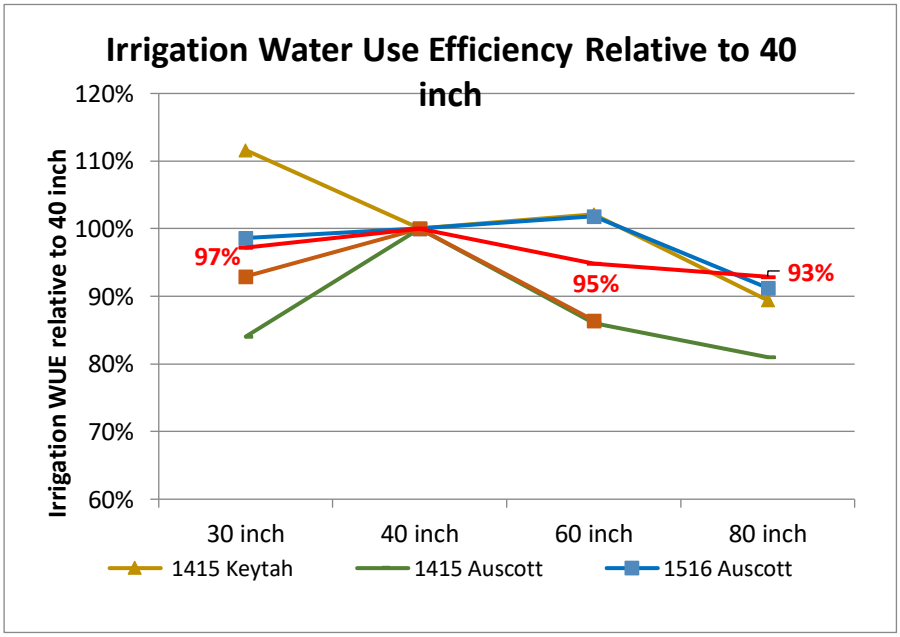
Figure 16 and figure 17 following provide more detail on the irrigation water use efficiency of the four sites. The 30, 60 and 80inch plots used three, five and seven percent less water relative to the 40inch.

Figure 16: Irrigation Water Use Efficiency Summary



	30 inch	40 inch	60 inch	80 inch
1415 Keytah	2.24	2.00	2.05	1.79
1415 Auscott	1.61	1.91	1.64	1.55
1516 Auscott	2.14	2.17	2.21	1.98
1617 Auscott	1.44	1.55	1.34	
Average	1.86	1.91	1.81	1.77

Figure 17: Irrigation Water Use Efficiency Relative to 40inch



Discussion

The four Irrigated Row Configuration trials have provided useful information which growers will be able to utilise in farming system decisions going forward.

The objective was to determine what the maximum yield potential was for each of the different row configurations under optimal water. The yield and irrigation water applied as seen in figures nine to 16 depict the trial findings.

The data has shown that there is little difference in the yield or irrigated water use efficiency between to 30inch and the 40inch row configurations. The average yield over four trials for the 30inch was 13.2 Bales/Ha, three percent less than the 13.6 Bales/Ha average for the 40inch configuration (figure 13 and 14). It is important to note that the 30inch average includes the replanted plot at Auscott in 2014-2015, where there was a yield penalty possibly due to the replant. The highest yield achieved for both configurations were over a bale more, at 4.8 Bales/Ha in the 30inch plots at Keytah in 2014-2015 and 15.4 Bales/Ha in the 40inch plots at Auscott in 2015-2016. There was minimal difference in the amount of irrigation water applied to either the 30 or 40inch. When yield is reviewed in conjunction with the irrigation water use efficiency, it reaffirms the similarity of both narrow row configurations. The 30inch water use efficiency of 1.86 Bales/ML is three percent less than the 40inch at 1.91 Bales/ML.

For the 60inch, the highest yield was 13.3 Bales/Ha at Auscott in 2015-2016. The average 60inch yield was 11.1 Bales/Ha with an average of 6.28 mega litres per hectare of applied irrigation water, or 12 percent less than the 40inch. The average irrigation WUE of the 60inch plots was 1.81, five percent less than the 40inch.

In the 80inch plots, the highest yield was 11.2 Bales/Ha at Auscott in 2015 - 2016. The average yield was 9.7 Bales/Ha from 5.45 mega litres per hectare of irrigation water. An average of 33 percent less than the 40inch, using and average of 24 percent less water. The 80inch configuration was not planted in 2016 - 2017 as it is not expected to be commonly utilised as an irrigation option in the industry.

One finding with the trials was that bed preparation is important. In 2014-2015 there was limited lead time between bed development and planting at both sites there were some issues when the trial was watered-up, resulting in replanting at one of the sites. In the subsequent two seasons good early bed preparation ensured there were no issues with watering or crop establishment.

Conclusions:

The four row configuration trials have demonstrated that the 30 and the 40inch row configurations are both very similar with regard yield potential and irrigated water use efficiency. The yield performance of the two narrow row configurations is very similar, with a yield variance of only three percent (including the replanted 2014-2015 data). Where there is sufficient water to fully irrigate the findings suggest that either a 30inch or a 40inch row configuration would produce high yields. They both also have good irrigation water use efficiency, using on average 7.19 and 7.15 mega litres per hectare.

When availability of irrigation water is not limited a solid plant of 30 or 40inch both have the potential to produce robust yields with good water use efficiency. In situations where irrigation water is limited, and a solid plant may not be appropriate, growers can now make more well-informed decisions on what configuration to plant.

The data suggests that growers who are set up with the standard 40inch bed configuration could move to 80inch configuration when faced with limited water. If the 80inch spacing is then watered to try to maximise yield, it would result in an average yield reduction of 33 percent, but there would be a saving of 24 percent in irrigation water under optimal irrigation. In situations where growers fully irrigate 60inch configurations which if fully irrigating to maximise yield would have on average an 18 percent yield penalty but would use on average 12 percent less water.

The trials indicate that under optimal irrigation the water use efficiency of this wider row spacing is five to seven percent less than for the 40inch spacing. Using this information with the other producing costs and the price of cotton growers can then determine if they should be planting a smaller area of either 30 or 40inch cotton, rather than a larger area of 60 or 80inch cotton.

The decision as to which row configuration is most appropriate for growers will depend on crop rotation and the farm operations. Cotton growers who grow a range of irrigated and dryland crops now have data to allow them to more confidently adjust their farming systems to accommodate both dryland and irrigated crops. Adjusting to 30inch row configuration will enable irrigators to move to machinery with wheel spacings of three meters, the spacing typically used in dryland cropping. Standardising wheel spacing across all equipment is important for producers pursuing true control traffic farming a technique critical to reducing compaction and hence water use and nutrient use efficiency in agriculture.

The trial confirms the importance of well-established bed structures and the need for significant lead time to enable new bed configurations to stabilise. The 1.5m beds used in the 30 and 60inch row configurations need to be established well in advance and the edges should be rolled to minimise slumping. Both sites found that were the bed structure was new there were significant issues with slumping and creating an evenly wet seed bed.

In conclusion the four trial sites have indicated that if growers intend to fully irrigate an area of cotton they would achieve better yields and irrigation water use efficiency from either the 30 or the 40inch row configurations. However, this may not be the case in terms of optimising water use efficiency under 30 or 40inch in a higher rainfall season or in higher rainfall environments. Irrigation of the wider row configurations is justified but there will be significant yield penalties.

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making every drop count

Appendix

Keytah Data

KEYTAH COTTON ROW SPACING TRIAL RESULTS 2014/2015

Field	Ha's	Variety	Ha's Picked	Total Modules	Estimated Yield by Module (b/ha)	Estimated Yield by Module (b/acre)	Estimated Yield by Actual Module Weight (b/ha)	Estimated Yield by Actual Module Weight (b/acre)	Average Turnout	TOTAL LINT WEIGHT	ACTUAL YIELD/HA	ACTUAL YIELD/ ACRE	Irrigation Water Applied (meg/ha)	Oct - April Rainfall (ML/ha)	Total Seasonal Water	Seasonal WUE (bales/meg)
K08 30inch	5.4	**Sicot 74BRF**	5.4	18	14.4	5.8	14.59	5.88	**43.8**	**18143**	**14.8**	**5.99**	6.62	2.54	9.16	1.62
K08 40inch	5.4	**Sicot 74BRF**	5.4	18	14.4	5.8	13.96	5.63	**42.5**	**16840**	**13.74**	**5.56**	6.86	2.54	9.4	1.46
K08 60inch	5.4	**Sicot 74BRF**	5.4	13	10.4	4.2	10.67	4.3	**42.8**	**12963**	**10.58**	**4.28**	5.17	2.54	7.71	1.37
K08 80inch	5.4	**Sicot 74BRF**	5.4	11	8.8	3.5	8.64	3.48	**43.2**	**10599**	**8.65**	**3.5**	4.83	2.54	7.37	1.17
	21.6		**22**	**60**									**5.87**			**2.02**
		Ginned Average	***22***						***43.1***	***58545***	***11.9***	***4.8***				

Average Module Weight	**2270**
Average Turnout	**43.20%**

Auscott Data 2014-2015

AUSCOTT COTTON ROW SPACING TRIAL RESULTS 2014/2015 (GINNED)

Field	Ha's	Variety	Ha's Picked	Total Modules	Module Wt	Average Module Wt	Bales / Module	Total Bales	Average Turnout	TOTAL LINT WEIGHT	ACTUAL YIELD/ HA	ACTUAL YIELD/ ACRE	Irrigation Water Applied (meg/ha)	Dec May Rainfall (ML/ha)	Total Seasonal Water	Seasonal WUE (bales/meg)
L1 30inch	5.22	**Sicot 74BRF**	5.22	15	31160	2077	3.92	58.8	**42.8**	**13338**	**11.3**	**4.6**	7.04	2.66	9.7	1.16
L1 40inch	5.22	**Sicot 74BRF**	5.22	18	39640	2202	4.09	73.6	**42.15**	**16708**	**14.1**	**5.7**	7.38	2.66	10.04	1.40
L1 60inch	5.22	**Sicot 74BRF**	5.22	14	31800	2271	4.15	58.1	**41.49**	**13194**	**11.1**	**4.5**	6.75	2.66	9.41	1.18
L1 80inch	5.22	**Sicot 74BRF**	5.22	13	27140	2088	3.74	48.7	**40.72**	**11051**	**9.1**	**3.7**	5.88	2.66	8.54	1.07
	20.88		**20.88**	**60**												
		Ginned Average	***20.88***						***41.79***		***11.4***	***4.6***	**6.8**			1.20

Auscott Data 2015-2016

AUSCOTT COTTON ROW SPACING TRIAL RESULTS 2015/2016 (GINNED)

Field	Ha's	Variety	Total Modules	Total Module Wt	Average Module Wt	Average Turnout	Bales / Module	Total Bales	YIELD/HA	YIELD/ ACRE	Irrigation Water Applied (meg/ha)	WUE of Applied Irrigation Water (bales/meg)	Oct Mar Rainfall ML/ha	Total Seasonal Water per Ha	Seasonal WUE (bales/ML)
30 Inch	8	**Sicot 74BRF**	30	63100	2103	43.89%	4.07	122	**15.3**	**6.2**	7.14	2.14	2.42	9.56	1.60
40inch	8	**Sicot 74BRF**	31	63900	2061	43.82%	3.98	123.35	**15.4**	**6.2**	7.09	2.17	2.42	9.51	1.62
60inch	8	**Sicot 74BRF**	25	55860	2234	43.28%	4.26	106.5	**13.3**	**5.4**	6.03	2.21	2.42	8.45	1.57
80inch	8	**Sicot 74BRF**	22	47760	2171	42.44%	4.06	89.29	**11.2**	**4.5**	5.65	1.98	2.42	8.07	1.39
	32							*441.15*	***13.79***	***5.6***	**6.5**	2.13			

Auscott Data 2016-2017

AUSCOTT COTTON ROW SPACING TRIAL RESULTS 2016/2017 (GINNED)

Field	Ha's	Variety	Total Bales	YIELD/HA	YIELD/ ACRE	Irrigation Water Applied (meg/ha)	WUE of Applied Irrigation Water (bales/meg)	Oct Mar Rainfall ML/ha	Total Seasonal Water ML/Ha	Seasonal WUE (bales/ML)
30Inch	12.8	**Sicot 74BRF**	147.05	**11.4883**	**4.649214**	7.96	1.44	2.83	10.79	1.06
40inch	12.8	**Sicot 74BRF**	144.52	**11.2906**	**4.569224**	7.28	1.55	2.83	10.11	1.12
60inch	12.8	**Sicot 74BRF**	122.9	**9.60156**	**3.885675**	7.17	1.34	2.83	10.00	0.96
	32	**Average**	*138.1567*	***10.7935***	***4.368038***	**7.47**	1.4444305			
Acres per plot	31.629									