SRDC Grower Group Innovation Project
Final Report

SRDC project number: GPP007

Project title: Controlled Traffic Farming Systems for the North Coast Grower Group

Group name: North Coast Grower Group

Contact person: John Fox (0408 772 666) / Michael Zamparutti (0428 587 727)

Due date for report: February 2008

Funding Statement:

This project was conducted by the North Coast Grower Group in association with the Sugar Research and Development Corporation (SRDC).

SRDC invests funds for sugar R&D derived from the sugar industry and the Australian Government.

Executive Summary:
(An overview of the aim, conduct, key results and learnings from the project)

The project aim was to implement and trial farming systems that incorporate the practices of controlled traffic, minimum tillage and crop rotations. The North Coast Grower Group members combined their resources and efforts to develop and implement a new farming system that utilized the bulk of their existing equipment, improved the management of their natural resources and reduced their cost of production. The group combined the results of their trials to identify a farming system that is sufficiently robust to handle the variations experienced in the North Coast environment (seasonal conditions, soil types, farm layouts and variable equipment) and improve the financial sustainability of the group members.

The key results and learning's of the project include:

- It is beneficial to plant different soybean varieties in different blocks/situations. Three varieties were trialled – Leichhardt, YY and Stuart. Each variety suited certain situations better than others. However all varieties produced suitable Nitrogen fixation for the following cane crop.
- Importance of replication in trials. Two first year trials were not replicated and the group now realises the unreliability in using these un-replicated trials to base farm management decisions on.
- Similar yield results from conventional and controlled traffic systems with 3 different varieties. Plant and first ratoon trials produced very similar yield and tonnes of sugar per hectare for both conventional and controlled traffic systems. Therefore there is no yield loss from moving to controlled traffic.
- Financial results collected to compare controlled traffic to conventional systems. There seems to be a lack of information on the actual financial analysis between the systems. From our data it appears there is a definite cost saving in the plant cane, however the ratoons had an almost identical cost of production in all trials. An important area of potential cost savings is in the harvesting costs. The group did not examine this factor, but there is potential for the harvesting costs in the controlled traffic system to be significantly less than the conventional.
- It is uneconomical and unnecessary to apply any Nitrogen fertiliser on a plant cane block following soybean. Some members of the group were sceptical about this, however the trial block proved the yield was higher in the replicates without extra added Nitrogen, and the crop was easier to harvest because it was not lodged.
- Lower rates of Potassium on a plant cane block achieved higher yields, but the reason for this is unclear. More work needs to be done to investigate this result.
- More work needs to be done investigating the potential for lower planting rates. One replicate in the dual row vs wide shute trial was consistently behind the other replicates in terms of shoot counts and biomass samples. However at harvest time this replicate produced the highest yield.

- Different planting techniques (dual row and wide shute) in a controlled traffic situation produced the same yield. When moving to a controlled traffic situation it appears that the planting method does not impact on yield. The grower should use the technique which best suits his farm, machinery and farming style.
- Emerging GGIP's need to thoroughly determine the number of trials to establish each year and manage these appropriately. Managing and reporting on replicated trials is new to most growers and needs careful management and planning.
- We are not telling other growers that they should change, we are trialling these principles in our own situation to determine the profitability of the new farming system.

Background:
(Why did you need to do this project?)

Prior to the commencement of this project (July 2005) there was a push from industry research bodies for growers to move to controlled traffic, legume fallows and minimum tillage. Research results indicated that there would be either increased or maintained yield from the new system. However, none of these trials were conducted in our area, or in conditions similar to our farming situation.

Previous research results like pineapple planting also indicated an increased yield was possible, however when implemented on a real farm situation it was found that there was a yield loss. There were also practical issues related to the conversion to controlled traffic which were overlooked, such as the need for elevator extensions.

Before group members were confident to apply these new farming practices, they needed to be tested and proven in our situation, on our farms, and using our equipment.

Rather than individuals conducting their own little, unreplicated trials, we decided to work as a group and conduct this project together. This way we could ensure that all group members had input into what trials were undertaken, have access to results, and a greater number of trials could be conducted.

In the promotion of these changed farming systems there was also a lack of information on the financial results of doing so. While maintenance of yield was promoted, there was no information on the impact to our bottom line. It was therefore essential to keep input records to be able to provide a financial comparison between a controlled traffic and conventional farming system. It is this information that growers need to use to make decisions regarding changed farming practices.

Aims:
(Include the Aim and the expected benefits that were listed in Section 2 of your original Application)

The project aim was to implement and trial farming systems that incorporate the practices of controlled traffic, minimum tillage and crop rotations. The North Coast Grower Group members combined their resources and efforts to develop and implement a new farming system that utilized the bulk of their existing equipment, improved the management of their natural resources and reduced their cost of production. The group combined the results of their trials to identify a farming system that is sufficiently robust to handle the variations experienced in the North Coast (seasonal conditions, soil types, farm layouts and variable equipment) and improve the financial sustainability of the group members.

The Expected Benefits of the Project included:
The economic benefits will be reduced costs of production through:

- improved field efficiencies
- reduced soil cultivations
- reduced nitrogen inputs
- improved moisture infiltration

The improved financial viability of the group members will in turn contribute to the improved financial viability of the Mackay Sugar Co-operative.

The environmental benefits will be:

- improved soil health
- reduced soil erosion
- reduced chemical and nutrient movement off farm
- reduced herbicide requirements
- reduced fertilizer requirements
- reduced fuel consumption
- reduced pesticide requirements

The social benefits will be derived from the improved financial sustainability and reduced time inputs of the group members. Following the communication and promotion of the group's achievements, these social benefits will be applicable to all growers that adopt similar farming systems. The social benefits will be:

- improved financial viability of group members
- improved quality of life for group members and families
- increased time availability for group members
- improved community perception of the sugar industry.

Methodology:
(How was the project conducted?)

Numerous trials were conducted during the project to test different aspects of the new farming system. These trials included:

- 4 row spacing trials to compare controlled traffic to the conventional farming system
- 2 soybean variety trials to compare the growth and Nitrogen fixation ability of the varieties under the North Coast conditions
- 1 fallow management trial to compare burnt trash versus trash worked in
- 1 trial investigating different fallow management techniques – minimum tillage versus full cultivation
- 1 trial comparing controlled traffic dual rows to controlled traffic wide shute
- 2 fertiliser trials – Nitrogen rates following soybean; and different rates of Potassium

Two of the first year row spacing trials were not replicated, while all other trials were. At the time of establishing their trials the group members were not skilled in terms of trial design and layout. After attending an SRDC conference in Townsville in early 2006, group members developed a greater understanding and appreciation of the importance of robust trial design. This was also confirmed when the plant cane results from these trials were harvested in late 2006. The group members realised they were not able to "hang their hats" on these results as it was simply a comparison between two different halves of the block. However these trials were monitored into the first ratoons.

The majority of the trials also relied on two different data sources to collect yield results. Due to past experiences with group members being involved in trials, and bins being lost, mixed up or falling in the river, the group decided to hire the BSES weigh truck as a back up data source. Fortunately, throughout the project no trial data was lost from the mill samples. Therefore, each trial has yield and PRS data from the Mackay Sugar mill, as well as a minimum 30% of each treatment weighed using the weigh truck and CCS data from small mill samples. The group decided this was the best way to ensure the results were not lost.

Harvest results from the mill and from the weigh truck and small mill samples were entered into an Excel spreadsheet to determine yield per hectare. Financial considerations such as sugar price, harvest and levy costs, and mill payment system were also entered to calculate the farm gate value. Input costs were also calculated and deducted from the farm gate value to provide a Gross Margin result.

Results and Outputs:
(What results were produced by the Project? The results should include data collected, articles or reports written, events held and anything else you see as relevant to the industry. Relevant files including photographs should be provided on a CD.)

Legume Fallows
Two replicated break crop trials were undertaken to compare three varieties of soybean. The aim of these trials was to examine the beneficial effects of soybean on soil health, as well as identify the variety/varieties of soybean best suited to the North Coast environment. These trials were evaluated based on an observation assessment, nitrogen fixation based on Nitrate strip tests, and a biomass sample.

Trial 1
Geoff Hall

- Small plot soybean variety trial
- Comparison between 3 varieties of soybean (Stuart, Leichhardt and YY)

Biomass samples were collected from this trial, and based on a formula published in the BSES Bulletin by Alan Garside, we calculated the Nitrogen supplied by the crop. The formula is:

Wet biomass kg/ha x 25% x 3.5% = Nitrogen content in the crop tops

Nitrogen content in the crop tops x 30% = Nitrogen content in roots, nodules etc

These two figures are added together to give the estimate of the nitrogen returned to the soil from the soybean crop. The results from these calculations are provided in the following pages, as well as the visual observations of the crop.

Geoff's observations of the trial were:

Block 1

Observation assessment	Leichhardt	Stuart	YY
General impression	Struck first	Darker green than others for the whole crop life	First to seed
Erosion	None	None	None
Water logging	No effect	No effect	No effect
Crop vigour	Good	Very good	Fair to good
Colour	Green	Dark green	Light green

Block 2

Observation assessment	Leichhardt	Stuart	YY
General impression	First to come up		Flowered first
Erosion	None	None	None
Water logging	No effect	No effect	No effect
Crop vigour	Very good	Very good	Very good
Colour	Very dark green	Very dark green	Very dark green

Photo 1, 2 and 3 – Geoff's soybean variety trial

The results from the biomass calculations of Geoff's trial are listed in the following spreadsheet.

Geoff Hall's variety trial

Block 1 - near road						
Variety	**Wet weight sample (kg/m)**	**Wet Weight (kg/ha)**	**Dry matter percent (25% of wet weight)**	**N in tops (3.5% of dry weight)**	**N in roots (30% of N in tops)**	**Total N (kg/ha)**
Leichhardt	1.77	14750	3687	129	39	168
Stuart	2.35	19583	4896	171	51	223
YY	1.74	14500	3625	127	38	165

Block 2 - near house						
Variety	**Wet weight sample (kg/m)**	**Wet Weight (kg/ha)**	**Dry matter percent (25% of wet weight)**	**N in tops (3.5% of dry weight)**	**N in roots (30% of N in tops)**	**Total N (kg/ha)**
Leichhardt	2.09	17417	4354	152	46	198
Stuart	1.73	14417	3604	126	38	164
YY	3.29	27417	6854	240	72	312

Non trial Soybean						
Variety	**Wet weight sample (kg/m)**	**Wet Weight (kg/ha)**	**Dry matter percent (25% of wet weight)**	**N in tops (3.5% of dry weight)**	**N in roots (30% of N in tops)**	**Total N (kg/ha)**
	6.12	51000	12750	446	134	580

(Geoff had a great crop of soybean that was not part of the trial but we calculated the N for it too for interests sake)

Trial 2
Michael Zamparutti

- Small plot soybean variety trial
- Comparison between 3 varieties of soybean (Stuart, Leichhardt and YY)

Biomass samples were also collected from this trial, and the Nitrogen supplied by the crop was calculated using the same formula published in the BSES Bulletin.

Michael's observations of the trial were:

Block 1

Observation assessment	Leichhardt	Stuart	YY
General impression	Grassy, very wet	Grassy, very wet	Grassy, very wet
Erosion	None	None	None
Water logging	No effect	Slight effect	Affected strike
Crop vigour	Fair	Fair	Fair
Colour	Dark green	Dark green	Dark green

Block 2

Observation assessment	Leichhardt	Stuart	YY
General impression	Grassy, very wet, vines present	Grassy, very wet, vines present	Grassy, very wet, vines present
Erosion	None	None	None
Water logging	Slight effect	Affected	Very poor strike
Crop vigour	Poor from weed pressure	Poor from weed pressure	Poor from weed pressure
Colour	Green	Green	Green but light on

The results from the biomass calculations of Mick's trial are listed in the following spreadsheet.

Zamparutti variety trial

Block 1						
Variety	**Wet weight sample (kg/m)**	**Wet Weight (kg/ha)**	**Dry matter percent (25% of wet weight)**	**N in tops (3.5% of dry weight)**	**N in roots (30% of N in tops)**	**Total N (kg/ha)**
Leichhardt	1.69	14083	3521	123	37	160
Stuart	1.67	13917	3479	122	37	158
YY	1.57	13083	3271	114	34	149

Block 2						
Variety	**Wet weight sample (kg/m)**	**Wet Weight (kg/ha)**	**Dry matter percent (25% of wet weight)**	**N in tops (3.5% of dry weight)**	**N in roots (30% of N in tops)**	**Total N (kg/ha)**
Leichhardt	1.51	12583	3146	110	33	143
Stuart	1.85	15417	3854	135	40	175
YY	1.23	10250	2562	90	27	117

Pachymetra samples were taken prior to all of the soybean crop trials being planted and a second sample was planned to be taken following the crop to determine any differences due to the legume fallow. However, due to issues such as smut (which influenced the ability for soil samples to be sent to Tully for analysis), the second sample was not able to be collected and therefore a comparison can not be made.

Nitrate test strips were also conducted on these trial blocks to determine any further Nitrogen required for the following cane crop. These test strips indicated that the paddocks did not require any further application of Nitrogen.

However, at a group meeting there was some skepticism shown by members of the group in regards to not applying Nitrogen fertiliser following a soybean crop. To address some of these concerns a replicated trial was established on Geoff Halls farm to compare yields of plant cane following soybean with and without Nitrogen top dressing. The results of this trial are listed in the fertiliser trial result section.

Summary
Mick and Geoff were satisfied with their soybean crops but from visual assessment and the results of the biomass weights, the varieties Stuart and YY stood out for them. They suggested to the rest of the group that not all varieties are suited to all conditions of the North Coast area. Leichhardt seemed to be better in low lying, waterlogged areas. Stuart and YY performed well in most other areas.

The follow up Nitrogen application trial also demonstrated to the group members that it is not necessary to apply Nitrogen to a plant cane crop following soybean. With Urea costing between $800 and $900 a tonne at the moment (January 2008), it is uneconomical to ignore the inherent benefits of growing a nitrogen fixing fallow crop.

***Fallow management trials*:**
Trial 1
A fallow management trial was conducted to examine soil health results between a conventional, cultivated fallow and a minimum tillage fallow management treatment. This trial attempted to determine the most productive and sustainable fallow management technique.

Ian and Bruce Wallace

- Spray out (Minimum tillage) verses Cultivation (conventional)
- Trial Evaluation
    - Record yield data from Mackay Sugar harvest results
    - Record input treatments for each comparison and cost analysis
    - Identify soil type

This fallow management trial was conducted over the 2005-06 season and the block was harvested in 2007. The yield data for this trial is summarised in the following table.

Treatment	**Tonnes**	**PRS**
Cultivated	42.55	13.33
Minimum tillage	37.78	13.33

As can be seen the conventional, cultivated treatment had a slightly higher yield than the minimum tillage treatment. Inputs were also recorded and these are presented below.

Date	Cultivation treatment	Spray out treatment
11 December	Off set	
4 March	Sprayout	Sprayout
13 July	Off set	Off set
13 August	Off set	Off set
14 August	5 tyne cultivator	5 tyne cultivator
15 August	Yeoman ripper	Yeoman ripper
16 August	Billet planter	Billet planter
9 September	Multi-weeder	Multi-weeder
12 September	Cut away	
21 October	Grubber	Grubber
21 November	Bonel fertiliser applicator	Bonel fertiliser applicator

As can be seen there is very little difference in the inputs used for each treatment. This is due to the fact that cultivation was still required when moving to a wider row spacing. After a complete crop cycle in a controlled traffic situation, a more accurate minimum tillage system could be trialed. In this trial the spray out, minimum tillage system was only $72 per hectare less.

Trial 2
John Fox

- Comparison of bed shapes
- Compare flat planted Soybean to mound planted Soybean

John worked the paddock and established preformed mounds in preparation for planting soybeans for this trial. However, due to the dry weather conditions over the 2005-06 summer it was not suitable for soybeans to be planted.

The mounds remained in place, and on the 7th June 2006 we used an Aquaterr moisture probe to measure the current soil moisture to a depth of about 200mm. The trial has 8 replicates of 3 rows of preformed mounds, then 3 rows of flat. The area was left bare fallow over summer and did have some weeds present. The following are measurements taken along the paddock in each replicate. The measurements start at the top of a slight slope and continue down to a flat area of the paddock. From the soil maps, the top of the slope is a mountains and hills soil type, while the rest of the block is soloth.

Summary of each treatment and the measured soil moisture content

Treatment	Preformed mounds	Flat
Replicate 1	40.3	35.5
Replicate 2	33.5	57.5
Replicate 3	52.3	55.7
Replicate 4	51.2	44.3
Replicate 5	47.3	47.6
Replicate 6	42.1	45.2
Replicate 7	34.9	52.1
Replicate 8	34.5	45.5
Average	**42.01**	**47.98**

While not many conclusions can be made from these results it appears that at that point in time the preformed mounds generally had a slightly lower moisture content at a depth of 200mm.

Trial 3
Michael Zamparutti

- Comparison between Burnt Trash treatment verses Trash worked in.
- Soybean crop planted in each treatment
- While this trial was originally planned to measure a number of factors, the focus changed to investigating the impacts on Pachymetra and Nematodes
- Trial Evaluation
    - Record input treatments for each comparison and cost analysis – the group decided against collecting input costs because we are no longer interested in burning trash in fallow treatments as a regular part of our farming systems. The reason for this is the decreased ability of the soil to store moisture when there is no trash blanket and the increased erosion potential over the wet season.
    - Soil test for pachymetra spore counts, nematode counts and free living nematode counts, before and after treatments
    - Collect yield data to compare the treatments

The Pachymetra tests indicated that there was no difference in spore counts between treatments both before and after burning. All spore counts were less than 7000 spores per kg which is low and unlikely to cause any yield loss.

The Nematode tests indicated that the burnt side had slightly higher levels of Root Lesion Nematodes than the trash side – 24 counts per 200g of soil compared to 0 counts. However this is also unlikely to have any impact on yield.

The yield data from this trial indicated that there was no difference between treatments. Both treatments yielded approximately 90 tonnes per hectare, with a PRS value of 13.47. Mick did observe that it was much easier and quicker to work the ground in the burnt section. Fewer workings were required to prepare this treatment for planting. In the future it would be beneficial to record the differences in inputs between treatments, as was originally planned.

Trial 4
Geoff Hall

- Comparison between Burnt Trash treatment verses Trash worked in
- 2 soybean crop replicates in each treatment
- Soybean Variety (as per availability)
- Trial Evaluation
    - Organic matter comparison
    - Record input treatments for each comparison and cost analysis
    - Identify soil type
    - Soil test for pachymetra spore counts, nematode counts and free living nematode counts, before and after treatments

This trial was not conducted due to dry weather conditions. A soybean crop was planted in 2006, however there was not an appropriate time to burn the trash for this trial.

Row spacing trials

Three trials were established in year 1 of the project. Following are the results of the trials for plant cane and first ratoon.

Year 1 trial results – plant cane
These trials were harvested during August and September 2006.

Trial 1
Michael Zamparutti
- Conventional treatment verses wide shoot (400mm) controlled traffic
- 1.625m (5' 4") verses 1.8m (6')
- Variety Q197
- Plant date July 2005

Trial 2
Gary Comelli
- Conventional treatment verses wide shoot (450 mm) controlled traffic
- 1.625m (5' 4") verses 1.8m (6')
- Variety Q157
- Plant date July 2005

Trial 3
John Simpson
- Two replicated treatments
- Conventional treatment verses wide shoot (450 mm) controlled traffic
- 1.625m (5' 4") verses 1.8m (6')
- Variety Q157
- Plant date September 2005

The results from these trials were entered into an Excel spreadsheet to determine yield/ha and tons sugar/ha. Harvest and levy costs were then calculated to provide a gross margin figure for each treatment.

The results are listed in the following pages.

Photo 4 and 5 – using the weigh truck during the harvest of Zamparutti's trial

Photo 6 and 7 – using the weigh truck at Simpsons trial; John and Gerry Simpson about to measure the trial area

Trial 1 result

Michael Zamparutti North Coast Grower Group

Row Spacing Trial 1.63m (5'4") v 1.8m (6') (300mm planter shoot)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	$ / Ha less harvest & Levy
Treatment A 1.63m	**Rep 1**	1.08	8.33	12.42	91.84	11.41	0.0907	26.52	2435.905	1738.83
Treatment B 1.8m	**Rep 1**	1.19	8.85	11.88	88.77	10.55	0.0997	24.82	2203.357	1529.621
Difference									232.55	209.21

1.63m(5'4")

Mill Data

Split	62%	
Sugar price	350	
Area harvested	1.08	

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q197 pl	25-Aug		33.51	13.32%	4.5	13.1	7.2	719	21.47
Q197 pl	25-Aug		33.33	13.61%	4.5	13.0	7.2	737	22.10
Q197 pl	25-Aug		37.94	13.03%	4.9	14.8	7.2	790	20.83
								0	
Total/Average			**104.78**	**13.31%**	**13.9**	**41.0**	**7.2**	**2246**	**21.44**
								0	
Values/ha			**97.02**		**12.9**	**38.0**	**698.53**	**2080**	

1.8m (6')

Split	62%
Sugar price	350
Area harvested	1.19

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q197 pl	25-Aug		13.88	13.03%	1.8	5.4	7.2	289	20.83
Q197 pl	25-Aug		30.23	12.57%	3.8	11.8	7.2	599	19.83
Q197 pl	25-Aug		16.12	12.74%	2.1	6.3	7.2	326	20.20
			16.51	13.61%	2.2	6.5	7.2	365	22.10
			16.46	12.74%	2.1	6.4	7.2	333	20.20
Total/Average			**93.2**	**12.88%**	**12.0**	**36.5**	**7.2**	1912	**20.51**
Values/ha			**78.32**		**10.1**	**30.6**	**563.90**	**1606**	

Difference 474

Trial 2 results

Gary and Wayne Comelli North Coast Grower Group

Row spacing trial 1.63m verses 1.9m

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	$ / Ha less harvest & Levy
Treatment A 1.63m	**1.63m**	0.46	10.972	13.49	109.83	14.82	0.0999	29.89	3283.198	2449.59
Treatment B 1.8m	**1.9m**	0.54	13.552	12.68	112.75	14.30	0.1202	27.34	3082.685	2226.948
Difference									200.51	222.64

Mill Data 1.63m

Split	62%
Sugar price	350
Area harvested	0.46

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	25-Aug		51.79	13.47%	7.0	20.3	7.2	1129	21.79
Total/Average			**51.79**	**13.47%**	**7.0**	**20.3**	**7.2**	**1129**	**21.79**
Values/ha			**112.59**		**15.2**	**44.1**	**810.63**	**2454**	

1.9m

Split	62%
Sugar price	350
Area harvested	0.54

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	25-Aug		58.95	13.07%	7.7	23.1	7.2	1233	20.92
Total/Average			**58.95**	**13.07%**	**7.7**	**23.1**	**7.2**	**1233**	**20.92**
Values/ha			**109.17**		**14.3**	**42.7**	**786.00**	**2284**	

Difference 170

Trial 3 results

John Simpson North Coast Grower Group

Row Spacing Trial 1.63m v 1.8m (300mm planter shoot)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	Average $ / Ha	$/ ton less harvest & Levy	$/ ha less harvest & Levy	$ / ha less Harvest & Levy
Treatment A 1.63m	**Rep 1**	0.5	12.424	13.43	125.24	16.82	0.0992	29.70	3720.25		22.11	2769.66	
	Rep 2	0.49	11.99	13.77	125.16	17.23	0.0958	30.78	3851.76	3786.00	23.19	2901.82	2835.74
Treatment B 1.8m	**Rep 1**	0.56	13.41	12.86	125.92	16.19	0.1065	27.91	3514.18		20.32	2558.48	
	Rep 2	0.57	14.34	13.94	132.89	18.53	0.1079	31.31	4160.97	3837.57	23.72	3152.32	2855.40
Difference										51.57			19.66

Treatment A 1.63m Rep 1

Split	62%
Sugar price	350
Area harvested	0.5

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	17-Sep	58	13.95	14.83%	2.1	5.5	7.2	345	24.76
Q157 pl	17-Sep	59	18.11	14.83%	2.7	7.1	7.2	448	24.76
Q157 pl	17-Sep	157	26.09	14.93%	3.9	10.2	7.2	652	24.98
Q157 pl	17-Sep	weigh truck +	1.1	14.93%	0.2	0.4	7.2	27	24.98
Total/Average			**59.25**	**14.88%**	**8.8**	**23.2**	**7.2**	**1473**	**24.86**
Values/ha			**118.50**		**17.6**	**46.4**	**853.20**	**2946**	

Treatment A 1.63m Rep 2

Split	62%
Sugar price	350
Area harvested	0.49

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	17-Sep	156	56.71	14.83%	8.4	22.2	7.2	1404	24.76
Total/Average			**56.71**	**14.83%**	**8.4**	**22.2**	**7.2**	**1404**	**24.76**
Values/ha			**115.73**		**17.2**	**45.3**	**833.29**	**2866**	

average **2906**

Treatment B 1.8m Rep 1

Split	62%
Sugar price	350
Area harvested	0.56

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	17-Sep	158	8.62	15.24%	1.3	3.4	7.2	221	25.66
Q157 pl		159	56.79	15.23%	8.6	22.2	7.2	1456	25.63
		weigh truck -	-1.768	15.23%	-0.3	-0.7	7.2	-45	25.63
Total/Average			**63.642**	**15.23%**	**9.7**	**24.9**	**7.2**	**1632**	**25.64**
Values/ha			**113.65**		**17.3**	**44.5**	**818.25**	**2914**	

Treatment B 1.8m Rep 2

Split	62%
Sugar price	350
Area harvested	0.57

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 pl	17-Sep	157	12.37	14.93%	1.8	4.8	7.2	309	24.98
Q157 pl		158	59.81	15.24%	9.1	23.4	7.2	1534	25.66
Total/Average			**72.18**	**15.19%**	**11.0**	**28.2**	**7.2**	**1843**	**25.54**
Values/ha			**126.63**		**19.2**	**49.6**	**911.75**	**3234**	

average	**3074**
Difference	**168**

Summary

As can be seen from the results, there is not a significant difference between the treatments in terms of the farm gate value. The un-replicated trials resulted in favour of the current 1.6m system, while the replicated trial showed an improved yield in the 1.8m system. After reviewing these results the group decided that not much value can be placed on the un-replicated trials as they are simply a comparison of one half of the block to the other half. The group now sees the value in replicating trials, and all future trials will be replicated. The comparison trials will however continue to be monitored over the coming years.

Due to the small size of the treatments (0.5ha), differences in actual costs were not able to be separated for each treatment. To calculate the input costs, an assumptive cost comparison was made based on the decreased time and metres of row in the controlled traffic system – for instance the 1.6m system has 10% less rows than the 1.8m system.

The calculated input costs for each trial are presented in an excel spreadsheet in the following pages. The initial paddock treatments in each trial are conducted broad acre across the entire paddock and therefore row spacing is irrelevant. The differences in costs of production occur once the row spacing effect is implemented. There are also some instances where the fertiliser or chemical costs are the same for each treatment and this is due to the grower purposely changing rates and speeds to ensure the same amount of product is applied to the controlled traffic as the conventional system.

Michael Zamparutti Row Spacing Trial 2006

Treatments	date	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.8m
Hodge discs - 24 plate	10-Apr					67.67	$67.67
spray - 7 m flat boom	1-May	roundup	5 L / ha	$8.50		42.5	$42.50
					13.25	13.25	$13.25
Hodge discs - 24 plate	3-May					67.67	$67.67
Hodge rippers - 4 m 9 leg	3-May					57.9	$57.90
rotary hoe - 1 row	4-May					25.92	$23.33
mark out - 7m	4-May					15.67	$14.10
Plant fertiliser	5-May	GF367	370.5	$550		203.775	$183.40
planted - HBM 400mm shute					165.33	165.33	$148.80
		cane t/ha	10	$32		$320	$288.00
		shirtan mL/ha	750	$35.00		$26.25	$23.63
		telstar mL/ha	450	$33.00		$13.20	$11.88
hardi sprayer - 4 row boom					13.32	13.32	$11.99
	6-May	atrazine kg/ha	1	$13		$13	$11.70
(pre emergent)		diuron kg/ha	1	$10		$10	$9.00
		baton kg/ha	1	$23		$23	$20.70
Top dress fertiliser	7-May	GF505	370.5	$550		203.775	$183.40
top dress - 3.2m					56.62	56.62	$50.96
fill in furrow , hill up - 3.2m	8-May				28.91	28.91	$26.02
hardi spray - 4 row boom					13.32	13.32	$11.99
		velpar kg/ha	2.75	$24		66	$59.40
Irrigation - high pressure o'head (2 x 16 hour runs)	11-May	diesel L/ha	10	$1	$320+R&M	320	320
Total						$1,767.08	$1,647.27

Gary Comelli Row Spacing Trial 2006

Treatments	date	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.9m
							14% less
rotary hoe - 140 inch	11-Apr				120.9	120.9	$120.90
spray - 6 m hardi	2-May				18.05	18.05	$18.05
		roundup	5 L/ha	$8.50		13.25	$13.25
rotary hoe - 140 inch	4-May				120.9	120.9	$120.90
rippers - 2.5 m	5-May				66.77	66.77	$66.77
rotary hoe - 140 inch	6-May				120.9	120.9	$120.90
mark out - 4 rows	6-May				15.22	15.22	$13.09
Plant fertiliser	6-May	DAP	100		64.68	64.68	$55.62
planted - vane billet	6-May				117.97	117.97	$101.45
		cane t/ha	10	$32		$320	$275.20
		shirtan mL/ha	750	$26.25		$19.69	$16.93
		telstar mL/ha	400	$13.20		$5.28	$4.54
		suSCon blue	24kg	$14.33		$343.92	$295.77
hardi sprayer - 3 row boom	8-May				18.05	18.05	$15.52
	8-May	treflan	3	$13		$39	$33.54
(pre emergent)		atradex	2	$9		$19	$16.17
grubber plus harrows - 2 row	8-May				51.59	51.59	$44.37
top dress fertiliser	10-May	LOS+P	3.7	$117		117.25	$100.84
hill up	10-May				56.62	56.62	$48.69
irwin spray bars - 4 row	10-May				18.05	18.05	$15.52
		velpar kg/ha	3	$23		69.9	$60.11
Total						$1736.79	$1,558.15

John Simpson Row Spacing Trial 2006

Treatments	date	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.8m
							10% less
offsets - 24 plate	10-Sep				69.95	69.95	$69.95
ripper - 5 tyne	15-Sep				55.94	55.94	$55.94
rotary hoe - 3 m	16-Sep				110.7	110.7	$110.70
spray out - 7 row	4-Feb				14.15	14.15	$14.15
ripper - 5 tyne	15-Aug				55.94	55.94	$55.94
rotary hoe - 3 m	16-Aug				110.7	110.7	$110.70
mark out - 4 rows	3-Sep				15.8	15.8	$14.22
							$0.00
planter - hodge billet	11-Sep				165.33	165.33	$148.80
		cane t/ha	10	$32		$320	$288.00
		suSCon		$12.33		$12.33	$11.10
		bumper		$35.46		$35.46	$31.91
		regent		$369.84			$0.00
Plant fertiliser		DAP	100	$1		$65	$58.50
Sprayer - 7 row	18-Oct				14.15	14.15	$12.74
(pre emergent)		velpar kg/ha	3	$24		$72	$64.80
Top dress fertiliser	20-Oct	LOS	4	100.67		100.67	$100.67
Total						$1,218.12	$1,148.11

Summary of cost comparisons
The differences in input costs between the systems in each trial were $119.81, $178.64 and $70.01 per hectare. The following table displays the gross margin calculation and the input cost comparison.

Trial		**1.6m**			**1.8/1.9m**	
	Gross margin	**Input costs**	**Profit**	**Gross margin**	**Input costs**	**Profit**
Zamparutti	2080	1767.08	312.92	1606	1647.27	-41.27
Comelli	2454	1736.79	717.21	2284	1558.15	725.85
Simpson	2946	1218.12	1727.88	2914	1148.11	1765.89
	2906	1218.12	1687.88	3234	1148.11	2085.89

(the only fixed costs included in these calculations are for depreciation, shelter and interest on the tractors and implements used in the trials. These costs include labour costs)

Trial	**1.6m**	**1.8m/1.9m**	**Difference**
	Profit	**Profit**	**1.8m – 1.6m**
Zamparutti	312.92	-41.27	- 354.19
Comelli	717.21	725.85	8.64
Simpson	1727.88	1765.89	38.01
	1687.88	2085.89	398.01

As can be seen these costs are very similar. Zamparutti's trial resulted in favour of the 1.6m system, while the other trials resulted in favour of the controlled traffic system by between $8.64 to $398.01 per hectare. While the similar yield results were expected, a greater input saving was expected from the controlled traffic system. The group continued to monitor these trials into the ratoons to determine if yield or costs improvements can be recognised during the crop cycle.

Year 2 trial results – first ratoon
These trials were harvested during September 2007. The results are listed in the following pages.

Photo 8 – using the weigh truck during the harvest of Simpsons trial

Trial 1 result

Michael Zamparutti North Coast Grower Group

Row Spacing Trial 1.63m (5'4") v 1.8m (6') (300mm planter shoot)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	$ / Ha less harvest & Levy
Treatment A 1.63m	**Rep 1**	1.08	8.566	17.65	94.44	16.67	0.0907	35.63	3364.681	2647.857
Treatment B 1.8m	**Rep 1**	1.19	8.114	17.33	81.38	14.10	0.0997	34.79	2831.46	2213.755
Difference									533.22	434.10

Mill Data

1.63m (5'4")

Split	62%
Sugar price	290
Area harvested	1.08

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q197 1st R	13-Sep	594	15.27	14.22%	2.2	6.0	7.2	277	18.11
Q197 1st R	13-Sep	619	13.54	14.22%	1.9	5.3	7.2	245	18.11
Q197 1st R	13-Sep	642	59.64	14.65%	8.7	23.3	7.2	11270	18.89
Total/Average			**88.45**	**14.51%**	**12.8**	**34.6**	**7.2**	**1648**	**18.64**
Values/ha			**81.90**		**11.9**	**32.0**	**589.67**	**1526**	

1.8m (6')

Split	62%
Sugar price	290
Area harvested	1.19

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q197 1st R	13-Sep	594	14.4	14.22%	2.0	5.6	7.2	261	18.11
Q197 1st R	13-Sep	597	75.95	14.60%	11.1	29.7	7.2	1428	18.80
Q197 1st R	13-Sep								
Total/Average			**90.35**	**14.54%**	**13.1**	**35.4**	**7.2**	1689	**18.69**
Values/ha			**75.92**		**11.0**	**29.7**	**546.66**	**1419**	
Difference (1.6m minus 1.8m values)			5.97	-0.03%	0.8	2.3	43.01	107	-0.05

Trial 2 results

Gary and Wayne Comelli North Coast Grower Group

Row spacing trial 1.63m verses 1.9m

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	$ / Ha less harvest & Levy
Treatment A 1.63m	**1.63m**	0.46	10.052	16.97	100.62	17.08	0.0999	33.85	3406.179	2642.469
Treatment B 1.8m	**1.9m**	0.54	12.19	17.11	101.41	17.35	0.1202	34.22	3470.104	2700.369
Difference									63.92	57.90

Mill Data

1.63m

Split	62%
Sugar price	290
Area harvested	0.46

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	15-Sep	821	38.73	15.32%	5.9	15.2	7.2	778	20.10
Q157 1st R	15-Sep	824	4.3	15.32%	0.7	1.7	7.2	86	20.10
Total/Average			**43.03**	**15.32%**	**6.6**	**16.8**	**7.2**	**865**	**20.10**
Values/ha			**93.54**		**14.3**	**36.6**	**673.51**	**1880**	

1.9m

Split	62%
Sugar price	290
Area harvested	0.54

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	15-Sep	822	53.08	15.31%	8.1	20.8	7.2	1066	20.08
Total/Average			**53.08**	**15.31%**	**8.1**	**20.8**	**7.2**	**1066**	**20.08**
Values/ha			**98.30**		**15.0**	**38.5**	**707.73**	**1974**	
Difference (1.9m minus 1.6m values)			4.75	-0.01%	0.7	1.9	34.22	94	-0.02

Trial 3 results

John Simpson North Coast Grower Group

Row Spacing Trial 1.63m v 1.8m (300mm planter shoot)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	Average $ / Ha	$/ ton less harvest & Levy	$/ ha less harvest & Levy	Avg $ / ha less Harvest & Levy
Treatment A 1.63m	**Rep 1**	0.5	9.912	16.51	99.92	16.50	0.0992	32.65	3262.48		25.06	2504.09	
	Rep 2	0.49	11.376	16.04	118.75	19.05	0.0958	31.42	3731.57	3497.02	23.83	2830.27	2667.18
Treatment B 1.8m	**Rep 1**	0.56	10.482	16.52	98.42	16.26	0.1065	32.68	3216.17		25.09	2469.15	
	Rep 2	0.57	11.85	16.48	109.84	18.10	0.1079	32.57	3577.88	3397.02	24.98	2744.17	2606.66
Difference										-100.00			-60.52

Mill Data

Treatment A 1.63m Rep 1

Split	62%
Sugar price	290
Area harvested	0.5

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	636	47.23	15.80%	7.5	18.5	7.2	990	20.97
Total/Average			**47.23**	**15.80%**	**7.5**	**18.5**	**7.2**	**990**	**20.97**
Values/ha			**94.46**		**14.9**	**37.0**	**680.11**	**1981**	

Treatment A 1.63m Rep 2

Split	62%
Sugar price	290
Area harvested	0.49

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	726	16.55	15.25%	2.5	6.5	7.2	331	19.97
Q157 1st R	21-Sep	798	32.54	15.66%	5.1	12.7	7.2	674	20.72
Total/Average			**49.09**	**15.52%**	**7.6**	**19.2**	**7.2**	**1005**	**20.47**
Values/ha			**100.18**		**15.6**	**39.2**	**721.32**	**2050**	
average for 1.6m (value/ha)			97.32	15.66%	15.2	38.1	700.72	**2015**	20.72

Treatment B 1.8m Rep 1

Split	62%
Sugar price	290
Area harvested	0.56

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	713	53.58	15.80%	8.5	21.0	7.2	1123	20.97
Q157 1st R	21-Sep	716	3.45	15.66%	0.5	1.3	7.2	71	20.72
Total/Average			**57.03**	**15.79%**	**9.0**	**22.3**	**7.2**	**1195**	**20.95**
Values/ha			**101.84**		**16.1**	**39.8**	**733.24**	**2134**	

Treatment B 1.8m Rep 2

Split	62%
Sugar price	290
Area harvested	0.57

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	655	53.92	15.80%	8.5	21.1	7.2	1131	20.97
Total/Average			**53.92**	**15.80%**	**8.5**	**21.1**	**7.2**	**1131**	**20.97**
Values/ha			**94.60**		**14.9**	**37.0**	**681.09**	**1984**	

average for 1.8m (value/ha)	98.22	15.80%	15.5	38.4	707.17	**2059**	20.96
Difference (1.8m values minus 1.6m)	0.90	0.13%	0.3	0.4	6.45	**43**	0.24

Summary

As can be seen from the results, there is not a significant difference between the first ratoon treatments in terms of the farm gate value. One of the un-replicated trials resulted in favour of the current 1.6m system, while the remaining trials showed an improved yield in the 1.8m system.

The calculated input costs for each trial are presented in an excel spreadsheet in the following pages. There are some instances where the fertiliser or chemical costs are the same for each treatment and this is due to the grower purposely changing rates and speeds to ensure the same rate of product is applied to the controlled traffic as the conventional system.

Michael Zamparutti Row Spacing Trial 2007
First Ratoon Q197

Treatments	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.8m
						10% less
Fertiliser	LOS+P	4m3	$139		$554.76	$554.76
hardi spray - 4 row boom				13.32	13.32	$11.99
Chemical	Atradex	1.5	10.87		16.31	$16.31
	Diurex	1.5	9.6		14.40	$14.40
	2,4-D	1.25	$9		11.25	$11.25
Total					$610.04	$608.70

Gary Comelli Row Spacing Trial 2007
First Ratoon Q157

Treatments	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.9m
						14% less
Fertiliser	LOS	3.7m3	$118.58		$438.75	$438.75
hardi sprayer - 3 row boom				18.05	18.05	$15.52
Chemicals	Gramoxone	2	$10		$19	$19.00
	Amicide	2	$9		$18	$18.00
hardi sprayer - 3 row boom				18.05	18.05	$15.52
Chemicals	Amicide	2	$9		$18	$18.00
Total					$529.85	$524.79

John Simpson Row Spacing Trial 2007

First Ratoon Q157

Treatments	Products	Rate (kg/ha, L/ha, mL/ha)	Product cost	Application of treatment	cost /ha 1.625m	cost /ha 1.8m
						10% less
Fertiliser	LOS+P	4m3	$139		$554.76	$554.76
Sprayer - 7 row				14.15	14.15	$12.74
Chemical	Atradex	1.5	$11		$16.31	$16.31
	Diurex	1.5	9.6		$14.40	$14.40
	Amicide 2,4-D	1.25	9		$11.25	$11.25
Total					$610.87	$609.45

Summary of cost comparisons
The differences in input costs between the systems in each trial were minimal due to the small number of operations undertaken in ratoon blocks. The following table displays the gross margin calculation and the input cost comparison.

Trial	**1.6m**			**1.8/1.9m**		
	Gross margin	**Input costs**	**Profit**	**Gross margin**	**Input costs**	**Profit**
Zamparutti	1526	610.04	915.96	1419	608.70	810.30
Comelli	1880	529.85	1350.15	1974	524.79	1449.21
Simpson	2015	610.87	1404.13	2059	609.45	1449.55

(the only fixed costs included in these calculations are for depreciation, shelter and interest on the tractors and implements used in the trials. These costs include labour costs).

Trial	**1.6m**	**1.8m/1.9m**	**Difference**
	Profit	**Profit**	**1.8m – 1.6m**
Zamparutti	915.96	810.30	- 105.66
Comelli	1350.15	1449.21	99.06
Simpson	1404.13	1449.55	45.42

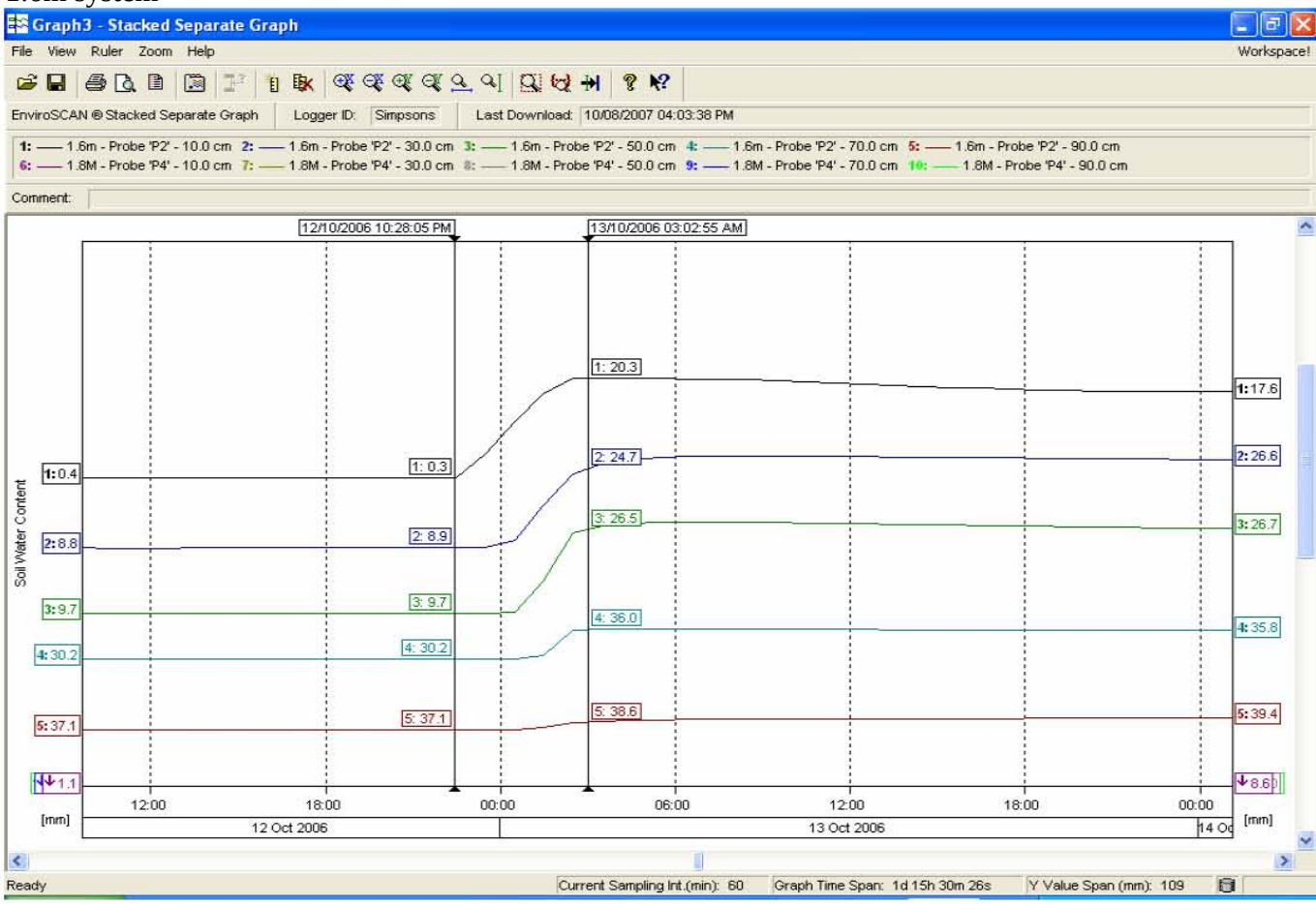
As can be seen these costs are very similar. Zamparutti's trial resulted in favour of the 1.6m system, while the other trials resulted in favour of the controlled traffic system by between $45.42 and $99.06 per hectare. The group will continue to monitor these trials into the ratoons, even after the completion of the GGIP, to determine if yield or costs improvements can be recognised during the crop cycle.

Water Infiltration
An enviroscan (soil moisture monitoring tool) was established in Simpsons trial to compare water infiltration between a controlled traffic and conventional system. While no definite conclusions can be made from this data, from interpreting the data some valid questions were raised. The following graphs are from a single rainfall event in October 2007.

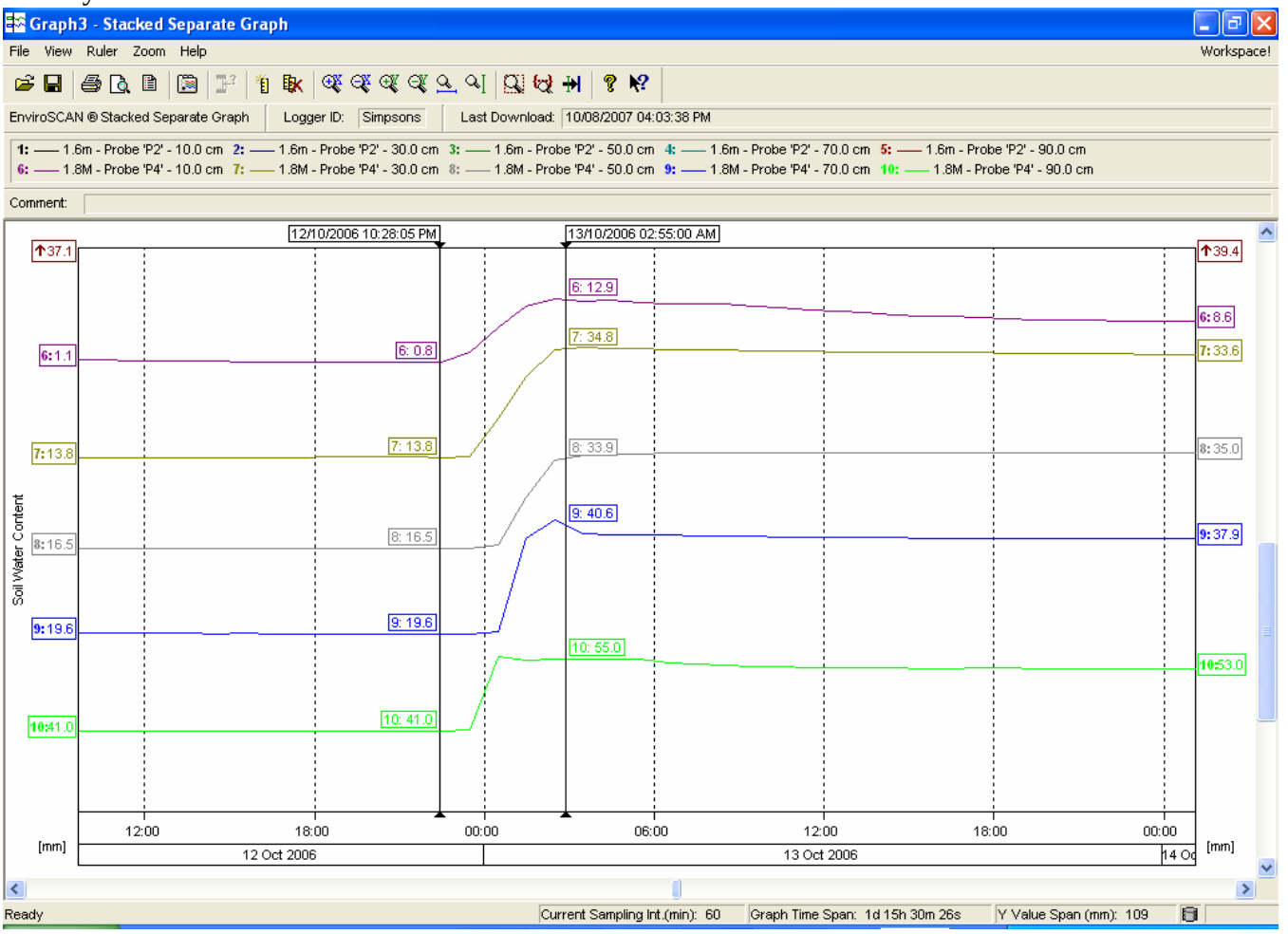
The Enviroscan has sensors located at 100mm, 300mm, 500mm, 700mm and 900mm deep in the soil profile. A rise in the lines in the graph indicates that water has reached that sensor and the soil moisture level has increased.

Graphs 1 and 2 – water infiltration following a rainfall event

1.6m system



1.8m system

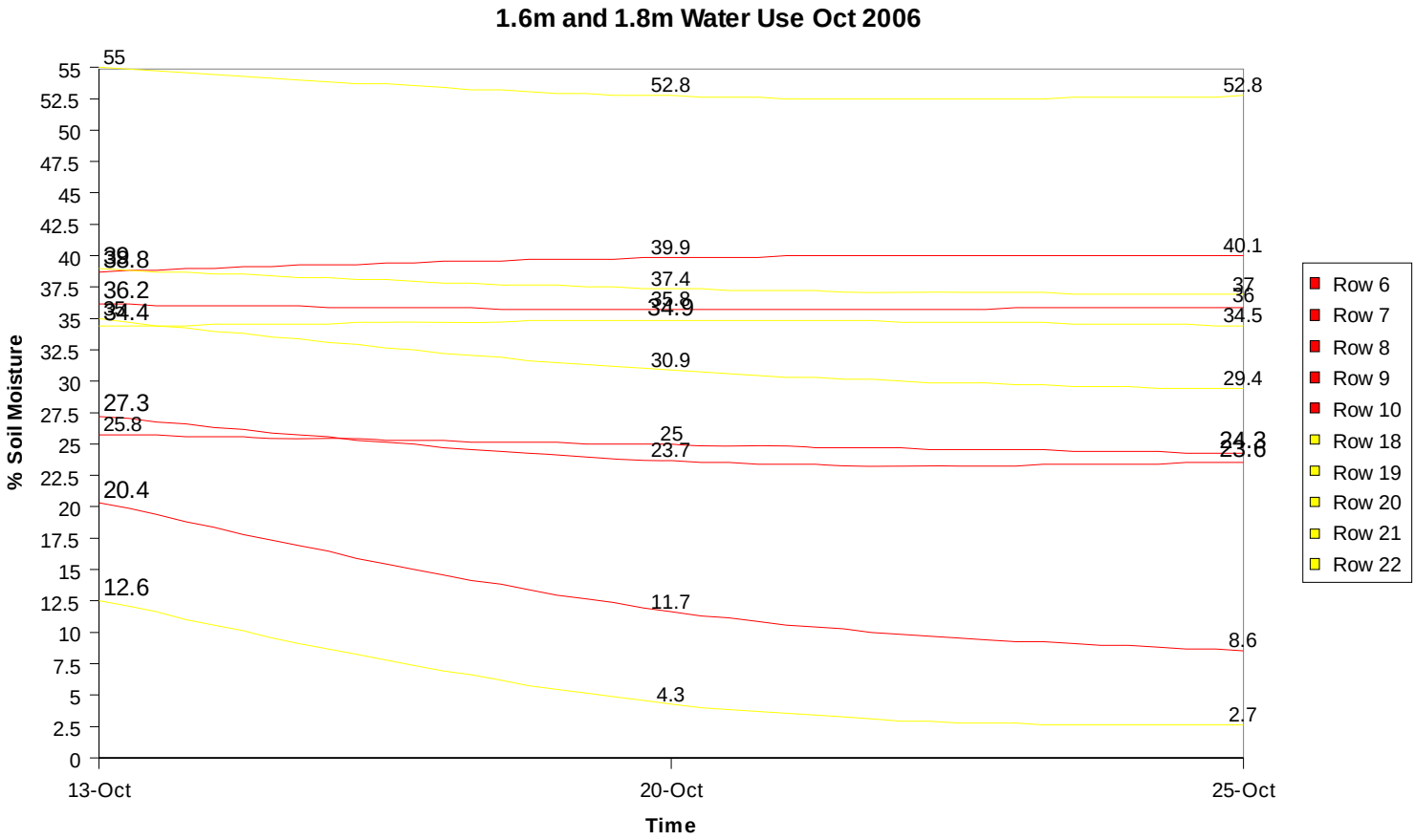


From analysing these graphs it appears that the 1.8m system allowed for more water infiltration than the 1.6m system. The 1.8m system generally had a bigger increase in soil moisture content at each depth and also had water infiltrate down to the 900mm sensor. The 1.6m system had infiltration down to the 700mm sensor, and each sensor recorded less of an increase in soil moisture.

These figures were then analysed another way to see if the same trends continued. In the following graph, the yellow lines represent the 1.8m system sensors, while the red lines are the 1.6m system. These lines are the reverse to the previous graphs ie the 100mm sensors are at the bottom of the graph, while the 900mm sensors are at the top. This graph is looking at the soil moisture loss over the 2 weeks following rainfall in October 2007. As you can see, on average it appears that the 1.8m system is a moister profile. The 100mm sensor in the 1.8m system is the driest and this could be explained by the reduced canopy cover in this system.

Obviously this is data from 1 event and can't be used to make any conclusions about which is the better system. However it does raise the question about water use efficiency in a controlled traffic system. Is it possible to grow the same tonnes with less water in a controlled traffic system because the plants have access to more soil, which could be storing more water than conventional systems?

Graph 3 – a comparison of soil moisture use in a 1.6m and 1.8m system over 2 weeks following rainfall



(The yellow lines are the 1.8m system while the red lines are the 1.6m system)

Planter configuration trial

A replicated trial was established in 2006 to compare planting techniques in a 1.8m controlled traffic system. The trial involves cane planted using a dual row double disc opener planter compared to a wide shoot billet planter. All of the groups year 1 trials involved wide shoot planters, therefore the aim of this trial is to compare the productivity results of a minimum tillage dual row system to the conventional wide shoot system, both planted at 1.8m.

John Fox

- Dual row Disc Opener Planter 1.8m verses Wide Shoot (400mm) 1.8m Billet planter
- Three replicated treatments (30tons minimum)
- Plant date (August 2006)
- Irrigation Type – water winch
- Trial Evaluation
    - Record planting rates between treatments
    - Record shoot counts regularly
    - Identify soil type
    - Record yield data from Mackay Sugar harvest results

Planting rates and shoot counts were measured between each treatment to allow for comparisons in plant population and establishment. The planting rates were measured using the BSES weigh truck and measuring the distance planted with that measured weight.

Planting rates
Double disc opener
690 kg billets used to plant 368.7m of rows at 1.8m

690/368.7 = 1.87 kg billets per 1 metre

1.87 x 5,555.56 (m in one ha at 1.8m) = 10.39 t/ha

Wide shute
276 kg billets used to plant 162.8m of rows at 1.8m

276/162.8 = 1.7 kg billets per 1 metre

1.7 x 5,555.56 (m in a ha at 1.8m) = 9.44 t/ha

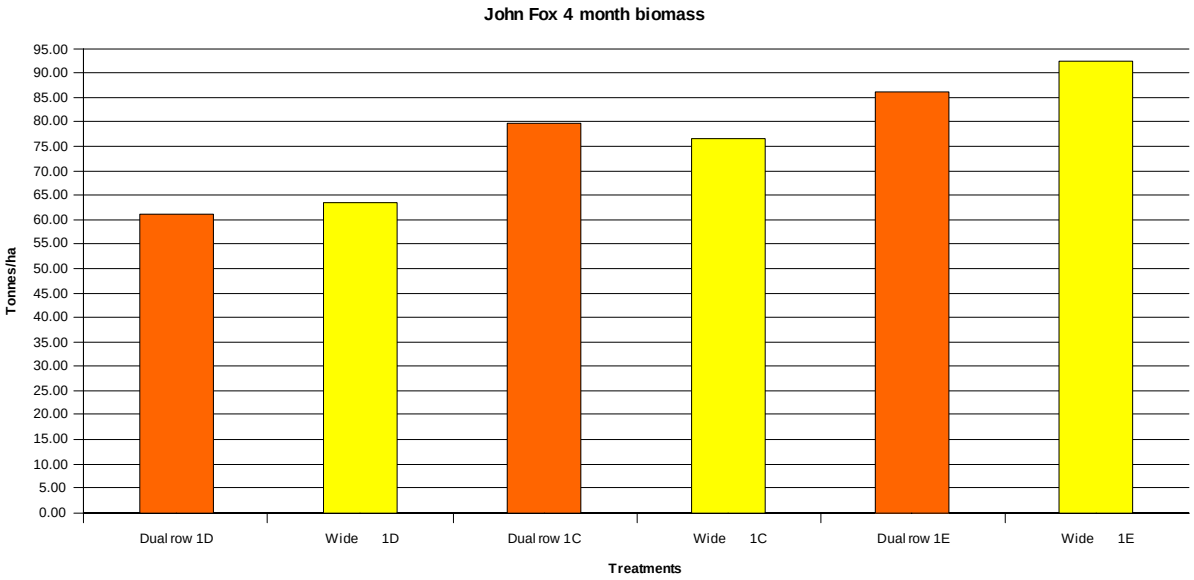
Therefore the dual row double disc opener planting treatment used a slightly higher planting rate per hectare.

Shoot counts and biomass samples were also conducted to compare plant population. The following graph illustrates the population dynamics between the treatments.

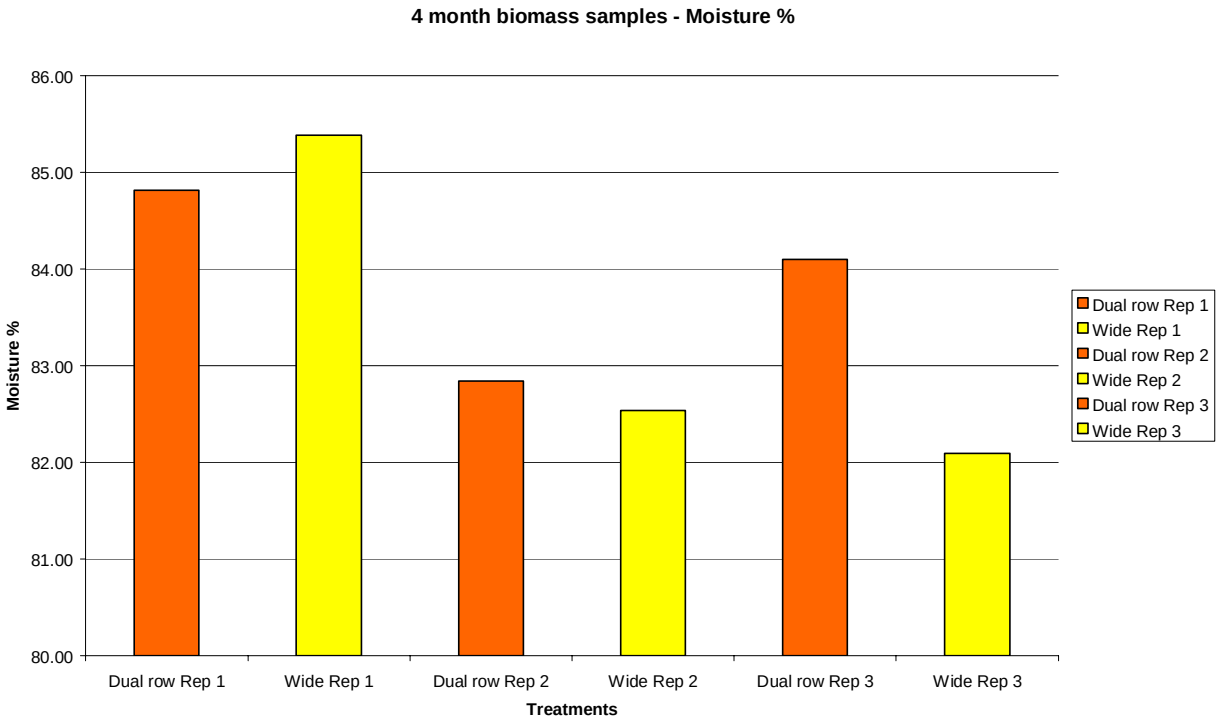
As can be seen the dual row treatment had a much higher plant population than the wide shoot earlier on. However, the counts then evened out at around 100,000 sticks per hectare. Therefore the wide shoot treatment lost around 50% of the actual established shoots, while the dual row lost about 68%. Biomass samples were also taken on two different occasions to gain a better understanding of the relationship between plant population and yield.

Biomass Results

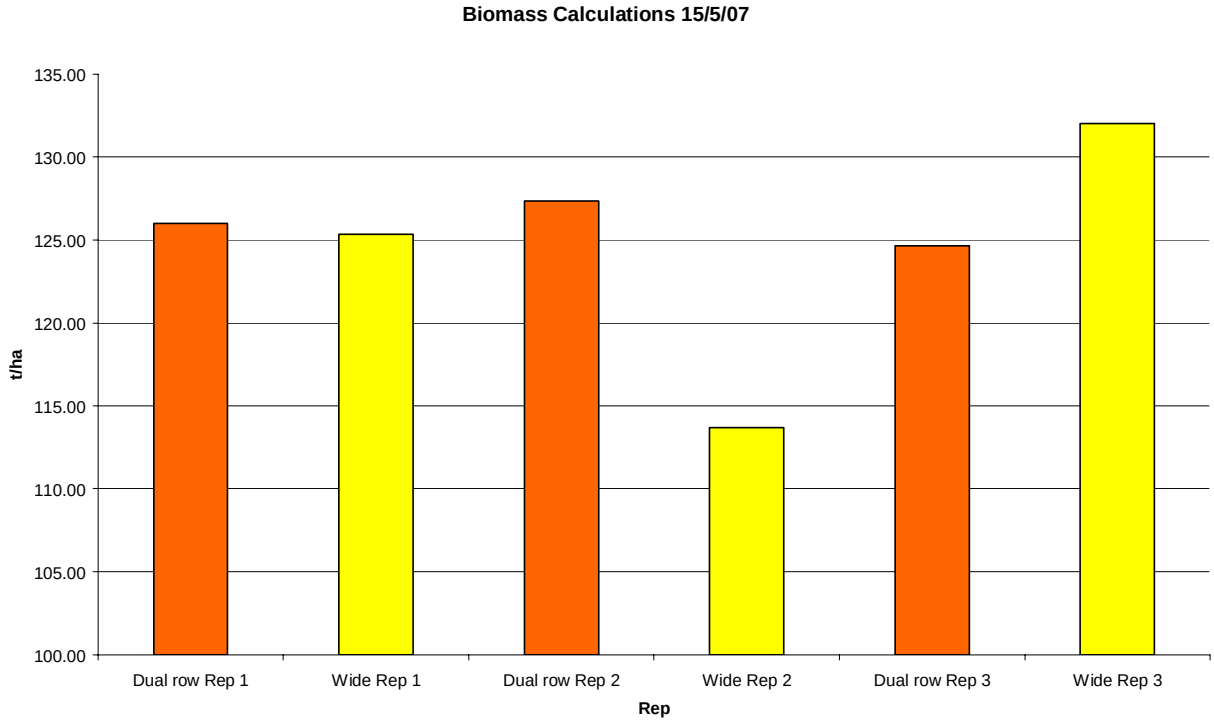
Graph 1 – biomass weights at 4 months of age



Graph 2 – moisture content at 4 months of age



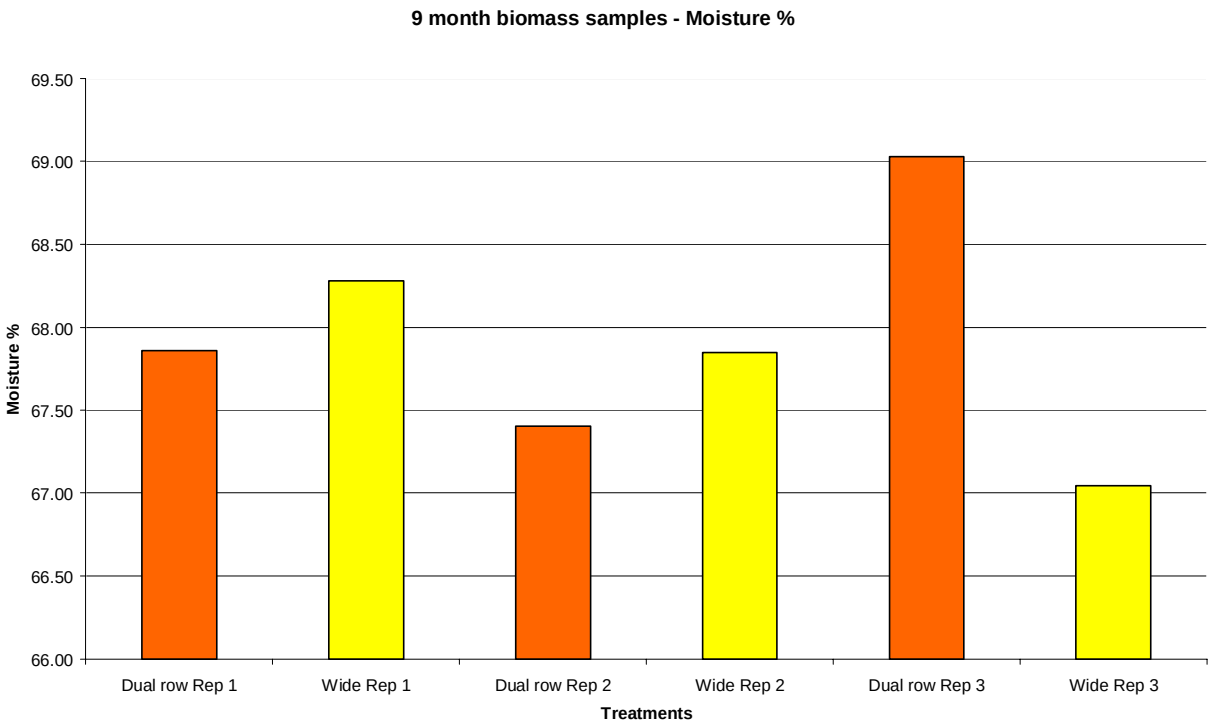
Graph 3 – biomass weights at 9 months of age



This graph shows that there is not much difference in yield between the treatments, except for Wide Shute Rep 2 which recorded an estimated yield of 113 tonnes/ha. On average the dual row reps produced around 123 tonnes/ha, while the wide shute reps averaged 125 tonnes/ha.

Moisture samples were also measured at the same time as biomass samples. The following graph shows that the moisture contents were similar in all treatments. There does seem to be some links between moisture content and yield – the lower the moisture the higher the yield.

Graph 4 – moisture content at 9 months of age



The following tables include the harvest results using the mill data as well as the small mill and weigh truck results.

John Fox North Coast Grower Group

1.8m Planting Technique Trial - dual row vs wide shute

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	Average $ / Ha	$/ ton less harvest & Levy	$/ ha less harvest & Levy	Avg $ / ha less Harvest & Levy
Treatment A Dual Row	**Rep 1**	0.6375	17.318	19.1	108.66	20.75	0.159	39.41	4282.48		31.82	3457.73	
	Rep 2	0.6103	16.03	19.71	105.06	20.71	0.153	41.00	4307.91		33.41	3510.48	
	Rep 3	0.6026	15.788	19.14	104.80	20.06	0.151	39.52	4141.18	4243.86	31.93	3345.76	3437.99
	Average			19.32	106.17	20.51		39.98					
Treatment B Wide shute	**Rep 1**	0.6674	16.404	19.31	98.32	18.98	0.167	39.96	3928.61		32.37	3182.40	
	Rep 2	0.6169	17.49	18.87	113.42	21.40	0.154	38.81	4401.86		31.22	3541.01	
	Rep 3	0.5674	15.578	19.36	109.82	21.26	0.142	40.09	4402.65	4244.37	32.50	3569.11	3430.84
	Average			19.18	107.18	20.55		39.62					
Difference							Dual row minus wide shute			-0.52			7.15

Treatment A Dual Row Rep 1

Split	62%
Sugar price	290
Area harvested	0.6375

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 plant	26-Oct	763	67.14	17.32%	11.6	26.3	7.2	1592	23.72
Total/Average			**67.14**	**17.32%**	**11.6**	**26.3**	**7.2**	**1592**	**23.72**
Values/ha			**105.32**		**18.2**	**41.2**	**758.29**	**2498**	

Treatment A Dual Row Rep 2

Split	62%
Sugar price	290
Area harvested	0.6103

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	27-Oct	912	63.89	16.86%	10.8	25.0	7.2	1462	22.88
Total/Average			**63.89**	**16.86%**	**10.8**	**25.0**	**7.2**	**1462**	**22.88**
Values/ha			**104.69**		**17.7**	**41.0**	**753.74**	**2396**	

Treatment A Dual Row Rep 3

Split	62%
Sugar price	290
Area harvested	0.6026

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	27-Oct	913	63.3	16.99%	10.8	24.8	7.2	1463	23.12
Total/Average			**63.3**	**16.99%**	**10.8**	**24.8**	**7.2**	**1463**	**23.12**
Values/ha			**105.04**		**17.8**	**41.1**	**756.32**	**2429**	
average for Dual Rows			105.02	17.06%	17.9	41.1	756.12	**2441**	23.24

Treatment B Wide Shute Rep 1

Split	62%
Sugar price	290
Area harvested	0.6674

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	26-Oct	778	63.29	17.27%	10.9	24.8	7.2	1495	23.63
Total/Average			**63.29**	**17.27%**	**10.9**	**24.8**	**7.2**	**1495**	**23.63**
Values/ha			**94.83**		**16.4**	**37.1**	**682.78**	**2240**	

Treatment B Wide Shute Rep 2

Split	62%
Sugar price	290
Area harvested	0.6169

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	26-Oct	779	66.62	17.49%	11.7	26.1	7.2	1600	24.02
Total/Average			**66.62**	**17.49%**	**11.7**	**26.1**	**7.2**	**1600**	**24.02**
Values/ha			**107.99**		**18.9**	**42.3**	**777.54**	**2594**	

Treatment B Wide Shute Rep 3

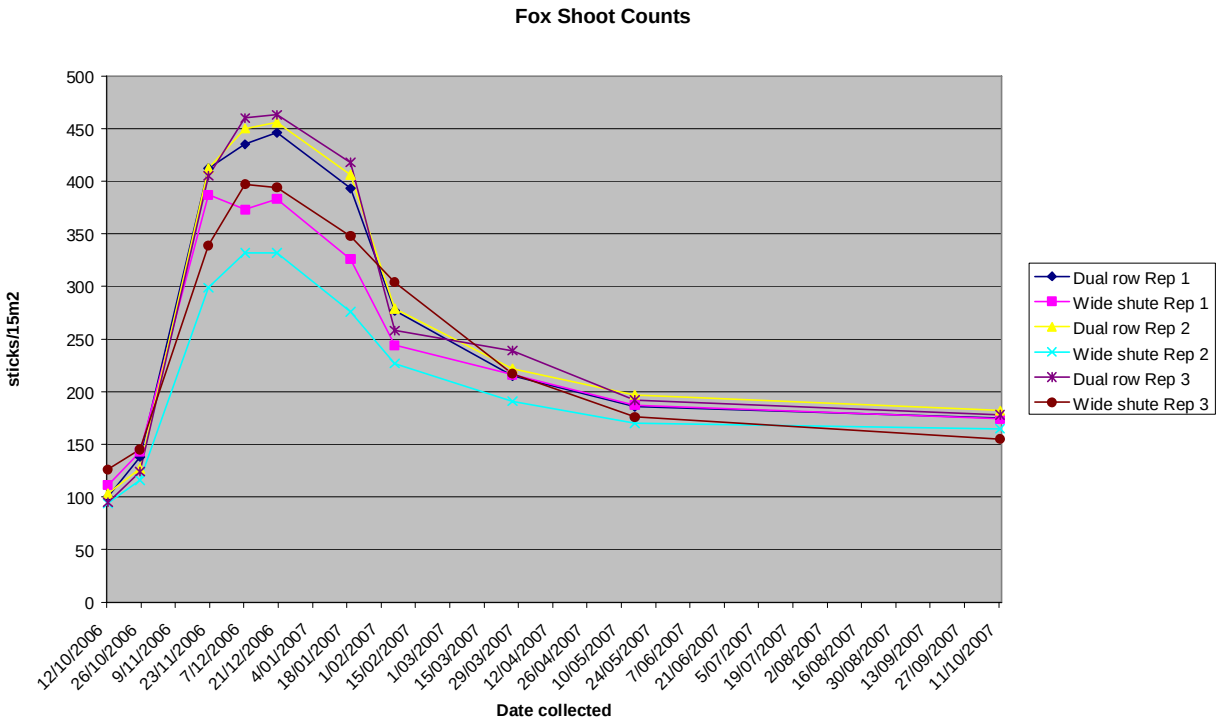
Split	62%
Sugar price	290
Area harvested	0.5674

Variety	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	26-Oct	914	57.37	16.87%	9.7	22.4	7.2	1314	22.90
Total/Average			**57.37**	**16.87%**	**9.7**	**22.4**	**7.2**	**1314**	**22.90**
Values/ha			**101.11**		**17.1**	**39.6**	**727.99**	**2316**	
average for Wide shute			101.31	17.21%	17.4	39.6	729.44	**2383**	23.52
average for Dual Rows			105.02	17.06%	17.9	41.1	756.12	**2441**	23.24
Difference			3.71	-0.15%	0.5	1.4	26.68	**57**	-0.28

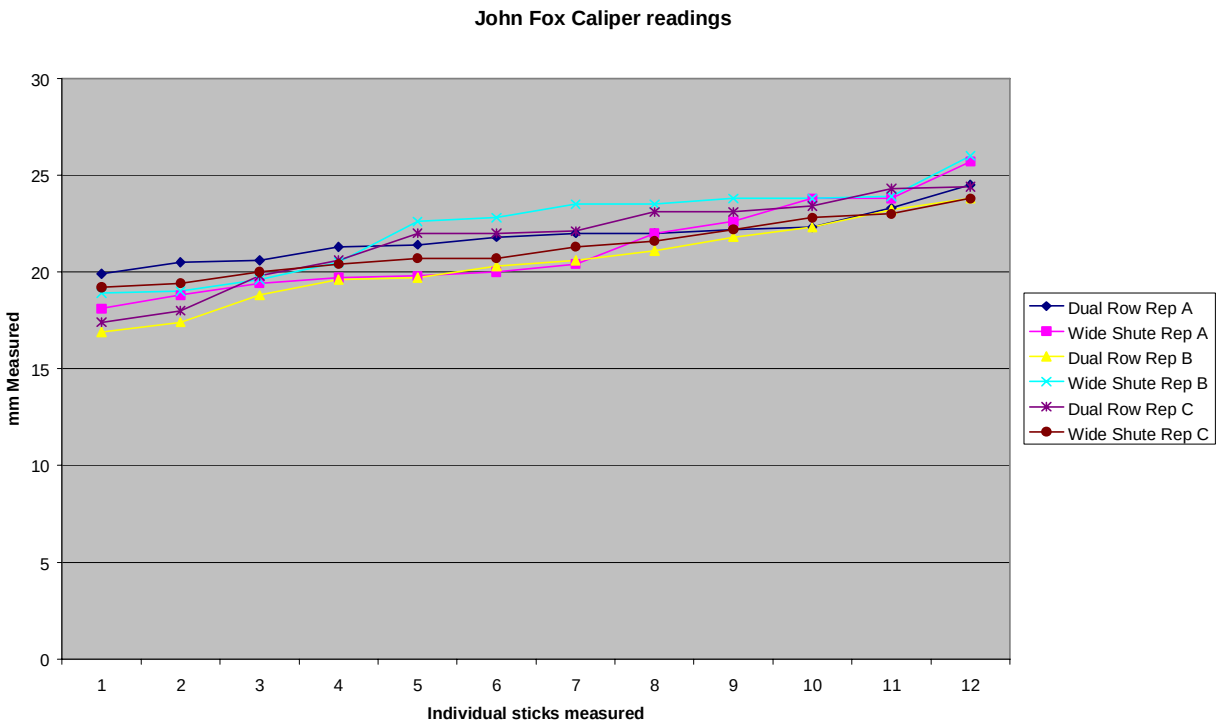
Dual Row minus Wide Shute

As can be seen from this planting technique trial, there is virtually no difference in yield and tonnes of sugar between a controlled traffic dual row system and a controlled traffic wide shute system. The decision to use either system should be based on the individual grower deciding which system will best suit his current practices and equipment.

From further analysis of this trial some interesting questions came about. By looking at the individual rep shoot counts we could see that the Wide Shute treatment Rep 2 was always well behind the other reps – see the following graph.



From the mill data and weigh truck data, this rep cut out the heaviest at 108t/ha and 113t/ha respectively. However, at the 9 month biomass sample, this rep weighed the least at 113 tonnes/ha (cane and tops). When this trial was harvested, caliper readings were also taken on 12 random sticks in each treatment. As can be seen in the following graph, this rep generally had thicker sticks and on average was between 0.5 and 1.9mm thicker than the other treatments.



This raises the question about whether it is more beneficial to have a lower planting rate, with lower initial germination and less stick deaths. This could then lead to thicker sticks which are heavier and produce higher tonnes. From the mill data this rep also produced the highest PRS, however it was lowest in the small mill CCS data. This result highlights the importance of the work being done by Tony Bugeja and the Homebush Innovative Farmers group, investigating different planting rates.

Fertiliser trials

Potassium rate trial

Geoff Hall

In response to the new BSES nutrient guidelines, which recommends an increase in potassium application, the group decided to establish a trial to test this recommendation. Soil tests indicated this block required between 100 and 120 kg/ha of Potassium.

- 80kg/ha potassium vs 160kg/ha
- Replicated 3 times
- 0.5 hectare plots
- Trial evaluation
    - Record yield data from Mackay Sugar harvest results
    - Record nutrient costs and cost of application

As with the row spacing trials, the group decided to use the weigh truck as a back up data source, as well as the mill data. The yield results from this trial are presented in the following tables.

Geoff Hall North Coast Grower Group

Potassium rate trial (160kg/ha vs 80kg/ha)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	Average $ / Ha	$/ ton less harvest & Levy	$/ ha less harvest & Levy	Avg $ / ha less Harvest & Levy
Treatment A 160kg/ha	**Rep 1**	0.3135	13.542	18.08	107.99	19.52	0.1254	36.75	3968.52		29.16	3148.87	
	Rep 2	0.2958	13.746	17.27	116.18	20.06	0.11832	34.63	4023.74		27.04	3141.96	
	Rep 3	0.2902	13.648	17.81	117.57	20.94	0.11608	36.04	4237.85	4076.70	28.45	3345.46	3212.10
Treatment B 80kg/ha	**Rep 1**	0.2889	12.434	18.02	107.60	19.39	0.11556	36.59	3937.24		29.00	3120.57	
	Rep 2	0.2387	13.28	18.32	139.11	25.48	0.09548	37.38	5199.18		29.79	4143.35	
	Rep 3	0.2734	13.602	17.79	124.38	22.13	0.10936	35.99	4476.61	4537.67	28.40	3532.58	3598.83
Difference – 80kg/ha – 160 kg/ha										460.97			386.74

Treatment A Dunder 160kg/ha Rep 1

Split	62%
Sugar price	290
Area harvested	0.3135

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 plant	4-Oct	645	32.32	15.09%	4.9	12.6	7.2	636	19.68
Total/Average			**32.32**	**15.09%**	**4.9**	**12.6**	**7.2**	**636**	**19.68**
Values/ha			**103.09**		**15.6**	**40.3**	**742.28**	**2029**	

Treatment A Dunder 160kg/ha Rep 2

Split	62%
Sugar price	290
Area harvested	0.2958

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	4-Oct	647	32.68	15.32%	5.0	12.8	7.2	657	20.10
Total/Average			**32.68**	**15.32%**	**5.0**	**12.8**	**7.2**	**657**	**20.10**
Values/ha			**110.48**		**16.9**	**43.2**	**795.46**	**2221**	

Treatment A Dunder 160kg/ha Rep 3

Split	62%
Sugar price	290
Area harvested	0.2902

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	4-Oct	642	32.82	15.48%	5.1	12.8	7.2	669	20.39
Total/Average			**32.82**	**15.48 %**	**5.1**	**12.8**	**7.2**	**669**	**20.39**
Values/ha			**113.09**		**17.5**	**44.3**	**814.28**	**2306**	
average for 160 kg/ha K			108.89	15.30%	16.7	42.6	784.00	**2185**	20.06

Treatment B No Dunder 80kg/ha Rep 1

Split	62%
Sugar price	290
Area harvested	0.2889

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	4-Oct	646	31.94	15.34%	4.9	12.5	7.2	643	20.14
Total/Average			**31.94**	**15.34%**	**4.9**	**12.5**	**7.2**	**643**	**20.14**
Values/ha			**110.56**		**17.0**	**43.3**	**796.01**	**2226**	

Treatment B No Dunder 80kg/ha Rep 2

Split	62%
Sugar price	290
Area harvested	0.2387

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	4-Oct	648	32.14	14.89%	4.8	12.6	7.2	621	19.32
Total/Average			**32.14**	**14.89%**	**4.8**	**12.6**	**7.2**	**621**	**19.32**
Values/ha			**134.65**		**20.0**	**52.7**	**969.45**	**2602**	

Treatment B No Dunder 80kg/ha Rep 3

Split	62%
Sugar price	290
Area harvested	0.2734

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	4-Oct	643	33.38	15.88%	5.3	13.1	7.2	705	21.11
Total/Average			**33.38**	**15.88 %**	**5.3**	**13.1**	**7.2**	**705**	**21.11**
Values/ha			**122.09**		**19.4**	**47.8**	**879.06**	**2578**	
average for 80kg/ha K			122.43	15.37%	18.8	47.9	881.51	**2469**	20.19
average for 160 kg/ha K			108.89	15.30%	16.7	42.6	784.00	**2185**	20.06
Difference – 80kg/ha minus 160kg/ha			13.54	0.07%	2.1	5.3	97.50	**283**	0.13

Summary
This trial had a significant difference in tonnes cane/ha with the 80kg/ha treatment producing on average 122.43t/ha, while the 160kg/ha treatment producing 108.89t/ha. This difference was not expected so advice was sought from BSES agronomist Barry Salter. Barry was also unsure of why there was such a yield difference between the treatments.

This trial indicates that less Potassium still produced good results, and that over applying nutrients does not result in improved yields. However, no final decisions can be made regarding Potassium application rates and the best course of action is to follow fertiliser recommendations.

Nitrogen rate trial
Geoff Hall
In response to group members concerns about not applying Nitrogen following a soybean crop.

- No chemical Nitrogen applied vs 100kg/ha
- Replicated 2 times
- 0.5 hectare plots
- Trial evaluation
    - Record yield data (tonnes and PRS) from Mackay Sugar harvest results
    - Record nutrient costs

This trial was harvested in October 2007 and was evaluated based on mill data and weigh truck results. The results are presented in the following tables.

Geoff Hall North Coast Grower Group

Nitrogen rate trial (No Urea vs 100kg/ha)

Small Mill & Weigh truck results

		Area	Weigh results tons	CCS	TC/ Ha	TS / Ha	Weighed area	$/ ton	$ / Ha	Average $ / Ha	$/ ton less harvest & Levy	$/ ha less harvest & Levy	Avg $ / ha less Harvest & Levy
Treatment A No Urea	**Rep 1**	0.6033	19.812	16.16	120.41	19.46	0.1645364	31.74	3821.56		24.15	2907.64	
	Rep 2	0.5108	19.652	16.2	128.24	20.78	0.15324	31.84	4083.52	3952.54	24.25	3110.16	3008.90
Treatment B 100kg/ha N	**Rep 1**	0.5387	20.534	16.66	127.06	21.17	0.16161	33.04	4198.36		25.45	3233.98	
	Rep 2	0.5271	20.08	16.54	127.00	21.01	0.15813	32.73	4156.53	4177.44	25.14	3192.62	3213.30
Difference	**100kg/ha minus No Urea**									224.90			204.40

(the BSES small mill CCS data is not reliable for this trial. The mill was experiencing difficulties therefore this data should not be used)

Treatment A No Urea Rep 1

Split	62%
Sugar price	290
Area harvested	0.6033

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q209 Plant	5-Oct	768	72.37	16.09%	11.6	28.3	7.2	1555	21.49
Total/Average			**72.37**	**16.09%**	**11.6**	**28.3**	**7.2**	**1555**	**21.49**
Values/ha			**119.96**		**19.3**	**46.9**	**863.69**	**2578**	

Treatment A No Urea Rep 2

Split	62%
Sugar price	290
Area harvested	0.5108

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	741	38.92	16.35%	6.4	15.2	7.2	855	21.96
Q157 1st R	21-Sep	790	22.07	15.57%	3.4	8.6	7.2	454	20.55
Total/Average			**60.99**	**16.07%**	**9.8**	**23.9**	**7.2**	**1308**	**21.45**
Values/ha			**119.40**		**19.2**	**46.7**	**859.69**	**2561**	

Average for 0kg/ha N			119.68	16.08%	19.2	46.8	861.69	**2570**	21.47

Treatment B 100kg/ha N Rep 1

Split	62%
Sugar price	290
Area harvested	0.5387

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	769	64.53	15.57%	10.0	25.3	7.2	1326	20.55
Total/Average			**64.53**	**15.57%**	**10.0**	**25.3**	**7.2**	**1326**	**20.55**
Values/ha			**119.79**		**18.7**	**46.9**	**862.48**	**2462**	

Treatment B 100kg/ha N Rep 2

Split	62%
Sugar price	290
Area harvested	0.5271

Variety/paddock	Date	Rake	tonnage	PRS	t sugar	levies	Harv cost / ton	Farm gate value	Cane value / ton
Q157 1st R	21-Sep	740	62.16	15.72%	9.8	24.3	7.2	1294	20.82
Total/Average			**62.16**	**15.72%**	**9.8**	**24.3**	**7.2**	**1294**	**20.82**
Values/ha			**117.93**		**18.5**	**46.1**	**849.08**	**2456**	

Average for 100kg/ha N	Value/ha	118.86	15.65%	18.6	46.5	855.8	**2459**	20.69
Average for 0kg/ha N		119.68	16.08%	19.2	46.8	861.7	**2570**	21.47
Difference		0.82	0.0043	0.65	0.32	5.91	**111**	0.78

Summary
As was expected the 0kg/ha treatment yielded more than the 100kg/ha of Nitrogen. This reaffirms the fact that following a good soybean fallow crop, the plant cane does not require any additional application of Nitrogen. The benefits of not applying Nitrogen include $111 per ha, as well as the cost of fertiliser - $800-900/t Urea.

From the following photo, and anecdotal evidence, there also appears to be a harvester saving in this trial from not applying Nitrogen. The treatments with the additional Nitrogen were lodged, which slowed down harvesting significantly.

Photo 9 Comparison of Nitrogen application treatments.

The front of the photo with the fallen cane is the 100kg/ha treatment, while the standing cane is the 0kg/ha Nitrogen treatment.

Machinery Modifications
As stated in the project aim, the group wished to utilise existing equipment when converting to a controlled traffic system. This required necessary modifications to a number of pieces of machinery. This equipment includes:

- Wide shoot planters
- Bed former
- Cultivation equipment
- Spray equipment

Photo 10 and 11

Planter - has been modified out to 400mm wide single shute with angled press wheels to create a raised rill to stop soil crusting.

Photo 12 and 13

Vane planter - with modified shute to 450mm, Teflon lined to prevent soil build-up, angled press wheels to create raised rill to prevent soil crusting.

Photo 14 and 15

Zonal tillage Culti/Ripper/Roller cultivator and Bed forming machine

Photo 16 and 17
Bolt on modification to outrigger spray arms from 5ft to 6ft row spacing

Photo 18 and 19
1) View of flat soil profile created by planter, to prevent pooling of water thereby decreasing excessive soil crusting
2) Double disc opening wide single shute with soil grader blade for row shaping.

Photo 20 and 21
Dual row hill up machines

1) hydraulic drive 3 row machine
2) ground driven single row machine

Harvester modifications
One harvester was modified to cut a controlled traffic system by installing a flipper, which the group previously saw working with members of the Plane Creek Sustainable Farmers group. This flipper propels the cane further out, into the haul out, and can be used in conventional 1.6m systems as well as the controlled traffic system.

Photos 22 and 23 – the flipper installed on the harvester elevator

Other members of the group purchased an elevator extension which they attached in 1.8m row spacings and removed when cutting 1.6m row spacings. However it was found that the elevator extension threw the cane too far over and there was cane lose. With their harvester, a 2006 Cameco 3500 it was found that an elevator extension is not necessary. The harvester is able to deliver cane to the haul out in both 1.6m and 1.8m row spacings.

Photo 24– the elevator extension attached to the Cameco 3500. Note the haul out driving on the stool to ensure the cane lands in the bin. The elevator extension was removed soon after this row was cut.

Intellectual Property and Confidentiality:
(If there is any protected Project Technology, eg information that has been kept confidential, such as equipment specifications, patentable knowledge please outline. Is there anything in this report that should be treated as confidential, and if so under what circumstances?)
Nil

Capacity Building:
(How has the Group's capacity to conduct R&D and implement better farming systems been enhanced?)

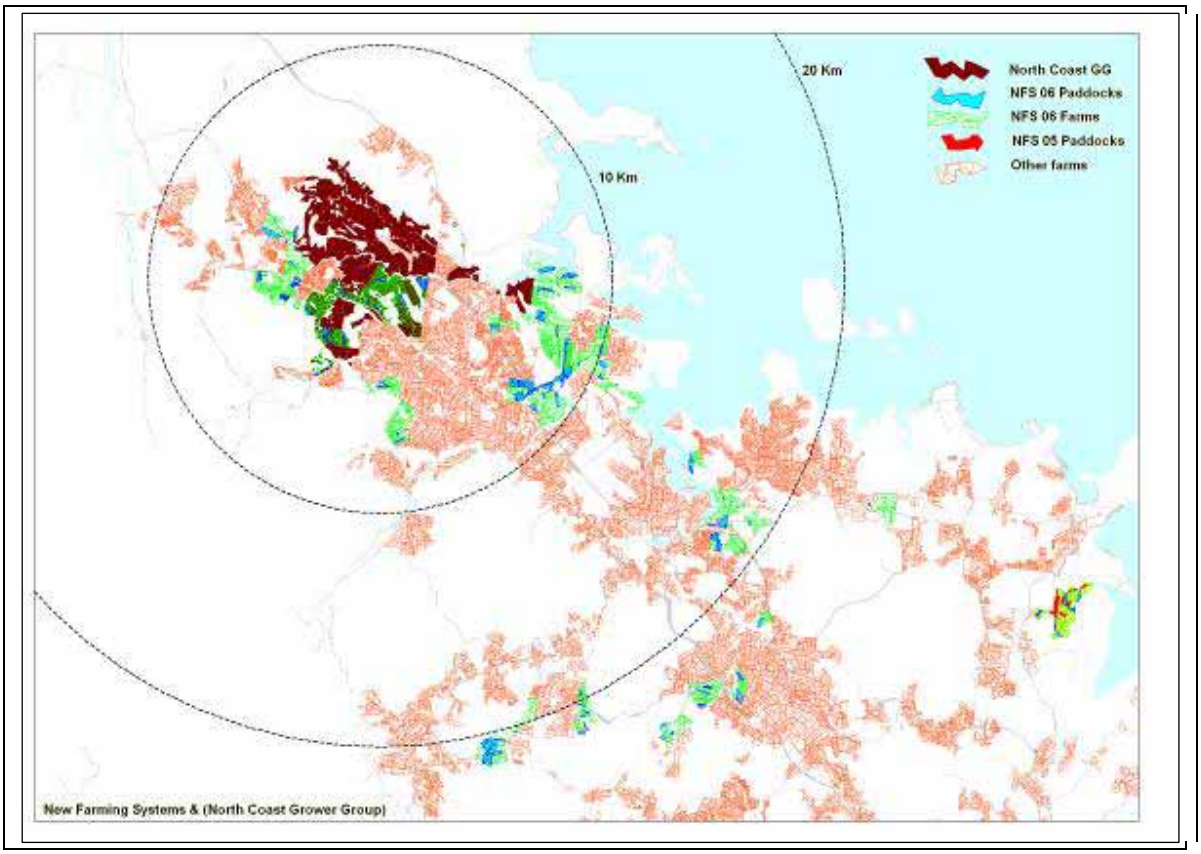
As growers trying to improve our productivity and profitability, it is always essential to trial new technologies and farming practices on our farms. As stated earlier, two of our first year trials were established as un-replicated, comparison trials. This occurred prior to us receiving detailed information regarding the establishment of robust trials. Since this increased understanding regarding the importance of good trial design, and our own inability to base farm changes on the results of these un-replicated trials, we have significantly increased our capacity to conduct R&D. In the future when we want to trial a new practice on our farm we will establish replicated trials, rather than a comparison trial, or planting one block to that treatment and comparing it to other plant cane blocks (which have more differences than that one farming practice).

This increased knowledge has also been beneficial when interpreting results from other research trials. It is common for growers, as well as industry representatives to state as a

matter of fact that different farming practices or technologies did or did not work on their farm/in the district. Unfortunately these statements may not be based on robust trial results. With an increased capacity to understand R&D we are now better equipped to question these “results”.

Conducting these trials has also increased group members capacity in relation to understanding costs of production. Industry research results are generally focused on yield results. By conducting these trials we not only looked at yield differences, but also looked at input costs and gross margin comparisons.

Conducting this project has also enhanced group members ability to implement better farming systems. As a result of interpreting trial results and focusing on profit comparisons, nearly all group members have converted to a controlled traffic system, while all group members try to plant a legume fallow if weather conditions permit. Since the project started in 2005 there has also been an increase in controlled traffic systems by farmers in the surrounding area who are not part of our project. While these growers would not have converted farming systems just based on our project results (because farmers take information, ideas, technology etc from a variety of sources before making a farm management change), these growers did speak to members of our group about our progress and results. The following map shows the farms the blocks converted to controlled traffic in 2005 and 2006.



Working within a group has also allowed innovations developed to assist the conversion to better farming practices to be more easily shared with other group members. While these innovations would normally be shared with other local growers, being involved in the project allowed these innovations to be more quickly shared with a greater number of growers both within and outside the North Coast area.

Outcomes:
(What benefits have been achieved or are expected from the project, and what more has to happen to get the full benefit from the project? How do the expected benefits compare with those predicted at the start of the project, as outlined in the Application?)

Following is a list of the Expected Benefits of the Project as outlined in the application which have been achieved:
The economic benefits will be reduced costs of production through:

- improved field efficiencies – less rows per hectare which lead to reduced input costs especially in plant cane
- reduced nitrogen inputs – the soybean variety trials indicated that the following cane crop did not require any Nitrogen application. This was confirmed by the results from the Nitrogen application trial
- improved moisture infiltration – while the soil moisture tools were indicating that there was improved moisture infiltration in a controlled traffic system, this requires further research

The environmental benefits will be:

- improved soil health – through a conversion to controlled traffic. This will also be achieved through the group members deciding against burning trash in the fallow
- reduced soil erosion
- reduced chemical and nutrient movement off farm – this would be achieved through reduced application of nutrients as well as potentially more moisture infiltration and less movement off farm
- reduced fertilizer requirements – in plant cane following soybean
- reduced fuel consumption – through improved field efficiencies

The social benefits will be:

- improved financial viability of group members – through reduced input costs especially in plant cane
- improved quality of life for group members and families – increased field efficiencies means reduced time inputs
- increased time availability for group members – through increased field efficiencies
- improved community perception of the sugar industry – through promotion of the environmental benefits

There are however a number of issues that need to be examined to get the full benefit from the project. These include:

- More data on the actual financial analysis between farming systems should be collected. There seems to be a consensus that there is no yield loss from a controlled traffic system, however there is limited data on the actual financial benefits of changing system, or on the costs of converting to controlled traffic.
- An important area of potential cost savings is in the harvesting costs. We did not examine this factor, but there is potential for the harvesting costs in the controlled traffic system to be significantly less than the conventional.
- More work needs to be done to investigate the result of the lower rates of Potassium trial. With increases in fertiliser prices it is essential for growers to produce maximum yields with minimal inputs. At least this result highlights that applying higher rates than the soil test recommendations will not produce increased yields.
- More work needs to be done investigating the potential for lower planting rates. One replicate in the dual row vs wide shute trial was consistently behind the other replicates in terms of shoot counts and biomass samples, however at harvest time this replicate produced the highest yield. If growers can send more cane to the mill and reduce planting inputs, this will benefit the Mackay Sugar Co-operative.

Environmental Impact:
(Outline any adverse or beneficial environmental impacts of conducting the Project and/or implementing its findings)

By conducting these trials there was confirmation of the benefits of legume fallow crops in terms of decreasing Nitrogen application in plant cane. The Potassium rate trial also confirmed that applying higher rates than that recommended by soil tests will not increase yields. With increased pressures being placed on agriculture to reduce chemical inputs, this confirmation is a benefit to the group, and other local growers.

As stated previously the environmental benefits of implementing this project have included:

- improved soil health – through a conversion to controlled traffic. This will also be achieved through the group members deciding against burning trash in the fallow
- reduced soil erosion
- reduced chemical and nutrient movement off farm – this would be achieved through reduced application of nutrients as well as potentially more moisture infiltration and less movement off farm
- reduced fertilizer requirements – in plant cane following soybean
- reduced fuel consumption – through improved field efficiencies

Soil moisture monitoring tools have indicated that there could be increased water infiltration in controlled traffic systems. Increased infiltration could lead to reduced run off and movement of chemicals off farm. It could also lead to an increase in water use efficiency and therefore a reduction in irrigation requirements. It would be beneficial if further work investigating this aspect was conducted in future research projects.

Communication and Adoption of Outputs:
(Outline any communication activities that have been conducted and any that are planned. How has SRDC been acknowledged or involved? Have any lessons from the project been applied by members of the Group, or others?)

All communication activities have made mention of the fact that the group is supported by SRDC and the trials are established and monitored as a result of SRDC recognising the groups interest in testing these principles in their own situation.

Bus Trip 1
A bus trip to communicate the groups work was conducted on the 21st of March 2006. This bus trip was organised in conjunction with the Septimus Farming Group, and was sponsored by Mackay Rural Supplies and BSES/MAPS group extension program.

64 people attended, which included growers, agronomists, and industry representatives.

A feed back sheet was distributed to all attendees on the return bus trip. The feed back sheet contained 5 questions and a summary of the responses for each question is detailed below:

1. Which section of the bus trip did you find most valuable for your farming business?

    - 28% of respondents listed aspects of wider row spacings, dual rows and planting configurations.
    - 16% of respondents directly listed the North Coast row width trials, machinery modifications or soybean trials.
    - 14% wrote everything.

2. Could you explain why you found this section useful?

68% of respondents listed reasons that related to their learning's which were relevant to their farm or situation, to give them new ideas, the bus trip provided a diverse view of growers experiences, or to reinforce what they are doing on their own farm.

3. How would you rate the overall bus trip (1 being lease useful and 5 being most useful)

Rating	% of responses
1	0
2	0
3	6
4	59
5	35

4. Could the bus trip have been improved in any area?

There were very few comments made to this question. The most common response was made in regards to the failing air conditioning on the main bus.

5. Is there any follow up information or activity required from what you have been exposed to during the bus trip?

    - 82% of respondents said they would like to see the productivity results once the trials were harvested
    - 14% of respondents said they would like to do the same trip again in 1 year to see how the groups went

6. Any other comments?

All the comments that were made were very positive. Examples of the type of comments made include:

- Learnt some new information to help my situation
- The farmers and sites were very good
- A good informative trip
- The most important thing is that everyone is different and you can use different means for the best results for your farm

Photo 25 – Michael Zamparutti presenting information at the bus trip	Photo 26 – the bus trip participants networking at the completion of the field trip, preparing for the return trip

Bus Trip 2
An information bus trip organised through the MAPS/BSES group extension project was organised in 2007 to include stops at the groups trial sites. However due to wet weather making access to some trial sites difficult, the bus trip itinerary was altered. While the bus did not stop at the trial sites, we still had the opportunity to present the results from our first year trials during a seminar session following lunch. A power point presentation was presented which detailed the fallow management, break crop and row spacing trial results.

GIVE 2007
The group also thought that the GIVE day 2007 would have been another opportunity to communicate results to other growers from across the industry. Unfortunately this day didn't eventuate.

GIVE 2008
The group presented some of the trial results at GIVE 2008 which was held in Mackay in February. The group also presented trial results and demonstrated machinery modifications and innovations on one of the GIVE bus trips.

SRDC regional workshop
At the Mackay and Proserpine SRDC regional workshops in 2007, results from the first year trials were presented as an example of not only the work we are undertaking, but also the collaborative nature with which we have been able to complete our workplan. The groups we are working with include SRDC, BSES, MAPS, DPI&F, and agribusiness representatives.

BSES field day
The North Coast group were involved in the Group Extension tent at the 2007 BSES field day. Along with other grower groups from the Mackay region we presented the groups activities, our first year trial results, photos of trial sites, and answered questions during our time manning the station.

Shed meetings

In early 2007 and 2008 our local shed meeting group met with representatives from MAPS and BSES. We used this opportunity to present the results of our first year trials to other growers in our local area who are not involved in the group. This generated good discussion about the benefits of controlled traffic and potential cost savings, and highlighted the similar yields achievable at wider row spacings.

Trial Information Day
A trial information day was organised by MAPS and BSES to present the results from trials conducted in Mackay and Plane Creek in 2007 to:

1. industry representatives – research and extension officers
2. board members – growers and others from Mackay Sugar, MAPS, Plane Creek Productivity Board, CSR and Canegrowers board, and
3. Shed meeting hosts.

The results from our trials were presented at this event

Trial Booklet
A Central region Trial Information Booklet is currently being compiled based on the results presented at the Trial Information Day. Results from our trials will also be included in this book.

Media article
Bill Kerr who is a free lance journalist wrote an article on the North Coast group and our trials. The article was published in the Queensland Country Life, and in the Australian Canegrower. A copy of the article is attached in Appendix 1.

Adoption levels

- Approximately 150 ha of group members plant cane in 2007 were planted to wider row spacings. This represents 60% of the total group members plant cane, which is significant given that 0% was planted to controlled traffic prior to the commencement of this project. Group members who have not yet moved to controlled traffic are aiming to do so in the near future.
- There is strong interest within the region for growers to plant soybeans or other legume fallows, however this will be dependant on weather conditions and seed availability

Recommendations:
(What recommendations would you make as a result of the project, including suggestions for further research and development?)

Recommendations

- Ensure all new GGIP's are involved in training regarding trial design prior to the establishment of their trials.

- Make sure growers are fully aware of what is required of them before they agree to be involved in a GGIP. We have found that we have been asked to be involved in a lot more additional activities during the completion of the project.

Further research

- More data on the actual financial comparison between farming systems should be collected, as well as the cost of conversion.
- Data collected to compare harvesting costs between conventional and controlled traffic systems.
- More work needs to be done to investigate the result of the lower rates of Potassium trial.
- More work needs to be done investigating the potential for lower planting rates.
- Monitoring needs to be conducted to compare water infiltration and use between controlled traffic and conventional systems.

Publications:

(List and attach copies (electronically if possible) of all articles, newsletters and other publications from the project.)

Appendix 1 – article written by Bill Kerr for the Australian Canegrower and Queensland Country Life

Enterprising cane growers in the Wagoora-Pindi Pindi area between Mackay and Proserpine are trialing new farming practices based on controlled traffic, minimum tillage and crop rotation principles to identify those methods that have practical application locally.

The North Coast Grower Group is an informal coalition of 11 mainly dryland farms along Winton's Road, supplying cane to Farleigh Mill. The undulating topography covers a wide range of soil types.

The growers have no access to government irrigation schemes and, where possible, have had to develop on-farm storages for supplementary irrigation. Water harvesting and adoption of contouring to improve moisture retention and reduce erosion enabled some growers to expand onto hilly country. However, further productivity and efficiency gains are now needed to ensure future profitability.

The group's experimentation with new farming systems grew out of discussions over a few beers at the end of the week about whether innovations being adopted in other districts might suit their climate, soil types, farm layouts and existing machinery.

Since mid-2005, the North Coast growers, with support from BSES Limited and some financial help from SRDC, have been combining their resources and efforts with the aim of developing and implementing a new farming system that will reduce their costs, increase productivity and improve management of natural resources.

Individual farmers are conducting trials involving aspects of row spacing, fallow preparation, organic matter, soil biology, break cropping and variety selection. They share the results with other group members. Results so far have been encouraging.

All the growers share a common desire to enhance their financial viability and are willing to make changes where practical experimentation shows there is benefit from doing so.

An informal 'committee' oversees the project but the work is very much a collective self-help effort. After four years of below break-even operations, the Wagoora growers realise they need to adopt better (cheaper) ways of farming to remain financially and environmentally sustainable in the long term.

“It’s time consuming doing this sort of thing and the red tape part can be frustrating but we figure that if we are going to get the answers we want we have to help ourselves,” says Michael Zamparutti, a strong supporter of the group approach. “There’s no such thing as a free lunch.”

He is keen to increase his income, not just reduce the costs of growing cane.

“We’re not trying to convert others to our way of thinking – just trying to see what works best for us,” says John Fox, another group member.

Group members bought a new bean planter and have modified cane planters, a bed former, soil cultivation equipment, and spray machinery for use on the trial blocks. In June 2006 the group met to design a new implement for filling-in and hilling-up plant cane.

Trials have included planting of rows at 1.8 m and 1.6 m, burnt trash versus worked-in trash, fallow trial of spray-out compared with conventional weed control, bed forming and planting of soybeans as a break crop.

Ends