



final report

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Leucaena Grazing in SW Queensland

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2003/Q11 - Goondiwindi BeefPlan Group

Leucaena Grazing in SW Queensland

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BEEF - NORTHERN

BUDGET \$9,968.00

Aim:

To evaluate the suitability of Leucaena for the Goondiwindi region (South West Queensland), including its potential for improved, more sustainable and economically viable beef production and its contribution to the reduction of salinity hazard.

Objectives:

To demonstrate successful establishment techniques for Leucaena on 120 ha, comprised of different soil types, and having plant density averaging 4000 plants/ha. Measured by plants/m row.

To target 1500kg/ha/year of leaf biomass to demonstrate plant production potential in a range of Goondiwindi soils and following frost and grazing events. To increase average weight gains from an average of 0.50kg/day to greater than 1kg/day.

To determine water use and other soil benefits related the to the introduction of Leucaena. Measured by soil hydraulic conductivity and rooting depth at selected sites and targeting deep drainage of less than 10mm/year and 25-50kg/ha of biologically fixed nitrogen per year.

Co-ordinator's Comments

19/06/2006 Very good FR showing much experience gained by members in trying to introduce Leucaena in southern Qld. Frost and dry conditions tested out 'standard' seeding and ground preparation advice and local best practice had to be established. Growth rates were very good on the best plantations and members are looking forward to reaping good gains from their efforts.

23/05/2005 Good new information being discovered here. The most southern Leucaena growing area in Australia, and new/better establishment methods and equipment being developed. Some failures, but real progress. Field Day to be held on Carisbrook. Could be a 'how to' booklet as an outcome.

- 17/08/2004 Good start despite dry year with 2 sites being resown which did not grow as it was too dry. I visited John Slack's site west of Inglewood 30/8/4 - photos on file. Good growth for 8 months. He will trial some with irrigation this year. I have sent him details of a dripper option.
- 16/12/2003 Six trial sites of 20hec each have been soil tested and planted. All members have agreed to use the Leucaena Code of Practice. Good media coverage on WIN TV and local paper.
- 16/07/2003 Good response, they now have Leucaena Code of Practice and have been in contact with Leucaena Network. Ready to go.

2003/Q 11 - GOONDIWINDI BEEFPLAN GROUP
Leucaena Grazing in SW Queensland

FINAL REPORT - June 2006

PROJECT OBJECTIVE

The project objective was to determine if Leucaena plantations in the Goondiwindi and Inglewood areas are a productive and profitable grazing tool. The trial set out to determine the affect of frosting on production, while determining the suitability of local soil types and the potential productivity of Lecuaena in this area. Specific objectives included:

- To increase average weight gains to 1-1.5kg/day.
- To determine plant production potential following frost and grazing events.
- To determine establishment of Leucaena on different soil types.
- To determine soil benefits related to the introduction of Leucaena.

PROJECT METHODOLOGY

The project was to have 6 trial sites on different soil types. The following methods were implemented:

- Stock days and density were recorded for trial sites. Cattle weight gains were recorded during grazing events.
- An establishment "recipe" was used to ensure best practice techniques were used.
- Due to irrigation restrictions all plots were dryland.

ANALYSIS OF DATA

Frost

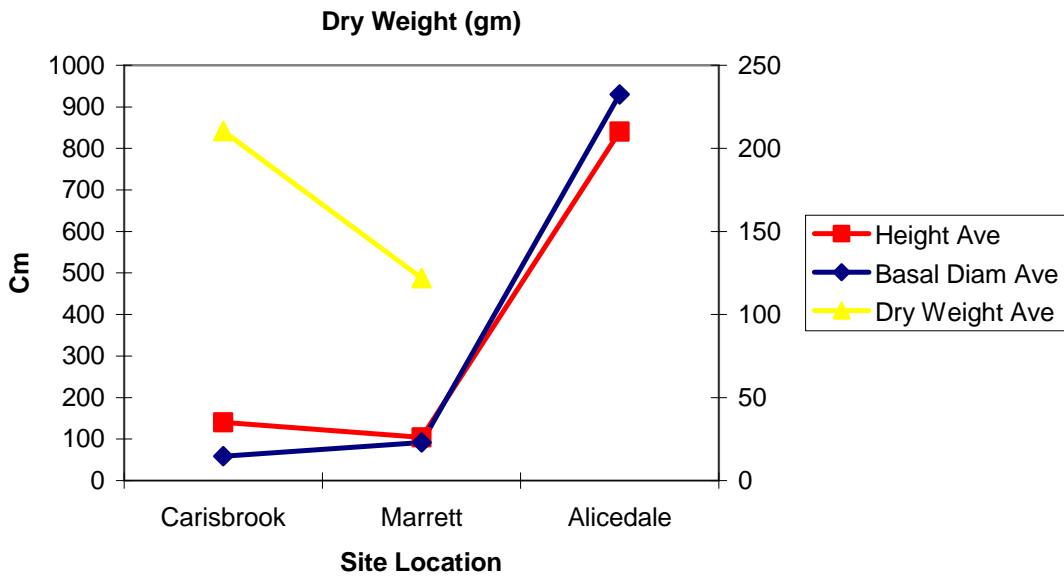
Frosting resulted in leaf loss at all sights. Time of total leaf loss varied due to frost severity but usually results following several heavy frosts. Spring warmth and rainfall prompted rapid leaf recovery on all sites.

Plant Biomass

Plant biomass results were not conclusive as there were many variables effecting establishment and none of these plots had what was considered a highly successful first establishment. Please refer to Appendix One for plant biomass data.

The following graph shows that at sampling plants were higher yet "narrower at the base" than at the Marrett site. Generally across the plot, plants were closer together at Carisbrook which would explain this trend to grow up more than out. Dry weight was greater for sampled plants at Carisbrook however this site had been established longer than the Marrett site at time of sampling. The plant population at Alicedale were higher and "broader at the base" than the other sites. This site was established for longer than Carisbrook at sampling.

Graph One
Plant Biomass Results



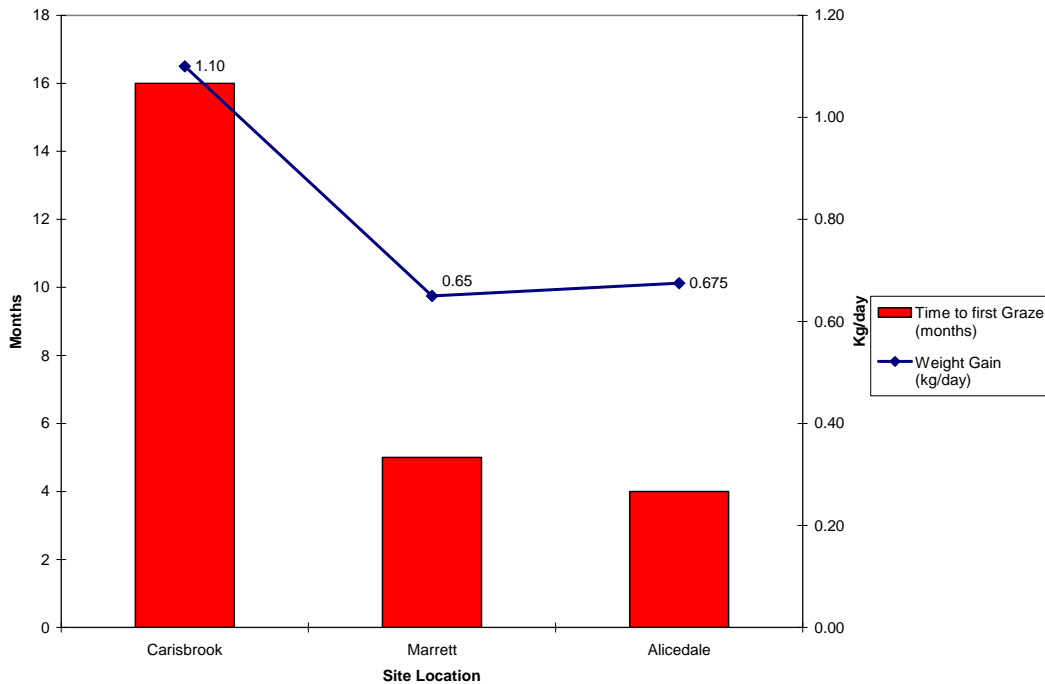
Weight Gains

On Carisbrook weight gain results show that production in the first year was at least twice that of native grasses. While on Marrett, weight gains were lower but after forthcoming use of the rumen inoculant increases are anticipated. Weight gains were also much less than Carisbrook findings at the Alicedale sight, however this site was grazed very minimally and for such a short period that results are not conclusive at this site for the first year. Plants were also left longer before the first graze on Carsbrook which may be a contributing factor in weight gain results.

Please refer to Appendix Two for Grazing Results.

The graph below shows that allowing plants time to develop directly benefited weight gain results. The Carisbrook site was left significantly longer than the other sites before grazing began (16 months as compared to 5 months at Marrett and 3 months at Alicedale). It has been suggested that the stem of plants should be as thick as the average forearm before grazing is initiated.

Graph Two
Effect of Time to First Graze on Weight Gains



WHAT THE GROUP LEARNED

1) Establishment

The first and probably biggest lesson was that establishment is complicated and risky. Despite having an “establishment recipe” for all members to follow, initial plantings were not successful. The project lost two (2) participating enterprises after establishment failed more than once. Findings included:

- Early planting is risky, a cold snap following early germination all but wiped out one plantation.
- Heavy rain post plant compromised early plantings, and once this happens the seedbed tends to “crust over” making it difficult for seedlings to germinate.
- The seedbed must be fine, and soil must be worked enough to ensure this fine texture and ease of germination. Methods to break up surface crusting eases germination.
- Good planters were hard to acquire and in the end a planter was designed and built by one enterprise to ensure satisfactory planting. This planter was based on a Jenke planter with precision boxes, adjustable tines, twin press wheels and a Jenke parallelogram.

2) Successful Methods

After early establishment failures, the three remaining enterprises varied their establishment techniques slightly. The following are the successful establishment techniques:

- 8 meter centered row spacing on Marrett was most successful.
- On Carisbrook rows with 6.5m centers were successful.
- A tined air seeder was used on Carisbrook.
- Planting rate was 1kg/acre.
- Taramba was used on Carsibrook and a mix of Taramba and Cunningham was used on Marrett.
- Using Lawsban and MAP @ 30-50kg/ha beside the seed was successful at Alicedale.

- 1meter between rows and twin rows are a good idea as this seems to promote a good plant population.
- Planting with parallelogram tines provides good depth control.
- Herbicide use – Round-up pre planting and Spinnaker or Duel Gold after planting. *Note Duel Gold worked better than Spinnaker on Alicedale.*
- Inter-row cultivation after establishment to control weeds. Yetter Wheels used for inter-row cultivation.
- Hilling up seedbeds worked most successfully on Marrett and Alicedale.
- Water injection aided emergence.
- Fertiliser and seeding in one pass.
- Good seed bed preparation is a must!
- Planting on good moisture is essential.

3) Future Methodology

Future Changes in establishment will include even higher beds at Marrett. The soils in this area tend to be sodic and don't always drain well, hilling helps drainage and prevents water-logging after heavy rains. Gypsum will also be used to help stop surface crusting. Further plantings at Carisbrook have been more successful with a more stringent weed control approach.

4) Trial Measurements

a) weight gains

Establishment problems compromised the early stages of the project and as such grazing did not start until well into the project and much later than anticipated. Also further advise suggests that the longer the delay in first grazing the better the health and future productivity of the plant. This is demonstrated in grazing results where Carisbrook was left for longer before first grazing and this may have contributed to increased weight gains compared to the other two sites. See Graph Two above.

The delay in grazing data, changed the emphasis of the project and for a while it became about how to successfully establish plantations on these soils types and in this climate. As such grazing results are not conclusive and results collected over the next two years will determine the success of the project goals. One site used electric tape to split the area and rotated cattle throughout the plot. Please see Appendix Two for grazing results.

b) frost affects

Measurements of leaf biomass can be found in Appendix One. It took several frosts to lose all leaves. However, post frost measurements would have been very difficult to take due to leaf loss. Plants remained dormant until rain and warmth of spring when leaf production became prolific. On average 10 days of this prolific growth was enough to enable the option to regraze plants. Therefore, it is concluded that frosting forces plants into a dormant state (even though they look dead). Post frosts, there was no damage to plants and productivity continued to increase with increasing temperatures. Frosting negated the need for slashing; no slashing has been performed on any trial sites. Indeed effective grazing also managed plant heights with cattle taking off the tops of plants if they are grazed at regular intervals and not permitted to get too "woody".



Sampling on Marrett – A Richardson & D Ellis



Sampling on Carisbrook – John Slack

OPEN DAY

The group held a free open field day for the public on 13th April 2005. Approximately 100 people came from across Southern Queensland and Northern New South Wales. Guest speakers included Prof. Max Shelton and Dr. Scott Dalzell from the University of Queensland, and Peter Larsen from *Leucseeds*. Please refer to the attached media releases.



Max Shelton (UQ) & John Slack (Goondiwindi BeefPlan Group)



Bryan Lahey & Andrew Richardson (Goondiwind BeefPlan Group)



GROUP SATISFACTION

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Overall the group is very satisfied with the project. Firstly, the project initiated planting Leucaena and prompted this to happen quicker than may have otherwise been the case. Also by starting on a small project scale the group members were able to handle losses from early establishment problems. Learning better techniques benefited the expansion of plantings on these enterprises.

While it took some time to begin grazing the feelings about the potential of the sites is very positive and group members are looking forward to high productivity and weight gains from 2006.

HOW COULD THE PROJECT HAVE BEEN DONE BETTER?

The group feels that they explored resources well in finding establishment information and that learning how to effectively establish Leucaena on these soil types was a learning process and a successful part of this project. The use of Yetta wheels is recommended on these soil types to decrease surface crusting and aid emergence.

Weed control on some plots could have been better and caused parts of the plots to be thinner than others and in some cases failure of emergence. Leucaena is not tolerant of competition in the seedling stages.

One enterprise didn't inoculate cattle with the rumen "bug" prior to grazing, due to unavailability of the inoculant. Inoculating should result in increased weight gains.

FUTURE PROJECTS

There is some interest in extending the project, to look further into weight gains over the next two years from these plots.

RECOMMENDATIONS FOR OTHER GROUPS

Make sure the project is targeted and something you will probably do anyway, this will ensure that the project gets completed successfully. Ensure group member commitment to monitoring and sampling throughout the project.

SUMMARY/BOTTOM LINE

Goondiwindi BeefPlan Group members involved in this project, sum up their experiences in doing an MLA PIRD Project as follows:

- It is a worthwhile experience, as projects are targeted to your needs and therefore industry needs.
- It is important to have a project coordinator to keep members on track and handle the paperwork.
- Be prepared to complete monitoring and project targets.
- This particular project has helped Group Members by allowing impetus for initial plantings which all members feel are successful. The 3 remaining enterprises in this project are extending their plantations. Successful planting methods have now been determined and this information will be passed on to others in the area wishing to plant Leucaena. The prospects for weight gains are exciting.

MANAGEMENT OF PIRDS

Group members would have benefited from more information regarding running a scientific project. It is very encouraging that MLA trusts group members to run a worthwhile project. It generates a positive outlook and allows our members to feel proactive within our industry.

APPENDICIES

Appendix One

Plant Biomass

Carisbrook			
SAMPLE #	HEIGHT(cm)	BASAL DIAM(cm)	Dry Weight(g)
1	82	18	52.18
2	134	100	240.46
3	390	160	731.88
4	118	45	149.7
5	54	5	38.63
6	62	25	50.06
Ave	140.00	58.83	210.49

Marrett			
SAMPLE #	HEIGHT(cm)	BASAL DIAM(cm)	Dry Weight(g)
1	110	100	186.2
2	90	35	31.2
3	100	100	67.8
4	110	130	160.1
5	100	130	141.3
6	100	60	93.4
7	120	90	173.3
Ave	104.29	92.14	121.9

Alicedale			
SAMPLE #	HEIGHT(cm)	BASAL DIAM(cm)	Dry Weight(%)
1	700	750	39.2
2	900	1100	35.8
3	800	1000	36.8
4	900	800	34.9
5	900	1000	37.4
6			
7			
Ave	840.00	930.00	36.82

Appendix Two

Grazing Results

	Carisbrook	Marrett	Alicedale
Planting Date	Oct-03	Oct-04	Dec-04
Plot Size	20ha	44.5ha	20ha
First Graze	Feb-05	Mar-05	April 05
Time to first Graze (months)	16	5	4
Days Grazed	89	120	18
Number of Cattle	50	60	208
Weight Gain (kg/day)	1.10	0.65	0.675

Appendix Three

Income & Expenditure Report

DATE	DESCRIPTION	CHQ #	AMT	MLA IN
28/11/03	MLA PIRD			\$5,500
20/9/04	Ten Mile Cattle Co			
	Reimburse project costs	000026	\$1,375.00	
13/8/04	Dry matter lab test	000025	\$143.00	
5/4/2004	Alicedale reimburse costs	000017	\$1,375.00	
5/4/2004	JR Slack reimburse costs	000018	\$1,375.00	
5/4/2004	Nareen reimburse costs	000019	\$1,375.00	
12/4/2005	Dry Matter Lab tests	000034	\$275.00	
28/4/05	Uni of Qld Field day costs	000036	\$955.51	
28/7/05	MLA PIRD			\$4,000
13/4/06	Reimburse project costs	000065	\$875.33	
13/4/06	Reimburse project costs	000066	\$875.33	
13/4/06	Reimburse project costs	000067	\$875.33	
	SUB TOTALS		\$9,499.50	\$9,500
	Surplus		\$0.50	

Appendix Four

Media Coverage

1. MLA BeefPlan Newsletter Edition 8 – August 2005. Attached.
2. Queensland Country Life – April 2005.