



finalreport

Project code: RMT. 004/B.RMT.0004
Prepared by: Peter Williams
Department of Primary
Industries and Water
Date published: June 2008
ISBN: 9781741912838

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Red Meat Targets: Grazing management systems for increased red meat production in Circular Head

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

This publication is published by Meat & Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of information in the publication. Reproduction in whole or in part of this publication is prohibited without the prior written consent of MLA.



Abstract

This project aimed to evaluate, in terms of annual live weight gain per hectare, the consequence of adopting intensive grazing managements at two sites, Montagu and Alcomie at Circular Head. It also strove to document the response to supplementing cattle grazing pasture with grain at the Montagu site. The Montagu site characterised by Hydrosol (sandy) soils and Alcomie characterised by Ferrosol (red) soils are typical of the Circular Head region of Tasmania, from which about 25% of the state's beef is produced.

Grain supplementation at the rate of 450 kg/head did not increase animal production and thus was shown to be uneconomic. Meat and fat colour were similar to that from pasture fed animals but marbling of the supplemented animals was inferior to that achieved from conventional grain feeding.

Intensive rotational grazing at the Montagu site resulted in annual live weight production of 1052 kg/ha and 956 kg/ha respectively over two years. Nitrogen fertiliser was used in the second year at the rate of 60 kg/ha.

Intensive grazing rotation at Alcomie resulted in annual live weight production of 980 kg/ha and 1269 kg/ha respectively during 2006-07 and 2007-08, giving an annual production advantage of about 200 kg/ha over set stocking.

Executive Summary

The two main drivers of profitability for beef production are price and production per hectare. Producers have little control over commodity prices but can significantly influence productivity. The business plan for the Red Meat Targets program along with the Meat and Livestock Australia strategic plan, clearly identify increasing pasture production and utilisation as a significant opportunity for beef producers to increase their enterprise profitability. Many factors (pasture species, fertiliser, grazing management and supplementary feeding) driving pasture production and utilisation have individually been shown to increase animal production but there are few examples of measuring their effect when combined as a best practice system.

This project based on similar work already completed at Winnaleah, aimed to achieve this and in doing so quantify benchmarks producers can use in order to make informed decisions with regard to adoption of technologies. In an effort to produce local and relevant data the Alcomie and Montagu sites were chosen as being representative of the Circular Head district, as it is the major beef producing area of Tasmania.

In 2005 – 06 cattle grazing pasture at Montagu were supplemented with grain in the form of calf pellets. There was no production or economic advantage measured from adopting such a strategy.

In 2006 – 07 grazing managements in the form of set stocking, four paddock rotation and three shifts per week resulting in a 28 day intensive rotation were compared at the Alcomie site. Work at the Montagu site focused on quantifying the response to intensive rotational grazing. Results from both sites are presented in table 1.

Table 1 Animal production from grazing systems 2006 - 07

Grazing system	Beef Production kg/ha Live-weight gain		
	Set stocked	4 paddock rotation	Intensive rotation
Alcomie production	813	866	980
Montagu production			1052

At Montagu about 80% of production came from the spring / summer period because of the cold, wet winter resulting in very wet soils and low pasture production. This site has been used for a number of grazing management trials over the past twelve years evaluating inputs such as phosphate source, plant species, and supplementation with hay, silage and grain. Production of 1052 kg live weight/ha in this present work is the highest level of production recorded at this site. Although there is obviously year effects, this does suggest that grazing management is likely to be a major determinant of production potential.

In 2007 – 08 the grazing management comparisons were repeated at Alcomie because greater variability in botanical composition became apparent after the start of the first year. As a consequence some of the treatment differences were probably due to paddock effects. At Montagu the rotational grazing benchmarking continued but with the addition of winter applications of nitrogen. These results are presented in table 2.

Red Meat Targets: Grazing management systems for increased red meat production in Circular Head

Table 2 Animal production from grazing systems 2007 - 08

Grazing system	Beef Production kg/ha Live-weight gain		
	Set stocked	4 paddock rotation	Intensive rotation
Alcomie production	1057	1087	1269
Montagu production			956

The above results suggest the biological limit for annual animal production from pasture using best practice grazing management is about 1000 kg live weight /ha for Hydrosol type soils at Montagu, and about 1200 kg live weight /ha for Ferrosol type soils at Alcomie. The Alcomie site is climatically similar to that at Winnaleah hence this result is not unexpected.

The driving force of this level of animal production is growth and utilisation of pasture. Animal production systems can focus on either achieving high individual animal performance or high group performance by having more animals with lesser individual production. In reality, economics dictate a compromise, so this work has been undertaken with the aim of achieving such a situation. Over the years the system has been fairly successful in achieving this compromise because the observed levels of animal production per hectare have not been at the expense of performance per animal, as all animals met sale specifications. Although individual animal performance varied with season, it remained within the window of 0.39 kg – 1.92 kg /head/day irrespective of stocking rate.

In order for a system to annually produce 1269 kg live weight, about 9 tonnes of pasture dry matter must have been consumed per hectare. Accepting utilisation of 70% implies 12.9 tonnes of dry matter must have been annually produced per hectare. Although this is less than reported by the dairy industry, the only input has been grazing management.

Economics must always be considered as part of the decision making process associated with adopting new technology. Adoption of an intensive grazing management system does require adequate sub division and provision of sufficient water points. Portable electric fencing may also be required to sub divide areas but paddock size can be adjusted to suit herd size. In this experimental area each plot of 1.9 ha was divided in half by a two wire permanent electric fence. Each half was then further sub divided into six breaks with temporary electric fences requiring about an hour's labour per week. The annual break-even cost for this operation and capital equipment is the value of about 200 kg of beef live weight per hectare, being the production advantage of this system over set stocking.

This work substantiates that already undertaken at Winnaleah, and sets the annual benchmark for beef production in a 1000 mm rainfall area with freely draining soils at 1200 kg live weight gain/ha, if only best practice grazing management is adopted. As demonstrated at Winnaleah the benchmark can be further extended by intensification through addition of nitrogen and irrigation.

Contents

	Page
1 Background	6
2 Project Objectives.....	6
3 Methodology.....	6
4 Results and Discussion.....	7
5 Success in Achieving Objectives	7
6 Impact on Meat and Livestock Industry – now & in five years time	7
7 Conclusions and Recommendations.....	8

1 Background

The two main drivers of profitability for beef production are price and production per hectare. Producers have little control over commodity prices but can significantly influence productivity. The business plan for the Red Meat Targets program along with the Meat and Livestock Australia strategic plan, clearly identify increasing pasture production and utilisation as a significant opportunity for beef producers to increase their enterprise profitability. Many factors (pasture species, fertiliser, grazing management, supplementary feeding) driving pasture production and utilisation have individually been shown to increase animal production, but there are few examples of measuring their effect when combined as a best practice system. This system has been demonstrated at Winnaleah with the resultant annual live weight production benchmark of about 1600 kg/ha.

Technologies although apparently simple, are generally slow to be adopted particularly when they have not been proven at a local area level. This project is largely designed to address this issue and increase adoption in a geographic area responsible for producing about a quarter of the state's beef.

2 Project Objectives

This project aimed to establish animal production benchmarks for pasture based beef production from Hydrosol and Ferrosol soils in the Circular Head region of Tasmania, using best practice grazing management.

It also aimed to investigate the response from supplementing pasture fed cattle with grain.

3 Methodology

Montagu:

In the first year, grain supplementation was assessed using eight 1.5ha plots of established permanent pasture based on Aries and Bronsyn ryegrass and white clover. These were stocked with Angus steers with four replicates supplemented with grain and four as control treatments. Supplementation started in September 2005 and progressed for about 120 days during which time each animal consumed 450 kg grain.

In year two, the response to rotational grazing was undertaken using 16 plots each of 0.75 ha, created by dividing in half the eight plots described above. Angus steers were rotated around these plots on either a 32 or 48 day rotation depending upon availability of feed.

Red Meat Targets: Grazing management systems for increased red meat production in Circular Head

In the third year the eight plot design was re-established with the animals being rotationally grazed at a rate determined by available feed. Nitrogen fertiliser was applied twice at the rate of 30 kg/ha.

Alcomie:

This site is basically a replicate of that established at Winnaleah. Six 1.9 ha paddocks were created from an existing area of ryegrass and white clover pasture. In year one, two paddocks were grazed by either set stocking, a four- paddock rotation or an intensive rotation based on three shifts per week to give a 28-day rotation. Average pasture cover using a rising plate pasture meter, and animal live weight was assessed monthly. Stocking rate on each treatment area was adjusted so as the average pasture cover remained in the window of 850 –1800 kg DM/ha. Weaned beef and dairy X beef bred steers and heifers, with a mean live weight of about 250 kg were used to graze the areas. These animals were sold when they reached a target weight of about 500 kg.

4 Results and Discussion

With the exception of the grain feeding work at Montagu, the other objectives of quantifying benchmarks associated with the various management practices were achieved.

5 Success in Achieving Objectives

The objectives at Montagu were only partially achieved, as the carcasses of the control animals in the grain-supplemented work were not assessed due to the property being sold. The sale also prevented the third objective of grain feeding for finishing cattle year round from occurring, as that strategy did not fit in with the new owners management plans. Consequently revised milestones were agreed to with MLA for this site.

The plots at the Alcomie site were much more variable in terms of botanical composition than was recognised when the trial was established. As a consequence some of the observed differences during the first year was due to paddock rather than treatment effects. As a consequence it was decided to repeat the grazing systems comparisons in the second year rather than progressing to include assessment of nitrogen response.

6 Impact on Meat and Livestock Industry – now & in five years time

Given increasing costs of production, the long-term profitability of the beef industry in temperate Australia will largely be dependent upon adopting technologies that allow production to be increased. As has been identified by several studies the greatest opportunity for increasing profitability lies with increasing pasture production and utilisation. The results from this work confirm the benchmarks already established by the Winnaleah work for beef production from areas annually receiving about 1000mm of rain on freely draining soils. Results from the Montagu site establish a benchmark of about 1000-kg of live weight annually produced from Hydrosol soil areas annually receiving about 1000mm of rainfall. Producers can now confidently aspire to these benchmarks and use them to make rational adoption decisions. Combining the observed physical responses coupled with the economic factors current at the time, allows these results to be timeless at least until substantially different pastures species or other systems become available.

Red Meat Targets: Grazing management systems for increased red meat production in Circular Head

Current industry benchmarks although confounded by season and physical location, suggest commercial producers are annually achieving less than 1000-kg live weight gain per hectare. The results reported here therefore suggest most cattle finishing businesses in temperate Australia have considerable room to improve production without large capital investments. Increasing production by 500 kg/ha has the potential to double enterprise profitability.

The technologies used in this work are all well known and researched but industry has largely failed to adopt them. This is despite such technologies being routinely used by the dairy industry. Perhaps the results from this work can be used to inspire producers, particularly if their adoption on a whole farm scale can be documented.

7 Conclusions and Recommendations

This work has clearly shown that at least 1000 kg live weight gain per hectare can annually be produced from Hydrosol soils and at least 1269 kg/ha from freely draining soils, by adopting intensive grazing management that allows plants significant time to rest between grazing. The study also confirms the results of earlier work conducted at Winnaleah thereby giving producers and advisers increased confidence to accept the observed benchmarks.

The results achieved with this work set benchmarks for pasture and animal production for a number of management systems. Whilst these absolute benchmarks are specific to a year and environmental conditions, their relativity appears to remain constant across systems. This suggests that the advantage of intensive rotational grazing over set stocking is annually about 200 kg live weight per hectare. Producers can now use this to determine whether this practice offers their businesses any advantages.

Commentators have been critical of the methodology used in this work in that it does not represent a system that will be practically operated on a commercial farm. This is true in the sense that a commercial farm would not have access to a pool of animals from which to add or subtract individuals depending upon the pasture supply. This would normally be managed by conservation and feeding of pasture as silage or hay. Transferring pasture feed between seasons as conserved material is not practical in this experimental setting because of the practicalities of conserving fodder in a small area and feeding it back without inducing nutrient transfer issues. The design is defensible from the sense that it focuses on growing and consuming pasture in situ and therefore estimates the biological limits of pasture production in any one season.

Benchmarking production data for beef production in temperate Australia is relatively scarce and often involves a breeding cow component, which will result in a lower level of production because of their relatively high maintenance demands. Results from a breeding and finishing benchmarking study on King Island suggest the best producers annually output about 470 kg live weight gain per hectare. The dairy industry has a much longer history of benchmarking than the beef industry and a relatively much simpler system because production is easier to measure. Results from the 2006 Tasmanian dairy business award show that the pasture utilised by the winner and average entrant was 11806 kg/ha and 8731kg/ha respectively. Although greater than the results reported here it includes the use of nitrogen and irrigation, which are not included in the present study.

Red Meat Targets: Grazing management systems for increased red meat production in Circular Head

The grazing management technologies assessed in this work are well known and have been the subject of many individual studies. A number of economic and environmental factors are currently acting to depress profitability of beef production (terms of trade annually decreasing by at least 1.5 %) so it is imperative that technologies such as best practice grazing management are adopted by the industry. The reasons for non-adoption are not clear and perhaps should form the subject of a separate sociological study. The reason could perhaps be summarised as the “people factor” which may be complex but worthy of elucidating, because if simple technologies are so slow to adopt, are more complex ones even worth contemplating?