final report

Project code: B.NBP.0582

Prepared by: Alan Laing

Department of Agriculture, Fisheries and Forestry, Queensland

Date published: March 2014

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

Utilising MSA Feedback to Enhance MSA Compliance

Producer Demonstration Site Burdekin, north Queensland

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

Abstract

On ground demonstrations and associated group learning successfully increased understanding and adoption of practices to improve MSA compliance rates. The percentage of steers meeting JBS abattoir specifications for MSA grading was 57%, with significant numbers excluded by excess HSCW. Of the steers eligible for MSA grading, on average 79% graded MSA (Boning group 6 to Boning group 16) and 31% received a premium (Boning group 10 or better). Ossification (the physiological age-defining cartilage turning to bone) was the main parameter preventing higher Eating Quality scores, followed by combinations of hump height, HSCW and Marbling. Ceasing to use HGPs in order to improve MSA compliance is unlikely to be a profitable option for most producers in north Queensland.

Executive summary

The Burdekin Producer Demonstration Site (PDS) project was a good example of producer groups, beef extension staff, Meat Standards Australia (MSA) trainers and export abattoir JBS Australia Pty Ltd (JBS) working together with the aim of improving MSA compliance rates. Over the course of the PDS eight group activities including two forums were held. The PDS project was very successful in meeting the objective of improving skills and understanding of MSA grading, plus analysis and interpretation of MSA feedback. Producers identified which practical management strategies, some which they then implemented, improved MSA grades and general market compliance.

Detailed economic analyses were undertaken on (a) the molasses feeding component at Lisgar, (b) Hormone Growth Promotants (HGP) use at Lisgar, (c) the Lisgar management system and (d) regional impact of the project outcomes. They highlighted the profitability of this cattle business and potential for the region.

A major MSA and Marketing Forum was held at Dalrymple Stadium on 22 June 2012, targeting the large industry audience to disseminate the results from both Dalrymple and Burdekin PDS's. Surveying participants before and after the forum showed a large improvement in understanding of MSA as a result of the forum. The forum was a success in demonstrating and communicating results to the broader north Queensland grazing community.

The Lisgar PDS site successfully demonstrated that significant percentages of steers (59%) consigned MSA met company specifications and were eligible for MSA grading, and that 17% would grade Boning group 10 or better and receive a premium.

The average carcase weight of Lisgar steers consigned MSA (2008 to 2012) was 323kg. The majority of steers that fell outside the JBS specifications were too heavy. With the majority of steers consigned MSA in the range 280-320kg, reaching a minimum carcase weight was not of concern for the Lisgar herd to achieve MSA grading eligibility as well as higher Boning groups. The Lisgar carcase weights were generally higher than the regional average for the same time period.

At an individual property scale, managers should look at selling the lead early in the meatworks season (January/February) when there are premiums, versus in the middle of the year when most producers are selling cattle. At the end of the season (October/November) there is also a premium, where 6 tooth steers that are 340kg plus and 7mm or higher P8 fat, are generally worth a more money both per kg and per head.

Carcases become 'ungrades' (i.e. not making MSA specifications) if: meat pH is greater than 5.7; meat colour is too dark (4, 5, 6); and if rib fat is < 3mm and/or fat distribution is poor. The majority of the 86 ungrades from Lisgar were due to a combination of pH greater than 5.7 and meat colour too dark (4, 5 or 6). If muscle glycogen had been higher at slaughter, then there is a reduced chance of high pH and meat colour. Muscle glycogen levels can be depleted due to handling, mustering and stress (including nutritional stress) prior to slaughter.

This PDS project successfully demonstrated that the level of ungrades could be significantly reduced by not holding steers overnight in the yards prior to trucking. The first Lisgar consignment had 66% ungrades. Subsequent ungrades ranged from 2 to 47% (average 16%).

Overall the better Boning group carcases (lower MSA score) tended to have lower ossification scores, lower hump heights, higher marbling scores and good Hot Standard

Carcase Weight HSCW (usually greater than 300kg). However, a very low hump height, a very low ossification score, a good marbling score or a HSCW over 300kg on their own did not guarantee grading in Boning group 10 or better.

Ossification score has the biggest impact on Eating Quality (EQ) score, and therefore was a key parameter affecting Boning group. Ossification is a measure of physiological maturity of the beef carcase. As an animal matures, cartilage present around bones gradually fills with blood and develops into bone. Although this development occurs in association with the animal's chronological age, it is affected by nutrition and development. Ossification is measured visually in the chiller by the MSA accredited grader. The range in ossification scores was found to be large in this PDS, despite the majority of steers having been weaned from control mated cow herds and then managed in a similar manner following weaning. This is typical of harsher environments in northern Australia. The target for ossification is a score less than 200 in order to reach Boning group 10 or better, provided other MSA parameters are better than average.

At the Townsville JBS abattoir tropical breed content of a carcase is determined by measuring hump height. High hump heights represent higher tropical breed content (i.e. Brahman). Low hump heights can equate to lower EQ scores and therefore better Boning groups. The range in hump height for the Lisgar steers and heifers consigned MSA between 2008 and 2012 was 35mm to 170mm. The target should be a hump height of no more than 100mm, provided tropical adaptation is not compromised.

HGPs are known to increase live-weight gains, but also reduce MSA compliance. For the Lisgar MSA PDS, it was shown that that the consignment difference between the two groups of animals would need to be 143.5% in order for the non-HGP trends cattle to match or exceed the return generated by treated cattle. This is an unobtainable level of compliance, as compliance cannot exceed 100%. Sensitivity analysis showed that a rise in premiums to $1.80/kg would be required to economically justify the removal of HGP's.

The impact of molasses on herd gross margins was modelled using the Breedcow and Dynama herd modelling software package. In the modelling exercise, steers were turned off at the 24-35 month age bracket with molasses feeding, compared to 36-45 months without molasses feeding. This resulted in a herd gross margin increasing from $253.60/AE to $309.60/AE, before interest on herd capital was considered, or $189.45/AE to $249.99/AE after interest was calculated on herd capital at 10%.

This project has demonstrated that the high levels of individual animal performance found within age groups, were linked to superior genetics existing within the herd. The challenge for producers is to effectively improve the average genetic performance of the herd towards that of the superior performers through the application of sound breeding, genetic decisions and actions. Continued education in the area of breeding and genetics is important. It is recommended producers attend detailed and well structured workshops (with follow-up days) to achieve a level of understanding in the tools and strategies available, in order to make informed and educated choices and effectively implement change with positive results.

The project also demonstrated that management inputs to improve MSA compliance should be carefully considered, and that cost benefit analyses should be conducted preferably by suitably qualified persons. Beef producers consigning cattle MSA may wish to review their HGP program if it involves multiple implants and use of a terminal combination implant. The continued use of HGPs in a less aggressive program is possibly a more viable economical option. Low cost strategies to improve handling pre slaughter should significantly reduce "ungrade levels", however logistically some of these strategies may be difficult to incorporate into existing management systems. The project highlighted the need to tighten carcase

weight ranges and increase the average carcase weight. The host site and other properties are now getting higher percentages into the higher priced parts of the meatworks grid.

The final activity, the MSA and Marketing Forum held at Dalrymple Stadium, 22 June 2012, was directed at a much wider audience. The final results of both the Charters Towers and the Burdekin MSA PDSs were disseminated, along with results from another key MLA project plus relevant CRC outcomes. Over 100 people were asked to score their current level of understanding of MSA prior to the forum (i.e. at the registration desk) and again on their feedback forms at the end of the day. Prior to the forum the majority of participants scored their level of understanding of MSA at 2-3 out of 7, and after the forum the majority score was 6 out of 7 (survey feedback: n = 49 before forum; n = 29 after forum).

This major forum was a fitting end to the demonstration project in showcasing project activities as well as increasing understanding of the factors involved in producing MSA quality meat from north Queensland tropical herds.

Contents

List of Tables

List of Figures

Acronyms

PDS	Producer Demonstration Site
MSA	Meat Standards Australia
HSCW	Hot Standard Carcase Weight
HGP	Hormonal Growth Promotant
MSAMB	MSA Marbling
IMF	Intramuscular fat
OSS	Ossification
EQ	Eating Quality
EMA	Eye Muscle Area
EBV	Estimated Breeding Value
AE	Adult Equivalent
GM	Gross Margin
ABARE	Australian Bureau of Agricultural Research and Economics
BBSE	Bull Breeding Soundness Evaluation
Beef CRC	Beef Co-operative Research Centre

1 Background

There were limited opportunities for beef producers in north Queensland to access premiums for MSA graded carcases until April 2008 when MSA grading commenced at JBS in Townsville. The advent of MSA grading provided a 10c premium for eligible cattle grading "Boning group" 10 or better. This premium had potential to improve business gross margins where grading percentages could be achieved.

It was expected that many producers may have difficulty achieving satisfactory MSA grading percentages, and would have a high percentage of ungrades due to pH and meat colour. On ground demonstrations and group action learning was seen as a way to increase the understanding of MSA in general and of management inputs required to improve compliance rates for MSA graded meat at the export abattoir in Townsville. Improved production and profitability outcomes for both JBS and producers was seen as important to keeping MSA market options open to producers in north Queensland. Therefore, the two MSA PDS projects (Dalrymple B.NBP.0583 and Burdekin B.NBP.0582) were set up in 2008 to address awareness and adoption of MSA grading systems.

Lisgar station was chosen as the key demonstration site and is owned and operated by Robert and Donna Rea and family. It was purchased by the Rea family in 1961. Both the property and the herd have undergone considerable development and improvement since then. Lisgar is located 30 kilometres south of Home Hill between the Bruce Highway and the Pacific Ocean which forms the eastern boundary. Lisgar (home of the mighty reds) is a breeding and fattening operation and a Droughtmaster stud of 750 fully BREEDPLAN recorded breeders. Lisgar targets the grass fed Jap ox market. Throughout the course of the demonstration Robert Rea has intensified bull selection to incorporate use of carcase measurements such as P8 fat depth, Rib Fat, Eye Muscle Area (EMA) and Intramuscular fat (IMF). Lisgar started recording individual animal BREEDPLAN data in 2004. BREEDPLAN measurements have intensified since then and moved to cover the complete breeding herd in 2008.

Feedback data from cattle consigned MSA were analysed and interpreted using on property NLIS data and the MSA online Benchmarking system, compliance data from JBS. The MSA Benchmarking system provides a pathway for producers to download feedback data and reports. From this data they are able to determine: grading percentages; detail on why cattle did not grade; and how cattle performed compared to district averages. Through downloading this data along with Electronic Identification or RFID numbers, individual animal data can be linked back to paddock performance records. This information was shared within the Burdekin PDS group, and across other producer groups including the Dalrymple MSA PDS group.

Critical factors such as pre slaughter handling and nutrition, breed, HGP programs, age, temperament, were some of the critical factors discussed to increase MSA grading through addressing specific parameters such as pH and meat colour, HSCW, ossification, hump height and MSA marbling. The PDS project ran special training workshops and field days in conjunction with the project groups. Producers identified which practical management strategies they could implement to improve MSA grades and general market compliance.

Weight for age is an important criteria for targeting market specifications that allows carcases to be placed in the higher priced sections of the price grid (e.g. yearling ox or MSA ox). Weight for age also improves MSA grading eligibility through younger age and potentially less teeth, and improves MSA grades indirectly through potentially lower ossification scores. An achievable target for steers produced in the region should be 300kg HSCW with 0-4 teeth, as a percentage of each year group is already achieving this target. At Lisgar, the steers are progressively becoming younger at the same time and with heavier

carcase weights. This is due to a combination of growth genetics and pasture and supplement nutrition improvements.

To enhance MSA eligibility, an adequate fat coverage will protect the carcase from uneven chilling and cold shortening, prevent dehydration, and add flavour. Carcases must also have even fat distribution and no hide puller damage. When targeting heavier weights at a younger age it is important to select bulls with genetically adequate P8 fat cover so that the minimum fat cover requirements of 5 or 7mm can be met for these younger animals. An animal with 5mm of P8 fat is at the bottom of the specification range for MSA grading eligibility. Many animals with only 5mm fat have poor fat distribution (and then become ineligible for grading), or have less than 3mm rib fat (and become MSA ungrades). Older, heavier and more mature animals are more likely to have P8 fat cover within the specifications. However these animals are more likely to not comply on dentition (i.e. be 6 teeth) and also be too heavy for MSA eligibility. The challenge is to achieve weight for age as well as adequate fat cover.

2 Project objectives

The overall objective of the Burdekin MSA PDS was to use “on ground” producer demonstrations and group action learning as a way to increase understanding of: the MSA grading system and the management inputs or changes required to improve compliance rates at JBS export abattoir in Townsville. Potentially leading to improved practices and improved steer gross margins for north Queensland beef producers who consigned cattle MSA.

Objectives over the course of the project:

1. In conjunction with JBS at the Townsville works and Meat Standards Australia, assess the prevalence of animals and producers that submitted for MSA grading in the fiscal year 2008 and established compliance rates.
2. Improve compliance rates from cattle marketed for MSA grading at JBS in Townsville. In particular reduce percentage ungrades and increase Boning group grades.
3. Improve skills and understanding of MSA grading, plus analysis and interpretation of MSA feedback, benchmark knowledge and practice change.
4. Provide opportunities for producers to be involved in and/or directly participate in “on property demonstrations” of strategies to achieve improved MSA compliance.
5. Provide-annual opportunities for technical support and training activities for both the Burdekin and Dalrymple producer groups.
6. Provide annual opportunities for producers to learn from other Value In Beef (VIB) groups and relevant research outcomes.
7. Demonstrate at a field day the cost effective ‘on property’ practices that improved MSA compliance to wider beef community..
8. Improve awareness of the wider beef community of strategies to improve MSA compliance being undertaken by PDS groups.
9. Benchmark the knowledge and practice change that occurred as a result of the project.

3 Methodology

3.1 Group formation and processes

The Burdekin MSA PDS group was formed in Ayr in April 2008. Expressions of interest were sought from a group of people that had previously registered for a combined MLA MSA and JBS producer awareness workshop held at Ayr (2008).

The Burdekin PDS group consisted of ten businesses, ten properties, and 50,980 head of cattle across 8,250 hectares. By the end of the PDS all were actively using NLIS to some

level. The level of adoption varied from monitoring all animals on the property to monitoring select groups within the herd such as weaners, heifers or steers.

The producer group nominated Lisgar station as the PDS site to demonstrate relevant management strategies for improving MSA grading and to track steer performance through to slaughter and MSA grading annually. Measurements to be recorded were full pedigree and BREEDPLAN data on progeny from the No 9's onwards, JBS carcase data and eligibility, and MSA Feedback and Benchmarking system data. There would be NLIS linkage of property records on individual animals to carcase data and MSA feedback data. Nutritional HGP and management inputs were also recorded. Other properties in the Burdekin PDS group would make available animal performance and MSA feedback data for the group.

Group activities were undertaken to enhance skills and technical knowledge needed to implement on ground strategies. Producer group Activities are listed in Appendix 11.

3.2 Site selection and background

Lisgar station was chosen as the key demonstration site primarily due to:

- The owner Robert Rea had a keen interest in pursuing MSA Grading;
- The level of individual animal recording including pedigree data commencing at the same time for BREEDPLAN purposes, provided a platform to measure carcase performance and compliance; and
- The Droughtmaster genotype with lower hump heights provided opportunity to supply this market.

At Lisgar, steers are fattened on dryland pastures with some access to ponded pasture. In times of seasonal excess and abundant forage, cattle are bought for opportunistic fattening. Steers are implanted with a HGP (400 day Compudose) at 18 months old. All cattle receive a Compudose G over their last 84 days prior to slaughter. Some long-term agistment country is managed separate from the main property. On this agistment country, NPN (Nitrogen-phosphorous) dry licks are fed during the dry season.

A more detailed description of Lisgar and its management is tabled in Appendix 2.

The target market is Jap Ox aiming for 300kg HSCW. The management objective is to aim for the highest priced part of the grass fed grid as shown in Table 1 below.

Table 1. Highest priced part of the grass fed grid

Grass Ox		
5-22mm P8 Fat	0-2 teeth	300kg +
7-22mm P8 Fat	0-4 teeth	300kg +
MSA Grass		
5-22mm P8 Fat	0-2 teeth	300kg +
7-22mm P8 Fat	0-4 teeth	300kg +

3.3 JBS Townsville plant Feedback Carcase data

The JBS carcase feedback sheets (emailed to the owner in .txt format) were converted to Excel. The following data was collated for individual IDs and body numbers of animals consigned MSA:

- dentition (*JBS MSA target grading requirements 0-4 teeth);*

- P8 Fat (*JBS MSA target grading requirements 5-22mm for 0-2 teeth and 7-22mm for 0-4 teeth);*
- HSCW (*JBS MSA* grading *requirements 180-339.5kg HSCW*);
- Bruising; and
- gross value (amended for MSA premium where applicable).

In particular, the above data enabled calculation of the percentage of the consignment which met the JBS MSA grading specifications for the Townsville plant in terms of dentition, P8 Fat and HSCW and therefore were eligible for MSA grading.

3.4 MSA Feedback and Benchmarking system data

The MSA data was retrieved from the MSA feedback and Benchmarking system on MLA's website: www.msagrading.com.au. The property code and password were required to retrieve the data. The retrieval of this data enabled summarisation of compliance data for each group of cattle consigned and also summarisation of key MSA parameters in each Boning group.

This data retrieved from MSA feedback and Benchmarking system included:

- Compliance Summary by Lot;
- Grading Analysis and Grading Analysis Graphed;
- Producer Feedback by Lot; and
- Benchmarking reports.

Compliance Summary by Lot

The compliance summary by Lot sheet was used to determine numbers complying with each Boning group. Also provided is the body number(s) of carcase falling into each Boning group which can be cross checked against JBS amended feedback sheets (i.e. price amended to account for MSA premium).

The Boning group 'U section' of the Compliance summary by Lot report lists "grade codes" and thus enabled identification of bodies with pH > 5.7, meat colour 1A or > 3, or subcutaneous fat depth out of specification (e.g.< 3mm), or fat distribution out of specification, or a combination of these factors causing carcases to be "ungrades" (Boning group U).

Grading Analysis and Grading Analysis Graphed

The Grading Analysis sheet was used to determine the minimums, maximums, averages and standard deviations for each parameter critical to MSA grading eg. OSS (ossification score), HSCW, MSA Marbling (MSAMB), a measure of Intramuscular fat IMF, Rib Fat (RFT) and pH. A count is also given e.g. numbers of carcases at 150, 200 and 250 ossification score.

The Grading Analysis Graphed sheets showed the above information in graphical format and this was used in powerpoint presentations to demonstrate to producers the range within each MSA parameters (e.g. ossification) and visually show the proportion of animals that fell outside "ideal" point or scores on the graphs. For example, ossification scores greater than 200 were unfavourable to MSA grading and marbling scores less than 300. The rib fat graphs clearly showed those animals that were ungrades i.e. rib fat less than 3mm.

Producer Feedback by Lot

The Producer Feedback by Lot sheets were downloaded in Excel format. The sheets were used to determine which MSA parameters (e.g. OSS, HSCW, MSAMB, RFT and pH) had a positive or negative contribution to EQ score or Boning group for each individual steer and also Boning groups.

Benchmarking reports

Benchmarking reports were used to determine how Lisgar cattle compared to the Herbert and Lower Burdekin region for a particular MSA parameter e.g. ossification score. While each property needs to identify problem areas for their own cattle in relation to MSA grades, this information can be useful to compare a parameter with a region to give a broader perspective.

3.5 Data analysis and interpretation

Slaughter data for each consignment was summarised into two components:

- Compliance data showing the level of compliance in meeting JBS Townsville plant specifications for eligibility for MSA grading. This was obtained from JBS feedback sheets converted to excel.
- MSA compliance data obtained from the MSA Feedback and Benchmarking system on the MLA website

3.6 Economic analysis

The following economic analyses were undertaken by Tim Moravek, DAFFQ economist located at Charters Towers.

3.6.1 Molasses feeding

Molasses feeding is an ongoing component of the successful cattle operation at Lisgar. Therefore the impact of molasses feeding on herd gross margins was incorporated into the Breedcow and Dynama analysis.

3.6.2 Hormonal Growth Promotants

Economic analysis was conducted on No 7 Heifers from Lisgar to determine the trade-off between revenue generated by compliance and carcase weight differences between treated and non-treated animals.

3.6.3 Capturing the Lisgar Management System

A Breedcow & Dynama analysis was undertaken in 2007 to assess baseline gross margins and herd performance at Lisgar. A follow-up Breedcow & Dynama analysis was undertaken in 2012 to determine changes in herd performance. Prices for inputs and price received were kept the same between the two dates, at 2012 prices, to capture changes that management practices had on performance. Seasonality was accounted for by ensuring data included several preceding years of production performance. This analysis should be considered whole-of-management analysis and does not attempt to reduce costs and benefits into *ceteris paribus* analysis of management practices or inputs, except price.

3.7 Benchmarking Producer understanding and knowledge of MSA

A major MSA and Marketing Forum was held in Charters Towers on 22 June 2012 at the saleyard auditorium. Participants who attended the MSA and Marketing Forum where asked to rate their current level of understanding of MSA at registration and again at the end of the forum. Participants were asked to rate on a scale where 1 = very limited and 7 = extremely high. Responses were received which showed a large improvement in understanding of MSA as a result of the forum.

4 Results

The results from 8 groups of steers and 5 groups of heifers consigned MSA from 2008 to 2012 were recorded and interpreted.

4.1 Pre delivery management for cattle consigned MSA

Managemenent for the first consignment of steers from Lisgar for MSA in June 2008 was:

- Day 1. Muster, draft, hold in yards overnight.
- Day 2. Load on trucks and consign to meatworks.

This first consignment in 2008 had 66% ungrades from high pH and dark meat colour brought about largely by the night in the yards on property.

Management for the second and subsequent consignments (i.e. 2009, 2010, 2011, 2012) of cattle from Lisgar for MSA were:

- Muster at least three weeks ahead, draft off the next consignment and keep separate on good feed
- On the day of despatch, muster to the cooler on water and hold, later put in the yards and onto trucks.

4.2 JBS Compliance Data and MSA Data for Lisgar steers and heifers

JBS Compliance data and MSA Compliance data was compiled and interpreted for:

Steers

1 consignment of No 5's (June 2008)

2 consignments of No 6's (November 2008)

1 consignment of No 7's (November 2009)

1 consignment of No 8's (December 2010) - not consigned MSA

1 consignment of No 9's (November 2011) - the "lead" of the No 9's

1 consignment of No 9's (February 2012) - the "tail" of the No 9's

Heifers

1 consignment of No 6's (October 2008)

2 consignments of No 7's (September 2009)

1 consignment of No 8's (October 2010)

1 consignment of No 9's (September 2011).

4.2.1 Carcase specifications for meeting JBS Specifications for MSA grading

The JBS specifications for eligibility for MSA grading at the Townsville plant are:

Dentition - 0 to 4 teeth.
HSCW - 180 to 339.5kg.
P8 Fat cover - 5 to 22mm for 0-2 teeth and 7-22mm for 4 teeth.

Records of the Lisgar No 5 to No 9 steers (including the one consignment not consigned MSA) were analysed to provide the overall percentage of steers which complied for dentition (0-4 teeth), HSCW (180-340kg) and P8 fat (5-22mm and 7-22mm) specifications. These percentages are shown in Table 2.

Table 2. Steer Percent compliance for Dentition, HSCW and P8 fat specifications for MSA eligibility

Trait	Specification	Percent Compliance
Dentition	0-4 teeth	75%
HSCW	180-340kg	78%
P8 fat Depth	5-22mm and 7-22mm	87%
Compliance with all company specifications		54%

Compliance with all company specifications varied from 42% in the first consignment to 92% in another consignment. The last four consignments were 47, 47, 50 and 50 percent compliant. Dentition (6 teeth) and high HSCW were the major contributors to non-compliance. Only one consignment had a low fat compliance. Improved management of nutrition has produced heavier carcasses, which now need to be marketed earlier,and more external fat cover is required through genetic selection.

Records of the Lisgar No 6 to No 9 heifers were analysed to provide the overall percentage of heifers which complied for dentition (0-4 teeth), HSCW and P8 fat (5-22mm and 7-22mm) specifications. These percentages are shown in Table 3.

Table 3. Heifer Percent compliance for Dentition, HSCW and P8 fat specifications for MSA eligibility

Trait	Specification	Percent Compliance
Dentition	0-4 teeth	98%
HSCW	180-340kg	100%
P8 fat Depth	5-22mm and 7-22mm	91%
Compliance with all company specifications		89%

In all consignments, the heifers achieved high rates of compliance.

Details of all Lisgar consignments are given in Appendix 3 (steers) and Appendix 4 (heifers).

4.2.2 Trends in Lisgar steer and heifer turnoff

Early in the project, Lisgar steers sold at 3 to 4 year old. In 2011-12, the steers sold at 2.5 to 3.5 year old. In 2012-13, the steers will sell at 2.5 to 3 year old. In all cases, the Jap Ox/USA Ox at 300kg plus carcase has been the target.

Further improvements in genetics for growth and carcase will increase the percentage of steers turning off at 2.0 to 2.5 year old and meeting JBS target specifications. Genetics for fertility are also an essential component of the Lisgar balanced approach to genetic selection.

Lisgar cull heifers consist of heifers culled prior to mating plus mated heifers that pregnancy tested empty and are boxed with the unmated heifers. All heifers are sold at less than 3 year old (30 to 35 months old). HSCW are good with 1 heifer coming at 377kg dressed in 2011. All drafts have a high level of compliance to JBS specifications for MSA grading.

4.2.3 Numbers of Lisgar MSA cattle

In Figures 1 to 9 that follow, the number of Lisgar MSA cattle in the data is 411 (n=411).

4.2.4 Boning group interpretation

The MSA Feedback and Benchmarking system has provided Boning group data for Lisgar.

Figure 1 shows the Boning groups of all Lisgar cattle graded MSA from 2008 to 2012.

Of the steers and heifers that were within JBS specifications and were MSA graded, 31% graded Boning group 10 or better. Another 24% graded Boning Groups 11 and 12. Theoretically, if HGPs had not been used, this 24% would grade 2 Boning groups lower (eg 9 and 10). However, HGPs are an integral part of the profitability of Lisgar turnoff cattle.

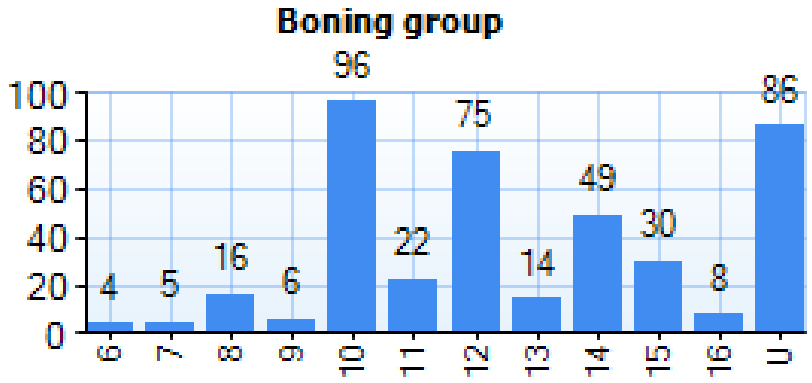


Figure 1. Boning groups of Lisgar steers and heifers 2008-2012

4.2.5 Ungrades

Meat pH greater than 5.7, meat colour of 1A and greater than 3 and rib fat less than 3mm result in Ungrades.

Lisgar grading resulted in 21% of steers and heifers meeting company specifications being ungrades. The majority of the ungrades came from high pH and meat colour too dark. Both these parameters were slightly below the JBS Townsville plant benchmarks. Lisgar cattle also suffered higher than plant average for hide puller damage, resulting in ungrades.

Figure 2 shows the reasons for ungrades in the Lisgar cattle along with the Region's figures.

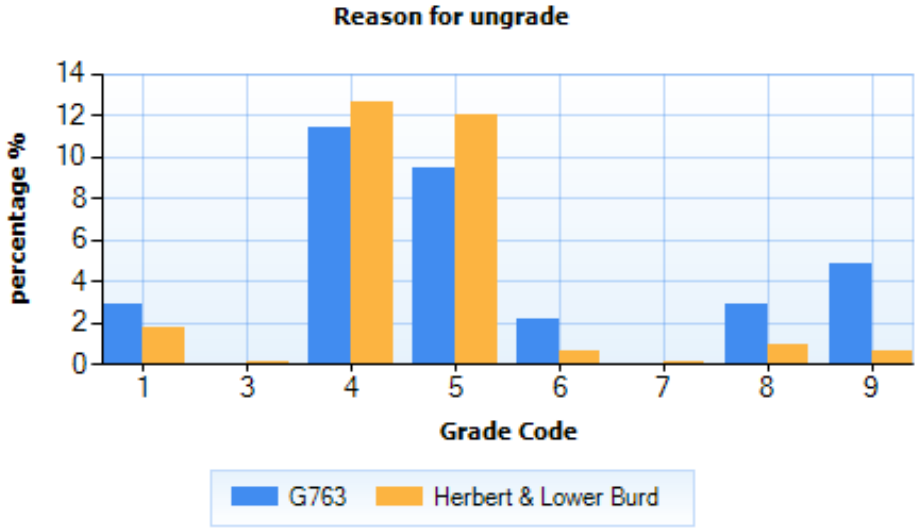


Figure 2. Reasons for Ungrades in Lisgar cattle 2008-2012 along with the Region's figures

Grade Code Key (x axis on Figure 2 graph)

1 Subcutaneous fat depth out of specification
3 Fat distribution out of specification
4 pH greater than 5.70
5 Meat colour 1A or greater than 3
6 Meets MSA requirements, but fails company imposed specification
7 Miscellaneous
8 Outside AUSMEAT chiller assessment specifications
9 Hide puller damage

4.2.6 Meat pH

Meat pH was not an issue with the Lisgar steers and heifers. Only 6% of graded cattle had a pH above 5.7.

When benchmarked against the region, the pH of Lisgar cattle showed:

- lower percentages of cattle with pH above 5.7
- a higher percentage of cattle at low Ph.

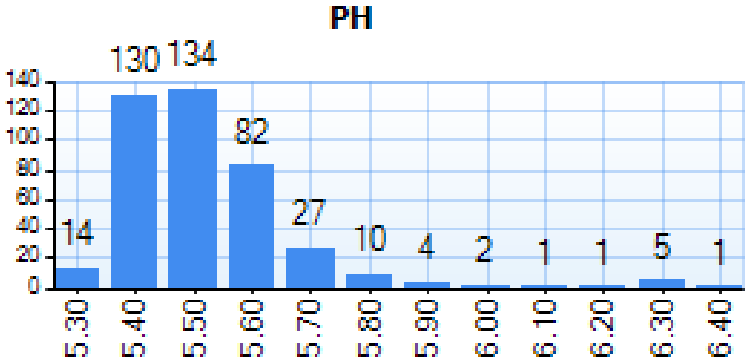


Figure 3. Numbers of Lisgar cattle by meat pH 2008-2012

Lisgar pH group benchmarks with the region are shown in Appendix 5.

4.2.7 Meat colour

The Lisgar cattle graded for MSA had 9.4% of eligible cattle with dark meat colour and therefore ungrades. This is a low level.

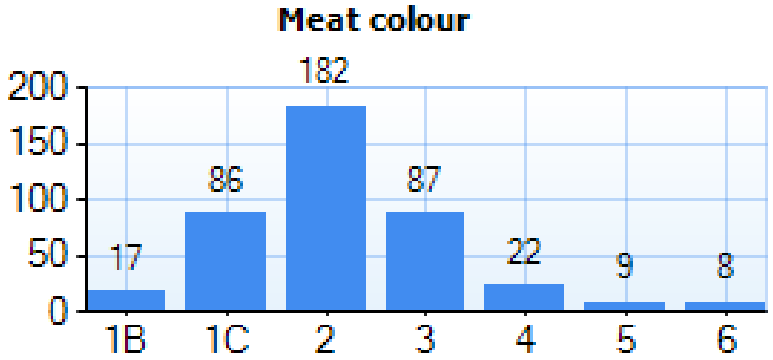


Figure 4. Numbers of Lisgar cattle by meat colour 2008-2012

When benchmarked with the region, Lisgar high meat colour grades were lower than the region. Overall, the good meat colour gradings were slightly higher in the Lisgar cattle. Lisgar benchmarks with the region for meat colour are in Appendix 5.

4.2.8 Ossification scores (Oss)

Ossification is a key factor affecting eating quality (EQ). In Figure 5 the range of ossification scores for the Lisgar cattle was extremely broad. These are homebred cattle from a tightly controlled mating program. The spread in ages is 5 months. The Lisgar average Ossification score was 232. MSA advise a target of 200. Half of the Lisgar cattle were above an Ossification score of 200.

When benchmarked with the region, the Lisgar cattle had higher percentages of the higher ossification scores of 200 or higher. Lisgar ossification benchmark with the region is shown in Appendix 5.

This is a parameter that needs focus on to achieve higher MSA compliance rates.

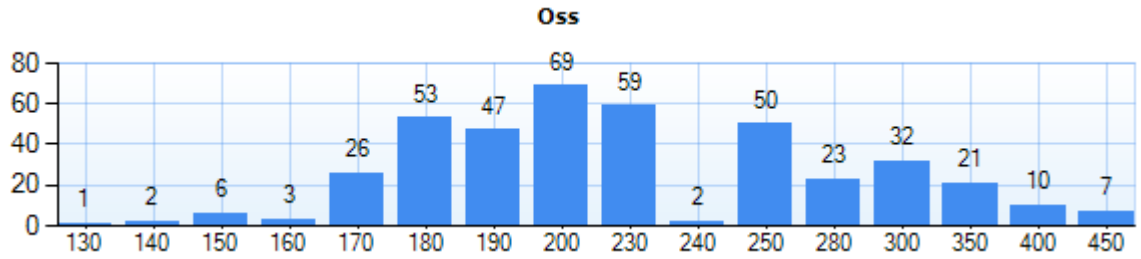


Figure 5. Lisgar cattle Ossification score distribution

4.2.9 MSA marbling scores

Aiming for MSA marbling scores above 300 will improve MSA compliance rates. In Figure 6, Lisgar cattle had a wide range of marbling scores from 110 to 480, with an average score of 264. When benchmarked with the region, Lisgar cattle had higher percentages in the above 300 range and lower percentages in the below 300 range. Lisgar MSA marbling score benchmarked with the region is shown in Appendix 5.

There is room to improve MSA marbling scores and genetically improving intramuscular fat is part of the Lisgar breeding objectives.

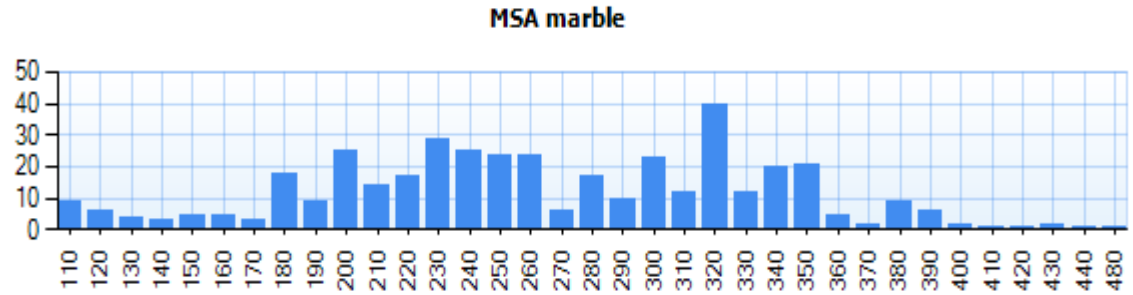


Figure 6. Lisgar MSA Marbling scores 2008-2012

4.2.10 Rib fat measurements

Lisgar cattle that met the JBS specifications had a high percentage of rib fat levels over the minimum (97%). As shown in Figure 7 average rib fat was 6mm.

Benchmarking the Lisgar cattle with the region showed similar trends between Lisgar and the region. Higher levels of rib fat will increase the percentage of cattle meeting MSA compliance. Lisgar rib fat measurements benchmarked with the region are shown in

Appendix 5. There is opportunity to increase the percentage of cattle having rib fat levels from 5 to 15mm through improved genetics.

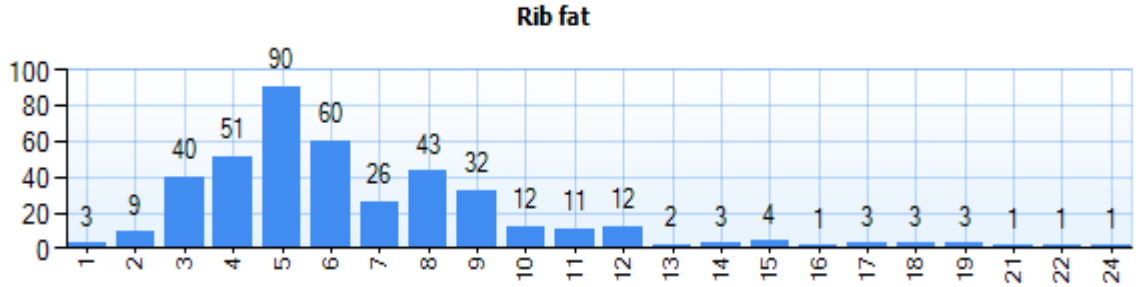


Figure 7. Lisgar cattle rib fat distribution 2008-2012

4.2.11 Hump height

Tropical breed content is measured by hump height. MSA research has shown that tropical cattle breeds have a negative impact on the eating quality of many cuts. The major effect is on the striploin, cube roll, tenderloin and oyster blade.

The Lisgar cattle had a range in hump height from 35 to 170mm with very few above 140mm as shown in Figure 8. Benchmarking Lisgar cattle with the region showed that the Lisgar cattle had lower hump heights (Figure 8).

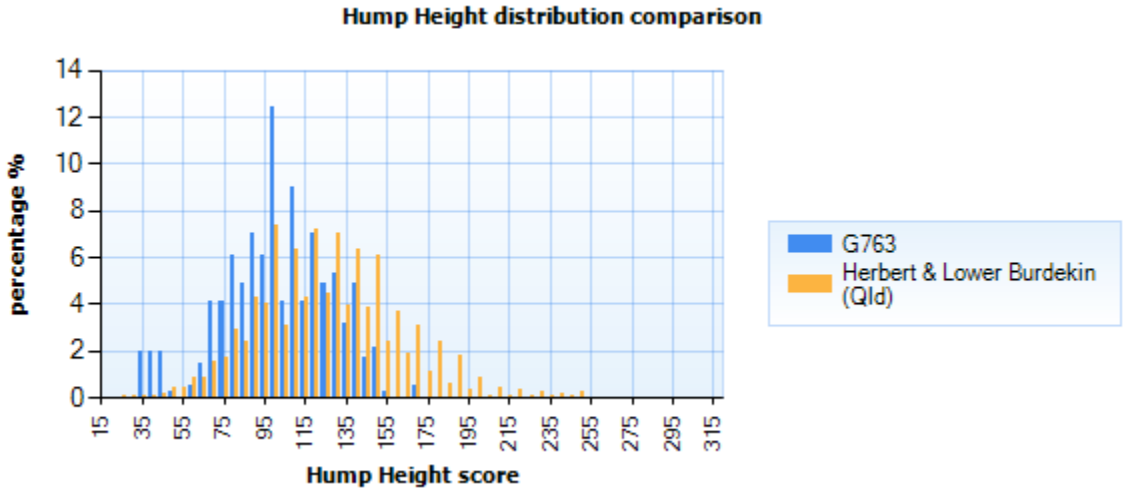


Figure 8. Lisgar hump heights and Benchmarking with the region 2008-2012

4.2.12 Carcase weights of Lisgar steers and heifers

The average carcase weight of the Lisgar cattle consigned MSA was:

- Steers- 323kg
- Heifers-285kg.

The following graph was retrieved from the MSA Benchmarking and feedback website (grading analysis graphed) and shows the percent of carcasses falling into weight ranges. Carcases over 339.5kg are normally outside the range of the JBS MSA grading eligibility specifications. The majority of steers which were outside the JBS specifications were too heavy. With the majority of steers consigned 300-320kg, achieving minimum carcase weight is not of concern for the Lisgar herd in achieving MSA grades.

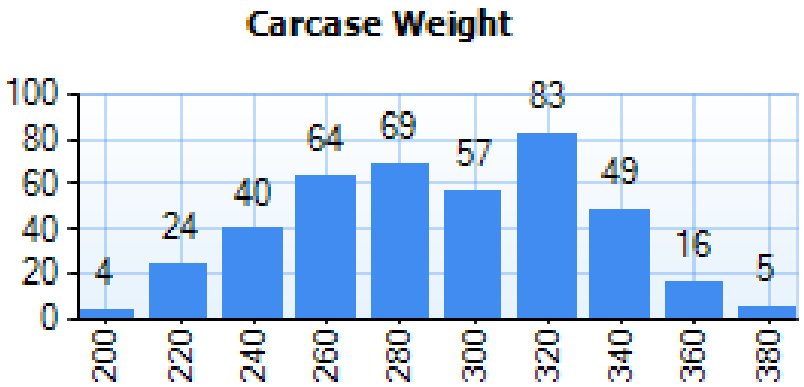


Figure 9. Lisgar carcase weight ranges 2008-2012

When benchmarked with the region, Lisgar has 18% more carcases in the 320 to 380kg range and less carcases than the region in the ranges of 300kg and below. Lisgar carcase weights benchmarks are shown in Appendix 5.

4.3 Economic analyses

4.3.1 Lisgar HGP analysis

In 2009, a small trial was initiated to test the effect of a short term HGP (Compudose G) on heifers prior to slaughter. On 29 June 2009, heifers were stratified by weight and treated or not treated with Compudose G. The heifers were weighed for a final weight on 11 September and slaughtered on 23 September. Compudose G is a HGP that is effective for 85 days.

The heifers were fed a molasses based supplement to target the MSA market.

The trial was hampered by considerable losses from 3 day sickness. After the losses, at slaughter there were 49 with HGP and 37 with No HGP.

There was no increase in Ossification in the HGP group and in a difficult nutritional season, the HGP produced enough extra carcase weight to pay for itself (9kg). Details of the MSA results for these heifers are tabled in Appendix 4

The Burdekin region received greater than average rainfall during the 2008/2009 wet season (approx 1500mm). Yet, the wet season ended abruptly in February 2009. A lack of rain over the following 11 months until late January 2010, and therefore no new pasture growth and accompanying levels of plant nutrition, meant that the region experienced a tough nutritional season with a extended reliance on feed supplements.

HGP's are thought to increase live-weight gain, but reduce MSA compliance. Economic analysis was conducted on No 7 Heifers from Lisgar to determine the trade-off between revenue generated by compliance and carcase weight differences between treated and non-treated animals. The key assumptions are listed in Table 4. Actual slaughter data was used to complete an investment analysis for the heifer consignment (impact on herd gross margin was not investigated for this analysis). All weights listed in Table 4 refer to carcase weights.

Table 4. Lisgar HGP economic analysis data and assumptions

	Non-Treated	**Treated**
Price	$2.73/kg	$2.73/kg
Average HSCW	248.00kg	257.00kg
Compliance (Boning Group 10 or less)	56%	49%
Premium	$0.10/kg	$0.10/kg
HGP Cost	$0.00	$1.60/Head

The cost-benefit analysis showed that despite a difference of 7% in MSA compliance between treated and non-treated heifers, higher carcase weights in treated animals offset extra revenue from premiums obtained by non-treated animals. Each animal in the HGP treated group achieved an extra $21.68, after accounting for extra input costs. Treated animals were, on average, 9 kg heavier, and of this extra weight, 49% was making the 10c premium, increasing the margin to treated animals.

Sensitivity analysis was conducted to determine thresholds where non-treated cattle outperformed treated cattle economically. The analysis showed that the consignment difference between the two groups of animals would need to be 143.5% in order for the non-treated cattle to match or exceed the return generated by treated cattle. This is an unobtainable level of compliance, as compliance cannot exceed 100%. The sensitivity analysis also showed that a rise in premiums to $1.80/kg would justify the removal of HGP's, economically.

Table 5. Results of $ Returns from + and-HGP

Treatment	**$/Head**
Non-Treated	$690.93
Treated	$712.60

4.3.2 Lisgar molasses feeding

The impact of molasses on herd gross margins was modelled with Breedcow and Dynama. Feeding molasses and supplementary hay to each steer for 6 months came at a cost of $54. Without feeding molasses, husbandry costs came in at $22/head for the steer group. Steers were implanted with a 2 x 400 day compudose shots, costing $13.70. Other husbandry costs included dectomax at $2 and a compudose G shot for the tail at $3.20/head

Results from the molasses feeding analysis, resulting in a decreased age turnoff. Steers were turned off at the 24-35 month age bracket with molasses feeding, compared to 36-45 months without molasses feeding. This resulted in a herd gross margin increasing from $253.60/AE to $309.60/AE, before interest on herd capital was considered, or $189.45/AE to $249.99/AE after interest was calculated on herd capital at 10%. Refer to Appendix 6, Breedcow & Dynama-Lisgar-Molasses Feeding Analysis for more detail on assumptions and results.

4.3.3 Lisgar management system

Herd productivity increases through management changes has resulted in an increase in dressed carcass weights of 5%, reduced age turnoff to a majority of 24-35 month olds from 36-47 month olds. Due to heavier carcase weights and higher prices through improvements in grid compliance and MSA compliance, gross margin has increased from $209.48/AE to $244.73/AE. In productivity terms, this is an annual increase of 2.9% per annum. Refer to

Appendix 7, Breedcow & Dynama-Lisgar-Management Analysis for more detail on assumptions and results.

4.3.4 Regional Impact

Modelling was done using Beef CRC Breedcow templates for the 313 ABARE regions (see www.futurebeef.com.au). An assumption was made based on expert knowledge that 33% of cull steers and heifers could receive a MSA premium of $0.10/kg against a base scenario of no MSA premiums being received.

The results of the regional impact outlined above are shown in Table 6 below. Specifically, the Burdekin region could add $5 million in additional gross margin by obtaining a 33% compliance into the premium Boning groups over a base case in which no MSA premiums were paid.

Table 6. Herd Gross Margin of ABARE 313 Region

Region	Before	After	Difference
313 A	$4,799,456	$4,916,077	$116,621.00
313 B	$61,079,851	$62,294,113	$1,214,262.00
313 C	$51,089,447	$52,024,716	$935,269.00
313 D	$23,280,287	$23,762,226	$481,939.00
313 E	$155,437,308	$157,688,203	$2,250,895.00
Total	$295,686,349	$300,685,335	$4,998,986.00

4.4 Genetic selection

This is considered in the context of balanced selection including fertility, growth and carcase.

The process of improving nutrition through pasture and supplement strategies in conjunction with improved growth from genetic selection has resulted in heavier turnoff cattle at younger ages and with less fat coverage at the P8 and Rib sites. Genetic selection considered a balance of traits including fertility, growth and carcass weight.

During this PDS, a search commenced to improve external fat cover and intramuscular fat (IMF) or marbling. Individual animals at MSA grading have shown MSA marbling scores up to 490.

BREEDPLAN data collected on all animals at 600 days included live animal carcase scanning. This has resulted in Eye Muscle Area (EMA), Rump and Rib fat and intramuscular fat (IMF) EBVs (Estimated Breeding Values). A few sires have been identified with various combinations including:

- High growth, high scrotal size and high carcase trait values
- Breed average growth with high carcase trait values.

At the June 2012 major PDS forum, six steers at 31 to 32 months of age (known birth dates) were on display. These steers had BREEDPLAN growth and carcase trait EBVs. Their EBVs and scan data were displayed. There were examples of steers:

- Above average to high growth, high IMF, and high rump and rib fat;
- High growth, low IMF, rump and rib fat; and
- Above average to high growth, average and above IMF and low rump and rib fat.

The data presented on these six steers at the forum is given in Appendix 8.

These traits now form part of the breeding objectives of the Lisgar herd. These objectives are ongoing and additional benefits are expected to accumulate over time.

Select sire-son and sire-daughter lists with EBVs are listed in Appendix 9 and Appendix 10.

4.5 Seedstock trends

Lisgar is a seedstock producer selling stud and herd bulls. During the PDS, interest in and demand for the sale bulls bred at Lisgar has significantly increased.

Bulls are booked up in advance. Other members of the PDS group as well as attendees at Lisgar Field days have become regular buyers. Buyers are looking for balanced bulls (fertility, growth and carcase and with a BBSE (Bull Breeding Soundness Evaluation) including sperm morphology results.

4.6 Producer group training workshops/activities and final MSA and marketing forum

The Burdekin PDS group held its inaugural group meeting in July 2008. Further MSA training and clarification of consigning issues was the main focus of this first meeting, as well as group member expectations and whole of PDS direction.

Over the course of the PDS a number of workshops were held, and group members also attended two Industry field days at the Lisgar site. For the group activities, the focus was formal linkage with other MSA PDS and Value in Beef project PDS producer groups. A list of the producer group activities is given in Appendix 11.

The final activity, the MSA and Marketing Forum was held at Dalrymple Stadium, 22 June 2012, targeted a much broader audience to disseminate the results from both Dalrymple and Burdekin PDS's, as well as the "optmising growth paths" project (Stu McLennan) which both groups had been following.

The program included the following presentations:

- Industry perspective on MSA - reasons for non-compliance and the future-*Jake Phillips, MSA*
- Linking grading back to the producer - *Brett Campbell, JBS*
- Producer production systems - *Robert Rea and Roger Landsberg (PDS Site producers for Burdekin and Dalrymple)*
- Lisgar & Trafalgar results, live cattle scan-*Alan Laing & Felicity Hamlyn-Hill, DAFFQ*
- Economics of producing MSA cattle-*Tim Moravek, DAFFQ*
- Producer case study - *Rodger Jefferis*
- Meeting market specs without compromising reproduction - *John Bertram, TBTS*
- Nutrition pathways for higher paying carcasses - *Stu McLennan, QAAFI*
- Genetics for carcass performance - *Alan Laing, DAFFQ*

Approximately 120 people attended this forum, coming from as far as western and central Queensland. The feedback on the day was highly favourable. Attendants were benchmarked on their "current level of understanding of MSA" at the start of the day and at the end of the day. The results showed a large improvement in understanding of MSA as a result of the forum (Figure 10).

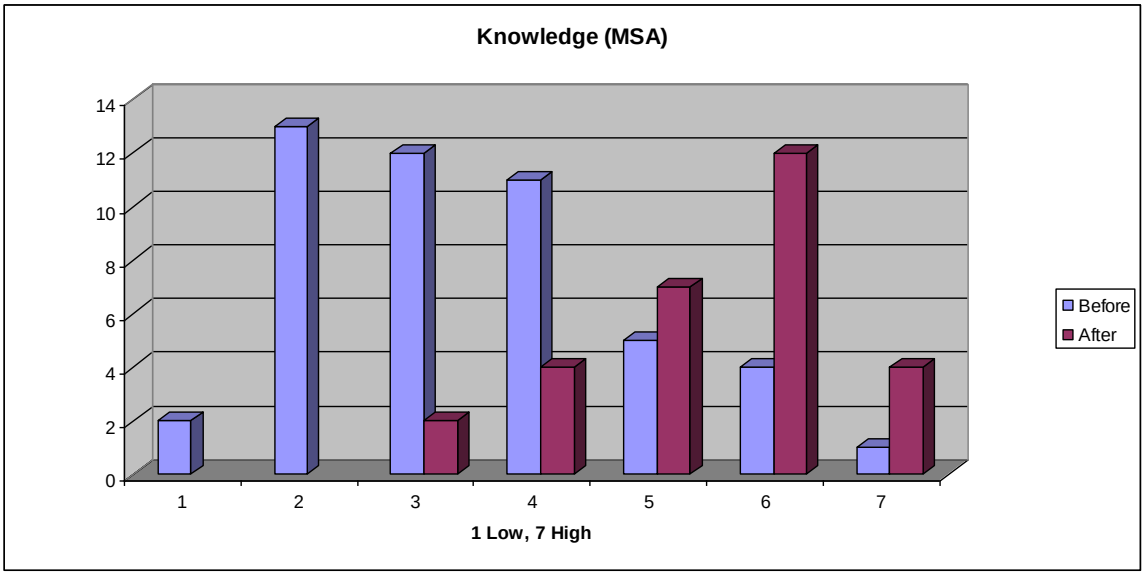


Figure 10. MSA and Marketing Forum Evaluation of Participants Knowledge of MSA (before and after the form) n=48 before and 29 after

It is frequently difficult to get attendees to fill in Evaluation forms especially after an event. The bigger the event, the more difficult to get Evaluation forms filled out.

4.6.1 Producer workshops

The group scored the "usefulness" of these workshops out of 7 respectively (with 7 being "extremely useful). These scores are outlined below the details of each workshop.
An example of participant feedback is shown in Appendix 12.

Satisfaction ratings from all producer group activities held were encouraging, with usefulness of activities between 6 and 6.5/7. This is a very high rating that give the project team validation in its operation of the project and its success demonstrating and communicating results to the broader north Queensland grazing community.

Through the above extension activities the Burdekin PDS group followed the results of the other projects which collected and analysed carcase and MSA data:

- Stu McLennan's MLA research project: "Optimising Growth Paths of Cattle for Increased Profitability in north Queensland".
- Flinders Beef Challenge (2008 and 2010) - growth, carcase and MSA results.
- Dalrymple (Trafalgar) MSA PDS - growth, carcase and MSA results.

All group members identified areas of improvement in the management of their cattle to target MSA grading and improve overall market compliance. Strategies producers identified to improve MSA grading were collated from workshop evaluation forms. These are listed in the producers own words and include:

- Modify handling pre slaughter
- Use NLIS and weight info to identify suitable steers
- Genetic improvement-use of EBVs
- Research bulls before sales
- Better bull selection
- Develop breeding objectives for sire selection
- Supplementation of steers direct to slaughter
- Feed molasses in the dry season
- Set up paddock for finished steers
- Work out best practice supplementary feeding

- Improve growth rates post weaning
- Alter the way we use HGPs.

Over the course of the MSA PDS most of the producers put into action strategies to improve market compliance. They recognised early on that strategies identified to improve MSA grading would have a broader benefit of increasing market compliance in general, and profitability. Most of the producers have adopted buying bulls with identified genetics to improve herd performance (fertility, growth and carcase). The most popular strategies were:

- Improved bull selection methods to target specific traits
- Nutritional improvements
- One producer has accessed Leucaena fattening country in central Queensland to fatten cattle towards the MSA market.

In 2011, no workshops were held as the Townsville MSA multi group forum in mid December 2010 covered all the PDS results. To date PDS site cattle were not consigned MSA until the end of 2011. Members of the PDS group were encouraged to attend the Swans Lagoon "Swan Song" field day in September 2011 and a number of other DAFFQ activities.

Management information was useful for producers in the group to identify strategies to improve MSA grading on their own properties, as well as improving general market compliance. The group investigated and discussed general genetic improvement opportunities at group workshops, the Lisgar field days and at the MSA Marketing Forum (2012).

4.7 Staff training

Eight DAFFQ staff from north Queensland and central Queensland attended Advanced MSA training in Townsville on 8 April 2009. Mark Inglis, Murray Patrick and Janine Lau from MLA delivered this training. Confidential data from JBS Townsville abattoir detailing MSA compliance rates was presented by Mark Inglis.

The purpose of the workshop was to build capacity in extension staff for enabling better interpretation and analysis of MSA Feedback data, plus ensuring sound advice was given to producers who wished to increase MSA compliance rates.

The outcome from the advanced MSA training workshop was an improved understanding of the MSA parameters affecting Boning group score and the sensitivity of the parameters. Staff were better informed to provide technical advice when reviewing MSA feedback data.

5 Success in achieving objectives

5.1 Assess compliance rates in 2008

Using traditional handling methods in the first consignment at Lisgar produced a low compliance and high % of ungrades. This was a learning curve for all with outcomes relayed to the groups and Industry.

5.2 Improve compliance rates from cattle marketed for MSA grading at JBS

The PDS project successfully demonstrated that the level of ungrades could be significantly reduced by not holding steers overnight in the yards. The first Lisgar consignment had 66% ungrades. Subsequent ungrades ranged from 2 to 47% (average 16%).

The Lisgar PDS site successfully demonstrated that significant percentages of steers consigned MSA were eligible for MSA grading, in terms of dentition, carcase weight and P8 fat cover. The project demonstrated the levels of performance were achievable within age

groups. Reasons for eligibility or ineligibility were discussed, along with potential herd performance targets and improvements in management requirements. The management inputs to achieve these levels of eligibility and performance included both environmental inputs such as grazing management but also genetic improvement, particularly weight for age and carcase traits. Lisgar management inputs were discussed with the producer groups during the course of the project and also with a wider audience at the June 2012 MSA and Marketing Forum.

Eligibility for MSA grading and improving MSA grading in terms of Boning groups was demonstrated mainly through the repetitive provision and examination of feedback data, to the producer group and later to the wider audience. This data clearly showed the carcase parameters resulting in why some animals were eligible or not for MSA grading, and why some animals had graded Boning group 10 or better and others hadn't. The reasons and details were discussed thoroughly, as well as management inputs to correct these.

In the steers, Boning group 10 or better grades ranged from 3% of those grading MSA (1% of the consignment) in the first consignment to 45% of those grading MSA (38% of the consignment) in a later consignment. Further improvement is envisaged as the genetic selection for growth and fat cover take effect.

Carcasses grading MSA has increased from 36% of those meeting company specs in the first consignment to 85 to 100% of recent consignments. Further improvement in moving some from grading Boning group groups 11 to 16 to 10 or less is envisaged.

The host site and other properties are now getting a higher percentage into the higher priced parts of the meatworks grid.

5.3 Improve skills and understanding of MSA grading, plus analysis and interpretation of MSA feedback

The PDS project was very successful in meeting the objective of improving skills and understanding of MSA grading, plus analysis and interpretation of MSA feedback. Through workshop or training activities, producers participated in both structured and informal activities designed to improve skills and understanding of MSA grading and feedback sheets, plus management inputs required to achieve improved grading results. Repetitive use of MSA feedback data and explanation of results contributed to this result. The satisfaction rating and workshop usefulness rating for workshop activities was 6 to 6.5/7.

At the MSA and Marketing Forum held at Dalrymple Stadium, 22 June 2012, 120 people were asked to score their current level of understanding of MSA prior to the forum and again on their feedback forms at the end of the day. The results showed the forum was very successful in improving the audience's knowledge of MSA as shown in Figure 10, page 25. Prior to the forum the majority of participants scored their level of understanding of MSA at 2-3 out of 7, and after the forum the majority score was 6 out of 7.

5.4 Provide opportunities for producers to be involved in and/or directly participate in "on property demonstrations" of strategies to achieve improved MSA compliance

There were two major Field days at Lisgar, a forum in Townsville and the major MSA and Marketing Forum in Charters Towers that all addressed 'hands on strategies' to improve MSA compliance and to increase the number of cattle hitting the higher priced parts of the grid.

5.5 Provide annual opportunities for technical support and training activities for the participating group of producers

Members of the Burdekin MSA PDS producer group had the opportunity to be involved in following the progress at “Lisgar”, and be informed of the data collected and subsequent analysis. The group were able to attend updates, which provided detailed consignment and MSA feedback information and summaries. They were also informed of management strategies investigated, and why some were implemented while others were not, and the reasons why. Producers were able to see the benefits of individual animal recording and its benefits in following the performance of cattle from paddock to plate.

Members of the producer group also had the opportunity to present their own MSA feedback and cattle performance results.

All producer group members recorded and discussed openly the management changes necessary on their own properties for improving overall market compliance and implementing management changes with the goal of improving market compliance in general, as well as MSA compliance. Some producer members were able to discuss how they had implemented some of these strategies.

There were eight formal training activities during the project. The producer group workshops are attached as Appendix 11.

5.6 Provide annual opportunities for producers to learn from other VIB groups and relevant research outcomes

During the course of the demonstration there were eight formal learning opportunities/activities held for producer group members. Most of these were workshops, but two were field days and one a large forum which the wider public also attended. The satisfaction rating for these activities was 6 to 6.5/7.

Through the extension activities the Burdekin PDS group followed the results of other projects which collected and analysed carcase and MSA data.

5.7 Demonstrate at a Field day cost effective on property practices that improve MSA compliance to the wider beef community

There were two major Field days at Lisgar in 2009 and 2010 and the MSA and Marketing Forum on 22 June 2012 at Charters Towers. At all three major days, the wider beef community were shown the on property practices and the outcomes. Formal feedback rated the days at 6 to 6.5 out of 7. Verbal feedback to the project team has always been highly positive.

5.8 Improve awareness of the wider beef community of strategies to improve MSA compliance being undertaken by PDS groups

There were two major Field days at Lisgar and the Major MSA and Marketing Forum in Charters Towers. Strategies to improve MSA compliance were presented at all these days to large audiences. Survey of the participants at the MSA and Marketing Forum showed a significant improvement in understanding of MSA (see Figure 10, page 25). A number of producers are known to be purchasing and breeding bulls across a range of breeds to target improved carcase compliance as a result of the Lisgar Field Days.

5.9 Benchmark knowledge and practice change

Approximately 120 people attended the 22 June 2012 MSA and Marketing Forum, travelling from as far as western and central Queensland. The formal and informal feedback on the day was highly favourable. Attendants were also benchmarked for their "current level of understanding of MSA" at the start of the day, and at the end of the day. The results showed a large improvement in understanding of MSA as a result of the forum (see Figure 10, page 25).

5.10 Media

The Lisgar and Trafalagar MSA PDS projects were also the focus of a number of extension and media articles, including:
Northern Muster September 2008 - Value in Beef - a snapshot of projects underway.
Northern Muster December 2008 - Working with Producers to Achieve MSA premiums.
Feedback Magazine March 2009 - Producer groups target MSA premiums.
Northern Muster August 2009 - Lisgar field day.
North Q Register August 2009 - MSA-graded cattle near million mark.
North Q Register August 2009 - Bull selection key to beef success.
Qld Country Life August 2009 - MSA Grading Changes Tested in the North.
Northern Muster April 2010 - Using MSA feedback to improve market compliance-NQ experiences.
Northern Muster December 2011 - Understanding the MSA Grading System; Making the MSA Grade.
North Q Register June 2012 - Increasing Returns Drives Forum.
North Q Register July 2012 - Hormones still play role in high quality beef for northern producers.
Feedback Magazine September 2012 - MSA makes dollars and sense, Nutritional strategies for cost effective compliance, MSA bonuses inspire changes on property.

Examples of the media and field day flyers are attached as Appendix 13 to 16

6 Conclusions and Recommendations

6.1 Conclusions from the MSA Feedback Data

In drawing conclusions from the Burdekin MSA PDS Project it was necessary to look at parameters within key areas:

- compliance with JBS specifications for MSA grading;
- percentage ungrades, and reasons for ungrades;
- Boning group results and MSA parameters;
- HGP use and effect on compliance; and
- economics of targeting MSA.

6.1.1 Compliance with JBS specifications for MSA Grading

The JBS specifications for **dentition eligibility** for MSA grading at the Townsville plant are 0 to 4 teeth. Of the groups of steers consigned MSA from 2008 to 2012 the dentition compliance ranged from 44% to 92%. Aside from JBS specifications for MSA grading "the better money" on the price grids is for 0-4 teeth steers at 300kg plus. This highlights the importance of selecting for weight for age, which addresses the dentition issue and also has indirect positive impacts on MSA grading through ossification score.

The JBS specifications for **P8 fat cover** compliance for MSA grading at the Townsville plant are 5-22mm for 0-2 teeth and 7-22mm for 4 teeth. The levels of fat cover compliance for Lisgar steers ranged from 64% to 100%.

The range in genetics for fat cover within a breed and between breeds can be as large and this can be utilised by objectively selecting bulls with adequate P8 fat cover. Recent Beef CRC result, show there is a positive correlation between body condition (including fat cover) in breeding females and the ability to cycle while lactating, so purchasing bulls with adequate P8 fat cover will benefit the breeders as well as the steers.

Older, heavier and more mature animals are more likely to have P8 fat cover within the specifications. However, these animals are more likely to not comply on dentition (i.e. be 6 teeth) and also be too heavy for MSA eligibility. The challenge is to achieve weight for age as well as adequate fat cover. Many animals with only 5mm fat have poor fat distribution (and then become ineligible for grading), or have less than 3mm rib fat (and become MSA ungrades).

The JBS specifications for **HSCW compliance** for MSA grading at the Townsville plant are 180-339.5kg. HSCW compliance for Lisgar steers consigned MSA ranged from 68%-100%. In all cases the steers that did not comply were too heavy. Reaching minimum HCSW was not an issue of concern with the Lisgar steers. However, the interaction between weight, dentition and P8 fat is evident as heavier steers are more likely to have the required P8 fat depth, but are less likely to meet dentition requirements and may go over the upper limit in HSCW for MSA.

6.1.2 Percentage Ungrades

One of the objectives of the project was to reduce the level of ungrades. The first Lisgar consignment had 66% ungrades. Subsequent ungrades ranged from 2 to 47% (average 16%). Changing pre-delivery management from muster today, draft, hold in yards overnight, truck tomorrow to muster at least three weeks ahead, draft off the next consignment and keep separate on good feed and on the day of despatch, muster to the cooler on water and hold, later put in the yards and onto trucks-has provided a reduction in ungrades.

The challenge for producers is to reduce the number of ungrades without incurring additional costs. At Lisgar, the lower level of ungrades was caused mainly by high Ph and dark meat colour. There was no obvious reason for the level of ungrades that existed for recent consignments.

6.1.3 Boning Groups and MSA Parameters

Of the steers that were within JBS specifications and therefore MSA graded, 31% graded Boning Group 10 or better. Another 24% graded in Boning Groups 11 and 12 and a further 25% graded in Boning groups 13-16.

Boning group 11 and 12 have the opportunity to make Boning group 10 if ossification is lowered, hump lowered slightly, carcase weights increased slightly as well as marbling scores.

Boning group 13 to 16 have the opportunity to make Boning group 10 if ossification is lowered, hump lowered, HSCW increased & higher marbling scores achieved.

The following actions that would be most effective in meeting MSA compliance at the JBS Townsville abattoir:

- Increased growth rate will reduce ossification and enable steers to reach slaughter weights with 4 teeth or less instead of some with 6 teeth
- Increased marbling score will increase the EQ score and counteract the negatives of ossification
- Tighten carcase weight ranges and increase the average

- Increased fat cover (P8 & Rib Fat) in conjunction with increased growth rate will result in younger animals with more cover and higher MSA scores
- Watch hump height by crossbreeding and/or within breed content.

Ossification is the parameter with the greatest impact on EQ score and therefore Boning group. For the Lisgar steers high ossification is the main parameter preventing MSA grading with higher EQ scores and improved Boning groups. Benchmarked against region 2008-2012 Lisgar steers had higher ossification scores. The average ossification score for Lisgar was 232. The average ossification score needs to come down below 200 if there is to be an improvement in Boning groups. However, reducing ossification scores as a short-term objective would require nutritional inputs which may prove too costly.

HGP implants will be a key factor contributing to higher Ossification scores. Theoretically an improvement in 2 Boning groups can be achieved if HGPs are not used. At this stage HGP usage will continue, given proven growth advantage and economic benefits which would outweigh improvements in Boning groups and numbers of animals receiving a premium. Consequently, at this stage HGP usage will continue.

In north Queensland, there is a large variation in ossification scores in herds analysed, even where control mating and tight management of age groups occurs. Ossification is lowly heritable so the main influences are environmental. Ossification is accelerated significantly by nutritional stress, especially at weaning. However, early HGP implanting has the greatest negative impact. Environmental factors such as aggressive HGP implant programs, poorly managed weaner and dry season supplementation programs, low pasture quantity and quality, stocking pressure, and poor animal health management, will all negatively affect growth path and ossification scores. Supplying additional nutritional inputs needs to be carefully examined to ensure production benefits outweigh the cost of supplements.

Low **MSA marbling (MSAMB)** scores can negatively impact on overall EQ score thereby affecting Boning group. However, a high MSA marbling score can mean the difference between a MSA premium or not, provided other parameters are average or better. The Lisgar average MSA Marbling score of 264 is lower than the target of 300, and this would have impacted on EQ score. When benchmarked against the Burdekin region 2008-2012, Lisgar cattle had higher percentages in the above 300 range and lower percentages in the below 300 range. This means that scope for marbling score improvements exists across the region. Selection pressure needs to be maintained on marbling when producers are committed to targeting better MSA grading results.

Hump height does have an influence on EQ score, but doesn't seem to be the main issue with the cattle from the Lisgar demonstration site. Benchmarking Lisgar cattle with the region showed that the Lisgar cattle had lower hump heights. Hump height can be counteracted with lower ossification, good HSCW and good marbling scores.

The average **hot standard carcase weight (HSCW)** of Lisgar steers consigned MSA (2008-2012) was 323kg. The majority of steers outside the JBS specifications were too heavy. With the majority of steers consigned 300-320kg, reaching minimum carcase weight is not of concern for the Lisgar herd in achieving MSA grades. However selection pressure does need to be maintained on growth and weight for age, due the impact of weight for age and its relationship with number of teeth (a JBS specification) and ossification score.

Numerous studies have shown selection for BREEDPLAN growth EBVs will result in progeny with improved growth rates. Yet it is important not to select for extremes and also to select in combination with a balanced selection of traits, including fertility traits. If producers are unsure of how to use BREEDPLAN technology advice should be sought from informed specialists, preferably those familiar with Beef CRC outcomes. It is important to select for

fast early growth as opposed to growth which results in a large mature size, which may genetically increase mature cow size. Consequently, producers should also seek information on mature cow size EBVs in the bulls they select.

6.1.4 HGP use and effect on compliance

The MSA PDS projects, both Lisgar and Trafalgar, showed that removing HGPs from management systems would remove weight gain and weight for age benefits and would negatively impact on returns, despite improvements in MSA grades and premiums.

The trial with and without HGPs in heifers in 2009 did not produce enough difference to not use HGPs. HGP's will continue to be a part of the Lisgar finishing strategy for turnoff cattle.

6.1.5 Economic analyses

Significant economic analyses showed:

- Molasses supplementation at Lisgar is an integral part of the profitability
- The Lisgar management system is profitable having increased gross margin by 2.9% per annum
- As a regional economic impact, the Burdekin region could add $5 million in additional gross margin by obtaining a 33% compliance into the premium Boning groups.

6.1.6 Economics of targeting MSA-Lisgar perspective

The challenge is to increase MSA compliance without incurring additional costs. The current premium of 10 cents per kg carcase means a producer cannot spend money chasing this small margin. However, better genetics can allow more of the turnoff reaching the higher priced parts of the meatworks grid. At Lisgar, steers over 340kg carcase with minimum 7mm P8 fat and even 6 teeth are worth more money in October/November. Selling the same steers in May/July, when everyone else is selling, brings less money.

At Lisgar:

- The No 9 steers were sold at 2.5 to 3.5 year old (May 2011 to February 2012)
- The No 0 steers were sold at 2.5 to 3.0 year old (May 2012 to November 2012).

As the genetics for growth, P8 and rib fat and IMF start to accumulate, the lead steers at Lisgar can be sold early in the meatworks season at 26 to 28 months (January/February) when there is more money for these animals. A higher percentage of this kill would grade MSA. This would mean the tail rather than the bulk would go in October/November with less animals reaching 6 teeth and/or over 340kg carcase.

6.2 Recommendations

6.2.1 Improving eligibility for MSA Grading

Producers should aim for a target weight of 300kg HSCW at 30 months of age for steers slaughtered. Not only will this potentially place steers in the higher priced part of the grid (particularly if dentition is < 2 teeth) but, also it will improve the percentage of carcases eligible for MSA grading. A problem with carcase fatness can arise if weight for age has been improved through breeding and cattle are slaughtered at heavier weight and at a younger age and have yet to reach maturity.

Eligibilty for MSA grading includes the P8 fat depth of carcases that has to be between 5 and 22mm for 0-2 tooth steers and 7-22mm for 4 tooth steers. While 5mm will mean a carcase will be eligible, at the lower P8 fat levels (5-7mm) fat distribution and rib fat levels may be inadequate, causing carcases to then become ungrades. Genetic improvement can also

address desired levels of carcase fatness in order to better meet specifications for fat cover and marbling.

The challenge for producers is to use both genetics and management to achieve the above targets. Attention to objective selection methods in bull selection is critical, remembering the bulls selected will determine the performance of the herd into the future. If crossbreeding, it is important to remember that there is as much variation within breeds as between breeds. If using a late maturing breed, then extra attention should be given to fat cover.

Continued education in the area of breeding and genetics is important. It is recommended producers attend detailed and well structured workshops (with follow-up days) to achieve a level of understanding in the tools and strategies available, in order to make informed and educated choices and effectively implement change with positive results.

If the current HGP program involves repeat implantation, and if the last implant in the program contains both oestradiol and an androgen, then the likelihood of the HGP contributing to reduced fat content of the carcase is also increased. It is important to review carcase feedback data to determine if inadequate fat cover is resulting in downgrading of carcases (or carcases missing out on eligibility to grade MSA).

6.2.2 Reducing Percentage Ungrades

It is recommended producers committed to consigning cattle MSA do not hold cattle overnight in the yards. Recommendations include:

- to muster,
- draft and weigh at least a fortnight or more in advance, and
- hold cattle in a smaller paddock within close walking distance of the yards.

This was the strategy put in place at Lisgar.

In addition to limiting the number of nights spent in yards, best practice cattle handling techniques need to be implemented to reduce the loss of glycogen due to stress and exertion. For properties committed to consigning cattle MSA, modifications to yard design may be beneficial, and also strategies to reduce mustering time. Cattle can lose 30% glycogen bucket from mustering alone.

It is recommended that bull selection criteria include objective methods of selection for temperament, and breeding females of poor temperament be culled from the herd. Cattle with poor temperament should be segregated and sold separately from cattle consigned MSA.

Strategies implemented prior to slaughter, with the goal of improving nutrition and glycogen levels, need to be carefully analysed prior to implementation to determine if there will be an economic benefit. Producers are advised to seek professional help in making such decisions and undertaking cost benefit analyses.

6.2.3 Improving Ossification Scores

The issue of ossification needs further research for the northern Australian environment, particularly as it is the parameter that has the greatest impact on EQ score and therefore Boning group. There is potential for work to be conducted on the impact of cost effective management inputs and strategies to reduce ossification scores in steers in Northern environments, through examining different management and growth pathway combinations. Research in this area will advance the understanding of extension officers and consultants and enable more targeted and informed advice to beef producers in reducing ossification scores.

Beef producers consigning cattle MSA may wish to review their HGP program if it involves multiple implants and use of a terminal combination implant. The continued use of HGPs in a less aggressive program is possibly an economical option. While MSA does not directly distinguish between single or multiple implant strategies, or type of implant, a less aggressive program may result in improved ossification, fat cover and marbling scores. In northern Queensland pasture systems this issue still needs further research.

Producers can avoid early life implanting of calves with HGPs and also use less aggressive implant programs. The latter may mean using only one implant during an animal's lifetime instead of 2. While these changes may impact positively on ossification scores and improve grading results, the simple use of a HGP will still equate to a lower EQ score and as suggested, two Boning groups. Once again research in the area of HGP implant programs in relation to ossification score would assist producers to make more informed and cost effective choices.

6.2.4 Improving HSCW and weight for age

Selecting for growth objectively (i.e. using BREEDPLAN EBVs) is a strategy all producers should use. In terms of a genetic strategy, this is the only reliable option available to producers, as there is little genetic variation betweens animals for ossification score, therefore it can not be selected for directly. Improved steer weight for age performance will not only improve MSA grades and eligibility, but will give producers more marketing options and potentially mean more cattle grade in the highest priced sections of the price grid (i.e. with 0-4 teeth). The target weight for age for steers in north Queensland should be 300kg plus carcase weight with 0-4 teeth.

6.2.5 Improving Marbling scores

Marbling is a moderately to highly heritable trait, meaning that a response to selection will occur. Marbling can be improved by selecting bulls with better than breed average Intramuscular Fat (IMF EBVs. Selection pressure needs to be improved or maintained on marbling if producers are committed to targeting better MSA grading results. Marbling is positively correlated with fat cover, so selecting for improved fat cover may also indirectly improve marbling and will also benefit rib fat cover which is included in the EQ score, although to a lesser extent than marbling score.

Marbling improves with good nutrition, particularly high energy diets. Where molasses supplementation is economically viable it may result in improved marbling scores, particularly if grain is also included in the ration.

Marbling is adversely affected by early life growth restriction so attention should be paid to weaner management and dry season management which impact on early life growth paths. Nutritional stress pre slaughter can rapidly reduce marbling score (and also impact on glycogen stores). Stress management pre slaughter and during lairage also has an impact.

6.2.6 Improving Hump Height

For high grade Brahman herds the fastest way to lower hump height is through implementing crossbreeding programs. Such programs need firstly to be designed to result in other production benefits, such as growth rates and fertility. The programs need to be carefully planned and managed. The biggest gains will come from utilizing hybrid vigour as well as complementarity of traits. Utilising objective trait selection within the genotypes being used is important in achieving good results. Producers should be wary of using breeds where little or no objective information is provided on the genetic merit of bulls for key performance traits. Such bulls could send the performance of the herd backwards, instead of forwards.

6.2.7 Using Actual Performance and Targets to Improve MSA Compliance Criteria

There is information available that can be used by producers to provide clear decision and management strategies to improve herd performance, market and MSA compliance. This performance can be collated from property data, meatworks feedback sheets and MSA Feedback and Benchmarking systems. Professional assistance may need to be sought to maximise the implementation of performance data in the grazing enterprise.

7 Acknowledgments

The author would like to acknowledge and sincerely thank the following for their contributions to the project and its success:
Robert and Donna Rea and family, JBS Australia Pty Ltd (especially staff at the Stuart, Townsville plant), Felicity Hamlyn-Hill, Tim Moravek, Dave Smith, Karl McKellar, fellow extension officers, Stu McLennan, MSA staff and MLA for financial support.

8 Appendices

Appendix 1. Group Activities

The initial group activities in 2008 were:

1. Establishment of the prevalence of producers and animals enrolled for MSA grading at the Townsville abattoirs and the distribution of grades and level of non compliance ie benchmark current performance.
2. Training to increase understanding and use of MSA feedback and Benchmarking tools, including how to download data and link with on property records (NLIS RFID).
3. Review of MSA feedback data and compliance rates. Determine key problems and identify opportunities/strategies for improvement along with detailed records of additional costs which may be incurred in adopting recommendations.
4. Training in use of MSA Calculator.
5. Review outcome of steps 1-3 and group discussion/feedback to determine skills training and technical expertise needs/requirements plus management strategy demonstration.
6. Benchmarking of then current producer group MSA knowledge and understanding.

Year 2 (2009/10) and Year 3 (2010/11)

Group activities included ongoing review of MSA and marketing feedback data, and associated discussion and planning. The group met four times to discuss/share: demonstration site results and management; feedback data and compliance rates; compliance issues and management issues. This was followed by identification of opportunities for cost effective management strategies/solutions and future skills training needs. Ongoing skills and knowledge training activities/sessions were incorporated in these workshops.

Other activities included:

- Formal linkage with other MSA PDSs and VIB groups (inc NLIS/VIB PDS group) through inter group activities (Townsville MSA forum and Lisgar Field days).
- Communication of group activities to the wider beef industry through the media (Northern Muster)
- Benchmarking of group changes in knowledge and practice.

Year 4 (2012)

The final activity for the PDS was a large forum held at the Dalrymple Stadium complex at Charters Towers on 22 June 2012. The purpose of this forum was to:

- disseminate the results from both the Dalrymple MSA PDS and the Burdekin MSA PDS.
- disseminate the economic results from both PDSs
- improve awareness of MSA and its current importance in the marketplace
- demonstrate the importance of live cattle scanning as an important selection tool in meeting market and MSA specifications
- provide an overview of a case study business with success in MSA (Elrose, WQ)
- provide an overview of CRC results and demonstrate the linkage between these and MSA grading.

Appendix 2. Lisgar Management

Lisgar was purchased by the Rea family in 1961. Both the property and the herd have undergone considerable development and improvement since then. Lisgar is located 30 kilometres south of Home Hill between the Bruce Highway and the Pacific Ocean which forms the eastern boundary. Lisgar is 10,000 hectares in size and is predominantly open woodland country with a range of soil types. The climate is semi-arid tropical. The long term average rainfall is 750mm with 80% of which falls between January and April. The sustainable long term carrying capacity for the property is 2000 head of adult cattle.

The soils range from sandy loams to salt pans on the marine plains and everything in between. The landscape is predominantly timbered with Moreton Bay Ash and Pandanus with poplar gum and bloodwood.

The understorey, originally black spear, *Heteropogon contortus* and kangaroo grass, *Themeda triandra* is dominated by Indian couch. A wide range of summer annual grasses, forbs and native legumes make up the remainder of the herbaceous layer. *Much of the property has been over sown with improved pasture species, mainly Urochloa, Buffel grass (Bothriochloa mosambicensis, Secca Stylo (Stylosanthes scabra), siratro, and burgundy bean. Significant areas of ponded pastures were established some years past.*

Minor coastal streams flow through the property. These are flanked by relatively narrow frontages (< 1km) of predominantly alluvial loams. These areas are highly productive due to the high nutrient content, soil moisture availability and the range and abundance of productive forage species.

Grazing land management is primarily about getting the balance right between stock numbers and the forage resource. The following key management actions underline the grazing strategy at Lisgar.

- Weed management - Mechanical control using a dozer and follow-up with basal bark and foliar spraying is used for parkinsonia, chinee apple, rubbervine and lantana. Managing these weeds is an ongoing process.
- Selective pasture development - Initially ponded pastures were established. Native pastures have been over sown with secca (*Stylosanthes scabra*), siratro and burgundy bean. Earlier buffel grass was introduced. Urochloa has been introduced and is spreading.

Lisgar is a breeding and fattening operation and a Droughtmaster stud of 750 fully BREEDPLAN recorded breeders is operated. Lisgar runs around 300-400 male cattle (some purchased).

BREEDPLAN EBVs (eg. 600 day weight, scrotal size and carcase traits) and Bull Breeding Soundness Examination BBSE are used to select the sires. Temperament is also a key selection trait. Throughout the course of the demonstration Robert Rea has intensified bull selection to incorporate use of carcase measurements such as P8 fat depth, Rib Fat, Eye Muscle Area (EMA) and Intramuscular fat (IMF). Lisgar started recording individual animal BREEDPLAN data in 2004. BREEDPLAN measurements have intensified since then and moved to cover the complete breeding herd in 2008.

Calves are weaned at 4-8 months of age, at 150-250kg. All calves are weighed at weaning and individually recorded. Weaners are retained in a yard for a period after weaning; they are fed, handled, educated and depastured to a fresh paddock and supplementary fed. At about 12 months of age, heifers, bulls and steers are put in separate paddocks and the weaner paddock spelled during summer and autumn. All weaners are fed a fortified molasses supplement from weaning until the break in the season.

Heifers are mated at 2 years of age for 3 months after which time bulls are removed. The older breeder herd is control mated for 4 months. All mating is from early January. Females are culled for temperament and/or infertility (based on pregnancy test). Females that were pregnant and turn up without a calf at branding are sold immediately. Cull females are sent direct to slaughter once fattened. Breeders are supplemented in the dry season. Supplementation revolves around fortified molasses based supplements. The new calves are recorded at branding.

Appendix 3. Compliance data for Lisgar steers consigned MSA from 2008 to 2012

		June 08	Nov 08	Nov 08	Mar 09	Nov 09	Dec 10	Nov 11	Feb 12
year no.		5	6	6	6	7	8	9	9
no. consigned		80	66	12	55	78	64	80	66
Compliance with company specs	**no.**	33	55	11	34	37	30	40	33
	%	42%	83%	92%	62%	47%	47%	50%	50%
Dentition compliance	**no.**	33	61	11	42	64	49	68	49
	%	42%	92%	92%	76%	82%	76%	85%	72%
P8 fat cover compliance	**no.**	80	62	12	48	43	56	71	55
	%	100%	94%	100%	87%	55%	88%	89%	83%
HSCW compliance	**no.**	56	59	11	45.5	60	44	54	61
	%	70%	89%	92%	83%	77%	69%	68%	92%
HSCW	**av**	324	316	318	321	317	331	331	319
P8 fat	**av mm**	10.7	7.8	9.8	8.3	7.1	11.3	7.7	8.7
No teeth	**av**	5.2	3.6	2.4	4.3	3.6	3.9	3.8	4.1
% MSA graded		36%	98%	83%	53%	64%	not consigned MSA	70%	85%
% Ungrades		64%	2%	17%	47%	36%		30%	15%
Boning Group 6 & 7		0	2/55	0	0	0		0	0
Boning Group 8		0	5/55	0	0	0		4/40	0
Boning Group 9		0	3/55	0	0	1/36		6/40	0
Boning Group 10		1/33	15/55	3/11	3/34	2/36		5/40	1/33
Boning Group 11 & 12		7/33	27/55	6/11	11/34	12/36		9/40	6/33
Boning Group 13, 14, 15 & 16		4/33	2/55	0	4/34	8/36		4/40	21/33
No. receiving premium		1/33	25/55	3/11	3/34	3/36		15/40	1/33
Av ossification score		292	236	215	283	203		184	253
av MSA MBL score		290	329	299	287	276		276	202
av Rib Fat		7	6	6.2	9	6		5.4	4.8

Compliance with JBS specification for MSA grading - steers

June 2008. These steers were 3.5 years of age. The overall level of compliance with JBS specifications for MSA grading was low at 44%. Dentition was the main parameter causing low level of compliance.

November 2008. These steers were 3 years old. The overall level of compliance was high at 83% for the larger group and 92% for the body load sent a few days later. This age group represented a good outcome.

March 2009. These steers were the tail of the age group at 3.5 years of age. The level of compliance was ordinary at 62%. The main parameter causing low compliance was dentition due to the older age. HSCW caused reduction in compliance from being too heavy. P8 fat compliance was a cause of non compliance with some low levels of fat.

November 2009. The overall compliance was low at 46%. P8 fat compliance was low at 64%. Dentition was a contributor to non compliance with 18% having 6 teeth (82% compliance).

December 2010. Unseasonal wet weather at mustering and trucking compromised desired MSA pre-delivery management. After consultation between Lisgar and JBS, targeting MSA with this consignment was abandoned. Eligibility for MSA grading with this consignment would have been low at 47%. HSCW compliance was low at 69% (carcasses too heavy). Dentition (76% compliance, 24% with 6 teeth) and P8 fat (88% compliance, 12% low fat) also contributed to non compliance. Some steers failed compliance in more than 1 parameter.

November 2011. The lead of the No 9's. This is the first draft of Lisgar progeny where the whole herd is BREEDPLAN recorded including carcase trait EBVs. Overall compliance at 50% is low. Heavy carcasses caused HSCW compliance to be low at 68%. Dentition (85% compliance, 15% with 6 teeth) and P8 fat (89% compliance, 11% low fat) caused lower levels of non compliance.

February 2012. The tail of the No 9's. Overall compliance at 50% is low. Dentition compliance at 72% was a major parameter in this consignment. The remainder were 6 tooth steers. P8 fat compliance at 83% is reasonable. However, this has come at older age and more teeth. This consignment had a compliance of 92% for HSCW. These are the slower growth component of the age group.

Overall 2008-2012.
As weight for age has increased (reduced age at same or heavier carcase weight), external fat (P8) has been an issue. Weight for age has increased due to tweaking of nutrition strategies (pasture and supplements) and using genetics for growth. As heavy carcase weights (above 300kg HSCW) have been produced at younger ages, the P8 fat level has declined with some coming under the minimum threshold. No animals are getting anywhere near the upper limit of 22 mm of P8 fat.

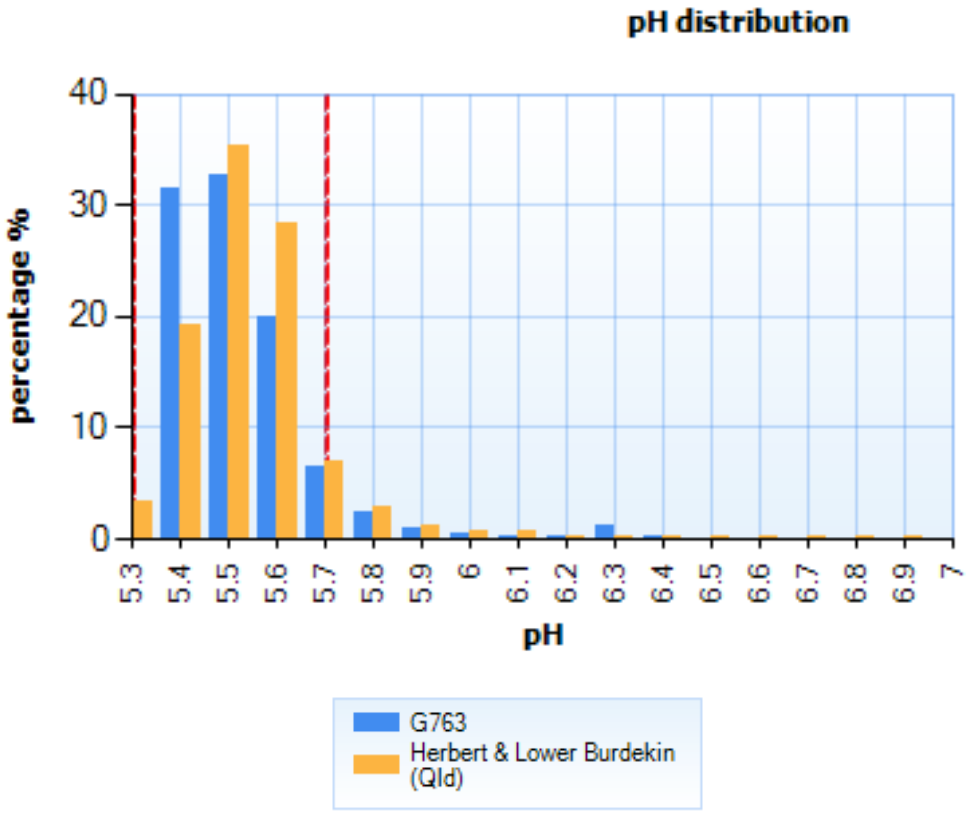
It has become obvious that there is a need to increase the genetics for fat cover. This is now a part of the breeding objectives of the Lisgar herd.

Price premiums are paid late in the meatworks season in November-December. Even 6 tooth steers 7-22mm of P8 fat and over 300kg dressed are worth a lot of money. The other period of the year where premiums are available is early in the meatworks season in January-March.

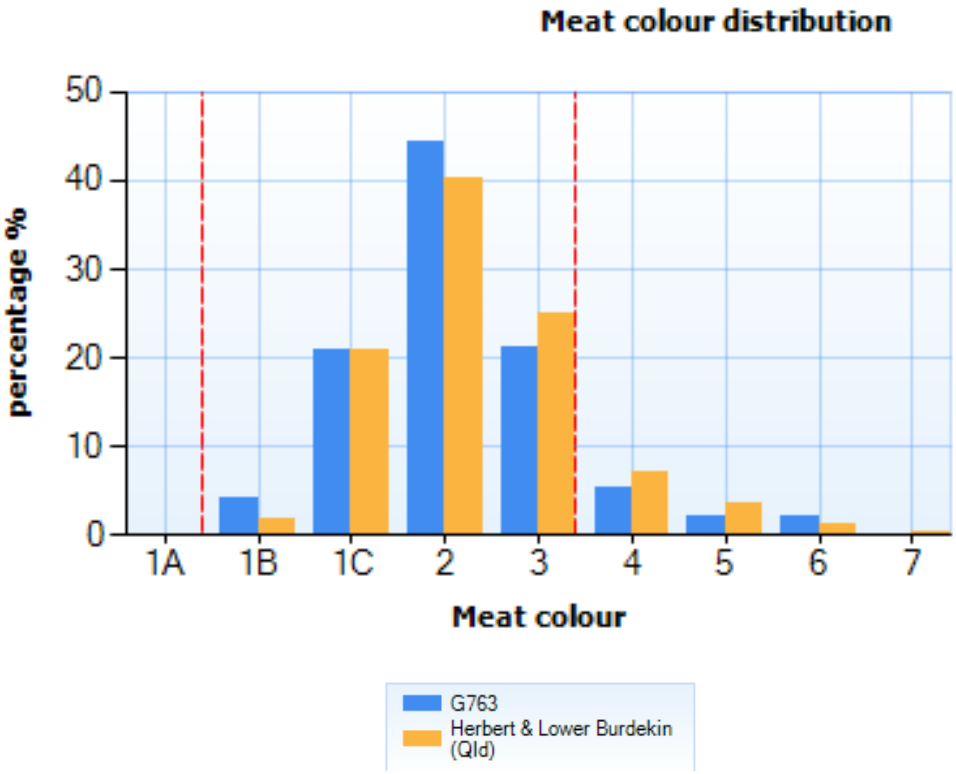
Appendix 4. Compliance data for Lisgar heifers consigned MSA from 2008 to 2012

			+HGP	-HGP		
Lisgar heifers		**Oct 08**	**Sep 09**	**Sep 09**	**Oct 10**	**Sep 11**
year no.		6	7	7	8	9
no. consigned		63	49	37	48	38
Compliance with company specs	**no.**	55	45	32	41	35
	%	87%	92%	86%	85%	92%
Dentition compliance	**no.**	63	48	36	48	36
	%	100%	98%	97%	100%	95%
P8 fat cover compliance	**no.**	55	46	34	42	36
	%	87%	94%	92%	88%	95%
HSCW compliance	**no.**	63	49	37	48	38
	%	100%	100%	100%	100%	100%
HSCW	**av**	246	255	248	274	285
P8 fat	**av mm**	9.3	10.3	10.1	7.4	10.1
No teeth	**av**	2.1	2.4	2.8	2.6	2.8
% MSA graded		84%	76%	62%	85%	100%
% Ungrades		16%	24%	38%	15%	0%
Boning Group 6 & 7		1	1	5	0	0
Boning Group 8		2	1	7	0	1
Boning Group 9		1	0	0	0	1
Boning Group 10		16	20	8	13	17
Boning Group 11 & 12		10	8	0	7	6
Boning Group 13, 14, 15 & 16		15	4	0	15	10
% receiving premium		20/55	22/45	20/32	13/41	19/35
Av ossification score		220	206	195	218	202
av MSA MBL score		264	248	257	272	258
av Rib Fat		6	6	6.7	6.2	13.8

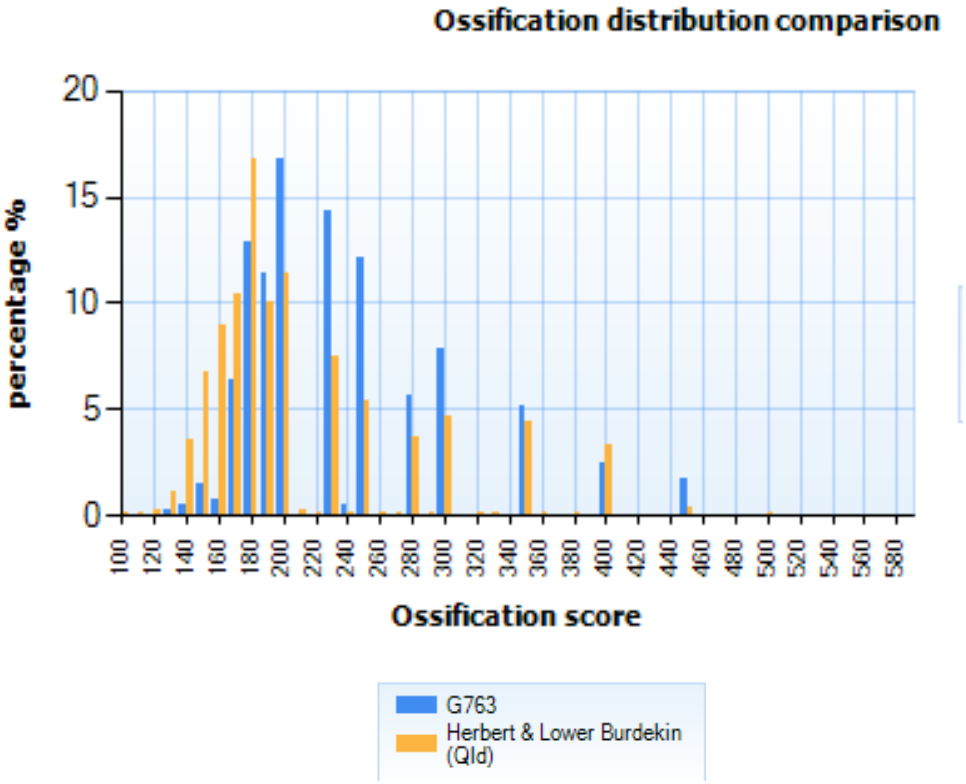
Appendix 5. Lisgar MSA Grades benchmarked with the Region



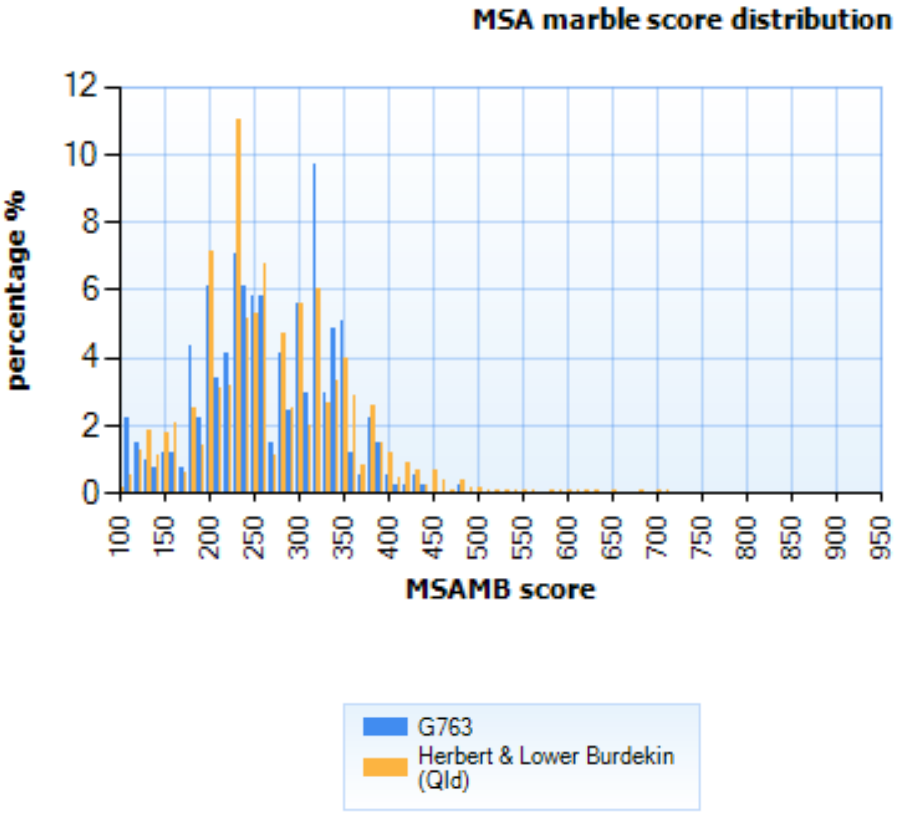
pH distribution of Lisgar MSA graded cattle 2008-2012 benchmarked with region



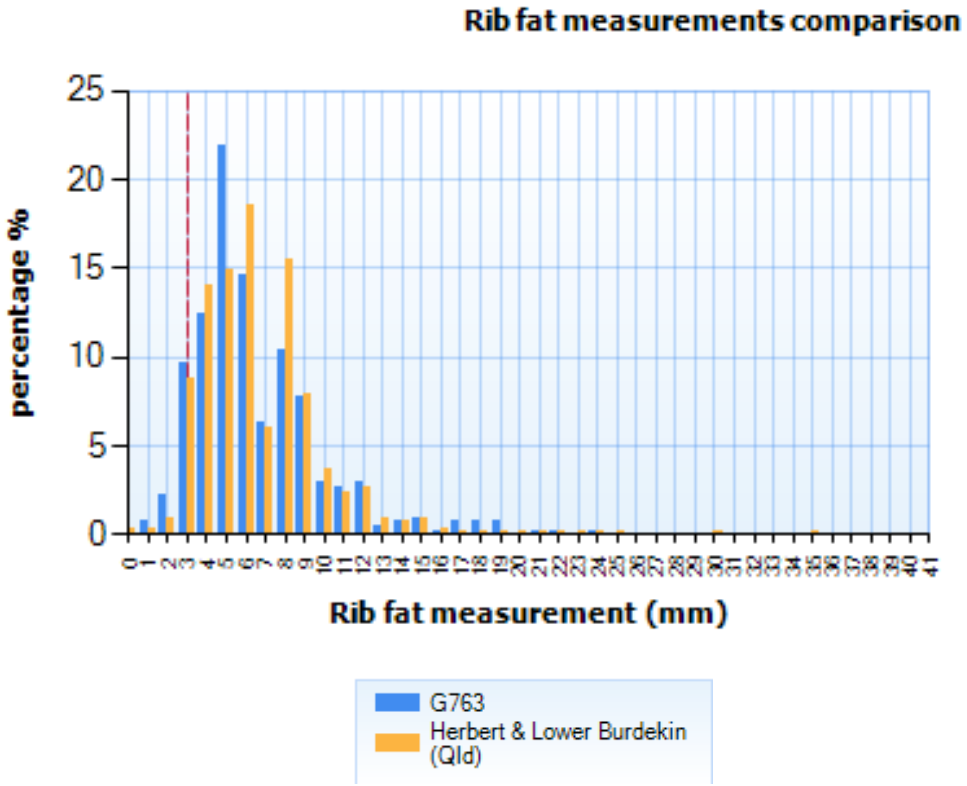
Lisgar meat colour benchmarked with the region 2008-2012



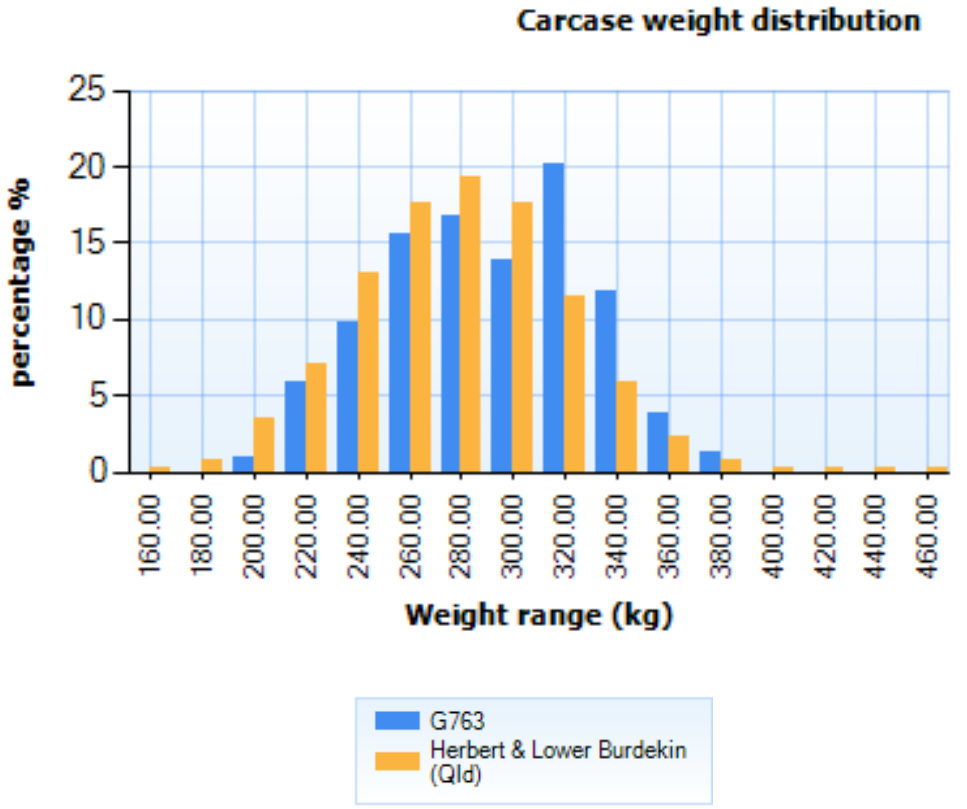
Lisgar Ossification scores benchmarked with the region 2008-2012



Lisgar MSA marbling scores benchmarked with the region 2008-2012



Lisgar cattle rib fat measurements benchmarked with region 2008-2012



Lisgar carcase weights compared to region 2008-2012

Appendix 6. Molasses feeding modelling

Breedcow & Dynama-Lisgar-Molasses Feeding Analysis

	Full Herd	Molasses Feeding
Total adult equivalents	1790	1790
Total cattle carried	1806	1897
Weaner heifers retained	256	338
Total breeders mated	631	834
Total breeders mated & kept	545	720
Total calves weaned	512	677
Weaners/total cows mated ..	81.18%	81.18%
Wnrs/cows mated and kept	94.00%	94.00%
Overall breeder deaths	2.00%	2.00%
Female sales/total sales %	49.32%	48.94%
Total cows and heifers sold	237	313
Maximum cow culling age	11	11
Heifer joining age	2	2
Weaner heifer sale & spay	0.00%	0.00%
One yr old heifer sales % .	0.00%	0.00%
Two yr old heifer sales % ...	35.91%	35.91%
One yr old heifer spay %	0.00%	0.00%
Two yr old heifer spay %	0.00%	0.00%
Total steers & bullocks sold	244	327
Max bullock turnoff age	3	2
Average female price	$684.32	$684.32
Average steer/bullock price	$1,338.59	$1,298.34
Capital value of herd	$1,291,466	$1,067,028
Imputed interest on herd val.	$129,147	$106,703
Net cattle sales	$495,162	$648,225
Direct costs excluding bulls	$22,226	$68,928
Bull replacement	$18,993	$25,116
Gross margin for herd	$453,943	$554,180
GM after imputed interest ...	$324,796	$447,477
GM per adult equivalent	$253.60	$309.60
GM/AE after interest	$181.45	$249.99

Appendix 7. Lisgar management analysis

Breedcow & Dynama-Lisgar-Management Analysis

	Summary (2007)	Summary (2012)
Total adult equivalents	1790	1790
Total cattle carried	1955	1999
Weaner heifers retained	277	283
Total breeders mated	683	698
Total breeders mated & kept	590	603
Total calves weaned	554	567
Weaners/total cows mated ..	81.18%	81.18%
Wnrs/cows mated and kept	94.00%	94.00%
Overall breeder deaths	2.00%	2.00%
Female sales/total sales %	49.32%	49.32%
Total cows and heifers sold	257	262
Maximum cow culling age	11	11
Heifer joining age	2	2
Weaner heifer sale & spay	0.00%	0.00%
One yr old heifer sales % .	0.00%	0.00%
Two yr old heifer sales % ...	35.91%	35.91%
One yr old heifer spay %	0.00%	0.00%
Two yr old heifer spay %	0.00%	0.00%
Total steers & bullocks sold	264	270
Max bullock turnoff age	3	3
Average female price	$734.88	$734.88
Average steer/bullock price	$1,372.87	$1,666.06
Capital value of herd	$1,440,149	$1,716,011
Imputed interest on herd val.	$144,015	$171,601
Net cattle sales	$558,159	$653,519
Direct costs excluding bulls	$18,651	$19,069
Bull replacement	$20,516	$24,781
Gross margin for herd	$518,993	$609,669
GM after imputed interest ...	$374,978	$438,068
GM per adult equivalent	$289.94	$340.60
GM/AE after interest	$209.48	$244.73

Appendix 8. Lisgar steers displayed at MSA PDS Forum June 2012

Animal Tag	01Jun11 600 d IMF %	Date	weight	wt gain per year		May 2012 Droughtmaster GROUP BREEDPLAN														19/06/2012				Age in months
						Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	P8	Rib F	IMF	EMA	
Breed Avg. EBVs for 2010 Born Calves						**-0.1**	**11**	**16**	**22**	**23**	**5**	**1.2**	**13**	**0.7**	**0**	**0.1**	**0.5**	**0**					
Above average to high growth, high IMF, high rump and rib fat																							
10001	5.2	15Jun12	594	194		-2.4	12	20	31	-	6	-	-	0.9	0.1	0.1	0.3	**0.4**	11	6	5.7	86	32
10007	5.5	15Jun12	582	178		-1.3	9	14	25	-	8	-	-	1.8	0.7	0.9	0.4	**0.4**	15	9	5.9	88	32
High growth, low IMF, rump and rib fat																							
10145	2.9	15Jun12	664	203		-	20	29	44	-	6	-	-	1.5	-1	-0.9	1.1	-0	10	6	3.5	92	32
10421	3.3	15Jun12	640	192		-	15	22	39	-	-	-	-	1.3	-1	-1.2	1.4	-0	10	6	3	81	31
Above average to high growth, average & above av IMF, low rump and rib fat																							
10146	5.3	15Jun12	600	183		-	17	22	41	-	8	-	-	1.4	-1	-1.5	1.1	0.2	6	4	6.2	79	32
10159	4.7	15Jun12	586	183		-	13	19	27	-	-	-	-	0.6	-0	-0.2	0.6	0	9	6	6	77	31

Appendix 9. Lisgar Sire-Son EBVs

Lisgar genetics-sires and sons

	November 2012 Droughtmaster GROUP BREEDPLAN												
	Name/ID	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)
	Breed Avg. EBVs for 2010 Born Calves	**-0.1**	**11**	**16**	**22**	**23**	**5**	**1.2**	**13**	**0.7**	**0**	**0.1**	**0.4**	**0**
sire	LISGAR GOVERNOR (P) D5	1.6	11	22	42	59	13	2.1	-	1.9	-0.8	-1	1	0
son	LISGAR 592 (P) (AI) D3	-	16	25	47	-	9	1.6	-	1.8	-0.8	-0.9	1.3	-0.1
son	LISGAR 595 (P) (AI) D3	-	9	15	33	-	10	1.4	-	1.4	-0.5	-0.5	0.8	-0.1
son	LISGAR 10092 (P) (AI)	2.4	15	26	40	-	9	1.5	-	2.2	0.3	0.4	0.7	0.4
son	LISGAR 11077 (P) (AI)	-	10	24	37	-	10	2.2	-	2.2	-1.6	-1.9	1.6	0
sire	GLEN FOSSLYN BURLEY (P) D2	2.5	26	49	58	-	1	2	-	1.9	0.6	0.8	0.5	0.1
son	LISGAR 10019 (P) (AI)	0.9	15	31	39	-	4	2.3	-	1.5	0.5	0.7	0.6	0
son	LISGAR 10085 (P) (AI)	2.8	23	40	58	-	4	1.3	-	1.6	-0.5	-0.5	1	0.1
sire	LISGAR 332 (P) D5	2.2	12	17	23	35	8	1.7	-	0.6	0.7	0.8	-0.4	0.7
son	LISGAR 09141 (P)	-	11	16	23	-	8	0.8	-	2.1	1.5	1.9	0.2	0.4

Appendix 10. Lisgar Sire-Daughter EBVs

	November 2012 Droughtmaster GROUP BREEDPLAN												
	Name/ID	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)
	Breed Avg. EBVs for 2010 Born Calves	**-0.1**	**11**	**16**	**22**	**23**	**5**	**1.2**	**13**	**0.7**	**0**	**0.1**	**0.4**	**0**
sire	TALGAI 1473 (H) D5	1.6	24	31	52	-	7	1.2	-	1.8	0.1	0.1	0.5	0.4
daughter	LISGAR 658 (P) (AI) D4	-	22	32	50	-	8	1.6	-	1.4	1.1	1.4	0	0.3
daughter	LISGAR 11045 (D) (AI)	-	20	32	48	-	6	-	-	2.7	0.7	0.9	0.6	0.4
daughter	LISGAR 11011 (P) (AI)	-	21	31	48	-	7	-	-	1	0.1	0.2	0.4	0.3
daughter	LISGAR 11039 (P) (AI)	-	18	29	47	-	7	-	-	1.5	0.8	0.9	0	0.7
daughter	LISGAR 11040 (P) (AI)	-	18	30	46	-	7	-	-	2.8	1	1.3	0.6	0.4
daughter	LISGAR 653 (D) (AI) D5	-	20	28	45	-	6	0.8	-	2.5	0.2	0.2	0.8	0.3
daughter	LISGAR 11016 (P) (AI)	-	20	29	44	-	6	-	-	1	1.2	1.5	-0.2	0.6
daughter	LISGAR 11017 (P) (AI)	-	18	27	44	-	6	-	-	0.9	0.3	0.4	0.2	0.3
daughter	LISGAR 661 (P) (AI) D3	-	15	18	33	-	7	-	-	0.9	0.4	0.4	0.2	0.4
daughter	LISGAR 11024 (P) (AI)	-	12	20	32	-	7	-	-	1.6	0.1	0.1	0.6	0.4
daughter	LISGAR 11021 (P) (AI)	-	13	18	31	-	8	-	-	1.4	1.7	2.1	-0.2	0.5
sire	TALGAI AFRO (D) D5	-0.1	23	35	36	34	2	0.7	-	3.5	1.4	1.8	0.6	0.5
daughter	8RP09030F	1.3	21	36	50	64	4	-	-	2.7	0.4	0.6	0.8	0.2
daughter	8RP09004F	0.2	23	34	41	44	5	1.1	-	2.1	0.7	0.9	0.4	0.4
daughter	PID070391F	0.2	18	28	34	34	4	-	-	2.5	1.1	1.3	0.5	0.4
daughter	8RP09025F	-0.3	15	26	31	40	5	-	-	1.1	1.7	2.2	-0.6	0.8
daughter	8RP09065F	-0.3	15	27	30	27	6	-	-	2.4	1.2	1.5	0.3	0.5
daughter	PID070021F	-0.1	15	23	28	32	4	-	-	1.2	1.6	2.1	-0.2	0.5
daughter	8RP09053F	0.3	18	26	27	29	6	1.3	-	1.3	0.9	1.2	0.1	0.3
daughter	8RP09060F	-0.8	10	23	26	28	1	-	-	2.5	0.7	0.9	0.6	0.3

Appendix 10. Lisgar Sire daughter EBVs …. Cont'd

	November 2012 Droughtmaster GROUP BREEDPLAN												
	Name/ID	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)
	Breed Avg. EBVs for 2010 Born Calves	**-0.1**	**11**	**16**	**22**	**23**	**5**	**1.2**	**13**	**0.7**	**0**	**0.1**	**0.4**	**0**
sire	PID020033M	0.7	22	41	54	57	6	0.7	-	1.9	2	2.5	-0.4	0.9
daughter	8RP08030F	-	13	27	38	43	7	-	-	1.3	0.1	0.2	0.3	0.6
daughter	8RP08031F	-	11	25	34	27	6	-	-	1.7	1	1.3	0.3	0.4
daughter	8RP08034F	-	12	24	39	53	5	1.3	-	1.1	1.5	1.9	-0.4	0.6
daughter	8RP08039F	-	16	30	41	34	6	0.5	-	2.1	2.8	3.5	-0.5	0.9
daughter	8RP08044F	-	16	29	39	33	8	-	-	1.6	0.4	0.6	0.6	0.2
sire	LISGAR 332 (P) D5	2.2	12	17	23	35	8	1.7	-	0.6	0.7	0.8	-0.4	0.7
daughter	LISGAR 09086 (P)	3.8	17	25	39	71	7	-	-	1	0.9	1.1	-0.3	0.4
daughter	LISGAR 10279 (P)	-	13	23	33	-	9	-	-	1.8	0.8	1	0.1	0.6
daughter	LISGAR 09390 (P)	-	11	21	31	53	8	-	-	1.5	1	1.3	-0.3	0.7
daughter	LISGAR 10369 (P)	-	10	21	29	-	8	-	-	2.4	0.5	0.7	0.5	0.4
daughter	LISGAR 09380 (P)	-	9	15	23	34	6	-	-	1.8	0.3	0.5	0.4	0.3
daughter	LISGAR 09070 (P)	0.2	8	16	22	28	8	-	-	1.1	0.3	0.4	0.2	0.4
daughter	LISGAR 09398 (P)	-	8	15	22	22	7	-	-	0.9	0.2	0.3	0.2	0.4
daughter	LISGAR 09061 (P)	0.5	8	14	22	28	7	-	-	1.3	1.2	1.5	-0.1	0.5

Appendix 11. Producer Workshops

Workshop 1, April 08

- Introduction to MSA system
- Profit Centre of Northern Beef Herds
- Discussion on MSA, gaps in knowledge
- Unanimously decided to form an MSA PDS group

The score for the "usefulness" of the meeting was 5.6 out of 7.

Workshop 2, July 2008

- Mark Inglis, MSA-Feedback System, benchmarks, reviewed local data.
- Taste test MSA beef for lunch
- Individual Business Action Planning
- What technical support, learning opportunities and further skill development required

The score for the "usefulness" of the meeting was 6.2 out of 7.

Workshop 3, April 2009

- Flinders Beef Challenge-MSA experience and learning's
- MSA Update
- Local MSA results
- Factors to improve MSA turnoff and all other beef turnoff
- Discussion and plans
- Summary
- MSA beef for lunch

The score for the "usefulness" of the meeting was 6.4 out of 7.

Workshop 4 (Lisgar Field day), July 2009 (Burdekin MSA PDS)

- Progressive tools to use in Bull Selection (in use at Lisgar)
- Targeting market specifications-Lisgar experiences, the MSA Producer Demonstration Site
- The Epigenetics project
- AI programs
- Paddock inspection
  - cull heifers on molasses brew targeting MSA plus and minus HGP
  - Lisgar fat cattle ready for MSA turnoff (bullocks, heifers)
- NLIS demo-scan, record PD, notes and weights

The score for the "usefulness" of this meeting was 6 out of 7.

Workshop 5, March 2010

- Overview of Beef CRC III
- Discussion on what participants have done
- Using MSA Feedback to Improve Market Compliance.
- Genetics, nutritional and breeder management strategies
- Summary Session

The score for the "usefulness" of this meeting was 6.3 out of 7.

Workshop 6 Burdekin MSA PDS site-Lisgar field day, July 2010

- Market signals for high quality beef
- Bull Buyer perspectives
- Epigenetic effects in breeding
- Fixed Time Artificial Insemination
- Pestivirus in beef herds
- Measuring carcase performance –Lisgar MSA results
- Premium eating quality beef in north Qld

The score for the “usefulness” of this meeting was 6 out of 7.

Workshop 7, Townsville MSA PDS and VIB Forum, 17 December 2010

- MSA overview and update (Lachlan Willcox, MLA)
- Lisgar MSA PDS-2010 growth and MSA results
- Meat Seaming Demonstration (Lachlan Willcox, MLA)
- Trafalgar MSA PDS-2010 growth and MSA results
- Flinders Beef Challenge-2010 growth and MSA results
- Growth Pathways Project (Stu McLennan)-discussion and results

The score for the “usefulness” of this meeting was 6 out of 7.

Appendix 12. Participant Feedback Example

Project	**Value in Beef**
Event/Activity	**VIB group / MSA PDS Burdekin Group**
Date	**23 April 2009**

Participant Feedback Sheet

1. Overall, how useful did you find today?

1	2	3	4	5	6	7
Not at all	Of little use	Some use	Useful	Quite useful	Very useful	Extremely useful

1a. Do you have any suggestions for improvements?

2. How did you rate the usefulness of the sessions?

1	2	3	4	5	6	7
Not at all	Of little use	Some use	Useful	Quite useful	Very useful	Extremely useful

- ❑ Flinders Beef Group data _____
- ❑ MSA Update _____
- ❑ Local MSA Results _____
- ❑ Factors to improve MSA turnoff and all other beef turnoff _____
- ❑ Discussions, Individual plans & issues _____
- ❑ Summary _____

3. What new knowledge or skills have you gained from today?

4. How will you use this new knowledge or information in your business?

5. What topics or activities would you like to see for future group meetings?

6. To date how do you rate the usefulness of being part of this group?

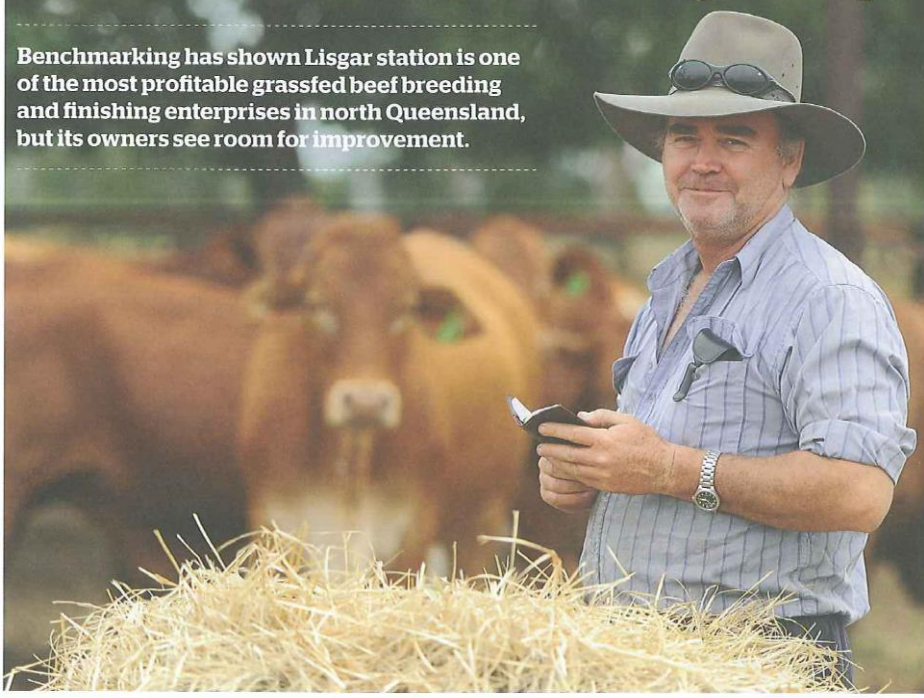
1	2	3	4	5	6	7
Not at all	Of little use	Some use	Useful	Quite useful	Very useful	Extremely useful

Thank you for your feedback. This will be used to improve future events

Appendix 13. Feedback magazine September 2012

MSA bonuses inspire changes on property

Benchmarking has shown Lisgar station is one of the most profitable grassfed beef breeding and finishing enterprises in north Queensland, but its owners see room for improvement.



Snapshot

Robert and Donna Rea, 'Lisgar' station, Burdekin, Qld.

Property: 10,800ha

Enterprise: Droughtmaster beef breeding and finishing

Livestock: 2,400 head

Pasture: Indian couch, improved stylos and Burgundy bean legumes

Soil: Variable, from sandy loams to marine plains

Rainfall: 750mm

Second generation producers Robert and Donna Rea are continuing 50 years of genetic improvement in carcase quality traits but involvement in the Meat Standards Australia (MSA) Producer Demonstration Site (PDS) trial has shed light on the future direction for their enterprise.

During the PDS trial, 89% of the family's 241 Droughtmaster heifers and 60% of 370 steers consigned to JBS Australia in Townsville met company specifications for MSA and 46% and 21% respectively received an MSA premium.

A small proportion were ungraded MSA because they did not meet pH, meat colour or rib fat specifications.

Robert said, ultimately, the ability to supply premium grade MSA cattle could provide a bonus of up to $34/head at certain times of the year (at maximum weights of 340kg).

Robert Rea, 'Lisgar Droughtmasters', Home Hill, with steers used at the marketing and MSA forum.

"Our main challenge is fine tuning the parameters of achieving weight for age, marbling and ossification," he said.

Breeding emphasis in the Lisgar herd was aimed at boosting fertility, growth rates, intramuscular fat (IMF) and external fat cover.

"Our turnoff age has dropped to three years old from four-and-a-half years old and we want to bring it down to two years old and 0-2 teeth, while maintaining 320-340kg dressed weight and good MSA premium grade compliance," Robert said.

We've introduced legumes to our pastures and we wean calves on to a molasses supplement until the season breaks. Weaners go into the wet season with a 20-30kg weight advantage.

"It is cost efficient because of increased herd productivity."

The Lisgar herd averaged about 88% pregnancy rates in the past three to four years and 2012 maidens achieved a 94% average after a three month joining period.

Meeting MSA specs

The Reas strongly believe in low stress animal management and muster sale cattle up to three weeks ahead of slaughter into a paddock closer to the yards, which has helped overcome meat pH problems.

Stock are scanned at 18-months for IMF and rib fat to identify sires for progeny with rib fat averages of 5-9mm and good marbling. Robert saw marbling as a trait which would reduce the impact of ossification scores.

"The PDS highlighted that using HGPs was creating ossification levels penalising us, so we'll now use them more strategically," he said.

They are also continuing to provide valuable genetic information to researchers through their use of DNA testing and evaluation of scanned carcase data against a range of BREEDPLAN Australian Breeding Values.

Robert and Donna Rea
T: 0438 848 203
E: lisgar.droughties@bigpond.com

Appendix 14. Northern Muster Articles

Working with producers to achieve MSA premiums

MSA grading at JBS Swift & Co in Townsville commenced in April 2008. The introduction of MSA grading provides an opportunity for producers to receive a 10c premium for 0-4 tooth cattle that grade 'boning room 10' or better. This premium has the potential to improve beef business gross margins.

Under the Value In Beef project, DPI&F staff are working with a number of producer groups to improve compliance rates of cattle consigned to MSA markets. This includes 3 MLA funded producer demonstration sites (PDS's) which have been set up in western Queensland, Charters Towers and the Burdekin regions.

The MSA PDS groups have producers partnering with DPI&F, MLA and JBS Swift & Co with the primary aim of improving MSA compliance rates. This includes:

- reducing the percentage of cattle that do not meet company specifications for weight, dentition and fat cover and are therefore ineligible for MSA grading;
- reducing the percentage of cattle which become MSA 'ungrades' due to pH and/or meat colour;
- increasing the percentage of cattle receiving a premium by grading into boning room 10 or better.

The MSA PDS project will improve skills and understanding of MSA grading, plus analysis and interpretation of MSA feedback. It also provides opportunities for producers to participate in 'on property' demonstrations of cattle performance monitoring and strategies to achieve MSA compliance. Each PDS has a key site. However compliance data and management strategies from other properties within the group are also addressed. The results and progress of these sites will be reported annually in the *Northern muster*, and in due course field days will be held (watch this space!).

Since June two of the sites have made progress in reducing the percentage ungrades due to pH and meat colour. At *Lisgar* (Burdekin group), three consignments have been sent in targeting MSA premiums since June 2008.

In the first consignment (3.5 year old steers), less than 3% made it to boning room 10 or better and 66% were ungrades from high pH or meat colour.

In the third consignment (2.5 year old steers), less than 2% were ungrades due to high pH and 45% made it to boning room 10 or better. However, 53% made it to boning rooms 11 to 14 – close, but not close enough for the premium.

The following changes were made

- reduced age
- finetuned stockhandling in the month prior to and up to trucking
- managed paddock nutrition.

Other practices underway at Lisgar include the longer term strategy of using genetics to improve MSA performance through

- increasing growth rate will reduce age at turnoff and therefore ossification
- increasing marbling
- increasing rib fat cover.

Improving nutrition pathways to reduce age of turnoff is also part of ongoing management. Further improvements are expected in this herd's MSA performance over time.

At *Trafalgar* in the Dalrymple Shire, there has been a high level of compliance with company specs, so the greater majority of cattle have been eligible for MSA grading. Of those eligible for MSA grading the percentage 'ungrades' in the August consignment was 41%. This was reduced to 12% in the October consignment, as a result of improved paddock nutrition, fine tuning stock handling and reducing time in the yards prior to trucking.

It should be noted that some of the better MSA results have come from cattle consigned from western Queensland. This is despite 10-12 hours travel time to the meatworks.

The key factors which impact on whether cattle grade boning room 10 or better, include ossification, marbling, hump height, carcase weight and rib fat. These factors (which affect eating quality) will be discussed in future articles.

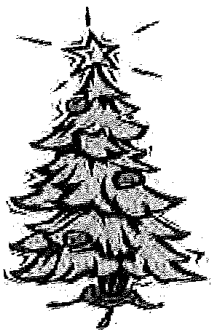
For more information go to www.msagrading.com.au

Felicity Hamlyn-Hill
DPI&F Charters Towers
Phone 07 4761 5157

Alan Laing
DPI&F Ayr
Phone 07 4720 5115

Karl McKellar
DPI&F Charters towers
Phone 07 4761 5153

Ian Gray
DPI&F Cloncurry
Phone 07 4742 1311



Northern Muster articles

Understanding the Meat Standards Australia (MSA) Grading System

Meat Standards Australia (MSA) is a grading system that was developed to improve the supply of consistently high quality meat to the beef consumer. MSA grades beef based on its eating quality. MSA grading is a tenderness guarantee to consumers.

MSA was developed using consumer taste tests of the main cuts of beef. Testing included beef from a wide range of cattle breeds grown under different management practices and using a variety of processing systems, ageing periods and cooking methods.

The MSA system grades each muscle (cut) on eating quality, with regards to tenderness, juiciness, flavour and overall liking. The grade can be 3, 4 or 5 star and each cut is labelled accordingly.

MSA certified graders assess carcase attributes collected during processing using a uniform set of standards and collate information provided by the beef producer. This information is then entered into a computer program. Results of grading are allocated to the carcase to produce a MSA score, and a grade is allocated to different cuts along with days of aging required to achieve the grade and the suggested cooking method.

MSA licensed processors ensure all their systems are compliant with MSA program requirements. The key factors are pre-slaughter lairage (rest in holding pens), processing treatments, carcase grading by a MSA certified grader and product labelling.

MSA parameters measured at the abattoir on each carcase include carcase weight, rib fat depth, eye muscle area, MSA marbling score, ossification (measure of maturity of carcase), hump height (as a measure of tropical breed content), meat and fat colour, and meat pH.

Producing MSA beef

Producing MSA beef is a marketing option for beef producers, particularly those supplying the domestic market. Producers wishing to supply MSA beef need to be registered as a MSA producer. You can request a MSA registration form by phoning 07 3620 5200 or download the form from Meat Standards Australia—Producer Training <http://registerproducer.msagrading.com.au/>

The on-property or feedlot management of beef cattle contributes significantly to the eating quality of the beef. Producing MSA beef does require meeting certain standards and requirements for cattle consigned to slaughter:

- **Do** handle and muster the cattle quietly to reduce stress.
- **Do** load cattle quietly, preferably without the use of goads and electric prodders.
- **Do** load cattle at the recommended densities set out in the trucking industry code of practice.
- **Do** allow the cattle free access to water until dispatch.
- **Do** allow the cattle free access to feed until dispatch, other than a minimum period required for preparation through cattle yards.
- **Do** ensure the cattle either continually graze or are fed rations to a level that is adequate for growth for a minimum period of one month prior to dispatch.
- **Do not** include pregnant females or ones that have previously calved.
- **Do not** consign any cattle of poor temperament or with signs of severe stress.
- **Do not** consign sick cattle or cattle within a withholding period for any treatment.
- **Do not** mix cattle from different mobs or pens on the property within two weeks of dispatch.
- **Do not** dispatch cattle purchased or moved from another property/saleyard within one month of arrival.

A MSA vendor declaration and a National Vendor Declaration must accompany the cattle to the MSA licensed abattoir. The MSA vendor declaration confirms that MSA guidelines for cattle handling and trucking have been followed and that HGP treatment is recorded.

To be eligible for MSA grading cattle consigned must meet the MSA licensed processing company specifications for grading. These specifications include weight, dentition and P8 fat depth parameters. All breeds are eligible for MSA grading, however high tropical breed content can impact on eating quality and therefore the level of grading achieved.

MSA feedback

A MSA boning group score is computer calculated for each carcase from measurements taken by the certified MSA grader and from information supplied on the MSA vendor declaration form. MSA assigns numbers to cuts that share similar eating qualities or grading outcomes. These numbers represent boning groups and are used to allow the boning room to utilise cuts from similar bodies during packing.

Boning groups are 1 to 18 and U, where 'U' represents ungraded carcases. Boning group 1 represents the group having the highest quality grading outcomes.

Northern Muster Article

MSA feedback is provided on cattle that meet company specifications and have been allocated a MSA boning group (including 'ungraded' or 'U' carcases). This feedback is also available online at ‹www.msagrading.com.au› Click on the feedback and benchmarking login button.

Producers who have consigned cattle to be graded in the MSA system should study the feedback sheets to understand why carcases:

- did or did not meet company specifications for eligibility for MSA grading
- did not receive an MSA grade (i.e. were ungraded)
- received a low, medium or high boning group score.

This will point to where changes in management can be made to increase MSA compliance rates and decrease boning group scores.

Felicity Hamlyn-Hill
Senior Extension Officer (Beef)
DEEDI, Charters Towers
Ph 07 4761 5157

Making the MSA Grade

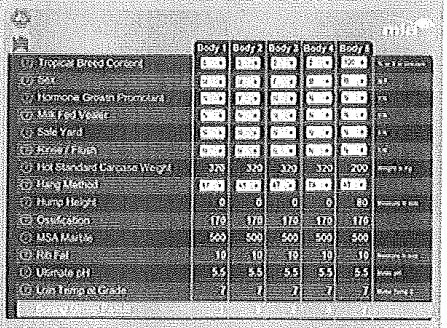
Strategies to improve MSA compliance rates should target:

- reducing the percentage of cattle that do not meet company specifications for weight, dentition and fat cover and are therefore ineligible for MSA grading
- reducing the percentage of cattle that become MSA 'ungrades' due to high pH, meat colour and low rib fat
- increasing the percentage of cattle receiving a premium (i.e. in a lower boning group).

The following are some examples of management strategies that can be used to improve the MSA Grade achieved:

- avoid holding cattle overnight in the yards prior to trucking
- do not mix strange mobs of cattle prior to trucking (draft cattle a fortnight before and hold separately where possible)
- do not consign animals with poor temperament with quieter cattle in a consignment intended for MSA grading
- apply best practice stock handling in the month prior to trucking to reduce stress
- provide the best available nutrition (and ensure it is a rising plane) to animals soon to be turned off
- ensure a high plane of nutrition as long as possible right up until muster and trucking
- assess stocking rates for efficiency and manage paddock nutrition to ensure adequate growth rates leading up to slaughter
- increase lifetime growth rate to reduce age at turnoff at sale and also ossification (maturity) through targeted supplementation
- increasing growth rate and reducing age of turnoff through genetic selection
- increasing rump fat, rib fat cover and marbling through genetic selection.

The Meat Standards Australia website also includes a MSA Grading Calculator that registered users can use. You can find it at ‹www.msagrading.com.au/login.aspx› When opened, the grading calculator looks like the image below. Just select an option for each parameter (e.g. hump height or ossification) and then click the calculate button. This calculator gives an indication of the scores that are required to achieve targeted boning groups. For example lower (i.e. better) boning groups will be achieved with lower ossification, lower hump height, higher carcase weight, higher MSA marble and higher rib fat scores.



Detailed information is available from Meat and Livestock Australia at ‹ www.mla.com.au/Marketing-red-meat/Guaranteeing-eating-quality/Meat-Standards-Australia›

Further information on MSA grading can be found at ‹www.msagrading.com.au› and a tips and tools booklet on MSA can be downloaded from ‹www.mla.com.au/Publications-tools-and-events/Publications›

A major MSA field day is being planned for North Queensland in mid 2012. Further advice will be available early next year.

Alan Laing
Senior Extension Officer (Beef), DEEDI, Ayr
Ph 07 4720 5115

Appendix 15. Lisgar Field day Flyer

Department of Employment, Economic Development and Innovation

From conception to palate - an integrated approach to beef production

Lisgar Field Day, Home Hill
29 July 2010

Opened by Don Heatley, Chairman, MLA

- Market signals for high quality beef
- Bull Buyer perspectives
- Epigenetic effects in breeding
- Fixed Time Artificial Insemination
- Pestivirus in beef herds
- Measuring carcase performance
- Premium eating quality beef in North Qld

...and much more

8.30 am (sharp) - 4.00 pm Smoko and lunch provided

More Information and RSVP:
Robert and Donna Rea
Ph: 4784 8203
Or
Alan Laing, Senior Extension Officer, DEEDI
Ph: 4720 5115
Mob: 0417 006 318
Email: alan.laing@deedi.qld.gov.au

Accommodation can be arranged, contact Robert and Donna Rea

Toward Tomorrow's Queensland | Queensland Government

Appendix 16. Forum flyer

Increasing $ Returns From Carcasses

Marketing and MSA Forum

Results from two MSA Producer Demonstration Sites

8.30am-4pm, Friday 22 June 2012

Dalrymple Saleyards, Charters Towers

Meeting market specs without compromising reproduction – *John Bertram, TBTS*

Industry perspective, reasons for non-compliance and the future – *Jake Phillips, MSA*

Linking grading back to the producer – *Brett Campbell, JBS*

Producer production systems – *Robert Rea and Roger Landsberg*

Lisgar & Trafalgar results, live cattle scan – *Alan Laing & Felicity Hamlyn-Hill, DAFF*

Economics of producing MSA cattle – *Tim Moravek, DAFF*

Producer case study – *Rodger Jefferis*

Nutrition pathways for higher paying carcasses – *Stu McLennan, QAAFI*

Genetics for carcass performance – *Alan Laing, DAFF*

Grass-fed MSA steak for lunch supplied by JBS

Please RSVP by 15 June
Janine King, JK Connections, 0419 735 542
Email: janine@jkconnections.com.au

For further information: Alan Laing 0417 006 318

MEAT STANDARDS AUSTRALIA GRADED

JBS

mla MEAT & LIVESTOCK AUSTRALIA

Queensland Government