AUSTRALIAN INTERCOLLEGIATE MEAT JUDGING ASSOCIATION INC.

Australian Intercollegiate Meat Judging Association

2007/08 Annual Report

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The 2007 ICMJ contest

Our eighteenth year saw further building. The Pre contest seminar was continued. The use of UNE, and Duval College, Armidale saw a very intense introduction to the meat industry over three days for 100 students and tutors from 12 Universities and five Schools. The facilities were first class and I again make particular reference to the food in the Duval College Dining room –it was superb.

ICMJ rests on tutor availability, generosity and enthusiasm. A tutor's lot is a lonely one and the reduced funding for all educational institutions continues to put tremendous strain on them as their workloads expand. Available abattoirs for practical teaching also continue to shrink. The new format lessens the tutors' problems. Now, thanks to the skill of Judith Grauer, we have a top website with illustrated teaching manuals for tutors to use.

Dr. Tom Carr, one of our patrons and a legendary figure in US ICMJ circles attended with his University of Illinois team. He is the best coach in the US and showed us why as he kept his team focusing on the contest even whilst our Australians watched the State of Origin Rugby League match.

Some of the committee are concerned that US teams, with full time meat science students will monopolise the Roy McDonald Shield. I think that it will happen but we have to compete in the world market with our beef and lamb and the younger we learn to compete, the better. Former top ICMJ student, Kate Neath, trained and brought out an MLA assisted team from Tsukuba University in Japan. They did remarkably well to overcome the huge language barrier and greatly enjoyed the social interchange on the last night. I am still trying to involve South Korea.

Day 1 We had industry speakers on **--** Tim McRae (MLA), Cameron Dart (MSA), Glenn Learmont (Cargills), Andrew Jackson (Country Fresh Australasia), Geogy Philips (Australian Pork Limited), David Clarke (Stockyard Beef), Ben Carter (OSI Foods) and Antoine Valterio (MLA).
After dinner a trivia night was cleverly run by the husband wife team –Brad Robinson and Hayley Moreland .This helped students particularly the two international teams to interact early in the program.

Day 2 involved practical activities. The facilitators were Dr Tom Carr and Michael Crowley. The after dinner speaker was Cye Travers, one of our Buckle Winners who is managing a major beef producing enterprise . He gave an inspiring insight into the use of technology and records.

Day 3 The small stock competition was held. At night, Alix McFarland read Dr.Joanne Sillence's speech as she was unable to attend as the representative of our second major sponsor –AMPC.

Day 4. The seminar was followed by the contest at Cargill's Tamworth plant. The contest organisation again saw a morning that went like clockwork at Tamworth— Committee members and former ICMJ team members all played their part.

The results are published elsewhere but The University of Illinois won the Roy McDonald Trophy.

We had some problems with behavior of students from one establishment and three were disqualified. We will not tolerate bad behavior .We are aiming to create an elite group that eventually leads our meat industry.

The US trip went smoothly under the guidance ofJason Strong and Rebecca Underwood. The team was very conscientious, they struggled with yield grading and had a bad day at the contest.

Our joint secretaries, Sarah Moore and Rebecca Underwood were again quite magnificent in their attention to detail and their calm, no nonsense, efficiency. Their milestone reports to our Sponsors were the most detailed yet. We will miss them as they go on into matrimony and other positions.

2007 Junior ICMJ contest

The Schools contest was held in November at Cargill's Tamworth under the guidance of Mick Crowley . We had 45 students from 7 schools competing. The contest was run in conjunction with the Northern schools steer contest. Organisation was a lot easier this year with Brony Neilson being the schools contact. Pip Farr and Ben Thomas (2007 Australian team) assisted Mick Crowley, teachers were team leaders, Kate and Lachlan James and Mick Connors assisted in scoring. Taminda Bacon Factory supported the contest again with sponsorship of retail cuts. Calrossy won the team and individual awards with Kempsey coming second.

Sponsors

We thank MSA for the weeks training that they donated in Brisbane leading to the final selection of the five for the US trip. John Dee Meats at Warwick generously provided training time at their plant. AMH gave the final 10 students an in depth tour of Dinmore-our biggest abattoir.

Our deep thanks to Cargill for their support for the program. Having so many on a plant with all the Q fever, Public Liability etc. on top of the normal disruption to an abattoir that never sleeps is a big thing. So was the barbecue lunch that they gave to us all. It was wonderful to have former ICMJ students, now Cargill employees, assisting manager Bernard Smith to ensure that all went well. We are very grateful.

Our $55,000 per annum sponsorship by MLA has been renewed for another year and the processors' AMPC gave $30,000 sponsorship toward our new training format. Dr Alex Ball represented MLA at the presentation dinner and gave a very interesting address. This year, thanks to the efforts of our Publicity Officer, Alix McFarland, Rural Press have provided $5,000 sponsorship in kind with advertisements and editorial. We are aiming to gradually create the wonderful inter-segmental atmosphere between production, processing and science that the US has had for so long through their ICMJ program.

Finally I again thank the committee who gave their time, their enthusiastic contributions to our telephone links and their help throughout the seminar and the contest. We have evolved into a self-replacing organisation as new people step forward to carry our standard. It remains an inspiration and an honor to work with you.

John Carter, President.

Sponsors

The Intercollegiate Meat Judging Association recognises and thanks the continued and generous support of its sponsors

Meat and Livestock Australia

Australian Meat Processor Corporation

Meat Standards Australia

Cargill Foods Australia

Dr Tom Carr, University of Illinois, USA

Taminda Bacon Factory

2007 Senior ICMJ contest results

Champion Individual - Beef Judging Class
Daniel Clark, University of Illinois

Champion Team – Beef Judging Class
University of Illinois
Whitney Keller, Daniel Clark, Jeffrey Gregg, Jason Perry

Champion Individual – Lamb Judging Class
Jason Perry, University of Illinois

Champion Team – Lamb Judging Class
University of Illinois
Whitney Keller, Daniel Clark, Jeffrey Gregg, Jason Perry

Champion Individual – Pork Judging Class
Matthew Goderham, Marcus Oldham College

Champion Team – Pork Judging Class
University of Illinois
Whitney Keller, Daniel Clark, Jeffrey Gregg, Jason Perry

Champion Individual – Questions and Reasons Class
Joanne Zanker, University of New England

Champion Team – Questions and Reasons Class
University of Illinois
Whitney Keller, Daniel Clark, Jeffrey Gregg, Jason Perry

Champion Individual – Placing Class
Daniel Clark, University of Illinois

Champion Team – Placing Class
University of New England
Joanne Zanker, Alistair Turner, Dylan Duncan, Kathleen Marshall

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Champion Individual – Retail Cut Identification Class
Whitney Keller, University of Illinois

Champion Team – Retail Cut Identification Class

Marcus Oldham College
Henry MacDougall, Jacqui Murray, Jess Rogers, Ben Watson

2007 Champion Team Overall

University of Illinois
Whitney Keller, Daniel Clark, Jeffrey Gregg, Jason Perry

2007 Coach of Winning Team

Dr Tom Carr and Christine Leick
University of Illinois

2007 Individual Champion Overall

Joanne Zanker
University of New England

2007 Shortlist for Australian Team

Jeremy Millar, University of Queensland
Hayden Green, University of Sydney
Kathleen Marshall, University of New England
Kelly Stanger, Murdoch University
Daniel Arthur, University of Sydney
Dylan Duncan, University of New England
Amy Watt, University of New England
Joanne Zanker, University of New England
Jasmine Edwards, University of Melbourne
Sarah Bonny, Murdoch University

2007 Australian Team

Jeremy Millar, University of Queensland
Kathleen Marshall, University of New England
Kelly Stanger, Murdoch University
Dylan Duncan, University of New England
Amy Watt, University of New England

2007 Junior ICMJ contest results

Champion Team - Beef Carcase Class 1
St Pauls Kempsey
Jade Baker, Bradley Notley, Georgina Lawrence, Nicole Clark

Champion Individual - Beef Carcase Class 1
Hannah Ponder, Calrossy

Champion Team - Beef Carcase Class 2
Calrossy
Hannah Ponder, Bethany Piper, Jared Snook, Anne Marie Johnston

Champion Individual - Beef Carcase Class 2
Bradley Notley, St Pauls Kempsey

Champion Team - Beef Primal Identification Class
Calrossy
Hannah Ponder, Bethany Piper, Jared Snook, Anne Marie Johnston

Champion Individual - Beef Primal Identification Class
Jared Snook, Calrossy

Champion Team - Retail Cuts Identification Class
St Pauls Kempsey
Jade Baker, Bradley Notley, Georgina Lawrence, Nicole Clark

Champion Individual - Retail Cuts Identification Class
Claire Bailey, Scone Grammar

2007 Australian Junior Meat Judging Competition - 1st Place Team
Calrossy
Hannah Ponder, Bethany Piper, Jared Snook, Anne Marie Johnston

2007 Australian Junior Meat Judging Competition - 1st Place Individual
Hannah Ponder, Calrossy

2007 Australian Junior Meat Judging Competition - 2nd Place Team
St Pauls Kempsey
Jade Baker, Bradley Notley, Georgina Lawrence, Nicole Clark

2007 Australian Junior Meat Judging Competition - 2nd Place Individual
Jade Baker, St Pauls Kempsey

ICMJ Committee

President

Mr John Carter	Elected June 1995

Treasurer

Hayley Robinson	Elected July 2006

Secretary

Sarah Moore	Elected September 2004
Rebecca Underwood	Elected July 2002

Committee Members

Michael Crowley	Elected June 2000
Owen Gwinn	Elected June 1995
Michael Connors	Elected July 2005
Brad Robinson	Appointed February 2006
Mark Hazelton	Appointed February 2006
Brony Nielson	Elected July 2006
Judith Grauer	Elected July 2007
Alix McFarland	Elected July 2007
Peter McGilchrist	Elected July 2007

US Trip Report

Coaches - Rebecca Underwood and Jason Strong

1. Background

This report details the experiences of the Australian Intercollegiate Meat Judging team throughout their United States tour, including industry encounters as well as results of the National Western Contest held in Denver.

Five students were selected from the Intercollegiate Meat Judging Competition to represent Australia at the National Western Competition in Denver on the 20th of January 2008. These students were:

1. Dylan Duncan (UNE)
2. Amy Watt (UNE)
3. Kathleen Marshall (UNE)
4. Jeremy Millar (UQ)
5. Kelly Stanger (MUR)

These students worked hard throughout the 3 weeks. They were good ambassadors for Australia and gained an enormous amount from being offered this opportunity.

The two coaches for 2008 were Jason Strong and Rebecca Underwood. Training for the contest involved utilising product and resources of various processing plants and Meat Science departments at a number of universities.

2. Training at US Processors

During the two weeks prior to the competition we were fortunate enough to train at the following companies:

- Joslin IBP (Tyson Foods)
- Amarillo IBP (Tyson Foods)
- Fort Morgan (Cargills)

2.1 Tyson Processors – Amarillo and Joslin

At the Tyson plants we spent the majority of time in the chillers where we focused on training the students in the USDA grading system. As well as being a major component of the National Western competition, an in-depth understanding of their grading system is an excellent way for the students to gain more understanding of some of the differences between our industry and the US.

The USDA quality grade takes into account a maturity score, which can be adjusted by meat colour, and a marbling score. Some of the differences in product the students became aware of were:

- The amount of marbling in the US generally compared to Australia was a great deal higher
- The difference in cattle feeding regimes, with the US herd being all lot fed compared to the large reliance on grassfed systems in Australia
- The quality grade of a carcase is adjusted, to make an animal older if the meat colour is dark. This is a very different concept to how we deal with dark cutters in Australia.

The training we conducted on USDA yield grading also helped highlight important industry differences to the students:

- A standard trimmed carcase by USA standards is extremely different to our AUS-MEAT equivalent. An example of this is they do not remove kidney, pelvic and heart fat on the slaughter floor.
- The difference in carcase weights, with US domestic bodies averaging around 900 pounds (409 kgs). This is a lot heavier than the average Australian domestic carcase.

Other general observations by the students included:

- Hygiene standards seemed to be lower – eg wooden rafters in chiller, no hand or boot wash
- Large Hispanic proportion of workforce
- It was mentioned to the Australian team that illegal immigration was proving to be a problem for US processing industry with 1 particular operation being audited the previous yearand finding 40% of workers with illegal immigration papers.
- As with the mining industry in Australia, the oil industry is being a large competitor for labour and drawing a lot of labour out of processing.
- Water seemed to be a lot less precious at the processing sites
- Grading seemed to be more subjective – no sign of reference standards ever being used such as our AUSMEAT standards
- Although Japan product was a very small amount, a large importance was placed on this product.
- A large amount of carcases were regraded
- The companies are making a definite move away from yield grading to the E+V system, a similar system to VIASCAN that can potentially reduce the labour component of carcase grading.

2.2 Cargills Processor – Fort Morgan

Overview

Cargills Australia had organised for us to have a site tour of the Fort Morgan plant. This was definitely a highlight of the trip as other processors were reluctant to provide insight to other areas of their operation other than the chiller area.

Cargill Foods own a number of beef processing plants in USA, which are either dedicated to fat cattle or cow processing. Cargill make up 1 of the 3 top processors in USA (by numbers) along with Swift and Tyson. The headquarters for Cargill is in Wichita, Kansas where all R & D is initiated.

The Fort Morgan plant operates 5 days a week during Autumn and Winter and 6 days/week (May –Sept) with 2 shifts per day and each shift lasting 8 hours.

Staff and training

The plant employs 1800 staff at any one time at an average wage of US$12/hr, yet maintains a 40% staff turnover. The business has a strong training department with 17 dedicated trainers, which is imperative due to the large proportion of non-English speaking employees. Each employee undergoes a 3 day induction and a 5 day probation period. An employee must prove job skill competency to a trainer before sitting a qualifying assessment to work. It seemed evident that there is not a standard

meat industry training body (like MINTRAC) to regulate the type and extent of training required for a processing job position.

All employees must be a member of a Union, and in particular for Cargill this is Teamsters Union.

Livestock operations

The Fort Morgan plant is a dedicated fat cattle processing, currently processing 4500 cattle per day (an increase from 1800/day when purchased in 1987) equating to 32,000 cartons of beef (excluding offal) being processed per day. To their advantage, all cattle are sourced from within a 500km radius on a direct consignment basis. This is primarily due to Cargill owning 4 feedlots, with the closest being only 75 miles away with a capacity of 30,000 head. This tight livestock operation allows for Cargill to operate a 'just in time' slaughter schedule. The livestock lairage area is a Temple Grandin design that only holds 800 head and animals are in lairage for less than 4 hours before slaughter.

Slaughter operations

The slaughter floor operates at a speed of 320 head per hour. These are speeds or outputs that no Australian processor is currently matching.

Interestingly, even with long-fed cattle that were extremely dirty, there is no pre-slaughter wash. The only washing is carried out on the slaughter floor with a number of other contamination preventative actions. These include a chlorophyll detector unit, used following trimming to detect any organic matter (manure) on a carcase. A steam pasteurization unit is also used (this is a Cargill patent). After visiting numerous Australian processors, it is evident that there is limited pre-slaughter preventative actions for carcase contamination yet so much more post-slaughter checking points.

Electrical inputs are also used in US processing plants. This particular operation was using a rubbing bar low voltage system shortly after slaughter for 5 seconds as well as a rigidity probe on the hidepuller for 4 seconds. However, there was no evidence of any pH decline monitoring to verify these inputs and their impact on carcase quality.

Products and exports

The Fort Morgan produces a number of brands and export products. The main export markets for Cargill product is Mexico, Japan and Korea with a large amount of offal going to Egypt.

Cargill pay producers on the yield and quality grade obtained in carcase grading. 60% of product graded in the Fort Morgan plant was meeting USDA Choice or higher at the time of our visit. Quality assurance of product is being maintained through having 12 USDA inspectors on site at all times and 2-3 graders at any one time. An off-line QA intervention system is also used which monitors steriliser temperatures and whether employees are following Standard Operating Procedures (SOP's).

Chillers at Fort Morgan hold approximately 10,000 carcases allowing for carcase to be chilled for 48 hours using a spray chilling practice. Once boned, there is no product aged on the premise.

The boning room is overwhelming when comparing to Australian operations and could be described as observing a 'beehive'. The immense scale of the operation is huge such as having 8 octopus vacuum packing machines working at any one time. As complex and fast the boning room was operating, it also posed questioning of how effective a traceback system would work in such a situation.

In observations when walking through the load out area, the product being packed at Cargill include the following brands:

- Stockyard Angus (equivalent to CAAB)
- Angus Pride
- Sterling Silver

The products were packed in cartons not weighing over 100 pounds. Converted to the metric system, the carton weights of US product is extremely heavy compared to normal carton weights in Australia. It is interesting that there is a weight limit imposed on Australian cartons exported to the US, when their own product is so much heavier.

The automated carton sorting system is new and has allowed Cargill to remove significant amounts of labour from this area of the plant. The system appears to be very similar to the new tote sorting system that has been installed as part of Australian Country Choice value adding additions.

Future research and development at Cargill Foods

All Cargill plants have dedicated R & D staff involved in designing and implementing projects that aim to identify and minimise areas of wastage, costs etc. The Fort Morgan plant in particular has 6 research projects operating. These have resulted so far in increasing profits by US$1.5 million through projects such as:

- Decreasing labour units required per animal
- Decreasing costs of ground beef materials

3. Training at Universities

To continue to train students for the contest, as well as increase the knowledge of the American meat industry, training was scheduled within the Meat Science departments of the following Universities:

- University of Illinois
- Oklahoma State University
- Colorado State University
- University of Wyoming

This also allowed students to compare the educational programs and facilities between US and Australia.

3.1 Product evaluation

At each of the Universities, the students were trained in evaluating the following products:

- Pork carcases
- Lamb carcases

- Fresh hams
- Pork loins
- Beef rounds
- Beef loins
- Beef ribs

Students were trained in:

- The ability to identify yield and quality differences between primals or carcases
- Ability to understand market requirements for a product and place accurate emphasise on yield and quality in making a judgment
- Ability to make comparative observations about a class of primals
- Ability to answer a series of questions about a class of primals and accurately recall their observations

3.2 Educational program and facilities

Australia boasts only 1 truly dedicated university Meat Science department at the University of New England in Armidale. For Australia, UNE offers dedicated meat science subjects and research areas. However, this is hardly a comparison when visiting US educational facilities.

The Meat Science division of US universities have large student enrolments and a strong judging movement, for both livestock and meat. The popularity of American college football teams is well known. To be part of a University Meat Judging team in the US, is not too dissimilar to the college football team whereby intense coaching is endured for months on end and is an extremely competitive 'sport'.

The Universities that were visited had plentiful chilled work areas that were capable of holding many students and a lot of product.

University of Nebraska

The team was given a tour of the University of Nebraska animal science department by Dr. Dennis Burson, Professor, Meat Extension/Food Safety . Considering they only have 300 hundred students the facilities were quite incredible. Some facts and figures include:

- Recognized as one of the top Animal Science programs; including a 4th place national ranking by Meat and Poultry magazine.
- USDA approved Meats laboratory and pilot plant.
- Animal handling and research facilities allow hands-on learning with cattle, horses, swine, poultry and small animals.
- Experiential learning offers opportunities for national travel and competition through Livestock, Meats, and Horse Judging Teams, Equestrian Team, internships and week-long study tours.
- Students have received national recognition through International Livestock Congress, National Cattlemen's Beef Association, American Meat Science Association, National Block and Bridle Club; All-American Judging Teams and other organizations
- Animal birthing facilities, horse stalls, an indoor arena and classrooms equipped to hold animals and people, allow students hands-on experiences with many types of livestock.
- Food product development, carcass evaluation and animal harvest can be done in the meats laboratory.

- Recently updated physiology labs are equipped for the study of recent developments in reproductive physiology, as well as DNA and genetics testing.
- Computer labs, a reading room, and a spacious commons are located within the building.

4. Retail visits

The US does not have seem to have a strong independent butcher market and throughout our 2 week tour, we saw only 2 butcher stores. The supermarkets chains in the US are very diverse in the products they sell and are basically a one-stop shop. So they are extremely dominant in sales of all products, including meat.

As many retail outlets as possible were incorporated into the trip for the team to encompass a feeling for the trends of domestic meat sales in America. Two examples will be discussed here:

4.1 Wild Oats

In Denver the Australian team visited a Wild Oats store. Wild Oats Markets, Inc. is a nationwide chain of natural and organic foods markets in the U.S. and Canada. With more than $1.2 billion in annual sales, Wild Oats currently operates 109 natural food stores in 23 states and British Columbia, Canada. Wild Oats markets include: Wild Oats Marketplace, Henry's Farmers Market, Sun Harvest and Capers Community Markets.

In February, 2007, Whole Foods Market and Wild Oats Markets entered into a merger agreement where Whole Foods Market commenced a tender offer to

purchase all the outstanding shares of Wild Oats Markets at a purchase price of $18.50 per share in cash, plus assumed debt.

Whole Foods Market® is now the world's leading retailer of natural and organic foods, with more than 265 stores in North America and the United Kingdom. The company was founded in 1980 as one small store in Austin, Texas.

The Wild Oats store although small was incredibly impressible. Key points observed include:
- Large range of products presented especially when compared to the size of the store
- Presentation of product was impressive
- Point of Sale material was very effective
- Store in general was beautifully presented

4.2 Cost Co

Costco's first location, opened in 1976 under the Price Club name, was in a converted airplane hangar on Morena Boulevard in San Diego. Originally serving only small businesses, the company found it could achieve far greater buying clout by also serving a selected audience of non-business members.

In 1983, the first Costco warehouse location was opened in Seattle. Costco became the first company ever to grow from zero to $3 billion in sales in less than six years. When Costco and Price Club merged in 1993, the combined company, operating under the name PriceCostco, had 206 locations generating $16 billion in annual sales.

Costco is now the fourth- largest retailer in the United States and the highest volume operator of membership clubs world wide. Costco operates more than 500 locations worldwide including more than 380 in the States.

The different Costco memberships include:
- Executive memberships - $100/year includes a free household card
- Business Membership - $50/year includes a free household card
- Gold Star Membership - - $50/year includes a free household card

Australian lamb for sale in Costco - $6.99/lb
The establishment number was 1614 (Tatiara Meat Company)

Other products included:

- Mince sold in chubs and in portion packs
- A large variety of value added beef meals
- All product was a graded choice
- There was a large variety of brands

5. National Western Competition

5.1 Overview of Swift and Company

The National Western competition was held at the Swift plant in Greeley.

On the eve of the contest, all students were provided a tour and overview of the Swift and Co. headquarters. Swift and Co in America own 4 beef and 3 pork processing plants, as well as a case ready packing operation. The tour of Swift and Co had particular interest to the Australian team due to the recent purchase of both Swift and AMH in Australia by JBS Fibroi.

The headquarters of Swift provide a base for their R & D, marketing and trading operations. The tour was able to show us their:

1. Korean BBQ cooking area for Korean customers
2. Mini butcher store used to demonstrate to clients how Swift product can be displayed
3. Taste testing area
4. Small scale version of a case ready packing plant and area where products are cooked and tested (example – new hamburger patties for chain restaurants).

1.

2.

3.

4.

6.2 Contest details

6.2 Contest details

There were 9 teams in our division and 36 students competing in total. As teams only consist of 4 students, Kathleen Marshall competed as an alternate. This allowed for her still to be eligible for prizes but not contribute to the Australian team score.

The following tables represent the results of the Australian National Team.

Table 1. Beef Judging

	Carcase 1		Beef Loins??		Pricing	Ribs??
	Placing (50)	Questions (50)	Placing (50)	Questions (50)	Placing (50)	Placing (50)
Dylan Duncan	50	45	50	35	50	48
Jeremy Millar	50	40	48	35	50	46
Kelly Stanger	48	35	48	25	50	46
Amy Watt	48	30	45	20	48	50
Kathleen Marshall*	48	30	48	20	50	50

The Australian team scored 1100 in the beef judging.

Table 2 Beef Grading

	Quality (150)	Yield (150)
Dylan Duncan	115	91
Jeremy Millar	119	88
Kelly Stanger	142	68
Amy Watt	111	97
Kathleen Marshall*	121	88

The Australian team had a really bad day in the competition particularly with yield grading. All coaches push their team to score over 100 for yield grading and 115 for quality grading and we did not achieve this on the day. Our team score was 831. Our total beef score was 1931.

Table 3. Pork Judging

	Pork Hams		Pork Carcase 1		Pork Carcase 2	Pork Loins
	Placing (50)	Question (50)	Placing (50)	Question (50)	Placing (50)	Placing (50)
Dylan Duncan	41	25	50	35	50	48
Jeremy Millar	36	35	45	30	21	50
Kelly Stanger	41	35	43	35	50	50
Amy Watt	48	30	48	30	45	50
Kathleen Marshall*	48	35	48	30	45	50

The Australian team scored 971.

Table 4. Lamb Judging

	Lamb Carcase 1		Lamb Carcase 2
	Placing (50)	Questions (50)	Placing (50)
Dylan Duncan	37	35	43
Jeremy Millar	45	25	32
Kelly Stanger	45	45	50
Amy Watt	37	30	46
Kathleen Marshall*	37	25	46

The Australian team scored 470 in the lamb division.

Table 5. Overall Individual Scores – Team Competition

Name	Score (1050)	Rank
Dylan Duncan	846	19
Jeremy Millar	795	34
Kelly Stanger	858	15
Amy Watt	815	31

There were 36 students in this division.

Table 6. Overall individual scores – alternate competition

Name	Score (1050)	Rank
Kathleen Marshall	819	15

Table 7. Overall Team Score

Team	Score	Rank
Clarendon College	3558	1
Coffeyville Community College	3449	2
Tarleton State University	3439	3
Garden City Community College	3426	4
Allen County Community College	3422	5
Fort Scott Community College	3414	6
Australian National Team	**3308**	**7**

The Australian National Team placed 7th in the National Western Competition. This was a fairly good achievement considering the limited training time we had. Unfortunately at times the students struggled on the day compared to their performance during training sessions

7. Denver Stock Show

The National Western Stock Show held in Denver was in its 102nd year. This event aims to showcase the agricultural industry through its emphasis on education, genetic development, innovative technology and offering the world's largest agricultural marketing opportunities. The 16-day show also serves as an entertainment arena, hosting the world's fifth richest regular season professional rodeo, largest horse show and Colorado's largest tradeshow. In 2007, 726,972 people attended the show.

More than 15,000 head of horses, cattle, sheep, swine, goats, llamas, bison, yak, poultry and rabbits are part of the National Western Stock Show each year. As always it is a great experience for the Australian team to spend a day at the show. A highlight was attending the Red Angus auction where the auctioneering was much more animated than Australian sales. 64 heifers were sold averaging $4,796.09 while 11 bulls averaged $3,486.36.

Also of interest were the show cattle, which were beautifully prepared. Not surprisingly they were a lot fatter than what we would find in Australia. The National Western was also a great source of information for the students' reports especially in areas such as BeefCheque and National Beef Quality Audit etc.

8. Clay Center

A new addition to the itinerary for the trip was a visit to the US Meat Animal Research Center (MARC) at Clay Center in Nebraska. The Meat Animal Research Center (USMARC) develops new technology in order to increase the efficiency of livestock production and benefit consumers. The USMARC was authorized by Congress on June 16, 1964, and development began in the spring of 1966 on 35,000 acres near Clay Center, Nebraska.

Presently, research programs are using a female breeding population of 6,500 cattle of 18 breeds, 3,000 sheep of 10 breeds, and 700 swine litters per year. The USMARC is administered by the Agricultural Research Service (ARS) within the United States Department of Agriculture (USDA). The total staff is around 300 including 78 research scientist and postdoctoral fellow positions.

The key research areas at the Clay Centre are:

1. meat quality
2. meat safety
3. genomics
4. waste management
5. animal health
6. animal nutrition
7. reproduction

We were lucky enough to have presentations by the following people in addition to a site tour:

1. Dr Larry Kuehn - Research Geneticist
2. Dr Andy King
3. Dr Shackleford

Outlined in their presentations were the following points:

Key focuses include:

1 - Phenotypes and working with genetics (85-90% beef, 10% pork, 5% sheep)
2 - Instrument grading
3 - Undervalued muscles (i.e. trying to replace a top sirloin (rump steak) as it is the lowest value steak)
4- Colour stability - is there a genetic basis, can we use existing grading to predict colour stability to draft into case ready lines. Preliminary work completed on this area.

MARC works with industry and will happily provide partial funding and research an issue provided by industry. One key difference between how MLA works with industry is that MARC insists on publishing every details. This must prevent some people form working with them on particularly commercially sensitive areas.

Sliced Sheer Force (SSF) was developed at the Clay Centre and is a faster and technically easier method for objectively measuring tenderness. They don't do a lot of consumer taste tests and tend to rely on SSF. Based on sliced sheer force USDA choice cuts received sightly higher ratings than select cuts. Their grading system is definitely not based on consumer panels like the Australian system.

To date MARC have completed 130 000 SSF tests. SSF is now applicable to 22 beef muscles. Most companies are unwilling to use SSF as they believe it is too invasive. E coli has forced the industry to be more scientific

Most steaks in the US are blade tenderised. There is a real potential for contamination and industry wants to move away from blade tenderisation. They have been looking at the ageing temperature and time to potentially eliminate the need for blade tendersiation. A key focus is looking at increasingly the value of secondary cuts and they too are focusing on muscle seaming. MARC like Australia have encountered yield issues with seaming.

Key contacts for meat quality are Tommy Wheeler, Steven Shackleford and Andy King.

Beef carcase image analysis

Tyson approached MARC and requested them to work on this area of objective carcase measurement. MARC formed a relationship with E+V Germany to develop visual grading technology for yield. They have been working on this program for 6 years.

The system has the ability to operate at line speed (i.e. can keep up with production at Greeley). The unit measures the following from the image - PYG (preliminary yield grade), ADJ (adjusted yield grade), REA (required rib eye) and therefore estimated a final yield grade. A notable exception is KPH (kidney pelvic heart) which is estimated

based on the other measurements. The R^2 for the yield grade is 0.9 and the R^2 for marble score is 0.93 as compared to the graders.

They have verified the accuracy of the system against an actual bone out on 267 carcases which apparently was slightly more accurate than a grader. A lot of cattle cut better than expected.

Creekstone are using the E+V system on their payment system and are going live with system on February the 4th 2008. The grade will be based upon the camera and a grader will confirm.

Prediction of tenderness (NIR)

The NIR system assumes product has been aged for 14 days. The machine is portable and carcases are scanned in the chiller and a green light indicates that the product can be certified tender. This is all based on the Longissimus dorsi and it appears that they are not using prediction models to look at other cuts.

The NIR technology originated in Norway and was originally developed to increase the value of select carcases. It has also been applied to choice carcases. It is a tenderness prediction technology and they are currently working on the second generation model. This is includes finalising the cost of the unit, speed, size, getting feedback from industry and ruggerdising the unit.

MARC have currently measured 2717 carcases from 4 different plants. Factors affecting the percentage certified tender include the quality grade and lean growth enhancers. Tough is defined as a SSF of greater than 25kg. They have included some bos indicus cattle and the technology did not work as well.

Two US companies are in the process of adopting the technology. Cargill and Safeway have a program called Ranchers Reserve where they test every steak to ensure quality. Only 1/20 qualifies for the program.

Argentina, Brazil, Uruguay, England and Ireland are all interested in the technology MARC wants to combine this technology with the E+V system however they believe this will be almost impossible.

Distillers grain

Ethanol plants have been operating in the US for the last 15-20 years. The US feedlot industry is actively investigating the opportunity to include distiller's grain (byproduct of ethanol) as a component in the ration. The wet distillers grain (WDG) has the following properties: a higher percentage of protein, fibre, fat, micronutrients (e.g. can have too much phosphorus).

MARC has run a lot of trials looking at how much distillers grain cattle can handle. At 60% of the ration, production goes down. In these trials corn has been the balance of the ration. They believe at this stage that at different growth phases, different percentages may be able to be used. It is necessary to back off towards the end of feeding in order to get cattle to marble.

They believe the optimum to be 25-40% of ration as WDG. The reduces costs by up to 90% as it eliminates the need for soy bean meal (which is very expensive). 95% of feeders in the Nebraska area are utilising WDG in rations due to the abundance of ethanol plants. In the Texas Panhandle, not a lot of WDG is used.

WDG may have a negative effect on marbling. MARC are about to start a large trial on feeding 40% which will look at marbling, efficiency and also any e coli issues.

9. Summary

The 2008 Intercollegiate Meat judging trip was extremely successful. The five students selected were keen young individuals and all are likely to pursue a career in the meat and livestock industry.

The experience gained by visiting companies such as Tyson, Swift and Cargills is exceptional. Also of extreme benefit are the visits to the universities and the retail/food service experiences.

We would like to thank Meat and Livestock Australia and the Australian Meat Processor Corporation (AMPC) for their continued support of the Intercollegiate Meat Judging competition. Their assistance is very much appreciated and it would not be possible to provide such a valuable experience for the students without it. On a personal note Jason and I are also extremely thankful for the opportunity to coach the 2008 team.

Report topic: Discuss Country of Origin Labelling in the US and its Implications for the Australian Industry. Discuss the Possibility of CoOL Being Introduced into Australia"

The Australian meat industry differs largely to that of the US in numerous ways, with one of the changes to the US industry being the more recent proposal for the implication of mandatory country of origin labelling of meat products. The mandatory labelling is a provision of the Farm Bill (Farm Security and Rural Investment Act) that has been delayed from late 2003 to be implemented in September of 2008 (Kay, 2007). This delay is a result of the controversy caused by the push toward CoO labelled meat products, with the main problems being around beef. CoOL requires that all muscle cuts and ground beef, lamb and pork sold at retail must have their country of origin printed on the label in some form. Mandatory labelling enables consumers to have access to information of "where their food is grown, produced, manufactured or packaged" (FSANZ 2006). Restaurants are exempt from these regulations.

One of the main issues that US meat processing plants will encounter following the implementation of CoO labelling is increased costs in packaging and labelling of products. The estimated increase in costs associated with the implication of such regulations is an estimated $US 1 billion. This figure is according to the estimation of the impacts that it will have on buyers within the supply chain (FMI).

In addition to this, animal documentation on arrival to the plant will be required, placing greater demands on producers. This documentation includes the keeping of life long records of all animals that are produced to sell. Animal documentation will be given to the processor at the time of sale and will remain with the animal from birth through to the retailer. The documentation will stay with the animal throughout the processing chain by technologies such as RFID tags within the hooks. Such technologies were witnessed on our detailed tour of the Cargill's Fort Morgan meat processing plant in Colorado. Labels required by the CoO regulations include information of where the livestock was born, raised and slaughtered, to be made visible to consumers on the products, or signs nearby for unpackaged meat product. Retailers are required to maintain documentation of covered commodities for a minimum of two years after the product leaves the store. This practise is in place in order to trace back relevant information when required (Farnese 2005).

Another issue facing processing plants in relation to the mandatory labelling of meat is the processing from a combination of origins. Both ground and frozen meat packers face the issue of more than one origin of components of the product i.e. trimmings from Australia along with lean from another country to make meat patties destined for fast food restaurants. According to USDA, beef imports comprise of more than 10% of US beef supply, with Australia's imports comprising a high percentage of trimmings for further processing. Janet Riley (2003) believes "this is one of the most costly and cumbersome sets of regulations ever proposed, it will create all sorts of disruptions in our plants", which is one of many opposing statements of meat plants regarding CoOL. USDA said it will require a budget of $60 million to implement mandatory COOL. Due to the average net profit of 1% obtained by supermarkets, costs of CoOL will exceed what they are willing and able to cover.

Therefore, increased costs of labelling will be offloaded to consumers by increasing the cost of imported meat and meat products (FMI).

In surveys undertaken by farm advocacy groups in the US, such as The Centre for Food Safety and the Institute for Agriculture and Trade policy, it was reported that 86% of US consumers are in favour of CoOL regulations. Of this high percentage, 76% would rather the labelling regulations be mandatory as opposed to voluntary (Farnese 2005). Of the US population, the above percentages show that the majority of consumers are in support of CoOL, however processors and retail sectors remain somewhat critical of the newly imposed regulations.

Australia, along with other exporting countries, will be directly affected by the implication of CoO labelling due to the amount of meat that is exported to the US. Trade barriers are one of the major fears for Australia in relation to the implication of mandatory country of origin labelling, with a vast majority of our meat export trade being between the US along with Japan and Korea. Such barriers would cause an increase in the cost of exported meat (NZ Food Safety Authority). Australian producers fear that US labelling will "add so much cost and paperwork for blended product that US processors and retailers will simply buy less imported beef" (ABC 2007). According to Tim McRae (2007), Australia alone exports 65% of the beef produced in our country with 31.3% of this being exported to the US (ABARE *2005*.). In addition to beef exports, approximately 50% of the sheep meat produced in Australia is exported throughout the world, with the remainder consumed domestically. Both sheep and beef exports contribute more than $A 4 billion per year to Australian economy (Curtis & Dolling 2006) thus highlighting the impact that possible reductions in exports would have on our economy.

CoOL is a not a proposal to increase the safety of imported meat and is therefore why Australia has strongly opposed the implication of mandatory labelling due to the absence of further safety gain. The reason, in fact, for the implication of these regulations is a commercial decision for consumer knowledge. Consumers believe that they "have the right to know" from where their food originates (FMI). In order for countries to be eligible to trade meat product with the US, the food safety inspection systems must be certified by USDA (FoodUSA 2007). Australia is the second largest exporter of beef in the world (behind Brazil) and it is feared that mandatory labelling will impact upon the number of continued exports to the US. This fear arises due to the possible reduction in consumer demand for imported meat due to premium prices that are suspected to occur following the implication. The introduction and implication of such labelling will cause consumer satisfaction with the knowledge and assistance required for their decision making when purchasing meat products, and will not improve the safety of the product.

It would not be viable for the Australian industry to introduce mandatory CoO labelling, as our meat imports are relatively insignificant at the present time. Most of the meat consumed within Australia is grown domestically, except for pork with a large 67.09% of processed pork in Australia being imported. Within the domestic market, Australia has retained CoOL for many years (NZ Food Safety Authority) with labels such as 'Product of Australia' on our domestically grown produce. Australians are more willing to buy domestic product, hence the viability of such voluntary labels.

The implication of mandatory country of origin labelling of beef, lamb and pork has been proposed, and is set to be implicated in September of 2008 in the United States of America. Because these mandatory labelling regulations are for commercial purposes only, the safety of imported food would not be improved, nor altered as a

result. It is believed that the implication of such regulations will have positive effects on customer beliefs, influence on purchase decision making and purchase behaviour at the same time as causing increased costs to the meat industry. This could possibly have negative impacts upon exporting countries, such as Australia by causing trade barriers to export countries. Such regulations may also cause trends for US consumers to purchase increasing amounts of domestic product as opposed to foreign counterparts. As a result of these regulations in the US, Australia must work to maintain the high quality product that is produced in order to try and maintain high export numbers. Introduction of CoOL into Australia would not be viable due to the small amount of imported product.

This is not a recent issue, but has been worked on for numerous years. It is a huge example of the sheer difference between the Australian and American meat industries and the reason for the use of different systems i.e. grading that are employed in order to make the most of each industry. I feel extremely privileged to have been able to witness this first hand on our trip to the US. I recognise that not anyone would be able to walk off the street and have the same industry access that we had in both Australia and the US throughout 2007 and 2008. I would like to take the time to say a huge thankyou to all the sponsors and everyone who took the time to make the experience so worthwhile and memorable.

REFERENCES

ABARE 2005 "*Australian Commodity Statistics"*
ABC 2007. "US May Introduce Compulsory Labelling"
http://www.abc.net.au/news/stories/2007/03/30/1885597.htm
Bertrand, K. 2003. ' Food and Drug Packaging'
http://findarticles.com/p/articles/mi_m0UQX
Farnese, P. 2005. 'An Update on Country of Origin Labelling' *Agricultural Institute of Canada Semi-Annual Meeting*, Victoria, British Columbia
FMI "Food Marketing Institute" – Mandatory Country-of-Origin Labeling
http://www.fmi.org
FoodUSA 2007. "Country of Origin Labelling is Anti-Import, Claims Industry Body"
http://www.foodproductiondaily-usa.com/news/ng.asp?n=76927-ami-cool-meat
FSANZ 2006 "Food Standards Australia New Zealand"
http://www.foodstandards.gov.au/_srcfiles/CoOL_brochure_2006.pdf
McRae, T. 2007. "Beef Export Trends" MLA.
MLA 2005 'Fast Facts 2005: Australia's Beef Industry.'
Kay, S. 2007. "The US Meat Industry and BSE – What Happens Now?" Editor and Publisher Cattle Buyers Weekly, Petaluma, California.
Riley, J. 2003 – senior vice president of public affairs at American Meat Institute.
Curtis & Dolling: The Sheep Industry - Australia in the Global Scene, Sheep CRC 2006.

Report topic: A comparison between biosecurity protocols in Australia and the United States.

Over the last 40 years, beef production has moved away from small farm enterprises and has transformed into large scale, intensive farming1. Concentrated production, particularly feedlotting cattle, has seen an overall increase in the use of antimicrobials to minimize detrimental animal health issues and maximize productivity. The combination of intensive production and continued use of antimicrobials is believed to be contributing to the emergence of increasingly virulent and multi-resistant microbes that threaten food safety2. In addition to changes in farming trends, the consumers are demanding more fresh meats, including prime cuts and minced beef which are higher risk products when compared with their preserved counterparts.

Whilst there are a vast number of microbes capable of causing food borne illness, E Coli 0157:H7 is of significant concern. Consumers are largely infected with the bacteria by eating undercooked, contaminated minced beef1. The bacteria then form a verotoxin that binds to mucosal cells in the gastrointestinal tract and can result in haemorrhagic diarrhoea, severe abdominal pain and in rare cases it can cause death1.

Figure one indicates the major sources of E Coli 0157:H7 cases and outbreaks that have been reported since 1982. Beef products have attributed to approximately 12.5% of outbreaks worldwide and about 10% of individual cases internationally. Such figures are detrimental to our industry as consumers lose confidence in beef products which can have a dramatic affect on sales and consumption.

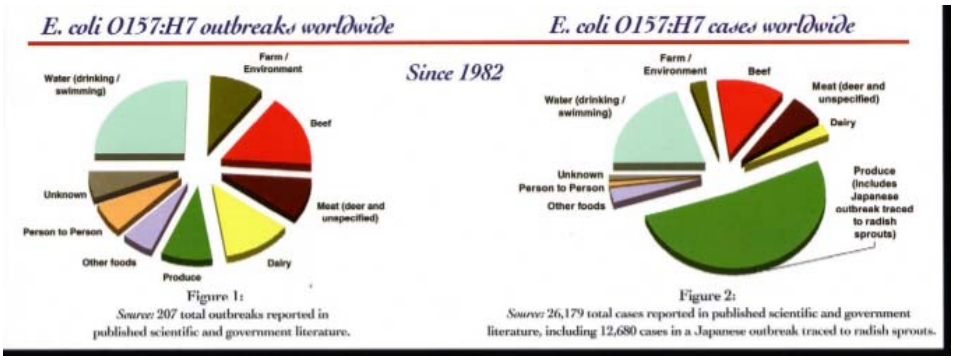

Figure 1: Sources of outbreaks and cases of E Coli 0157:H7 worldwide4.

A comparison between the Australian and USA abattoir biosecurity systems. Innumerable studies have highlighted that the major source of E Coli contamination of beef products is pre-slaughter faecal contamination of hides. Statistics also show a strong, positive correlation between feedlotted cattle and E Coli carriage on hides which is likely related to close contact and wet, muddy conditions2. Given that hide contamination is a major factor influencing E Coli levels on both chilled carcasses and consumer ready beef, biosecurity protocols largely aim to decrease carcass contamination prior to slaughter, prior to de-hiding and evisceration and before the products are chilled and boned out2.

The Australian system

As far as plant infrastructure, Australian abattoir biosecurity is limited. At an average plant, cattle are washed prior to slaughter and knives are sterilized between each cut of the carcass before de-hiding. After de-hiding, carcasses are largely evaluated subjectively for organic contamination before being trimmed or accepted for continuation along the chain. Some companies have exceeded these minimum requirements and have an automated chlorophyll detector, but many have not. Badly contaminated carcasses are held for trimming and must have AQIS approval before being sent for boning. The split carcasses then pass through a warm water sprinkler system designed to remove contaminants that remain after evisceration and are then chilled. Carcasses are reassessed by three independent evaluators who examine the bodies for organic matter before they are permitted into the boning room.

In addition to these biosecurity systems we do have extensive protocols for ensuring meat safety including the SAFEMEAT program, Meat safety quality assurance (MSQA) and the internationally accepted Hazard analysis at critical control points (HACCP) scheme6. Australian HACCP implements international standards as established by the United Nations Food and Agriculture Organization and the World Health Organization. Each processor must develop and implement processing procedures that will execute an acceptable MSQA system that integrates the HACCP targets. The aim of each of these programs is to undergo hazard assessment, identify critical control points, establish suitable 'critical limits' and have an appropriate means for monitoring. These schemes also require development of corrective action plans and necessitate extensive documentation and verification6. As part of the monitoring phase, random swab samples of abattoir 'clean' surfaces, chilling carcasses and workers equipment are collected and microbial culture and identification is conducted. If specific work areas or employees are swab positive on more than one occasion, retraining in hygienic practice occurs.

In addition to this, the nation wide adoption for the NLIS system provides a means for rapid traceability and accurate mapping of disease incidences. In the future, NLIS may prove a useful tool to communicate ongoing 'farm based' zoonotic diseases, identified at slaughter, to the farmer. Whilst this system was primarily implemented to track infectious, notifiable diseases, it does provide a means to identifying animals or producers whose product repeatedly tests positive to pathogens.

The American system

In comparison to Australian abattoir biosecurity, the state of the art processing plants we visited in the USA far exceeded the protocols employed in here. In 1993, a large scale E Coli outbreak associated with beef products occurred in the USA. Consumers questioned the quality of beef being produced and marketed in the US and consumption temporarily declined. Since that time more than 25 million US dollars has been invested into improving plant quality, resulting in the vast improvement to plant biosecurity4.

In one abattoir, the plant was divided into contaminated and clean regions. The contaminated section included all processing from animal holding to de-hiding and workers were not permitted move between the areas during operation. In this section, the cattle were run through a water dip to help remove loose organic contaminants before slaughter. Following knocking they passed through a dilute acid wash and were then de-hided. Once the hide was removed, the carcasses passed through an 80˚C water spray wash and then entered the clean half of the abattoir.

In the clean section, the washed carcasses were fed through a chlorophyll detector to assess bodies for organic matter. If a carcass showed contamination, it was diverted

to a holding rail for further trimming and evaluation before it continued along the line. After this assessment bodies traveled through a 200˚C water rinse and a steam cabinet. Following this processing, bodies were chilled before being boned and distributed.

This system is extremely extensive and employs a combination of both thermal and chemical decontamination. Recent research indicates that some E coli strains are not susceptible to pH, which is why thermal cleansing had been implemented. High temperature water washes and steam cabinets provide added safety and have been reported to decrease E coli carcass counts by up to 99.7%3.

It is important to note that whilst this model of biosecurity adopted in the USA is no doubt effective, it could not be practicably implemented in Australia. It is estimated that over 457 gallons of water is used per carcass during the kill-chill phase of processing with only 20% being recycled5. Due to the current environmental state in Australia, this is not a viable or acceptable method for adoption in here.

Upcoming targets for control

Although efforts to reduce E Coli contamination of beef products currently focus on minimizing hide and carcass carriage, other targets exist. Recently, there have been a number of studies investigating methods to minimize animal carriage and shedding of the microbe. Some suggested pre-harvest interventions to decrease cattle E Coli counts have included; vaccine technology, supplementation with neomycin sulphate and direct feeding of probiotics2.

The prophylactic use of antimicrobials such as neomycin sulphate is reported to decrease bacterial loads by up to 98%, but is a highly contentious issue and is costly. The use of probiotic largely aims to promote ruminal growth of non-pathogenic E Coli strains which will competitively exclude replication of E Coli 0157:H7. This will alter the rumen microflora and create a safer population of bacteria within faeces and hence on cattle hides. In a similar manner as occurs with probiotic use, vaccine technology could help to decrease faecal shedding of the virulent E coli and reduce pathogenic hide contamination2.

Unfortunately, development of such pre-harvest interventions are time consuming and costly to implement. If a suitable intervention was appropriately developed and widely accepted, it could be of enormous benefit to the beef industry. If we had an effective way of presenting cattle to the abattoir without potentially toxic pathogens on their hide, we could produce a safer product and concentrate current biosecurity measures elsewhere.

Should Australia re-evaluate its E Coli biosecurity measures?

Despite obvious differences in biosecurity measures between the two countries, I think the current protocols within the Australian system are apt. The USA beef production systems largely concentrate on lot fed, long haired cattle, which provide a means for close contact and gross carcass contamination, dramatically increasing the risk of E Coli carriage into processing plants. Australia does not feedlot to the same extent that the Americans do and our animals do not appear to have the same degree of hide contamination. For this reason E Coli 0157:H7 may not be as significant a threat as it is to the US processors. The American abattoirs genuinely need extensive biosecurity measures in place to ensure they produce a safe product and retain consumer confidence in their product.

Having said this however, Australia exported 67.1% of its beef and veal in 2007, largely for ground beef5. We rely heavily on continued export trade and have been

able to accomplish this with our disease free herds and 'clean and green' meat products. Our food safety and disease free status gives us access to a wide range of markets that demand safe, quality beef products. Whilst we cannot be E Coli 0157:H7 free, we can optimize beef biosecurity to minimize E Coli carriage on our products. In order to continue our export relations, we must comply with the importers requirements. If the FSIS wants to step up its E Coli monitoring, we need to accommodate this. Although it will be an added expense, it will enable us to continue export trade and further demonstrate our quality of product.

References

1. Duffy, G, O.A. Lynch and C Cagney. 2008. Tracking emerging zoonotic pathogens from farm to fork. Meat Science. 78: 34-42
2. Loneragen, G.H. and M.M Brashears. 2005. Pre-harvest interventions to reduce carriage of E coli 0157:H7 by harvest-ready feedlot cattle. Meat Science. 71:72-78
3. Koohmaraie, M., T.M. Arthur, J.M. Bosilevac, D.M. Brichta-Harhay, N Kalchayanand, S.D. Shackelford and T.L. Wheeler. 2007. Interventions to reduce/eliminate Escherichia coli 0157:H7 in ground beef. Meat Science. 77: 90-96.
4. Weiss. R. 2007. Human illness caused by E Coli 0157:H7 in 2007 Beef Industry Safety Summit: Executive summary. Beef Industry Food Safety Council. USA
5. Various. 2007. Fast Facts 2007 – Australian's Beef Industry. Meat and Livestock Australia. www.mla.com.au
6. Various. 2007. Safe Meat http://www.safemeat.com.au

Report topic: Contrast between Australian and American cattle production systems, including grass and grain fed operations. Including price comparisons for the feeder steers and why there is a difference in prices

Background

There are many differences in the beef production systems in Australia and America. The contrasts can be right through the production cycle. However, the beef feed-lot systems in America and Australia are being faced with the familiar issues of rising feed prices related to the worldwide grain shortage.
The grassfed beef operations in America are a much smaller component of the total beef market compared with Australia. The American grassfed beef industry is a niche market that is branded mostly as “natural beef”. The amount of beef produced “naturally” is low due to the American consumers’ demands. The American consumer wants a beef product that is tender and has a high degree of marbling. The American consumers see marbling as a quality trait. The cuts with higher marbling scores will receive a price premium in the domestic market.
The price difference received by the American producers is much higher than Australian producers. American feeder steers are much heavier than traditional Australian feeder steers and have a higher condition scores at feedlot entry.

Report objectives

The objectives of this report are to:

a. Contrast the American and Australian beef production systems (grass and grain fed)
b. Make price comparisons between American and Australian feeder steers

Discussion

The Industry data

The Australian beef industry is much smaller that the American industry. Australia has a total cattle inventory of 28.84 million head. In the year ending 2007, 2.7 million cattle were processed in Australia. 33% of these cattle were supplementary fed through a feedlot system making Australia the 7th largest beef producing country in the world.

The American beef industry is much bigger than the Australian industry. There are over 100 million cattle in the USA which is the 4th largest cattle heard in the world (MLA 2006). The majority of American cattle are lot fed to achieve quality grades of USDA select or higher which is what the American domestic market demands.

Grain feeding production and issues

The Australian feedlot system is different to the American System in many ways. Lotfeeding in Australia is for two separate markets, the domestic and the export market. Feedlotting for the Australian domestic market involves a short fed system. In this system cattle have typical feedlot entry weights of 280-400kg live weight and spend 60-90 days on feed. The Australian consumer wants beef that is tender, lean and tasty with white fat. The cattle are fed a high protein diet to increase muscle

growth while in the feedlot system. These animals are mainly European/British cross breeds. The European breeds produce a carcass that is leaner and higher yielding than the British breeds. The European breeds are preferred for the domestic market as they are later maturing, yielding a higher average muscle to fat ratio.
For the export market the quality of the product is determined by the market specifications. The main export market for feedlot beef in Australia is Japan. Angus and Wagyu breeds dominate the Long-Fed systems. Long fed cattle can be on feed for 300 days plus. These animals are targeted at the high end of the Japanese market. This market requires young animals with high degrees of marbling.

The American feedlot system produces a heavier, fatter and higher marbled carcass for domestic consumption. The domestic market is the main market for American beef. Domestic consumption accounts for 95% of all beef produced in America. The feedlot system produces a carcass with a minimum of USDA slight marbling. These animals are still relatively young and can achieve carcass weights of over 1000 pounds (480kg). The average for carcass weights is between 700 and 900 pounds. The American grading system gives premiums for USDA Choice and Prime carcasses. For these animals to achieve the desired high degree of marbling are in the feedlot between 90 and 200 days. The Angus breed dominates the feedlot market due to the success of the Certified Angus Beef Brand and the ability of the Angus breed to marble highly. American product is in direct competition with Australian product in The Valuable markets of Japan and Korea. Since BSE the American product has been restricted in Japan. America is now declared BSE free and will begin exporting under sanctions into Korea. Rudy Steiner of Cargill meats believes that America will have to look for new markets for their product, possibly Russia.

The worldwide grain shortage has pushed feed prices up in both Australia and America. This is a concerning problem for both countries. The current average price for feed corn in America is above $4.50 a bushel. This price has doubled in America within two years. The price rises are blamed on the worldwide shortage of grain and the competition for carbohydrate by ethanol plants. These plants are pushing the prices for the grain upward as they can afford to pay the high prices due to large subsidies and government mandates on ethanol production. In America the feedlot industries are beginning to utilise the by-product from the fermentation process called brewers gains.
During the visit to the American Meat Animal Research Facility in Clay Nebraska we viewed the current trials being done on brewers grains in feedlot rations. This by-product is included in Feedlot diets up to 40% without any decreases in weight gain (Kuehn L, 2008). The distillers' grains are high in fat and protein allowing producers to cut out expensive protein meals from typical feedlot rations (Kuehn L, 2008).
The high fat content was the rate limiting factor as it impaired rumen function. Brewers' grains provide a cheaper alternative for feedlot producers that do not want to directly compete with ethanol plants for whole corn (Kuehn L, 2008).
The process of using brewers' grains in Australian feedlots has not been investigated yet. With the expansion of the ethanol industry feedlots will have to look for other grains to make feedlot rations. There are some disadvantages in this process however. Some slight equipment modification is needed to handle the moist grains. The Ethanol industry has now seen the value of the by-product therefore, increasing the price of brewers' grains.

Grassfed Beef Production
Grassfed beef production is an important market for Australia, 77% of beef sold in Australia is finished on pasture (MLA 2006). There are arguments about the taste and quality of Grassfed beef vs. Grainfed beef. Generally the flavour will be more

robust in grassfed beef but the product will be less consistent. Grassfed beef will have a yellow fat colour. This fat colour is due to the cows' intake of carotin. Carotin naturally occurs in grass and does not change the taste of the meat (Thompson 2007).
Grass fed beef production in Australia is a large industry. Many of the *bos indicus* cattle produces in the northern climatic zones of Australia are grass fed. The grass fed system is extensive and has minimal inputs from labour. These systems are ideal for the large expanses of Northern Australia. The grassfed industry also includes the cow calf operations and veal production. The products from this market are the vealers sold into feedlots and abattoirs Australia wide.
America consumes large quantities of Australian grassfed beef. America is a large market for Australian trim. This trim is mostly grass fed and has chemical lean percentages of 85% and higher. Trim is then ground down and has some fat added to fit market specifications for the American ground beef market.
The American Grassfed beef industry is a small market. These systems target the niche markets of organic production. Organic foods in America are becoming popular and this has allowed the "natural beef" brand to expand. Large organic food chains like "Wild Oats" pay premiums for certified organic grassfed beef. This natural beef is beef that is purely grassfed and has not been treated with growth promoting hormones.

Live Export
The live export trade in Australia is a vital part of the Australian beef industry. The majority of live export cattle come from the northern areas of Australia. These cattle are *bos indicus* cross breeds. The main markets for these products are the Middle East and South East Asia.
Live export in America is a small market. The main destinations for live beef in America are Canada and Mexico.

Feeder steer price comparisons
Feeder steers in America weigh between 400 and 900 pounds or 180 and 450kg liveweight. All animals sold are sold by a price per 100 pounds. The 100 pound price for feeder steers at a saleyard in Wyoming on the 22nd of February was between $90 and $141. This price is equivalent to between $2 and $3 per kilo (Torrington Wyoming market report 2007). This price is much higher than Australian prices. These high prices are available because the steers are in much better condition than typical Australian feeder steers. Both the Australian and American markets offer premiums for younger stock in better condition.

References
Carr T 2008, "University of Illinois", personal communication
Kuehn L 2008, personal communication United States Meat Animal Research Center Clay Nebraska
MLA 2007, "The Making of Australia's Best Beef and Lamb,"
MLA 2007, "Australia's Beef Industry Fast Facts"
Steiner R 2008, Cargill Meats, Personal communication
Thompson J 2007, University of New England "Meat Science 418 Study Guide"
USDA 2008, "The Untied States Department of Agriculture", Torrington market reports
http://www.ams.usda.gov/mnreports/TO_LS795.txt
USDA Economic Research service, "Cattle Briefing rooms"
http://www.ers.usda.gov/Briefing/Cattle/
US Economic Research Service 2008, "Feed Grains Database, Yearbook of Prices"
http://www.ers.usda.gov/Data/FeedGrains/StandardReports/YBtable12.htm

Report topic: Report on the USA red meat export industry, its impact on Australian meat exports and the factors influencing the export trade

Introduction

With a population in excess of 300 million and high levels of red meat consumption the American red meat export industry runs a clear second place behind the domestic market. Over the three main red meat industries, beef, pork and lamb the most highly exported product is beef and still only 32% of beef produced in America is exported (USDA, 2008). However, the export market does play an important roll in the American red meat industry. As Bovine Spongiform Encephalopathy (BSE) exposed in the American beef industry, without strong, consistent export markets there will be an over supply of product on the domestic market which reduces prices received by processors (Kay, 2007).

Discussion

According to the United States Department of Agriculture (USDA) in 2007, 32% of beef produced in America was exported, 11% of lamb, and 9% of pork. These figures clearly show the dominance of the domestic market.

According to Andy King the beef industry is dominated by grain fed cattle. These cattle are fed on average for between 130 and 150 days, with around 50% being Angus. The high percentage of Angus cattle can be attributed to the Certified Angus Beef program, where producers receive premium prices for cattle that fall into this category. The requirements for this program are as follows; the cattle need to be 51% black, achieve a yield grade of between 1 and 3, achieve a quality grade of modest 50 or better, the marbling has to be finely distributed, no ear, meaning no Bose Indicus content, and the eye muscle has to have an area of between 10 and 16 inches (CAB, 2008).

Last year alone America produced 11,940,772 tonnes of beef. Of this amount only 374,556 tonnes was exported. The total exported amount was larger prior to an outbreak of BSE in America in 2003. This outbreak promptly ceased all exports to Japan, Korea, and many other countries. Prior to this particular case of BSE, America's main beef exports were to Japan and Korea. Now their major exports are to Mexico and Canada. BSE is a factor that has considerable influence on the American beef industry.

Diseases such as E-Coli are also of great concern to the American beef industry. As a result of this, processing plants have had to put in preventative measures such as extra washing of the carcasses with hot water and an organic acid solution, as well as the use of a chloroform detector (Steiner, 2008).

At the end of 2007 Japan and Korea had increased their importing of American beef products and moved up to third and fourth highest importers of American beef. In May of this year Korea are expected to completely reopen their market to American beef with no requirements on age or bone in products (Ronald, 2008).

This will have a considerable effect on the exportation of Australian beef. Currently around 41% of Australian beef exports are to Japan and 16% are to Korea (MLA, 2008). Once America has no restrictions on selling beef into these countries Australia will automatically be competing for market share. This will have an impact on the Australian industry for many reasons. One reason is the volume of product that America can produce and export into these countries compared to Australia and secondly America has a free trade agreement with Korea, which means that they will be able to export beef into Korea at a much lower price because they will not have to pay tariffs.

BSE has forced America to reconsider its export markets drastically and it has reduced the amount of product that is being exported. This has forced domestic prices of beef to decrease due to an over supply of beef on the domestic market (Steiner, 2008).

Re-opening the Japan and Korean markets will decrease the amount of domestic product on the American market therefore increasing the price and margins received by the processors. Over recent years since BSE, cattle prices have increased along with grain prices and labour has become difficult to obtain. Throughout this time America has not had the Japanese and Korean markets to take the pressure off the domestic market. According to Mr Steiner, six of Cargills eight plants in America are currently running at a loss. Whilst they attribute this primarily to high cattle prices, if they had unlimited access to the Asian markets then there would be less beef on the domestic market and therefore more opportunity to make a profit.

There are a number of factors which currently have an influence on the American beef industry. These include high cattle prices, high grain prices, and lack of labour due to competition from oil companies (Steiner, 2008). Although these factors are all of high importance it is not just in America where these influences are felt. According to Mr Steiner, America's largest competitors are Australia and Canada and both of these countries are currently facing similar problems. On top of this Australia has to cope with a strengthening dollar which is reducing profits made from exporting.

The major problems that the American beef industry is currently facing are the issues associated with traceability and country of origin labelling. Mandatory country of origin labelling will come into effect later this year. The country of origin labelling will cost the industry $3.9 billion in the first year alone (Kay, 2008). The factor with the most influence in the American Beef industry is traceability. The Asian market, in particular Japan, is becoming unwilling to accept beef that cannot be traced from paddock of origin to the plate (Ronald, 2008). Australia has a National Livestock Identification System (NLIS) in place, which satisfies this requirement. America does not have a national traceability system. If America is unable to achieve the level of traceability that Australia has obtained, it will prove to be detrimental to their industry. This will create a marketing advantage for Australia, one that is already widely exploited (Ronald, 2008). Mr Steiner believes that America is years away from having a full traceability system within their beef industry.

America's major beef exports are to Mexico, Canada, Japan, and Korea (USDA, 2007). In the future Japan and Korea will re-open their markets and therefore play a more significant role in the exportation of beef from America. Australia's main beef exports are to Japan, America, and Korea (MLA, 2008). Australia has enjoyed strong market share in Japan and Korea, but as these markets re-open to America, Australia will face tough competition for market share. On the 30th of June 2007, America and Korea signed a free trade agreement. This involves the reduction of

tariffs on beef imports into Korea from 40% to zero over 15 years (Kay, 2007). Australia does not have a free trade agreement with Korea and have only recently engaged in free trade negotiations. This process will take time. Meanwhile America has an advantage.

The American lamb industry is small in comparison with both the American beef industry and the Australian lamb industry. American lamb consumption is around 500grams per person per year, whereas beef consumption is around 42kgs per person per year (USDA, 2008). There are a number or reasons for the low consumption of lamb in America. One suggested reason is the psychological reprocutions from World War Two. Soldiers were fed a lot of lamb whilst they were at war. On return to America they refused to eat lamb. This created a trend in lamb consumption for consecutive generations. Anecdotal evidence from a private butcher indicated that lamb consumption was low overall but tended to fluctuate throughout the year. This trend may also be a result of America's high lamb prices and lack of cut selection. As demonstrated in the photo below, the range of lamb cuts in supermarkets such as Wal-Mart is limited. There is an opportunity for Australian lamb producers to work with American consumers to encourage them to eat more lamb therefore increasing Australian exports of lamb to America.

In 2007 there was a total of 86,167 tonnes of lamb produced in America. Of this amount only 7,941 tonne, equivalent to 11%, was exported (USDA, 2008). In 2007 America produced 86,000 tonne of lamb while Australia produced over 412,000 tonne in addition to 270,000 tonne of mutton (MLA, 2008). Of this amount 43% of the lamb was exported and 75% of the mutton. Australia produces 7% of the worlds total lamb supply and are second in the world in lamb production (MLA, 2008).

Australia's main lamb export markets are America (27.5%), North Asia (17.6%), and the Middle East (13.4%), Americas main lamb export markets are Mexico, the Caribbean, and Bermuda (USDA, 2008).

Australia exports a substantial amount of lamb to America, while America does not export any of their lamb to Australia (USDA, 2008). America's largest export market is into Mexico, whereas only 3.9% of Australian lamb is exported to Mexico. Australia and America compete for market share within the EU market, despite the relatively small supply from America to the EU (MLA, 2008). Australia's lamb industry has size and strength that the American lamb industry lacks. As a result, American exporting of lamb does not have a significant influence on the Australian lamb export industry.

The pork industry in America is strong with consumption of 23kgs per person per year. Due to this high level of consumption the domestic market was strong in 2007. Out of 9,579,400 tonne of pork produced in America, only 1,021,172 tonne (9%), was exported (USDA, 2008). The range of pork offered in American super markets is similar to the range of beef offered.

Australia's major export markets for pork are Singapore, Japan, and New Zealand. America's major export markets for pork are Japan, Mexico, and Canada, as well as smaller export markets in Singapore and New Zealand (ABS, 2008). America in 2007 exported 9% of the 104 million pigs slaughtered (USDA, 2007) making them the second highest exporter of pork after China. In comparison Australia has a total pig herd of 2.5million (APL, 2008), lowering their export strength. As demonstrated by these figures, America plays a major role in world pork markets. This has a negative affect on the strength of Australian pork exports. However it has more of an effect on the domestic pork market in Australia with the threat of cheaply produced imported American pork appearing on supermarket shelves (APL, 2008).

Conclusion

The American red meat export industry is small, in terms of percentages, due to high red meat consumption and an extremely strong domestic market. Despite the low percentage of export, the volume of pork and beef exported from America is very high. This is a clear indication of the size of these industries within America. The importance of the export market to the domestic market is invaluable as demonstrated by the 2003 incidence of BSE. The domestic market requires the strength of the export market to be maintained, ensuring processors receive the highest prices for their products and that there isn't an over supply of product reaching the domestic market.

References

ABS, Australian Bureau of Statistics 2007, Summary: 'Australia's Beef Cattle Industry', www.abs.gov.au
AP ltd, Australian Pork ltd, 2008 www.apl.au.com viewed on the 13/02/2008, 20/02/2008, and the 25/02/2008
CAB, Certified Angus Beef, 2008, www.certifiedangusbeef.com viewed on the 23/02/2008
Kay, S 2007, 'The U.S. Meat Industry and BSE – What Happens Now?', Cattle Buyers Weekly, September 6th, Petaluma, California, USA
King, A 2008, pers comm, United States Meat Animal Research Centre
MLA, Meat and Livestock Australia 2008, www.mla.com.au viewed on the 20/12/2007, 02/01/2008, 30/ 01/2008, 11/02/2008, 12/02/2008, and the 23/02/2008
Ronald, A 2008, pers comm, Australian Agricultural Company
Steiner, R 2008 pers comm, Cargill USA
USDA, United States Department of Agriculture, 2008 www.usda.gov viewed on the 29/12/2007, 4/01/2008, 11/02/2008, 12/02/ 2008, 14/02/2008, and the 24/02/2008

Report topic: Compare and discuss the differences between the USDA grading system and Meat Standards Australia grading system, including the role each systems plays within their respective industries.

INTRODUCTION

Many people may wonder why countries have different grading systems of their meat. There are a variety of reasons why this occurs including different target markets, consumer preferences and availability of meat. When meat is graded, it allows for correct allocation of price in relation to quality which allows consumers to know the quality of the meat they are buying and therefore leading to higher eating satisfaction.

Australia has a successful meat grading system which has been developed by Meat Standards Australia (MSA). MSA is a grading program that labels specific cuts with a quality grade and also a cooking method to help ensure quality eating for Australian consumers. MSA relates to both beef and sheepmeat and is a program that is widely used within the country.

Within the United States of America a system has also been developed by the United States Department of Agriculture (USDA) which provides three main functions including:

- Assistance to livestock producers- matching quality and quantity to prices received
- Supplying uniform meat quality to consumers and retailers
- Promoting and marketing of quality products.

The USDA grading system began being developed in 1920 and has continued to grow and develop since.

This report will focus in more detail on the differences between the two systems, why they are important within their countries and how the future is looking for the grading systems. It is hard to compare pork and lamb between the two countries due to the difference in importance, therefore this report will mainly focus on the beef industry.

MEAT STANDARDS AUSTRALIA

Australia's meat grading system is unique as it is primarily consumer driven which allows for higher consumer satisfaction and therefore a higher consumption of red meat. MSA is described as a 'paddock to plate' structure, taking into account the whole production sequence. It is the only system to use critical control points (CCPs), which helps to forecast the quality and grade of the final product (Thompson. 2005). There are a number of individual carcass characteristics that are taken into consideration when MSA grading is taking place. These include,

- MSA Marbling (MSAMB)
- Maturity (or Ossification) (OSS)
- Meat Colour (MC)
- Ultimate pH (pHu)
- Subcutaneous Rib Fat (RF)
- Hump Height (Hump HT).

The consideration of all these characteristics leads to a greater, more reliable final grade.

MSA Marbling (MSAMB)
Marbling at the rib eye muscle is not only assessed on amount but also distribution and piece size. The cut is given a score between 100 and 1100 which adds to the final quality grade. Marbling is important as it adds to juiciness and flavour aspects of eating.

Maturity (or Ossification) (OSS)
Ossification is an important factor when grading a beef carcase. It relates to cartilage turning to bone along the backbone. There are three sections of the backbone that need to be looked at including the sacral, lumbar and thoracic. Maturity is measured in increments of 10, ranging from 100 to 590.

Meat Colour (MC)
This characteristic is measured at the rib eye muscle and is only assessed on a chilled carcase. The colour is measured against the AUS-MEAT colour reference chip which ranges from 1A, the lightest, to 7, darker than the 6 chip. If an individual rib eye does not match any colours on the chips the next darker colour is accepted.

Ultimate pH (pHu)
This is a measurement of lactic acid within the muscle, the optimum pH of meat is 5.7 and below. It has been found when pH is measured correctly it can be one of the most accurate indicators of eating quality. pHu is related to pre-slaughter stress levels on individual animals but can be managed to a certain extent by post-slaughter treatments such as electrical stimulations and temperature.

Subcutaneous Rib Fat (RF)
This is a measurement of thickness in millimetres of subcutaneous fat at a specific rib but it can also be measured at the P8 (rump) site.

Hump Height (Hump HT)
Hump height is generally measured in gradients of 5mm and is used to determine the Tropical Breed Content.

There are a number of factors that can downgrade the quality levels of carcases. These include:

- Rib fat less than 3mm and/or P8 fat less than 5mm
- Ossification maturity grater than 300
- Uneven fat distribution over the loin, butt and forequarter
- A pH of 5.71 or above
- When meat colour exceeds 4
- If there is any bruising or ecchymosis present.

MSA has 3 different quality levels, MSA 3 Guaranteed Tenderness, MSA 4 Premium Tenderness and MSA 5 Supreme Tenderness. These quality levels are often found on labelling information which also includes the recommended cooking methods. The different cooking methods include Panfry/grill, Roast, Stir Fry, Casserole, Corn and Shabu Shabu.

USDA GRADING SYSTEM
The USDA grading system has been practiced for over 70 years, it began well before any type of grading system within Australia. It has been promoted as a grading system that sets an international standard for visual assessment of beef carcases. Each carcase is given a quality grade and a yield grade.

US meat is graded into three main grades for quality:

- USDA Prime
- USDA Choice
- USDA Select.

There are also two other quality grades that are very rarely seen at a retail level. These are USDA Commercial and USDA Utility. The three main quality stamps can be seen in figure 1 and table 1 illustrates the quality grade table.

Figure 1. Official USDA Quality Grade Stamps (United States Department of Agriculture. 2005)

Table 1. USDA quality grading chart (Tatum.D. 1997)

Degrees of Marbling	Maturity[2]				
	A[3]	B	C	D	E
Slightly Abundant	PRIME				
Moderate			COMMERCIAL		
Modest	CHOICE				
Small					
Slight	SELECT		UTILITY		
Traces					
Practically Devoid	STANDARD			CUTTER	

USDA Prime

This grade of the meat is the ultimate in tenderness, juiciness and flavour. It contains an abundant amount of marbling which makes the flavour and juiciness more enhanced.

USDA Choice

Choice grade has a little less marbling than Prime but it is still classified as high quality. This grade of beef can still be very tender and juicy if the individual cuts are cooked an appropriate way.

USDA Select

This quality grade is leaner than the grades above due to less marbling being present but this also affects the eating quality. This grade of meat may not be as juicy or flavoursome as the grades above.

Yield grade scores range between 1.0 and 5.9 with a YG of 1.0 being the highest yielding carcase. There are four main factors that are incorporated into the USDA grading system when considering yield. These include:

- Preliminary Yield Grade (PYG)
- Carcase Weight
- Rib Eye Area (REA)
- Kidney, Pelvic and Heart Fat (KPH %).

Once these factors have been estimated some adjustments need to be done to the REA and KPH% which will affect the final yield grade. It can be easily seen that the US grading system has less factors that are tested determining the final quality grade.

Preliminary Yield Grade (PYG)
This takes into account the thickness of fat approximately ¾ of the way down the rib eye muscle. It is measured so a final yield grade can be formed after assessing the other factors above.

Carcase Weight
This is an important factor as it allows for a required rib eye area. This is how big the rib eye area should be in relation to the size of the animal.

Rib Eye Area (REA)
The next measurement is for the grader to estimate the size of the rib eye. This is measured in sq/in. A small rib eye would be 9sq/in and a large rib eye would be greater than 20sq/in. The first adjustment to the PYG is then made in relation to table 2.

Table 2. Required rib eye areas for specific carcase weights

Carcass weight (pounds)	00	25	50	75
500	9.8	10.1	10.4	10.7
600	11.0	11.3	11.6	11.9
700	12.2	12.5	12.8	13.1
800	13.4	13.7	14.0	14.3
900	14.6	14.9	15.2	15.5
1000	15.8	16.1	16.4	16.7

Adjustment of REA above

1) 00-08	25-33	50-58	75-83	0
2) 09-16	34-41	59-66	84-91	+1
3) 17-24	42-49	67-74	92-99	+2

Kidney, Pelvic and Heart Fat (KPH %)
This is when a measurement is made of the percentage of kidney, pelvic and heart fat. The score ranges between 0.5 being hardly any, to 4.5 which is a large amount of fat. The last adjustment is then made to the PYG. Table 3 illustrates this adjustment.

Table 3. Kidney, Pelvic and Heart fat (KPH) adjustment for a final yield grade

KPH %	Adjustment
0.5	-0.6
1.0	-0.5
1.5	-0.4
2.0	-0.3
2.5	-0.2
3.0	-0.1
3.5	0
4.0	+0.1

As can be seen from above, to come to a final quality and yield grade of a carcase there are many factors to be considered. It is a successful system that works well for highly marbled beef although some say it does not have a consumer friendly approach.

CONCLUSION

Meat Standards Australia and USDA grading systems play an important part in both their respective countries. MSA has been effective within Australia due to the precise grading scheme, education campaigns and general marketing techniques. There is a great opportunity for the US to incorporate some of the MSA techniques into their system. The beef industries within both countries are on a relatively similar scale. Pork and lamb are hard to compare due to the vast differences in numbers and quality of product within the two countries.

REFERENCES

MLA Australia. 2004, 'How MSA beef is graded', *Tips and Tools Meat Standards Australia,* Meat and Livestock Australia. Retrieved 17 February 2008 from www.mla.com.au

Strong, J. 2004, 'Differences in carcass grading schemes used in the USA, Japan and Australia', *Australian Journal of Experimental Agriculture,* vol. 44, no. 7, pp. 675-680. Retrieved 17 February 2008 from http://www.publish.csiro.au/?act=view_file&file_id=EA02172.pdf

Tatum, D. (1997) Beef Facts: Meat science - Beef Grading. National Cattlemen's Beef Association, Chicago, Illinois.

Thompson, J. 2005, 'Key influences of meat quality', *Meat Science,* Beef CRC. Retrieved 20 February 2008 from http://www.beefcrc.com.au/nutrition/level_j/level_j.htm

United States Department of Agriculture (1995) 'How to Buy Meat'. Retrieved 19 February 2008 from http://www.ams.usda.gov/howtobuy/meat.htm

ICMJ successes

Since its foundation in 1990 ICMJ, over 1300 students from 22 Tertiary establishments from 5 states, and 3 countries have competed at our annual contest:

- Hamilton TAFE
- Werribee TAFE
- East Sydney TAFE
- University of Western Sydney
- Murrumbidgee Agricultural College (Yanco)
- Charles Sturt University-Orange campus
- Charles Sturt University- Wagga Campus
- CB Alexander College (Tocal).
- University of New England
- Emerald Agricultural College
- University of Queensland –Gatton
- Dalby Agricultural College
- Glen Ormiston Agricultural College
- Marcus Oldham Agricultural College
- Regency Institute TAFE
- Adelaide University
- University of Sydney
- Murdoch University
- University of Melbourne
- Tsukuba University, Japan
- University of Illinois, USA
- Oklahoma State University, USA

Secondary schools meat judging competition

Since 2001, we have had a Secondary Schools ICMJ contest at Tamworth each year. We have had up to 15 High Schools compete.

- Farrer Memorial Agricultural High School
- Calrossy
- Gloucester High
- Scone Grammar
- Barraba Central
- Inverell High
- Guyra Central
- Tamworth High
- Peel Technology High
- PLC Armidale
- McCarthy Catholic College
- Wingham High
- St Josephs Aberdeen
- Carinya Christian School
- St Pauls, Kempsey

US Trip

Since 1991 ICMJ have sent a total of 82 students to the US. Since 1994 teams of 5-6 have competed in the National Western ICMJ contest at Greeley, Colorado .This follows an intensive two week tour of abattoirs and University Meat Science facilities where students judge the quality and yield of beef, lamb and pork carcasses and primals. Over this period, 19 tutor/managers have accompanied the team and assisted in the coaching.

ICMJ students

The following lists past ICMJ contestants that have continued their passion of the meat and livestock industry through further employment and studies.

Agents		
Mark	Duthie	Elders, Emerald
Andrew	McCarron	Elders
Sarah	McGrath	Elders
Sean	McGrath	Elders
Feedlotting		
Briana	Daly	Ladysmtih feedlot, Wagga
Joe	McGrath	Rangers Valley
Michael	Pitt	Smithfield feedlot
Brad	Robinson	ACC feedlot, Brisbane Valley
Anthony	Rosser	Smithfield feedlot
Elizabeth	Schafer	Charlie Lund Laglan Clermont
Livestock Production		
Peter	Carmichael	ACC feedlot, Roma
Amanda	Corney	Cattle producer
Michael	Crowley	Crowley meat & livestock
Nick	Davison	National Australia Bank
Jasmine	Edwards	ACC feedlot, Roma
Ian Gardner	Gardner	Cattle producer
Kelly	Goodridge	Cattle producer
Alex	Harrington	Colonial Mutual
Brian	Ingram	Cattle producer
Barbara	Kingsley	NT cattle station
Charles	Laverty	Cattle producer
Dom	Makim	Cattle producer
John	Manchee	Senior Cattle Judge.
Alix	McFarland	Contract livestock work
Lonnie	Stone	Cattle producer
Kylie	Thompson	Cattle producer
Cye	Travers	Wallamumbi and Jeogla.
Emily	Webb	Cattle producer
Rachel	Zinnerman	Cattle producer
Tim	Noske	Supply chain production, SA
Processing		
Todd	Amor	Teys Bros, Biloela
Merrick	Block	Northern Cooprative Meat Company
Michael	Connors	Cargill, Tamworth
Steven	Harch	Teys Bros, Biloela
Karra	Daley	Cargill, Tamworth

Ed	Labrie	JBS Swift, Townsville
Jeremy	Millar	AACo
Tony	Moore	Nippon
Mark	Samson	G & K O'Connor
Nellie	Shannon	Nolan Meats, Gympie
Kristy	Sims	BE Campbell

Research and extension

Erica	Altman	Havard University, USA
Colin	Cavanagh	Genetics research, ACT
Norman	Corkhill	Booroowa Agricultural Supplies
Garry	Edwards	QLD saleyard IT
Roger	Evans	Bovine Scanning
Hayley	Robinson	pHD, University of QLD
Ben	Hill	Catapult genetics
Angus	Hobson	Meat & Livestock Australia
Patrick	Hutchinson	MLA
James	Klarner	Angus Australia
Deanna	Leven	Catapult genetics
Mark	Hazelton	University of Sydney
Ian	McConnel	Sheep and Wool DPI
Alison	McINtosh	MLA/DPI
Kate	Neath	MLA Japan
Travis	Parsci	MLA
Alistair	Rayner	NSW DPI
Jess	Richards	NSW DPI
Krystelle	Ridley	NLRS, Meat & Livestock Australia
Gilly	Simos	Syngenta
Jean	Smith	NSW DPI
Fiona	Sparke	MLA
Sarah	Strachan	MSA/MLA
Rebecca	Underwood	MLA
Emma	Weatherley	VIC DPI

Retail

Michael	Dimiech	
Belinda	Hoksins	
Tony	Watson	

School teaching

Elisabeth	Barker	Farrer Memorial High, Tamworth
Gemma	Carmichael	St Ignatius School, Bathurst
Alexandra	Clements	St Ignatius School, Bathurst
Niaomi	Evans	McCarthy High, Tamworth
Lachlan	James	Scone Highschool
Mary	Koch	Calrossy Girls School, Tamworth

Trading

Ben	Carter	OSI Foods
Troy	Setter	Elders
Tim	Smith	Austrade NY
Scott	Williams	Henderson Mallick