Department of Employment, Economic Development and Innovation

Northern **muster**

Information for rural business in north Queensland

Producing quality food and fibre for a healthy bottom line

in this edition

Issue 29 December 2011

editorial

Welcome to the 2011 summer edition of the *Northern Muster*. An early wet season has started for many areas and our climate people tell us we have a high chance of another above-average rainfall season.

This issue includes articles on climate watch, market outlook, around the Northern Gulf, herbicide residue monitoring and the poll gene test. A *Northern Muster* reader requested the articles on MSA.

We take this opportunity to thank all our advertisers for their support, for without them we would not have a newsletter. Thank you also to our contributors and production team.

Enjoy this edition of the *Northern Muster*. Use the Business Information Centre—phone 13 25 23—for advice and to contact DEEDI staff.

We wish everyone an enjoyable festive season, a timely break in the season and rain and pastures to sustain our industry.

Please fill in the *Feedback Sheet* and send it in. Tell us what topics you would like included in future editions.

Alan Laing
Editor

Queensland Government

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Understanding the Meat Standards Australia (MSA) Grading System

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

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

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

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

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

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

Producing MSA beef

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

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

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

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

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

MSA feedback

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

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

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

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

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

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

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Making the MSA Grade

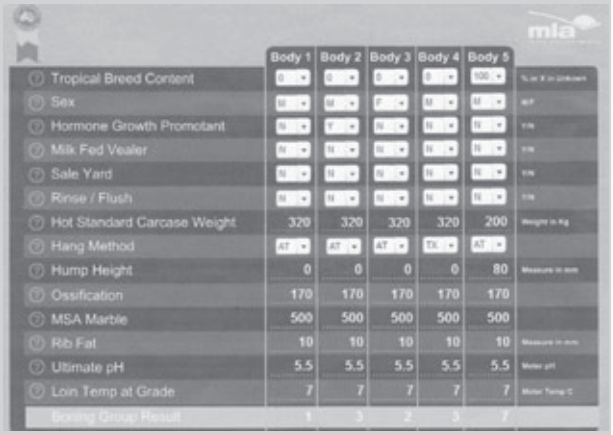
Strategies to improve MSA compliance rates should target:

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

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

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

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



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

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

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

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Australia's toughest critics agree

Implants increase profitability

"Economic analysis shows implants improve gross margin by an average of $29 per head." [2]

Lloyd Davies
Agricultural Economist

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[1]Hunter, R.A. (2009). HGP use in the Australian beef industry. Meat and Livestock Australia Project B.NBP.0397 [2]Davies, B.L. (2008) Economic evaluation of hormonal growth promotants, Meat and Livestock Australia Project B.NBP.0506
*Elanco®, Compudose® and the diagonal colour bar are trademarks of Eli Lilly and Company. EAH2020C

Climate Watch

Given the well above-average seasonal conditions experienced throughout much of Queensland last summer it is timely to review the seasonal climate outlook.

The first point to consider is that the Pacific is now in the early stages of a late forming La Niña event. This is reflected by the ongoing cooling of ocean temperatures throughout the central Pacific Ocean, persistently positive Southern Oscillation Index (SOI) values and stronger than normal trade winds. Interestingly there have been a number of occasions over the last 100 years where a La Niña event has been followed by another La Niña event. For more information try the Bureau of Meteorology ENSO wrap-up at ‹www.bom.gov.au/climate/enso› or ‹www.cpc.ncep.noaa.gov›

The second point is that the SOI was in a 'consistently positive' phase at the end of October. An analysis of historical rainfall records and this SOI phase indicates a 60–70% chance of getting above-median rainfall during the three months of November to January throughout most of Queensland.

The last time there was a consistently positive SOI phase at the end of October was in 2010. Other years since 1950 that have had the same SOI phase at the end of October include: 1955, 1962, 1964, 1970, 1971, 1973, 1974, 1975, 1983, 1988, 1989, 1996, 1998, 2000 and 2008.

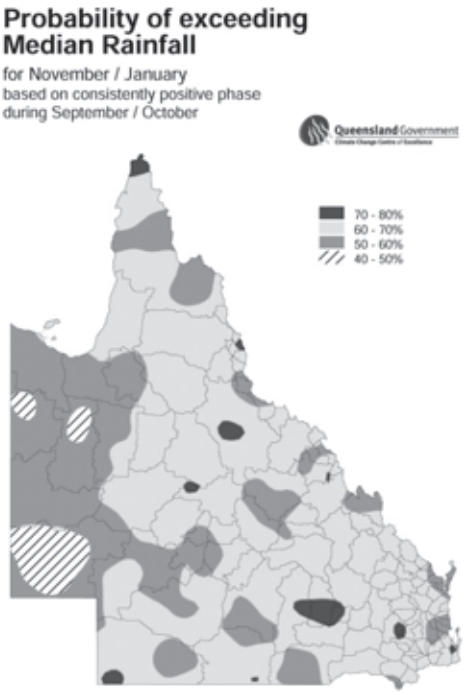
It may be useful to find out what rainfall and/or farming conditions where like in your area during November to January in those years. See how many times rainfall was well below, well above or close to average during November to January in the listed years.

For example, Charters Towers has a long-term average rainfall of 275 mm for November to January. Looking only at those years with a consistently positive SOI phase at the end of October, the average rainfall for November to January at Charters Towers rises to 375 mm. If the SOI was in a consistently negative phase this would fall to 178 mm. For more information on historical rainfall figures for your region try *Rainman Streamflow*. To order the *Rainman Streamflow* CD ph 07 4688 1200 or search on the Queensland Government Bookshop website ‹www.bookshop.qld.gov.au›

When using a climate forecast it should be remembered that the probability, or per cent chance, of something occurring is just that—a probability. For example, if there is a 70% probability of above-median rainfall, then there is also a 30% chance of below-median rainfall. It does not mean that rainfall will be 70% more than the median.

In summary, from a risk management point of view, the current outlook highlights the potential for significant rainfall over the coming summer rainfall period. While this does not necessarily equate to flooding, it is a risk that should be monitored. For more information, updates on SOI values, the latest outlook map or information on the SPOTA-1 experimental system go to ‹www.longpaddock.qld.gov.au›

Dave McRae
Qld Climate Change Centre of Excellence



Operation Clean Up helps farmers access cyclone-damaged fences

Farmers are seeing light at the end of the tunnel as Operation Clean Up (OCU) helps clear cyclone debris from fence lines and laneways.

OCU director Russell Gilmour said contractors engaged by OCU around the far north had been putting in the hard yards to clear debris from property roads and improve the roads to enable access for both farm workers and livestock.

Mr Gilmour and Department of Employment, Economic Development and Innovation climate risk director Vern Rudwick recently toured beef properties south of Mount Garnet to inspect work carried out and in progress.

"These cattle stations experienced the full wrath of Cyclone Yasi in the early hours of February 3," Mr Gilmour said.

"Come daylight they saw the huge task ahead of them.

"Thousands of fallen trees, including heavy timber, littered their properties, kilometres of fencing were downed, windmills destroyed and many head of cattle were scattered and some killed by flying debris.

Fallen trees that cluttered fence lines after Cyclone Yasi

"They have been working tirelessly each day since then clearing access roads to reach fence lines and to provide access for cattle to water and lick.

"It is good that we can provide some assistance to help them get back to business."

Producers welcomed the arrival of OCU as a helping hand for a job that was seemingly insurmountable.

One grateful producer Pat Lucey of *Marionvale* station said his family was devastated that morning.

"We thought we were never going to get over this," Mr Lucey said.

He and his son Connor rolled up their sleeves and started work, using their own heavy earthmoving machinery.

Mr Lucey said OCU's contractor provided ten days work helping to clear laneways to allow cattle to reach watering points and to make mustering easier.

"Mustering is going to be the next big job for most producers in the district because with fences down our cattle have scattered across each other's properties."

One of OCU's panel of contractors Ravenshoe/Mount Garnet district timber cutter Simon Burtenshaw and his crew of five has helped several properties bulldozing roadways in extremely tough terrain.

He has taken his D7 bulldozer up mountains and down ravines on *Glen Ruth* and *Goshen* stations to provide access to 46 km of fence line, including boundary fences.

"As a one-time ringer, I know these properties and their owners and this knowledge has been handy," Mr Burtenshaw said.

"I knew where the fence lines were and the boundaries between the properties."

Mr Gilmour said local contractors like Mr Burtenshaw were a major asset to OCU.

"By tapping into their knowledge and experience, OCU has provided the best possible service to the producers who were still cleaning up their properties six months after Yasi.

Nearby *Badjuballah* station got a helping hand from OCU contractor Tony Smith and his crew.

They are removing fallen trees and debris along more than 70 km of fence line on *Badjuballah*.

Herbicide residues – who to believe?

In most cases the more science the better when it comes to protecting the Great Barrier Reef (GBR).

However there is growing concern amongst certain stakeholders that herbicide residue readings found in inner shore reefs of the GBR are being used for political purposes.

Detection of herbicides at very low concentrations in runoff to inner shore reefs does not necessarily mean marine organisms will be affected. Sometimes this main message is lost in the current frenzy of reef research and monitoring where new technology can detect pesticide levels as small as one billionth of a gram (one nanogram) per litre.

In my experience a collaborative approach between industry, researchers and government will achieve far more than engaging in a 'blame game' that alienates those who are making real attempts to change, and fails to engage those who need to change.

There is no question graziers need to continue to strive to minimise run-off of residual, soil-applied herbicides. Herbicides such as tebuthiuron (Graslan) and hexazinone (Velpar) for woody vegetation control and atrazine and simazine used in forestry plantations and cropping land are being detected in coastal watercourses.

Australia and New Zealand Water Quality guidelines have set 95% trigger values for monitoring pesticide levels in fresh watercourses discharging into the reef. These values are set to ensure 95% of aquatic species are protected in areas of high conservation such as the reef. Occasional readings above these trigger values do not necessarily mean ecological harm but rather that further investigations and risk assessments are needed.

For example, 18 pesticides were detected in wet season flow events across eleven sub-catchments from Cairns to Bundaberg during 2009/10 (Smith et al, 2011). Only three of these pesticides exceeded the 95% trigger values. Unfortunately, some media (willingly led by certain interest groups) misconstrue these facts to infer that detection or exceeding trigger values means toxic impacts.

Herbicides used in grazing lands were detected at values less than the trigger value. During the 2009/10 wet season tebuthiuron was detected at 30–520 ng/L across seven sub-catchments. These detections were all below the 95% trigger value of 2200 ng/L. Hexazinone (used in cane and grazing) was detected at levels of 30–1860 ng/L across six sub-catchments, also below the interim trigger value of 75 000 ng/L.

Diverging views amongst the scientific community further complicates the issue of reef runoff. Some researchers are investigating new science where small residual amounts of similar mode-of-action herbicides are assumed to have an additive effect and therefore can be added together and assumptions drawn on the total figures.

These cumulative amounts are reported to exceed trigger values six times, which is double the incidence of individual herbicides exceeding these values (Smith et al, 2011). But there are concerns this method of adding residual amounts across herbicides assumes the same time period of detection.

Other scientists are doing experiments to determine what concentration and period of exposure to pesticides can cause ecological harm to a range of marine organisms. Reviews such as the recent *2011 Diuron Environment Assessment Review* by the Australian Pesticides and Veterinary Medicines Authority (APVMA) showed no risk to coastal receiving waters although there is an ecological risk to primary and secondary watercourses. Other scientists are developing mathematical models for use in ReefPlan to link herbicide runoff from paddock experiments to calculated catchment loads.

It's not surprising that amongst all this emerging research is a growing community perception that pesticides are 'bad'. There are active groups such as the National Toxics Network (NTN) lobbying to ban the use of eighty pesticides across Australia.

The grazing industry needs to be aware that there are divergent views within the scientific community and industry on the risks pesticides pose to the reef at the current levels of detection.

Again it is our hope at AgForce that as new science on pesticide impacts continue to emerge, plant science organisations, agricultural industries and governments will work towards a balance between the risk from pesticide use and the benefits to the entire community from responsible use of pesticides.

Reference: Smith R, Middlebrook R, Turner R, Huggins R, Vardy S, Warne M. 2011. *Large scale pesticide monitoring across Great Barrier Reef catchments – Paddock to Reef Integrated Monitoring, Modelling and Reporting Program*. Marine Pollution Bulletin.

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Richmond Beef Challenge tests out latest technology

In late June this year 45 steers entered the inaugural Richmond Beef Challenge at *Wilburra Downs Station*. Using the same structure as the Flinders Beef Challenge each producer entered five 0–2 tooth steers weighing between 300 kg and 400 kg.

With the help of local DEEDI officers, the group sought funding from MLA through the Producer Demonstration Site (PDS) scheme to commercially trial the latest available automated walk over weighing and remote camera technology throughout the challenge.

The animals entered the paddock on 23 June and for the first month were trained to use spear traps to enter and exit the portable panel water yard that the group had constructed. Tim Driver, from Precision Pastoral in Alice Springs, arrived in late July to set up an automated walk over weighing system that weighs the animals each time they exit the water yard. An Allflex panel reader reads each animal's NLIS tag as it crosses the scales and the tag number and weight are sent via the Telstra NextG mobile network to a website every week using Observant™ technology and software. This data is then uploaded to the group's website in the form of a graph for everyone, including the interested general public, to see how the cattle are performing. Visit ‹www.usee.com.au› and click on the link 'Looking for Richmond Beef Challenge' to access the data.

The website is managed by William and Hollie Harrington from Harrington System Electronics based at *Olga Downs*, Richmond. Will and Hollie installed two monitoring cameras—one to keep an eye on the water trough and another 2 km from the water to monitor the pasture. The water trough monitoring camera takes four photos a day while the pasture monitoring camera takes one shot every day. The photos are uploaded automatically from the cameras to the website so anyone can log on at any time to check on the water trough and pasture condition.

The average weights of each lot of five steers at entry ranged from 334 kg to 407 kg. In the first month in the paddock the steers gained 0.2–0.7 kg per day. Following the installation of the automatic walk over weigh bridge in late July the animals continued to gain weight until early September when their weight gain began to plateau. When the group observed this change from the data uploaded on the website they ordered supplement that was first fed to the steers on 24 September. The supplement was kindly sponsored by Stocklick Trading.

At the beginning of November the steers were beginning to gain weight again despite there being no significant rainfall. The group average daily gain since beginning the trial is 0.38 kg. Individual group averages vary from 0.22 kg to 0.59 kg.

Dung samples have been collected every month for faecal-NIRS analysis so that a close eye is kept on the pasture quality, which can be correlated to the weight performance of the steers. The last sample collected in late October showed the pasture in the paddock was holding on quite well with good digestibility (54%) and protein levels (6.8%).

Breeds represented in the challenge include Santa Gertrudis, Brahman, Brahman cross, Charbray, Angus, Braford, Droughtmaster and Senepol.

Watch this space for further updates in the next edition of the *Northern Muster*.

If you would like more information please visit ‹www.usee.com.au› and click on 'Looking for Richmond Beef Challenge' link below the login button or ontact the North West FutureBeef team.

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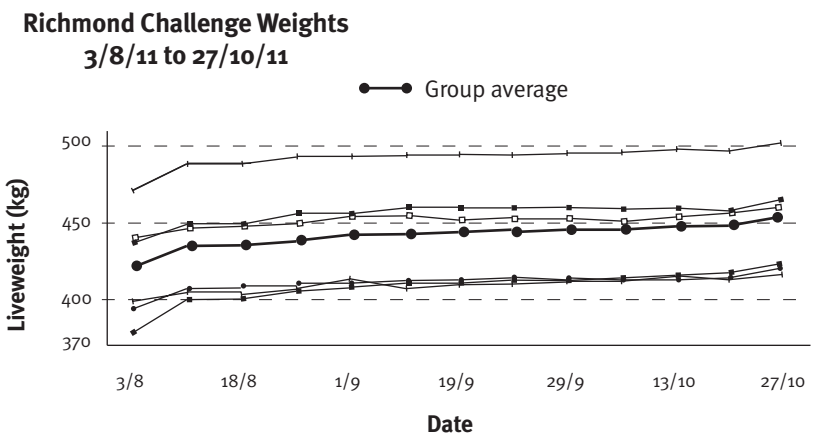

Live exports

The market situation has shown good improvement since our mid-year report. The live export situation has been turned around with the Australian Government lifting the ban they imposed back in June and some intense work by relevant industry bodies to improve the abattoir procedures in Indonesia. This includes the use of stun guns prior to slaughter at preferred abattoirs and the use of our NLIS tags to enable full traceability for welfare audits, ensuring Australian cattle are handled and processed to acceptable welfare standards.

The live export trade has rapidly picked up since the two-month shut down and we now have record prices for steers and heifers under 350 kg ($2.20 and $2.05 respectively) out of Darwin.

Operators across the supply chain including producers, transport companies, agents, holding yards, shipping companies, small businesses and the many others employed in the live trade suffered large income losses over many weeks as a result of the disruption. Beef prices in the Indonesian marketplace are at record levels, putting downward pressure on sales volumes. The manner in which the trade resumed after the ban was lifted indicates a preference for our quality, type and disease status product, and/or our prices delivered.

Our live export industries (first sheep and now cattle) have now had two major disruptions to trade because of animal welfare issues. Our industry needs to be on the front foot both at home and in overseas markets to ensure best practice is used right through the supply chain. Recently national newspapers carried an advertisement from Animals Australia on poor treatment of 'bobby calves' and we can expect this level of scrutiny into the future.

Live exports for the 2010–11 financial year were back 16% to 806 855 head, valued at $660 million. Indonesia was the main importer taking 459 186 head, followed by Turkey importing 104 355 head. In early September a new world record live cattle shipment left Australia for Indonesia with 24 683 out of Townsville and Darwin. The Wellard owned and operated *MV Ocean Shearer* is the largest livestock vessel in the world.

Chilled export market

Our EU market access for high quality grain-fed beef will increase from 20 000 tonnes to 45 000 tonnes on 1 July 2012. There are approximately 2000 EU-accredited properties and 40 accreditated feedlots across Australia. We also have an annual 7000 tonne Hilton or EU grass-fed quota. Often there is a good price premium for qualified background and/or prime cattle.

The world economic situation has not improved much since our last report. There is still plenty of bad financial news from Europe and the USA, and our shipments to Japan and the USA are running behind last year's totals.

Despite this, Australia is in the running to be the top global meat exporter in 2011. Our tonnage exported this year up to the end of August was 611 605 tonnes compared to 592 588 and 535 727 tonnes out of the USA and Brazil respectively. Russia is expected to be one of the biggest meat importers next year taking an estimated 1.06 million tonnes, followed by projected USA imports of 948 000 tonnes.

Russia is joining the 153-member World Trade Organisation and this should improve market access for Australian beef into Russia.

Domestic market

On the domestic market scene our slaughter rates have steadily improved over the last few months with better export and domestic demand, even with the volatility of the Australian dollar, which has risen and fallen sharply several times in past months. Some interesting market signals from our meatwork grids, with MSA grass bodies only 10 cents per kg dressed weight behind 100-day grain-fed MSA prices. Premium prices are for cattle dressing between 260 kg and 320 kg. As we moved into November most market reports indicated a shortage of suitable fat cattle supplies. During 2010–11, 1.42 million head passed through the MSA grading system.

Production

In our reader area we have had patchy storms with plenty of lightning. As a result there have been several bad bushfires causing problems for producers, especially if we don't have a break in the season soon.

Reasonable rains have been received in enough areas, especially in southern and central Queensland, to push the store market to high levels. Young cattle have been selling for well over $2 per kg liveweight.

Good seasonal conditions across most Queensland districts over the last 1.5 years has seen record individual average carcase weights during most months of 2011. The August average of 304.8 kg per head is a new average record for Queensland. To demonstrate the effects of higher slaughter weights: during the first eight months of 2011 Queensland processed 18 300 less head than 2010 but an additional 19 393 tonnes of beef has been produced.

Last financial year (2010–11) Australia produced 2.13 million tonnes of beef and veal from 7.34 million adult cattle and 730 000 calves. Of this 2.13 million tonne, 742 000 tonnes (34.8%) was used in the domestic market. Our domestic market consumption is 68% retail, 27% food service (best restaurants to fast food outlets) and 5% processed. Of the 68% beef used in retail, Woolworths had a 29.6% share, butchers 28.4%, Coles 20.2%, IGA 7.3%, Aldi 3.5% and others 11%. All retailers are moving to sell more products online, including meat, and Woolies have announced plans for a major push in this direction in the New Year.

A survey of Government subsidy levels to primary producers across the world reveals New Zealand farmers had the lowest level of support at just 1% of farm income followed by Australia 3%, Chile 4%, USA 9%, Canada 16%, European Union 22%, Korea 47%, Japan 49%, Switzerland 56% and Norway 60%.

Marketing

Looking at the domestic and export markets for Australian beef we would see ten carcases distributed as follows:

- 2.5 head would go to Japan
- 1.1 to the USA
- 0.9 to Korea
- 0.7 to Woolworths
- 0.7 to domestic butchers
- 0.5 to Russia
- 0.5 to Coles
- 3.1 head spread across the remaining 100 markets.

MLA's General Manager for domestic marketing, Glen Feist, is following up a big winter marketing program with a summer campaign that includes sending drink coasters branded with 'nothing beats beef' to 500 hotels across Australia plus an Australia-wide 'Beef on the BBQ' competition.

Meat Standards Australia have revised their MSA promotional material to re-engage consumers with our world class national tenderness guarantee scheme. Woolworths intend to promote the MSA technology as a key part of their marketing thrust in early 2012.

Cattle Council of Australia says it is on track to launch its Pasture-fed Cattle Assurance program in early 2012. The system has been designed to meet the US grass-fed beef and natural standards so accredited cattle will be eligible for both domestic and export markets. To be eligible cattle must have continuous access to pasture and no confined feeding, be HGP- and antibiotic-free, have lifetime traceability and be MSA graded.

Fast food company Hungry Jack's has launched a new organic beef burger in their restaurants.

USA

Very dry conditions in the USA's southern states is predicted to cause further depletion of the breeding herd and reduce the national calf drop. In the short term the drought conditions have pushed up slaughter numbers and beef production estimates for 2011 are being revised upwards to 11.99 million tonnes. The weak US dollar has made their exports very competitive and they expect to sell over a million tonnes to various export markets.

Japan

Consumer concerns about radiation contamination of beef has resulted in most major food service companies reporting declining sales figures. Australian grass-fed beef has been in good demand from the fast food, casual eatery and processing sectors but our grain-fed product has been impacted by our high dollar and stiff competition from USA feedlot product.

Negotiations are close to being finalised for the USA to be allowed to increase the age of beef they import into Japan, from 20 months old to 30 months. This agreement will put extra strain on Aussie beef sales into Japan.

Korea

The long-delayed free trade deal between Korea and the USA still has more steps ahead before the pact takes effect. At the end of October it had still not been ratified by the Korean National Assembly. Under the agreement up to 270 000 tonnes of USA beef can enter the Korean market under a declining duty level over 15 years, until eventually becoming duty free. Australia will be severely disadvantaged unless we to can reach a similar accord. At present both Australia and the USA pay a 40% tariff on all beef entering Korea.

Brazil

Beef exports from Brazil are running well below previous years (minus 16%) due to increasing domestic demand and high currency values, making their exports less competitive. The local market is also attracting exports from Australia from JBS Australia and MDH Pty. Ltd. (McDonald family). Meat cuts going into this market include rump caps, chuck crest, grain-fed cube rolls, tenderloins and striploins destined for restaurants.

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Junior Landcare features at the Barra, Beef and Bulldust Expo

Following the very first Gulf Kids Environment Day (GKED) in September, local Gulf school children were involved in more Junior Landcare activities at this year's Barra, Beef and Bulldust Expo.

Highlights from the Environment day included talks on leadership, weedbusting and biodiversity and participating in a variety of activities including waterbug monitoring, bird watching, window art, insect catching, gardening games and laser-tag. Children participated in similar activities at the Expo but with some exciting additions, including a giant board game and four computer stations with webgames on Water Watch and savannah fires, a digital microscope and a short film *Gulf Kids in the Garden*. A highlight of both events was the opportunity for children to get up close to some local fauna including a blue tongue lizard, a sugar glider, a python and even a baby crocodile!

The Northern Gulf Resource Management Group (NGRMG) was the proud host of the Barra, Beef and Bulldust Expo and Junior Landcare was a large component of the displays. NGRMG's Regional Landcare Facilitator Erica Blumson said both the Gulf Kids Environment Day and the Barra, Beef and Bulldust Expo were great opportunities for kids to get to know more about their local environment in a fun and interactive way.

Children were able to take Junior Landcare home from both events with their own show bag with lots of information and goodies like packets of seeds, a *Crikey* magazine and a *Weedbuster* activity booklet.

Photos of these events and links to Junior Landcare activities and information can be found at the Gulf Kids Webpage ‹www.northerngulf.com.au/gulfkids› For more information on Junior Landcare visit ‹www.juniorlandcare.com.au›

Erica Blumson
Regional Landcare Facilitator
Ph 0488 499 266

Emma Hegarty—profile

Beef Extension Officer, Cloncurry

Emma grew up on a property west of Longreach. After attending boarding school in Toowoomba she went on to complete a Bachelor of Livestock Science at the University of New England in Armidale, NSW.

Emma moved to Charters Towers to work for Coleman Stock Feeds. She spent her time advising producers on the nutritional management of their herds and supplement formulations and on the road working with producers on farm.

Emma then went on to study a Graduate Program with MLA and Teys Brothers (Rockhampton). With a focus on research and development within the abattoir, Emma also gained an understanding of the beef supply chain from paddock to plate and the processes required to produce a good quality product.

Emma has further developed her knowledge of the red meat industry through the Australian Intercollegiate Meat Judging (ICMJ) Program. She travelled to the USA in January 2009 as a member of the Australian team to learn about the US grading system and compete in a meat judging competition for beef, lamb and pork. She has been an ICMJ committee member since 2010 and is heavily involved in the program helping young graduates into agriculture.

She is looking forward to applying her studies and experience and working with the FutureBeef Team through the beef extension role in Cloncurry.

Emma Hegarty
Ph 0467 808 340

Lease renewal process

Around 50% of Queensland is leasehold land. Over the coming years many of the current leases will be due for renewal. In 2007 the *Delbessie Agreement* was formed between the Queensland Government, AgForce Queensland and the Australian Rainforest Conservation Society. The agreement was signed at *Delbessie Station* near Hughenden.

What does this mean to graziers on leasehold land?

If your lease is due for renewal the Department of Environment and Resource Management (DERM) will contact you about two years before the lease expires. They will do a 'desktop assessment' of your property to determine landtypes, natural features and infrastructure. For properties greater than 50 000 ha they will randomly choose 40 sites (or five sites per landtype) for assessment. Having done the desktop assessment DERM are able to ensure no sites clash with waters, roads, houses etc.

You will then be contacted to determine a convenient time for two DERM Assessment Officers to come out and do the on-ground assessments. Each site is assessed for land condition and will also consider soil condition, pasture, biodiversity, declared pests, riparian health, water quality and salinity. This assessment can take a few days to a week to complete, depending on the size of the property. If possible, go out with the team when they do their assessments to share information and the history of different paddocks as this will help them to make accurate assessments. Assessments take into account natural events such as floods, fire and drought.

Rob Hasset (DERM) spoke at the recent Barra, Beef & Bulldust Festival's Primary Producer Seminar about the lease renewal process. Northern Gulf Resource Management Group's Grazing Lands officer Erica Blumson said the seminar was well attended with some interesting questions coming out of the Delbessie session. NGRMG hope to have more sessions like this in the future to give producers more opportunities to ask questions about the decisions that affect them on the ground.

Once the Land Condition Assessment is complete a Land Management Agreement (LMA) is drawn up, which is essentially a property plan that states what land management practices you plan to use to maintain or improve the land condition on your property. A LMA is negotiable. You as the landholder can put forward how often you would like to monitor particular sites and what management activities you plan to undertake. This may simply mean putting in writing what you have been doing for many years.

DERM do the majority of the work in preparing a Land Management Agreement however it is up to the property manager to provide input to ensure that the agreement is achievable and to negotiate what is feasible to undertake. Once the lease is renewed, the leaseholder revises the LMA every five years and it is reviewed every ten years. It can be subject to periodic assessments.

If your land is maintained in good condition there is also the opportunity to have your lease extended through having an Indigenous land use access agreement and conservation agreements.

For more information on this, visit ‹www.derm.qld.gov.au/land/state/rural_leasehold/strategy›

For a fact sheet on the *Delbessie Agreement* visit ‹www.derm.qld.gov.au/factsheets/pdf/land/l201.pdf ›

AGforce Projects also offers free assistance and workshops on lease renewals ‹www.agforceqld.org.au›

Erica Blumson
Grazing Lands Officer / Regional Landcare Facilitator
Northern Gulf Resource Management Group
Ph 0488 499 266

Bushfires: *the silver lining in the cloud of smoke*

Following two extended wet seasons with above-average rainfall the abundance of pasture has seen an increased number of bushfires this dry season. While it can be difficult to remain positive in the face of blackened paddocks there can be upsides to the intense fires people have experienced.

Most native pastures will respond well to fire. Dry, rank pastures will be reinvigorated and in most areas plants will begin to shoot soon after the fire due to the sub-soil moisture from the previous big wets. The fresh growth will be of higher quality than unburnt areas and as many of you would know, cattle will prefer to graze these areas. Limiting the number of stock on these areas will encourage the growth of favorable pasture species. If possible it is best to completely exclude stock from burnt paddocks until the native pastures have set seed. As a minimum, stocking rates should be considerably reduced. This will ensure a healthy and productive pasture, which can out-compete less desirable species and help keep weed encroachment and woody weed suckers at bay.

Native and exotic species vary in their susceptibility to fire (see diagrams). Fire trials have also demonstrated that follow-up fires that occur a short time after an initial burn are highly effective in controlling undesirable native and exotic woody species in pastures.

Native species

susceptibility		
high	Gutta percha	*Excoecaria parvifolia*
↓	Bread fruit	*Gardenia vilhelmii*
	Wattles	*Acacia spp.*
	Yellow wood	*Terminalia platyptera, T. platyphylla*
	Currant bush	*Carissa lanceolata*
	Tea tree	*Melaleuca spp.*
low	Cooktown ironwood	*Erythrophleum chlorostachys*

Exotic species

susceptibility		
high	Rubbervine	*Cryptostegia grandiflora*
↓	Bellyache bush	*Jatropha gossypiifolia*
	Parkinsonia	*Parkinsonia aculeate*
	Mesquite	*Prosopis spp.*
	Prickly acacia	*Acacia nilotica subsp. Indica*
low	Mimosa	*Mimosa pigra, Acacia farnesiana*

At this trial site in the Northern Gulf, the area to the right of the track has been burned twice in recent years (in 2002 and 2003). It illustrates the effect of burning in opening up the mid-storey, which, at this site, was dominated by breadfruit. The eucalypt overstorey was not greatly altered.

Financial assistance

If you have been affected by the recent bushfires there is a process in place to apply for disaster relief funding. Freight subsidies and low interest rate loans are available and eligibility will depend on your circumstances. For more information and to find out if you are eligible for this funding please contact your local FutureBeef Extension Officers.

For more information contact the Far North – North West FutureBeef Team.

Cloncurry *Ph 07 4742 1311* ***Mareeba*** *Ph 07 4048 4600*

Grazing Industry Surveys for Reef Regions

In October DEEDI grazing extension officers started contacting 400 graziers across the reef regions as part of the annual industry benchmarking process for Reef Plan. They are asking a series of questions to understand the grazing practices commonly used and how these relate to grazing land condition. All gathered benchmarking information from producers will remain confidential. It's important to note that this is not an action associated with the reef protection legislation.

Reef Plan aims to have 50% of graziers practicing improving land management by 2013 and at least 50% ground cover at the end of the dry season. Kevin McCosker, DEEDI Management Practice Adoption Manager says this target is achievable considering the 2009 baseline report card indicated 50% of Burdekin and Fitzroy graziers are already adopting practices that maintain land in good (A and B) condition. The benchmarking process DEEDI staff use will help bridge the gap until the voluntary industry and NRM-led Grazing BMP benchmarking process is rolled out in 2012/13.

The Australian and Queensland governments have collectively invested $375 million in Reef Plan, seeking to improve land condition and water quality. Government requires feedback on the effectiveness of this investment in achieving Reef Plan targets including adoption trends in land management practices that minimise erosion and nutrient run-off.

Marie Vitelli, AgForce Reef Project Officer says this survey is a critical opportunity for industry to demonstrate to government and the wider community that graziers are very good land stewards and that the majority are already adopting best management practices.

DEEDI will also be asking questions about beef cattle production in order to better inform future research and extension work. "We hope that graziers will welcome the opportunity to share their knowledge about effective grazing practices with the local DEEDI grazing extension staff," says Marie.

The objectives of this survey are:

- To document the state of the cattle industry, which will enable industry and government to better monitor the performance of research and development through time.
- To collect information to better allow the needs of the industry to be addressed by AgForce, NRM groups and research and extension providers.
- To determine the most effective ways of providing extension information to producers and improve communication between cattle producers and DEEDI.
- To give the industry an up-to-date picture of management practices to better tailor future directions for research.

Graziers living in reef catchments in North Queensland may be contacted to undertake this survey, which will also be used to plan extension activities into the future.

If you have any further questions please call:

Kiri Broad
Far North FutureBeef Team
Ph 0428 102 841

Early storms kick off water quality project

Recent rainfall events on the wet coast and Tablelands have seen the start of wet season sampling for the Herbert River Water Quality Monitoring Project.

Initial samples were taken in the Upper and Lower Herbert catchment areas before the storms to help determine base flow levels of sediment, nutrients and pesticides in these catchments.

In late October, samples were again collected after storm events in the region and will continue to be taken throughout the 2011/12 wet season during important rainfall events.

The main objective of this industry initiative is to gather information on water quality from various land uses to assist industries in the Herbert to make informed management decisions based on independent, scientifically-robust data. Various industry stakeholders, government agencies and local governments are jointly funding Terrain NRM to manage the project for the next three years to measure how these various land uses (including urban) relate to the end-of-catchment loads being measured by DERM. Year one results should be analysed by May, 2012.

For more information contact:

Kiri Broad
Far North FutureBeef Team
Ph 0428 102 841

Fertilisers, legumes and ReefSafe Grazing

Traditional, mineral, manure, chelated trace elements, foliar, biodynamic or organic? There are numerous fertiliser types on the market and choosing the right one for your beef business can be an important but hard decision.

It is well documented that in improved pasture beef production systems, fertiliser is a must to ensure the ongoing productivity of these pastures, especially on the tropical wet coast and Tablelands where phosphorus is often an issue. As nutrients are taken out of the system with each graze or cut of hay, these must be replaced to maintain pastures and soil fertility.

Traditionally this has been achieved using synthetic fertiliser but nowadays there are many different options available. In order to compare all fertilisers on the market to see which one may fit your business, the Far North FutureBeef team, linking with the ReefSafe Grazing Project, is running a fertiliser trial.

Two sites were established in early November on the Atherton Tablelands, each with a different soil type. The trial will compare traditional fertiliser options, foliar sprays, compost fertiliser and soil biological agents to assess the effectiveness of each product in the wet grazing region. Plots will be assessed over the wet season and into next year, with measurements being taken of pasture yield, soil element analysis and soil biology.

The Far North FutureBeef team was also busy last wet season establishing trial legume plots across various properties on the wet coast and Tablelands, as a part of the ReefSafe Grazing project. These contain a variety of new and existing legumes to improve soil nitrogen levels, with the overall aim of decreasing nitrogen fertiliser use. Some of the new species are also being evaluated for their contribution to pasture quality, liveweight gain and response to grazing pressure.

In recent weeks, the team has been assessing these plots, which have established well and are currently being grazed by stock. The establishment of more trial plots is planned for the 2011–12 wet season.

Stay tuned for a results update in the next *Northern Muster*!

If you would like any information on these trials or the ReefSafe Grazing project in the Upper Johnstone and Upper Herbert please contact:

Kiri Broad
Far North FutureBeef Team
Ph 0428 102 841

Hendra virus

What is Hendra virus?

Hendra virus is a zoonotic disease, which means it can transfer from animals to people. Hendra virus can cause disease in horses but only rarely causes disease in humans.

How Hendra virus is transmitted

Hendra virus can be transmitted from flying fox to horse, horse to horse and horse to human. There is no evidence of human-to-human, human-to-horse or flying fox-to-human spread of Hendra virus.

While the actual mechanism of transmission is not known, it is thought that horses contract Hendra virus by ingesting material contaminated by body fluids and excretions from infected flying foxes.

The transmission of Hendra virus from horse to horse can occur through direct contact with infectious body fluids, or indirect contact via equipment contaminated with body fluids from an infected horse.

The few cases of Hendra virus infection in people have been the result of very close contact with the respiratory secretions (e.g. mucus) and/or blood of an infected horse. This can occur both before and after the horse develops clinical signs, as well as during autopsies. Other people have reported having contact with infected horses but have remained well and their blood tests have shown no evidence of Hendra virus infection.

Seven cases of human infection have been recorded, of which four have resulted in death.

Where the disease occurs

Hendra virus was first isolated in 1994 following an outbreak of disease at a stable in Hendra, Brisbane. Since then, more than 40 cases of Hendra virus in horses have been detected on or east of the Great Dividing Range from Cairns to northern New South Wales.

The disease in horses

Hendra virus can cause a range of clinical signs in horses and should be considered in cases where there is acute onset fever and rapid progression to death associated with either respiratory or neurological signs. The mortality rate in affected horses is approximately 75 per cent. Hendra virus is not known to infect other livestock, domestic pets or native animals.

Protective measures for people

To avoid infection, take great care regarding personal protective measures. In particular, do not make contact with the body fluids (blood, respiratory and nasal secretions, saliva and urine) and tissues of horses suspected of having Hendra virus.

Before cleaning contaminated equipment from a sick horse, cover any cuts or grazes you may have. Wear gloves while washing the equipment, and wash your hands thoroughly afterwards.

If you do have contact with possibly infected material, wash the contaminated skin thoroughly with soap and water, ideally by taking a shower. Thoroughly clean any cuts or abrasions that become exposed or contaminated. After washing, apply an antiseptic with anti-virus action, such as povidone-iodine, iodine tincture, aqueous iodine solution or alcohol (ethanol).

If you suspect Hendra virus, and potential human exposure occurs, seek medical advice immediately and contact the Queensland Health Hotline on 13 43 25 84.

Reducing the risk of horses getting the disease

Based on our current understanding of the virus, there are a number of measures horse owners can take to reduce the risk of their horses becoming infected with Hendra virus.

- Move horse feed and water containers from under trees. If possible, place feed and water containers under a shelter.
- Inspect and identify flowering/fruiting trees on your property. Remove horses from paddocks where flowering/fruiting trees are attracting flying foxes. Alternatively, consider fencing (temporary or permanent) to restrict access to the area around flowering/fruiting trees.
- Return horses only after the trees have stopped flowering/fruiting and the flying foxes have gone. Clean up any fruit debris underneath the trees before returning horses.
- If you cannot remove horses from paddocks, try to remove them during times of peak flying fox activity (usually at dusk and during the night).
- Isolate sick horses from other horses, other animals and people until you obtain a veterinarian's opinion.
- If you have more than one horse on your property, handle unaffected horses first. Then handle sick horses only after taking appropriate precautions (read more on the website in *Further information* below).
- Clean and disinfect all gear exposed to any body fluids from horses before using it on other horses. This includes halters, lead ropes and twitches. Talk to your veterinarian about which cleaning agents and disinfectants to use.
- Practise good biosecurity and do not travel with, work on or take sick horses to other properties or equestrian events.
- Do not allow visiting horse practitioners (e.g. farriers) to work on sick horses.

- Seek veterinary advice before bringing a sick horse onto your property.

Hendra virus and flying foxes

Queensland has four native species of flying foxes—grey-headed, black, little red and spectacled.

Hendra virus occurs naturally in flying foxes however there is no evidence that it can be transmitted directly from flying foxes to humans and flying foxes should not be targeted for culling.

Flying foxes are protected species and are critical to our environment. Flying foxes pollinate our native trees and spread seeds and without them we wouldn't have our eucalypt forests, rainforests or melaleuca forests.

Any unauthorised attempt to disturb flying fox colonies is illegal. Disturbing flying fox colonies to reduce the risk of Hendra virus transmission to horses is ineffective because:

- Flying foxes are widespread in Australia and are highly mobile.
- Attempts to disturb or cull flying foxes could worsen the problem by stressing them and potentially causing Hendra virus excretion.
- There are more effective steps people can take to reduce the risk of Hendra virus infection in horses and in people.

Further information

Hendra virus information and updates at ‹www.dpi.qld.gov.au/4790_15093.htm›

Your local DEEDI Biosecurity Officer or DEEDI Business Information Centre on 13 25 23.

Drench resistance in beef weaners

In the past, the impact of worms on beef weaners in Queensland has been successfully controlled with long-acting formulations of anthelmintics (drenches) conveniently applied as pour-ons and injections.

Recently, resistance to drench treatments was identified in subtropical and tropical worms of both beef and dairy cattle weaners for the first time in Australia. Agri-Science Queensland researchers found worms were resistant to the long-acting Macrocyclic Lactone (ML) drenches. Drenches containing this active ingredient type are among the most commonly sold in Queensland.

In 2009 and 2010 beef calves aged between seven and ten months and carrying natural worm infections were tested for resistance to drenches from the:

- Benzimidazole (BZ) group
- Levamisole (LEV) group
- Macrocyclic Lactone (ML) group, i.e. either Ivermectin (IVER) or Moxidectin (MOX).

Faecal Egg Count Reduction Tests (FECRTs) were conducted on three beef cattle properties and one dairy property in south-east Queensland. Dung samples were collected from individual animals at day 0 and day 10 post-drench for faecal egg count and resistance calculations.

Cooperia punctata was the predominant nematode on all properties although significant numbers of *Haemonchus placei* were also present. ML resistance in *H. placei* was found against IVER on one of the beef properties. ML resistance in *H. placei* and *C. punctata* against IVER and MOX was identified on the dairy property.

These results confirm that repeated use of drenches from the same chemical family group leads to worm resistance in beef cattle. It also reinforces the importance of using integrated parasite management strategies to ensure drenches remain effective.

This can be achieved by spelling weaner paddocks or grazing weaner paddocks with adult cattle, and using the LEV and BZ drenches for worm control if you are using ML products for lice, tick and buffalo fly control. A multi-active pour-on drench product will become available in the near future.

Producers also need to be aware that there are many different brand names of drenches but only three active ingredient types, namely the BZ, LEV and ML groups. Always read the active ingredient list on the drench label before you purchase the product.

In addition, using the faecal worm egg counting service of the WormTEST laboratory at the EcoSciences Precinct at Boggo Road, Brisbane before drenching will help producers to identify whether worms are a problem and if animals need to be drenched. This service is very cost-effective compared to the overall cost of drenches. A further option is to use a WormTEST at day 10 after drenching to determine whether the worm burden has been cleared by the drench. Further analysis can be carried out if a problem is found.

Staff at the WormTEST laboratory, in conjunction with local beef extension advisers, are available to assist producers in monitoring the current worm situation and developing integrated management systems to suit individual properties.

Wayne Ehrlich
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WormTEST laboratory
Ph 07 3255 4241

The Australian Poll Gene Marker test

The Australian Poll Gene Marker test was developed by the Beef CRC in partnership with CSIRO, MLA, the Animal Genetics and Breeding Unit and the University of Queensland Animal Genetics Laboratory. This article describes the test's accuracy and how the Australian Poll Gene Marker test can be used.

Producers now have a tool to identify breeding animals which will consistently produce polled progeny. The test also identifies carriers of horned genes. The test has been developed in tropically-adapted breeds, though results suggest that producers of some *Bos taurus* breeds may also be able to take advantage of the test.

Which breeds can use the test?

The test can be most accurately applied to Brahman cattle, where 89% of animals tested will return an informative or non-ambiguous result. In British and European breeds a higher percentage of animals can return an ambiguous result. The Australian Poll Gene Marker test is based on a marker linked to the polled gene.

A high level of informative results is likely from Brahman, Santa Gertrudis and Droughtmaster animals. *Ask the laboratory regarding your own breed*.

While some marker results are nearly always associated with polled and some marker results are nearly always associated with horned, there are also some ambiguous marker results for which the association between polled and horned cannot be determined.

Who performs the test?

The Australian Poll Gene Marker test is available through the University of Queensland's Animal Genetics Laboratory at its Gatton campus, or through Pfizer Animal Genetics Laboratory based in Brisbane.

Definitions of relevant terms

The DNA marker test for polled genes identifies multiple allele DNA fragments that are not directly responsible for polled status. These are called markers and are closely associated with the actual polled gene. In different breeds the strength of this association varies, giving rise to ambiguous alleles.

Allele describes the smallest unit of the genetic code. In this discussion, alleles will be described as 'P', coding for polled status, or 'H' for horned.

Genes contain two alleles, and are the smallest unit that determines phenotype. Here genes will be described as PP: carrying two copies of the polled allele, PH: carrying one copy each of the polled and horned allele, and HH: carrying two copies of the horned allele.

Genotype is a description of the two alleles that make up a gene. PP, PH and HH will be the three possible genotypes for polled status discussed.

Phenotype describes the trait as observed in the animal. Phenotype is affected by both genetics and environment.

Homozygous describes genes which contain 2 copies of the same allele. PP and HH are homozygous genotypes for polled and horned status respectively. For homozygous animals there is only one possible allele which can be passed on to their progeny.

Heterozygous describe genes that contain one copy of each allele (i.e. genotype PH). Heterozygous animals can pass either a P or an H allele on to their progeny.

Ambiguous describes markers that are related to both polled and horned status. These occur at different frequencies in different breeds.

Conclusion

The DNA marker test for polled genes provides producers with a powerful new tool for making selection decisions. Producers weighing up the value of DNA marker tests for polled genes in their herds need to weigh the cost of testing against the expected proportion of ambiguous results for their breed. *Using PP tested polled bulls will result in desirable polled genes dominating the herd quicker than if PH polled bulls are used*.

Cost of testing may be reduced by going through your breed society.

Further information

‹www.beefcrc.com.au/Assets/785/1/PollGeneTechnicalReport27-6-11.pdf›

Beef CRC website
‹*www.beefcrc.com.au/PolledGeneMarkerTest›*

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North Queensland beef producer, Tom Mann, *Hilgrove*, Charters Towers initiated the idea of a genetic test for polled tropically adapted cattle in 2003. Tom also contributed financially to the project that developed the test.

Many thanks are due to Tom's initiative.

UQ Animal Genetics Laboratory

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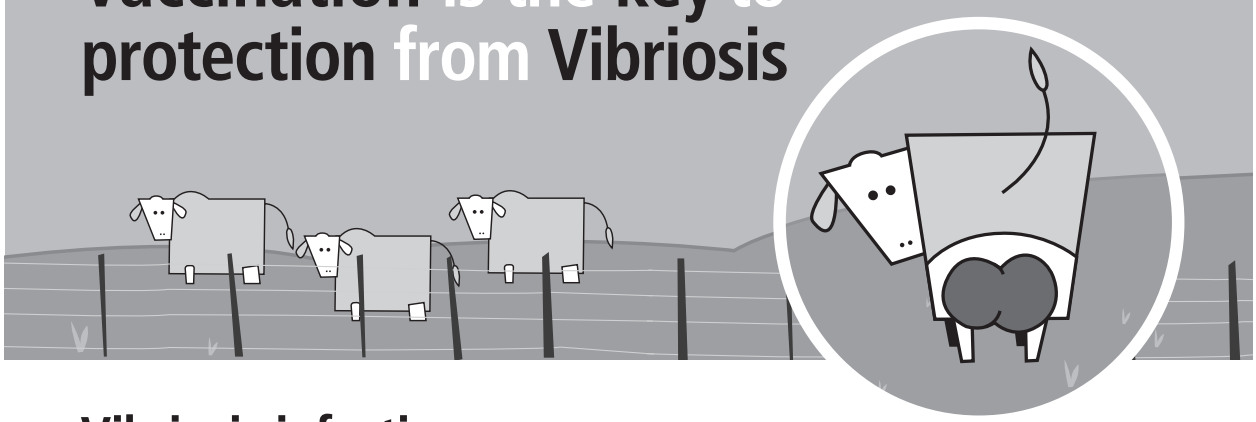
Vaccination is the key to protection from Vibriosis



Vibriosis infection

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