Beeftalk

Taking stock of your future

Prime news and views for beef producers of South East Queensland

Issue 35 Autumn/Winter 2013

in this issue

editorial

Beeftalk goes electronic! Beeftalk was first mailed to 10,000 readers in 1996. After 17 years this will be the final hardcopy version to be mailed out.

Beeftalk will now become a free online newsletter. To receive your next and all future editions automatically by email, simply go to the FutureBeef website at www.futurebeef.com.au and on the right hand side you'll see a 'Sign Up' box. From here you can sign up to receive Beeftalk as well as a range of other eBulletins.

It's quick and easy, so please register now. You can also access past copies of Beeftalk and our other newsletters from the website. If you have a smart phone, try scanning this QR code ('quick response' code) to take you straight to the sign-up page.

Over recent years there's been rapidly growing use of the internet, social media and tools like Smartphone apps and webinars in the Australian beef industry. Last month, we organised our first 'Beef Connect' webinar (a free online seminar) in collaboration with online news group, Beef Central, about using Twitter in the beef industry. More than 320 people registered, allowing them to view and listen to a range of industry perspectives from the comfort of their home or office! You can view all past recorded webinars at www.futurebeef.com.au. You can also see what events are coming up by going to the 'Events calendar'.

If you're hearing or seeing a bit about 'FutureBeef' but you're not sure what it's about, the FutureBeef Program for Northern Australia (which includes all of Queensland), is a coordinated extension partnership between the Queensland Department of Agriculture, Fisheries and Forestry (DAFF); the Northern Territory and Western Australian state agriculture departments, and Meat & Livestock Australia. This means that we are focusing our collective resources on the priorities that the northern Australian beef industry has identified for it to be sustainable and viable. The FutureBeef website is just one way we are making relevant research-based information more accessible and supporting the services that beef extension officers provide around the state.

Now that Beeftalk will be in an electronic format, feedback to date tells us that readers would prefer to receive online articles regularly, every month or two, rather than the entire newsletter biannually. As always we welcome and value your feedback and suggestions so please keep sending them in.

While on feedback, the winner of the Beeftalk 34 edition Grazon™ feedback prize, kindly supplied by Nick Koch of Dow AgroSciences Australia Ltd, was the Arthy's of Lamington. We hope that you enjoy this last hardcopy Beeftalk edition and register soon to receive future ebulletin Beeftalk articles.

Happy reading! The Beeftalk Team

Seasonal outlook

As at the end of March 2013 the Pacific Ocean remains in a neutral state (neither El Niño nor La Niña). This is reflected by sea surface temperatures, trade winds and tropical cloud patterns generally remaining at near neutral levels since late 2012. The exception is the SOI which has trended strongly upwards since the end of summer. However this is more due to the recent passages of the MJO, re-development of the monsoon trough over the Australian tropics and significant high pressure systems over the central Pacific rather than an early indicator of a possible La Niña.

SOI values are expected to return to more neutral values (between plus 5 to minus 5) before mid-winter. In terms of looking out to the next few months, the international couple ocean-atmosphere climate models reviewed indicates the current neutral climate pattern is likely to remain. Of the 7 models reviewed, all indicate the continuation of a neutral climate pattern through to the end of July.

However, as autumn and early winter is the key time of the year for the development of climate phenomena such as El Niño and La Niña it will be worth watching what occurs over coming months. For example if the SOI trended into strongly negative values and remained there it would be a warning sign for a likely dry winter/spring.

For SOI updates or the latest seasonal outlook, visit www.longpaddock.qld.gov.au Otherwise try the ENSO wrap-up at www.bom.gov.au/climate/enso

Product update

For those interested in more specific climate and pasture condition information for their location, 'FORAGE' is accessible via the Queensland Government Long Paddock webpage. FORAGE incorporates products such as SILO climate data, Landsat Satellite Imagery and the outputs from the GRASP and AussieGRASS grazing system models.

Users can request a Rainfall and Pasture Report, Ground Cover Report or satellite imagery products such as Bareground Index and Foliage Projective Cover Report.

To access FORAGE go to www.longpaddock.qld.gov.au

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Pasture flood recovery information on FutureBeef website

A presentation and discussion about pasture recovery following floods was recently posted on the FutureBeef website.

Stuart Buck (Senior Pasture Agronomist, Department of Agriculture, Fisheries and Forestry) covered the tolerances of grasses, various management options including pasture spelling, controlling weeds, reseeding pasture and forage crop options. Key points include:

- Pastures in good condition before flooding recover faster than those in poor condition
- Immediately adjust stocking rates to match feed availability and reassess grazing management
- Control weeds in high numbers
- Wait 2–3 weeks to determine if re-seeding is necessary
- Healthy pastures with recently set seed are unlikely to need re-seeding
- Avoid adding silk sorghum/forages to pasture mixes
- Avoid flying pasture seed mix onto receding flood waters
- Dedicated forage crop will provide short term feed and allow spelling of permanent pastures

To view this presentation and other topics on the FutureBeef website visit http://futurebeef.com.au/resources/multimedia/#pasturefloodrecovery

Land condition critical to long-term productivity

Land condition is one of the most important factors influencing the long-term productivity potential of paddocks. The capacity of land to respond to rain and produce useful forage is a measure of how well the grazing ecosystem is functioning. Land condition includes three components:

- Soil condition—the capacity of the soil to absorb and store rainfall, to store and cycle nutrients, to provide habitat for seed germination and plant growth and to resist erosion
- Pasture condition—the capacity of the pasture to capture solar energy and produce palatable green leaf, to use rainfall efficiently, to conserve soil condition and to cycle nutrients and
- Woodland condition—the capacity of the woodland to grow pasture, to cycle nutrients and to regulate ground water

There are four classifications of land condition—A, B, C and D—with progressive deterioration from A to D as indicated in the table below. Land condition also relates to the ability of land to persist and recover following disturbances such as drought, wildfire, overgrazing, floods or infestation by pests or disease.

Stability is enhanced by promoting diversity in vegetation and improving land condition, as opposed to pushing land so hard that it passes a threshold that constitutes a point of no return. Maintaining a high density of perennial grasses is the key to good land condition. The Grazing Land Management (GLM) workshop looks at how to encourage grasses that meet the '3P' criteria – perennial, palatable and productive.

Land condition	A	B	C	D
Cover of 3P grasses	Good	Some decline	General decline	General lack
Weed infestation	Not significant	Increase in less favourable grasses and weeds	Large amounts of less favoured species	Hostile environment for plants
Erosion, soil surface condition	No erosion, good	Some signs of erosion and decline in soil condition	Obvious signs of erosion or susceptible	Severe erosion
Woodland thickening	None or early signs	Some thickening	General thickening	Many thickets
Carrying capacity potential	100% of potential	75%	45%	20%

Source: MLA booklet *Grazing land management: Sustainable and productive natural resource management*. This and other titles, listed below, are available at www.mla.com.au, (or Google search the title) or by contacting the MLA on 1800 023 100.

Grazing management is all about managing the numbers, type and location of animals on the property. Planning for grazing will ensure that each paddock (or land type) receives the intensity and timing of grazing that suits long- and short-term cattle production as well as land condition goals. Managing utilisation is the key to improving land condition. Better grazing management is a combination of:

- Balancing forage growth and use so that land condition is improved
- Accurate assessment of pasture quality and quantity
- Accurate assessment of animal demand for forage
- Optimisation of water point distribution and paddock design
- Management of stocking rates to reach production and land condition targets.

Additional titles include:

- *A guide to best practice husbandry in beef cattle —Branding, castrating and dehorning*
- *Beef cattle nutrition: An introduction to the essentials*
- *Managing the breeder herd—Practical steps to breeding livestock in northern Australia*
- *Water medication a guide for beef producers*
- *Using hormone growth promotants to increase beef production*

Stocktake Plus—pasture management app for graziers

What is Stocktake Plus?

Stocktake Plus is a grazier decision support tool, which allows the user to monitor land condition, stock number and rainfall. It also has a forage budgeting tool to help calculate the right balance of stock to pasture available. Stocktake Plus also produces reports for all records kept, including long-term 'benchmark' carrying capacities for paddocks and properties.

The Stocktake Plus app has been developed after extensive industry consultation and is designed to be a practical, work-anywhere (including outside phone range), decision support tool to help with some key grazing land Best Management Practices. The app is available for both Apple and android devices and is FREE to all users.

It's an initiative of the Department of Agriculture, Fisheries and Forestry (DAFF) through the FutureBeef Program for Northern Australia and Meat & Livestock Australia, and is now available for use for all northern Australia beef producers. FutureBeef is a coordinated extension and communication program between DAFF, Northern Territory and Western Australia state government beef extension services, and Meat & Livestock Australia. The program brings together practical, research-based information, tools and tips for producers to improve their productivity and profitability.

Stocktake Plus represents the next generation in FutureBeef decision support tools. It is based on the previous and well respected Queensland Government Stocktake monitoring software but has been improved to allow the user to complete monitoring and calculations while in the paddock, for an immediate result.

The app also has a number of in-built support tools including land type sheets, pasture yield photos, ground cover photo standards, accessible yield sheets. Basically, everything you need to do with monitoring in the paddock is now within your smartphone or tablet. Having all this in one device and in one app is more efficient than being in the paddock and realising you have forgotten the pasture photo standards, your GPS, or camera needed to complete your assessment!

FutureBeef STOCKTAKE PLUS

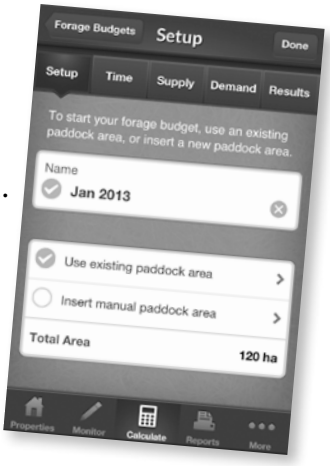
The Stocktake Plus app:

- Assists in monitoring grazing land condition by logically guiding the user through the process, storing information, producing reports including long-term carrying capacity calculations based on the information entered
- Guides the user through a basic or more detailed forage budget
- Stores rainfall records
- Stores stock numbers—converts to AEs, displays current stock on land condition reports and can bring stock numbers through to the demand section of the forage budget
- Directs users to their monitoring sites using the GPS function
- Helps the user identify what land type they are on, using the land type mapping of Queensland
- All information is backed up securely on the internet (only accessible by the user).

Each function can be used independently, so selected functions e.g. forage budget, can be easily accessed. Similarly, linking all the information entered from monitoring stock, land condition and rainfall, is also possible.

The app was designed to be visual, logical, easy to use and, importantly, to work without the need for 3G/4G phone reception.

Stocktake Plus has been developed specifically for graziers and agricultural advisors in Northern Australia (Queensland, Northern Territory, the Kimberley and Pilbara of Western Australia), however it has partial functionality for those in other regions of Australia. Users in other regions can still establish their own monitoring sites and produce reports in the same manner; reports will simply not calculate pasture growth and long-term carrying capacities. Forage budgeting and rainfall recording will have full functionality no matter where the user is.



Look for Stocktake Plus on you app store and/or visit www.stocktakeplus.com.au.

For more research-based news and information, tools, eBulletins and events for the northern beef industry, visit www.futurebeef.com.au

Nitrogen boosts productivity in 'rundown' pastures

Pasture productivity decline or 'rundown' is widely recognised in sown pastures, especially in buffel. The grass doesn't grow as high as it used to, it gets thinner, paler and yellow or may have even stopped flowering and producing seed. These are classic signs of the 'rundown' that has reduced pasture production by up to 50% in many cases.

More than 180 graziers have attended a series of 15 workshops across central and southern Queensland to understand why 'rundown' occurs and how to manage it. A series of on-farm trials across Queensland this year have shown how dramatic rundown can be and confirmed that nitrogen is the key to fighting back.

Many workshop participants have applied nitrogen to their pastures to see what impact it has. The results from adding ~100 kg N/ha have been dramatic. All the pastures have become much greener and many produced plenty of seed (refer photo 1). Those that were measured had significantly higher protein levels. Not surprisingly, the fertilised strips were all heavily grazed by cattle (and roos) that sought out the better quality feed. Most paddocks (30 out of 38) produced more grass, sometimes doubling biomass yield between January and May (refer Table 1).

All sown pastures will suffer rundown at some stage and the only long-term solution is to get more nitrogen into the system. This usually means getting legumes into the grass only pastures.

Buffel grass responding to applied nitrogen.

Establishing legumes into grass pastures is not easy but with better agronomy in recent years significantly more successes have been seen. Leucaena growers have led the way and shown better results are achieved by giving our legumes a chance with soil preparation and weed control.

Using some of the methods developed to establish leucaena, e.g. removing grass competition and storing soil moisture before planting, will dramatically increase the reliability of establishment. The quicker legumes are established, the sooner nitrogen is added to pastures and animal weight gain increases.

The rundown team has helped graziers assess the impact of rundown on 43 different paddocks this year. Each grazier was given a handheld fertiliser spinner and a bag of *Green urea*™ to spread on their pastures. Rain is needed to wash the product into the ground and start working but the formulae will last on the soil surface for up to 14 days before the nitrogen starts to break down and be lost. It's easy to do and gives a good indication of how rundown is affecting pasture. This work has lead to a project proposal to investigate the economics of fertilising pastures for commercial beef production.

Table 1. Green urea fertiliser strips show the effect on different grass species on one property at Bell, southern Queensland

Grass	Fertiliser	Dry matter		Colour	Flowers/seed	Protein
	kg N/ha	kg/ha	% increase	0-10[a]	0-10[a]	%
Qld bluegrass	0	2090	---	3	2	3.1
	50	4936	136%	6	6	---
	100	6753	223%	7	7	8.2
Bambatsi	0	1682	---	4	2	6.5
	100	6535	289%	8	8	12.9
Green panic	0	9406	---	2	4	4.6
	100	21932	133%	7	7	7.4
Rhodes	0	3016	---	1	3	4.2
	100	9429	213%	9	8	11.7
Creeping bluegrass	0	2809	---	3	2	3.5
	100	6780	131%	9	4	8.3

[a] Scale of 0 being yellowest colour / no seeds to 10 being greenest / most seeds ever seen.

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Factors affecting soil carbon inputs to pastures

Soil organic carbon inputs are controlled by the type and amount of plant and animal matter being returned to the soil.

Any practices that enhance pasture productivity and the return of plant residues (shoots and roots) to the soil opens the input tap, re-filling the bucket and the amount of carbon in the soil. The majority of carbon enters the soil as plant residues.

Plant residues, and thus soil carbon inputs are mainly affected by:

- the type of pasture plants being grown e.g. 3P grasses and legumes;
- the amount of dry matter the plants accumulate over the growing season; and
- environmental factors which govern pasture production.

Soil carbon can also be topped-up by direct application of organic materials to the soil. Examples include feedlot or deep-litter poultry manure, plant debris, composts, biosolids, with 'biochar' attracting interest because of its potential.

Practical 'Carbon Farming' examples for grazing landholders to increase soil carbon inputs or reduce losses:

- pastures dominated by deep-rooted 3P pasture grasses and legumes enhance dry matter production and the pasture's resilience to climate extremes
- high populations of pasture legumes to fix atmospheric nitrogen via nodulation and therefore increase soil nitrogen levels and enhance pasture dry matter production
- wet-season spelling to maximise the build-up of grass root carbohydrate reserves during the peak growth period of the year
- conservative stocking rates which maintain a pasture plant and mulch cover on the soil surface all year round
- management practices e.g. groundcover, which slow water movement and reduce raindrop splash and therefore maximise water infiltration rates into the soil and minimise runoff
- management practices e.g. off-stream and off creek flats watering points to retain sediments and nutrients on the paddock to produce more pasture dry matter
- management practices which minimise topsoil and organic matter losses from the paddock via sheet or gully erosion processes
- management practices e.g. using low-risk parasiticides, to optimise dung beetle populations to bury the dung over summer, reduce nutrient losses from the paddock and thereby produce more pasture dry matter
- no hay, stubble or manure removed from the pasture paddock.

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Research update: Climate Clever Beef

In 2011 generating electricity produced about 51% of Australia's green house gas emissions while agriculture and transport each produced around 15%. Livestock produced about 70% of agricultural emissions, largely due to methane from cattle and sheep.

This begs the questions: Can we produce as much or even more beef while lowering gas emissions and improving soil carbon levels and profit? What are the farm practices and technologies that will do this? Can these practices be used for receiving carbon credits within the Carbon Farming Initiative (CFI)?

For the expansive northern grazing industry, the Australian Department of Agriculture, Fisheries & Forestry (DAFF) funded 'Climate Clever Beef' project will trial and measure the impact of practical on-farm options aimed at reducing methane emissions and increasing soil carbon sequestration while maintaining or improving productivity. State and territory governments will partner to target large and diverse regions across northern Australia. In Queensland, the project is focussed on the Gulf, Fitzroy, Mitchell grass, Channel Country and Maranoa Balonne regions while in the Northern Territory it takes in the Victoria River District, Douglas Daly and Barkly.

Examples of practices to improve whole-of-life and herd efficiency include improved pasture management, use of legumes, resilient grazing systems, flexible stocking rates and strategic

supplementation to achieve earlier turnoff. Foetal aging is a practice that will improve herd efficiency by indentifying and removing non-productive breeders which are belching methane into the atmosphere for no return. Soil carbon can be increased with reducing hot, destructive fires, woody weed regrowth retention, rehabilitating degraded land and the use of grazing systems that increase ground cover and perennial grass density.

Project results will be compiled into a set of case studies and fact sheets to outline the best practice recommendations and provide real world examples.

This project will build on the experience, processes and networks developed in the previous Climate Clever Beef project and Northern Grazing Systems projects to assess ways to reduce the greenhouse impact of beef businesses, cope with climate variability, improve land condition and increase business profitability. More information can be found at http://futurebeef.com.au/resources/projects/climate-clever-beef/.

More information

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Positive land management results for grazing industry

The Department of Agriculture, Fisheries and Forestry (DAFF) has been undertaking individual surveys of reef region graziers to gauge how effective on-farm practices are in protecting the Great Barrier Reef. The ReefPlan targets encourage incremental change towards 'A' and 'B' level grazing management practices and the survey helps measure this change.

Results for the 2011 Benchmark Report represent a positive outlook for Queensland Graziers with the majority being able to demonstrate good land management practices that present low risk of soil erosion and poor water quality outcomes for the Great Barrier Reef.

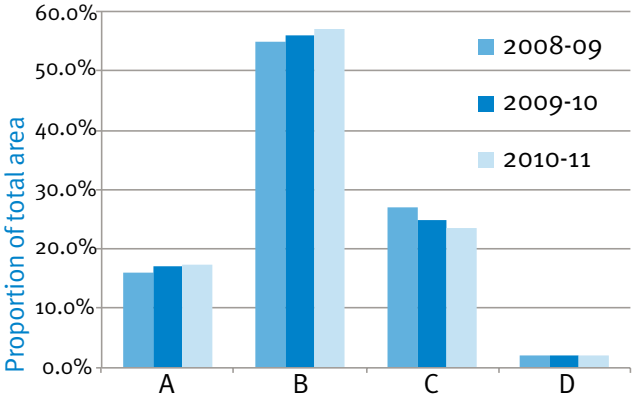

Figure 1. Results of data collected through the Grazing Management Practice Adoption Surveys

Graziers whom have attended a Grazing Land Management (GLM) workshop are familiar with rating their land condition from 'A' to 'D' and are also aware that land in 'A' condition is twice as productive as land in 'C' condition.

The grazing industry surveys are attempting to relate the on-ground management practices used by graziers to their likely effects on groundcover, soil erosion and land condition.

More than 70% of respondents are using grazing management practices likely to maintain or improve land in A and B condition which represents low to very low soil erosion and water quality risk. It is encouraging to see the trend away from practices likely to degrade land to poor (C) or very poor (D) condition which increase soil erosion and water quality risks.

DAFF Queensland's Management Practice Adoption Program Leader, Kev McCosker said while there has been a good response to the initial round of surveys, continued industry wide support from graziers would be beneficial.

"Information on Queensland's grazing industry practices is very important. It will improve the delivery of research, development and extension services and go towards evaluating how well the industry is faring in regards to meeting ReefPlan targets," Mr McCosker said.

"The 2011 Benchmark report confirmed that the industry is already well on its way of meeting the targets with over 50% of surveyed graziers already adopting practices that maintain land in good to very good condition or improving land in lesser condition, which demonstrates that graziers are good land stewards."

Graziers wishing to participate in the Grazing Survey are encouraged to contact the Department to register their interest. The surveys are strictly confidential, take approximately 1.5-2 hours on property and cover the key areas of grazing land, herd and business management, animal health and extension needs.

Graziers looking to evaluate their individual property's land management practices to identify specific improvements can also take part in the Grazing Best Management Practice (BMP) Program. This program helps property owners develop action plans to improve the economic and environmental performance of their enterprise. To register, visit www.grazingbmp.com.au.

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Weedy Sporobolus grasses—best management practices

Giant rat's tail (GRT) grass and other weedy Sporobolus grasses are aggressive grasses that can reduce pasture productivity and cause significant degradation of sown and native pastures and natural areas. Giant rat's tail grass is a Class 2 declared pest plant under Queensland legislation.

The 5 Weedy Sporobolus grass species are;

- Giant rat's tail grasses—*Sporobolus pyramidalis* and *Sporobolus natalensis*
- Giant Parramatta grass—*Sporobolus fertilis*
- Dwarf Parramatta grass—*Sporobolus africanus*
- American rat's tail grass—*Sporobolus jacquemontii*

Best management practices

Recommended control methods vary with both weed populations and land capability (see table 1).

Spot-spray techniques

- Spot-spraying with Taskforce—glyphosate should only be added as a chemical marker at very low application rates e.g. 1 mL/L (about half the rate as Taskforce)
- 'Tramlining' techniques are significantly more effective than spraying 'higgledy piggledy' at random
- 'Tramlining' does not require the addition of a chemical or a dye marker
- Avoid spot-spraying with flupropanate during the summer wet season

Withholding periods for grazing and slaughter

- The herbicide flupropanate e.g. Taskforce is a highly soluble root uptake chemical
- The grazing withholding period for spot-spraying is at least 14 days
- The grazing withholding period for broadacre spraying e.g. boomspray, is at least 4 months
- The slaughter withholding period for a flupropanate treated paddock is at least 14 days (to allow time for the animal to urinate any chemical residues).

Preventing the spread of GRT seed

- Quarantine cattle for a minimum of 5 days when moving them from infested to clean paddocks or to another property (up to 30,000 seeds in the dung on Day 1)
- A designated 'quarantine' paddock would be especially reserved for grazing by contaminated cattle moving from infested to clean paddocks
- A stock-proof fence plus a 10 m wide clean buffer strip (and kept clean) has been shown to hold 99% of GRT seed spread
- Clean down machinery and vehicles to remove seed before moving to clean paddocks or clean properties

Dry season spraying

Spray flupropanate herbicide in the lower rainfall winter/spring months e.g. May to November, to reduce the risk of heavier falls of rain washing the herbicide away from the root-zone.

Table 1. Recommended control methods

Population of GRT	Control
Very low e.g. up to 100 plants/paddock	Grub out the stools, bag them up, tie the bags, remove from the paddock and destroy the intact bag.
Low to Medium e.g. up to 2000 plants/ha	An 'effective spot-spray threshold' is about 1000 to 2000 plants/hectare e.g. 1 to 2 plants/10 square metres (i.e. the size of a small bedroom). Spot-spray with flupropanate e.g. Taskforce®, at 2 mL/L of water.
Dense e.g. more than 2000 plants/ha	On arable land—cultivate and crop for several years and spot-spray the headlands with Taskforce. On marginal arable land—fodder crop for a couple of seasons using reduced tillage techniques to minimise soil erosion; spot-spray the headlands. On non arable land—boomspray with Taskforce @ 2 L/ ha. On steep inaccessible land—helicopter spraying or aircraft applied pellets.

Pasture recovery techniques

Consider pasture improving heavily infested paddocks in the year prior to boom-spraying with flupropanate, or alternatively over sow the treated paddock in the summer post-treatment while the GRT stools are still dying. Bisset bluegrass, Katambora Rhodes and Wynn cassia are recommended pasture species for over sowing. Note that flupropanate has a plant-back delay period for grass seedlings.

For more information

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'Giant rat's tail grass' http://www.daff.qld.gov.au/4790_7288.htm or DAFF 13 25 23 (This note has links to more detailed fact sheets and the "Weedy sporobolus grasses best practice manual")

Beware sorghum grass poisoning in horses

A recent spate of sorghum grass poisoning, and the irreversible damage that it causes, is a reminder of the dangers of horses grazing forage sorghum. Toxicity is associated with grazing foliage, not with eating seeds. Some forage sorghums contain a warning label against horse grazing.

'Equine sorghum cystitis—ataxia syndrome' is associated with grazing by horses. Ataxia is a 'lack of muscular coordination'. Typical signs of sorghum poisoning in horses include loss of nerve function to the hind leg and bladder. It's most obvious when horses demonstrate an inability or reluctance to back up. If the horse can't urinate normally, constant urine dribbling will predispose the horse to cystitis.

In mares, periodic opening and closing of the vulva also occurs. Urinary irritation can give the appearance that mares are in oestrus. Horses develop paralysis and incoordination after grazing for several days on rapidly growing sorghum forages. Affected horses may stumble or drop to the ground momentarily if forced to exercise.

Treatment of sorghum poisoning in horses involves:

1. removing them from pasture.
2. treating cystitis with antibiotics.

Recovery is unlikely if ataxia is present, due to irreversible nerve damage.

Sorghum grasses include all classes of forage: Sudan grass, Johnson grass, hybrid forage sorghums, and grain sorghums. Sorghum in the green growing stages give horses urinary tract disease called cystitis syndrome or cystitis/ataxia (staggering). The disease is irreversible and believed to be associated with low levels of cyanide (prussic acid) in forage.

Sorghum pasture can also cause a problem for pregnant mares in the first three months of pregnancy, presumably because of prussic acid content. Foals can be born with contracted tendons, or mares can abort. Sweet-stemmed sudan grass and other sorghums that are relatively high in sugar also cause a laxative reaction in horses.

Johnson grass and other sorghums can be high in prussic acid (cyanide), especially when stressed. Rapid growth after a drought, drought or cold-stressed plants, and plants at and soon after frost are especially hazardous. Prussic acid poisoning is not as severe a problem in horses as in cattle, but it can occur. Sorghum can also have high nitrate content.

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Keeping dung beetles in pastures

Dung beetles have significant beneficial effects in cattle pastures. By breaking down and burying dung pats they clear the pasture of dung accumulation, return nutrients to the plant root zone and reduce compaction. They also reduce parasite challenge to cattle by removing breeding areas for buffalo flies, bush flies, biting midges and worms.

Control of cattle parasites often relies on chemicals, which can negatively affect dung beetle populations. Effects can include death of adult beetles, eggs or larvae, reduced breeding capacity of adults and retarded growth of larvae. Heavy chemical use can also lead to local extinction of some dung beetle species. Populations are especially vulnerable in spring during their early breeding season.

However, not all chemicals affect dung beetle populations and harmful effects can be avoided with careful choice and use of chemicals.

Some of the factors that influence whether or not tick, fly, lice and worm treatments affect dung beetle populations are discussed below. Consideration of these factors can help to design a parasite control programs that minimises undesirable impacts on dung beetles.

Chemical active

The different chemical groups and chemical actives registered for application to cattle and their likely effects on dung beetles are listed in Table 1 (see on page 13).

The two main groups implicated in undesirable effects on dung beetle populations are synthetic pyrethroids (SPs) and macrocyclic lactones (MLs or 'mectins'). Unfortunately there is not good information available on effects of chemicals from other chemical groups, particularly some more recently registered products. There are marked differences in the degree to which the different types of MLs impact dung beetles and these are listed in order from highest to lowest in Table 1.

Method of chemical application

The likely affect of a chemical treatment is determined by the amount of chemical absorbed. Most chemical is absorbed from injection, pouron or oral and dipping treatments, less from oversprays, even less from dust bags, back rubbers and least from ear tags. However, this is also influenced by the type and concentration of the chemical used. Depending on the chemical contained, slow release capsules (only registered for sheep not cattle in Australia) can have severe effects against dung beetle populations because of their prolonged release of active compound.

Mode of excretion from the animal

Chemicals where a significant proportion of unaltered chemical or toxic breakdown products are excreted in dung represent the greatest potential hazard for dung beetles. Whether chemicals are applied to cattle orally, by injection or absorbed through the skin they are eliminated from the body in three main ways. The unaltered chemical or breakdown products may be voided in the dung, the urine, or metabolised into other non toxic compounds. SPs, MLs and some insect growth regulator compounds (IGRs) are excreted mainly in the dung whereas most organophosphate compounds (OPs) are excreted mainly in the urine.

Frequency and timing of chemical application

The worst effects on dung beetles occur when there is ongoing and repeated use of dung beetle–active chemical treatments. Individual treatments can have significant and persisting impacts on populations but ongoing repeated use has much more severe effects and can lead to local extinction of some species.

Strategic applications and application only when economic thresholds for parasites have been exceeded can reduce the number of treatments required. Have a worm count done and seek advice before treating for internal parasites; only treat cattle for ticks and buffalo fly once economic thresholds have been reached. 'The cattle parasite atlas – A regional guide to cattle parasite control in Australia' has recommendations on strategic chemical use for parasite control (see the 'Cattle parasite atlas' article in this newsletter).

Some animals are more susceptible to parasites and treating only the animals that really need treatment can reduce chemical use. For example, weaners and young cattle are most susceptible to worms; bulls usually carry the heaviest populations of buffalo flies. *Bos indicus* cattle are generally more resistant to parasites and require less treatment.

In northern Australia, dung beetles are most active from October to March and most susceptible to the effects of chemicals during this time. Minimise treatments with high risk chemicals during this period.

Concentration

It is critical to use the dose rates for parasite treatment products specified on the label. Even chemicals considered low risk to dung beetles can have damaging effects if used at higher than recommended dose rates. Beware that using lower than the label-recommended dose rates can also have undesirable impacts by leading to rapid resurgence in pest numbers, requiring more treatments, with ultimately greater effect on dung beetles.

Table 1. Chemical groups and chemical actives contained in cattle parasite treatments and their likely effects on dung beetles

Chemical group	*Chemical active	Use	Effect on dung beetles	Comment
Synthetic pyrethroids (SPs)	deltamethrin cypermethrin flumethrin fenvalerate zeta-cypermethrin permethrin	Buffalo flies, ticks, lice, biting flies	Yes	Flumethrin may have less impact than other SPs
Macrocyclic lactones (MLs, 'mectins')	moxidectin ivermectin abamectin doramectin eprinomectin	Widely used against ticks, worms and effects on buffalo flies and lice	Yes (most!) abamectin› doramectin› ivermectin› eprinomectin› moxidectin	Moxidectin belongs to a different subgroup of MLs and is generally considered to have few undesirable effects against dung beetles
Organophosphates (OPs)	diazinon chlorfenvinphos tetrachlorvinphos	Buffalo flies, Ticks, lice	Limited data but probably not	Most excreted in urine, not faeces
Growth regulators (IGRs)	fluazuron (diflubenzuron in one lice control product)	Ticks, lice	Probably not	No dung beetle data available. Excreted in faeces but not thought to affect dung beetles.
Amidines	Amitraz	Ticks	No data	No data
Anthelminthics (Worm drenches)	levamisole albendazone fenbendazole oxfendazole	Worms	No	No effects on dung beetles from cattle treatment

* Refer to the product label. The chemical active(s) is usually written below the product name.

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More information

- 'Cattle parasite atlas'—free download from www.mla.com.au
- Dung Beetles Australia www.dungbeetle.com.au
- Testing laboratories
  - » State Veterinary Diagnostic Laboratory – *NSW Department of Primary Industries*
    www.dpi.nsw.gov.au/agriculture/vetmanual
    Phone: 1800 675 623
    Email: vet.lab@industry.nsw.gov.au
  - » StockWatch *www.stockwatchlab.com.au*
    Phone: 0488 089 676
    Email: wormtest@stockwatchlab.com.au
  - » Veterinary Health Research
    www.vhr.com.au/diagnostic-laboratory.aspx
    Phone: (02) 6770 3221
    Email: lab@vhr.com.au

Buffalo fly control options

Buffalo fly can be a problem during the period when dung beetles are most active. Non chemical control options include culling fly sensitive cattle, use of fly traps and having active dung beetles. If chemical use is warranted, a suggested program to minimise impacts on dung beetles is to use organophosphate compounds (OPs) early in the wet season while dung beetles are breeding, followed by ear tags (Table 1). Alternating chemical groups helps reduce fly resistance to the chemicals.

Table 1. Suggested chemical control options for buffalo fly to be used with non-chemical options

Spring	Summer	Autumn	Winter
Back rubbers or dust bags or fly traps			
OP spray (if flies are a problem early in the season)	Ear tags for 10 or 16 weeks when fly numbers exceed acceptable levels (Use OP tags for two years – then a SP tag for one year)	OP or SP spray* – or ML pour-on# (if flies remain a problem after tag removal) * Use OP spray after SP tags or SP spray after OP tags # Use a ML pour-on to get a combined efficacy against worms.	

OP = organophosphate, SP = synthethic pyrethroid, ML = macrocyclic lactones, 'mectins'

More information

- *'MLA tips & tools: Controlling buffalo fly on intensive beef and dairy properties'* – free download from www.mla.com.au

New dung beetle book available mid 2013

International dung beetle scientist Dr Bernard Doube and organic agriculture expert Tim Marshall have teamed up to produce a new publication on dung beetles and soil health.

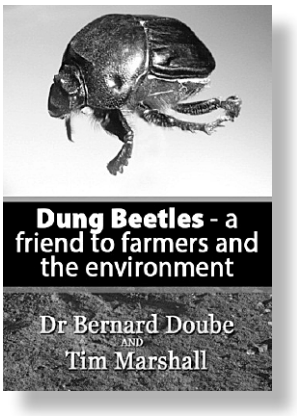
Dung Beetles for Australia: a practical guide is the definitive resource for farmers and land managers on the benefits and use of dung beetles.

This A4 colour book explains the agricultural and environmental benefits of dung beetles. There are sections on improving pasture production, soil structure, soil carbon, parasite control and water quality. The use and dangers of agricultural and veterinary chemicals are examined and detailed descriptions and guidelines given on the establishment and management of dung beetle populations. The publication also features specific regional information and details about the two new species being introduced to southern Australia.

Cost: $10 plus packaging and postage.

There are nine ways dung beetles can benefit your region or property, your bottom line and the environment.

1. More pasture
2. Less fertiliser
3. Fewer parasites
4. Less pesticide
5. Greater water infiltration
6. More earthworms
7. More soil carbon
8. Less nutrient loss
9. Improved water quality



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Case study: Achieving higher fertility performance

By applying selection pressure from every angle, David Greenup is pushing his stud and commercial Santa Gertrudis herds towards ever-higher fertility performance. In decades past, the Santa's reputation for high performance was somewhat marred by a matching reputation for low fertility. David recalls that pregnancy rates in his family's herd 20-plus years ago could be back to 70% at times. Today, they are consistently up between 88–92% on his properties at Jandowae, Queensland, where he and wife Sonya, along with their three sons and David's parents Grahame and Peggy, run commercial and stud herds of about 700 females each across 12,000 hectares.

Scrotal circumference

Getting to this position has meant a single-minded focus on the decisions needed to drive fertility. In David's Rosevale Santa Gertrudis Stud, which turns off about 300 bulls a year to buyers across the Australian rangelands, all working sires are semen morphology tested annually to ensure semen viability and scrotal size is assessed in all yearling bulls. Yearling scrotal size is an indicator of how quickly a bull and his sisters will reach puberty, an important factor in fertility. But size is also dependent on the environment and can change according to seasons. David notes that big is not necessarily best. A too-large scrotum in a mature bull can be a liability, as it is more prone to injury. To get another angle on likely outcomes for this trait, Rosevale also balances its physical scrotal measurements against estimated breeding values. It looks for genetics on target to produce yearling scrotal sizes in the top 20–30% of the breed, without being overly-large at maturity.

Heifer selection

Females come under their own form of stringent selection pressure. Seasons permitting, all yearling heifers over 290 kg are mated, to bring them into the breeding cycle as early as possible. "Last year, with a bit better season, we mated about 80% of our yearling heifers; this year we'd be down to 60%. It puts more pressure on them to conceive early. Anything that has calving problems, we cull," David said.

Days to calving EBVs

Rosevale has collected "days to calving" records on its stud females for almost a decade. The resulting BREEDPLAN estimated breeding value (EBV) on each female is a measure of the time from when the bull is introduced to the herd to when the cow drops her calf.

David said: "We're finding that those cows with good days to calving EBVs are those that continually calve in the first month of the calving season." Not many tropical herds are recording the trait. David thinks that this is a lost opportunity. He said: "If we can buy bulls out of cows with strong EBVs for this trait, it's another thing we can use to drive fertility."

Pregnancy testing and controlled mating

In the past couple of decades, aided by "religious pregnancy testing", David has progressively culled out cows with the thrifty *Bos indicus* tendency to only have 2 calves every 3 years, and selected for those that calve every year. "Rigid culling on a pregnancy test has not only removed those females of inherent low fertility but also those that lack a strong constitution and find it hard to conceive in a poor season while rearing a calf," David says. Joining periods have been brought down to 3 months, compared to 5 months 20 years ago. David thinks 3 months is the optimum for his conditions. "It's long enough to give us some flexibility, whether or not the season is with us. We're not prepared to feed cows to tighten up the joining. It means that every year we can put bulls in and pull them out on the same dates and still know we've got optimum coverage."

Culling policy

Rosevale's zero-tolerance approach to culling extends through to branding. The Greenup's properties, which border the dingo barrier fence, have the added pressure of wild dogs. "We ran into seven dogs in one pack just the other day," David said. Although Santa cows are extremely protective mothers, this inevitably means some extra mortalities at times, which add to other commonly experienced reasons for calf losses. "We're looking at losing 7–8% of calves between pregnancy testing and weaning. At branding time we will have a few cows that have slipped or lost their calf for whatever reason and we'll cull them then. We want to make a return on every female, every year, and that's either by selling her calf, or herself."

This article is from the Beef CRC's *Beef Bulletin December 2011*. The Greenup case study is one of a number of case studies online at the Beef CRC legacy website. All the information on this website is available for open use by the beef industry: http://www.beefcrc.com/products/industry-delivery/case-studies.html

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Cattle parasite atlas

The 'atlas' of parasite control in cattle has been developed by Meat & Livestock Australia (MLA) as a rapid reference for advisors and producers on the best practice for parasite control for all the major livestock regions in Australia. Each regional guide highlights the main production systems, most important parasites, control management systems and their cost-effectiveness.

Tick treatments

Treatment	Regime
Dip or spray	Six treatments at 3-week intervals commencing October
Acatak®	Two treatments at 12-week intervals commencing October
Macrocyclic lactone drench	At start of tick season in place of one dip or spray
All cattle should be vaccinated against tick fever between three and nine months of age.	

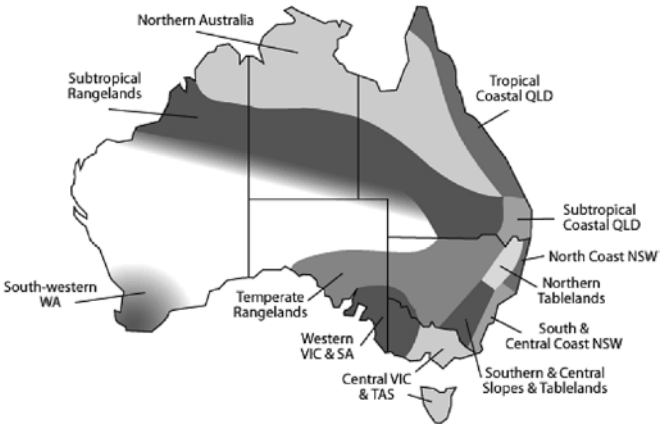
The recommendations are generic and therefore need to be customised to the needs of individual producers. Producers should seek the advice of their animal health advisor to develop a parasite control program for their property.

The guide can be downloaded from www.mla.com.au/Livestock-production/Animal-health-welfare-and-biosecurity/Parasites/Cattle-parasite-atlas

Some information from the subtropical coastal Queensland region is as follows.

Cattle tick

Cattle tick is endemic to coastal Queensland. Ticks are most active from November to July in the south and all year round in the north, although they are less active during the dry months of April to November.



Control

Bos indicus breeds and crosses with at least five-eighths *Bos indicus* have an innate resistance to cattle tick. Treatment at either end of the wet season will usually provide adequate control and coincides with mustering. Additional treatments during the dry season may be needed when more than 20 ticks larger than 5 mm are seen on one side of several animals.

Paddock rotations to produce tick-safe pasture can be used for high-risk animals. Tick-safe pastures can be created by spelling paddocks for four months. A two-paddock rotation at four-monthly intervals in September, January and May can reduce tick challenge.

Tick fever

Even though *Bos indicus* cattle have an innate resistance to cattle ticks, the risk of tick fever (Babesiosis) still remains. Ticks spread the blood borne parasites *Babesia* and *Anaplasma*. Vaccination against tick fever can produce substantial economic returns. All cattle should be vaccinated at three to nine months of age.

Internal parasites

The most important internal parasites are barber's pole worm *(Haemonchus placei)* and nodule worm. In the south, the small brown stomach worm *(Ostertagia ostertagi)* is also present.

Seasonal trends

High temperature and humidity allow hatching and development of parasite eggs throughout the year. Larvae can develop in just one week during summer and 2–3 weeks in winter. Unweaned calves heavily contaminate pastures with *Ostertagia* eggs during late summer and autumn. Yearlings also deposit eggs produced by adult *Ostertagia* worms which have resumed development from inhibited larvae picked up during the previous spring.

The eggs rapidly hatch into infective larvae which accumulate in the cooler conditions to reach their highest levels during late winter.

Disease due to *Ostertagia* is most common in late winter when high levels of infective larvae combine with seasonally low nutritional levels. Calves born in late winter and early spring pick up heavy burdens of *Haemonchus* during late spring. By autumn they are passing high levels of eggs in their faeces. These hatch following autumn rains.

Disease due to *Haemonchus* is most common in late summer and early autumn. The number of inhibited *Haemonchus* larvae rises during late summer and autumn. They resume their development in early spring. Strong immunity develops to most worms, with the exception of *Ostertagia*, by 12 months of age. The development of resistance to *Ostertagia* is not complete until 18 months of age.

Control

Due to the constant availability of infective larvae, fewer options are available for worm control than in temperate areas and limited opportunity to provide worm-safe pasture. Worm control in young stock delays the development of resistance and improves weight gain in young cattle. However the benefits are eroded in the second and third year after weaning. Only stock sold within 12 months of weaning are likely to benefit from worm control. Producers should reduce exposure of weaners and yearlings to high levels of infective larvae on pasture during late winter and early spring to maximise weight gain. Drench in March–May at weaning. In late July, a second drench should be combined with a move to worm-safe pasture. Worm-safe pasture can be prepared by grazing with adult cattle for the preceding four months.

Editors note: Worms are less of a problem in more extensive and dryer production systems and an increasing problem in higher rainfall and intensive situations. Stress also makes animals more susceptible. In wetter areas some producers strategically drench breeders at pregnancy testing to help them before going into winter and anecdotally feel the breeders benefit significantly. A diagnostic drench could be used to gauge the benefit where some identified stock are drenched and others not and liveweight performance measured. Worm egg count and larval culture tests are a more reliable predictive tool for sheep than cattle, however high counts in cattle will indicate a problem. Consider culling any individual stock which are chronically affected. Some worm testing laboratories are listed on the bottom of page 11.

Buffalo fly *(Haematobia irritans exigua)*

Buffalo flies are small blood-sucking parasites.

Lifecycle

Adult flies live on cattle and feed between 10 and 40 times a day. Adult females lay eggs in cattle dung. Larvae hatch within 24 hours then feed in the dung for 9–40 days as they mature to adulthood. In hot humid conditions the whole lifecycle may take less than two weeks.

Effect on cattle

Flies suck blood and cause severe skin irritation. This causes cattle to rub vigorously, disrupting grazing and damaging hides. Some cattle are 'allergic' to buffalo fly bites and rub excessively causing severe ulcers. Bulls, older cattle and those in poor condition usually carry heavy burdens. Where heavy infestations of buffalo fly are not effectively treated, it may cost up to $30 per head in lost production.

Control

Treatment is only required when there are more than 200 flies per animal (100 on each side) or when susceptible animals, such as bulls, show 'fly worry'. A range of chemical and non-chemical treatments is available. Prior to the use of chemical options all non-chemical options should be explored (see MLA 'Buffalo fly' factsheet). Some chemicals have an adverse effect on dung beetles. This can be minimised by the use of insecticidal ear tags, treating only when necessary, avoiding synthetic pyrethroids (SPs) during spring when dung beetles are emerging and using ML pour-ons in autumn and only when control of other parasites is required.

Liver and stomach fluke

(Fasciola hepatica and *Calicophoron calicophorum)*

Liver fluke is mainly present in the south while stomach fluke is present across subtropical coastal Queensland. Their impact will vary between properties and even between paddocks depending on the presence of fluke habitats. Stock pick up fluke as they graze infested areas such as swamps, springs, flood plains and creeks. Fluke numbers increase during spring and summer and disease is most common in late autumn and early winter in calves, weaners and introduced stock. Symptoms include reduced weight gains, weight loss, bottlejaw, scouring (stomach fluke) and sometimes death.

Control

A diagnosis of liver or stomach fluke should be made before treatment. Infection can be prevented by denying stock access to 'flukey' habitats with fencing and reduction in potential fluke habitats with drainage and re-vegetation. Drench in March–May and September to control liver fluke. On high-risk properties a third treatment may be required in December. Control stomach fluke with a single treatment in August—see your vet for details.

Beef prices at historic lows necessitates focus on cost of production

Current Queensland beef prices have fallen 40% in real terms from the highs of 2001 and about 17% since January 2012. This makes it increasingly difficult for beef businesses to repay debt and make profit.

While the Queensland Cattle Market Indicator (QCMI*) from 1986 appears to trend upward (refer Figure 1) when adjusted for inflation, cattle prices in real terms are historically low (refer Figure 2).

When looking at long-term trends such as this, it is necessary to take inflation into account to see the change in real prices. This is important because costs associated with running a beef business are increasing at least as fast as the rate of inflation.

If the January 2013 QCMI average of 180.7 (Figure 1) is adjusted for inflation, it becomes 70.8. To explain the conversion, $70.80 would have bought you the same amount of goods in 1985 that it would take $180.70 in today's dollars to buy (based on Australian Bureau of Statistics Consumer Price Index for Brisbane).

Therefore, prices today are 30% lower, in real terms, than they were in 1985 (Index was 100 in 1985, and adjusted index at the moment is 70.8).

Figure 2 also shows the quartile ranges of the QCMI adjusted for inflation. Quartiles show the distribution of data with 25% of the months in the lowest quartile, 50% in quartiles two and three, and 25% in the upper quartile. The inflation adjusted monthly average figure for January 2013 is at the 11 percentile, meaning that the market has only been lower 11% of time over the past 26 years. The last extended low period was from February 1996 to December 1998.

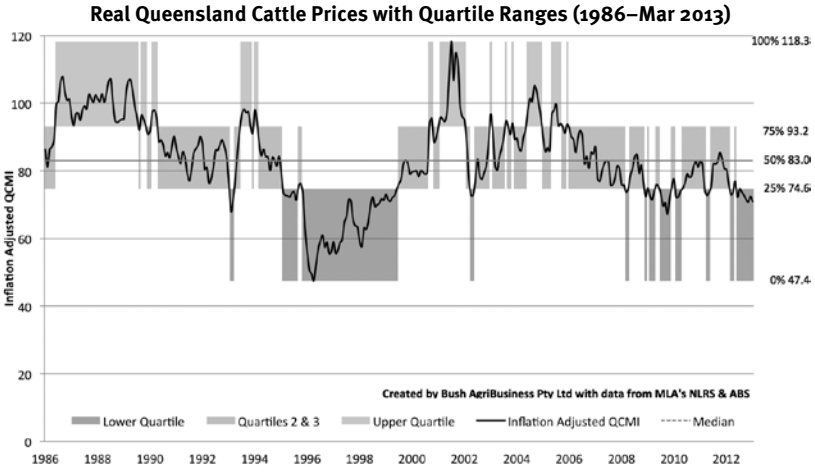


Figure 1: QCMI 1986 to January 2013 (unadjusted for inflation)

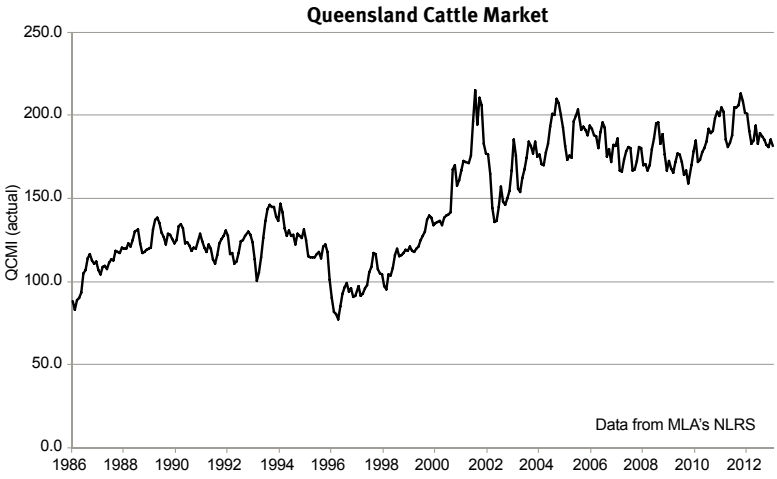


Figure 2: Inflation-adjusted QCMI 1986 to January 2013

Cost of production focus

So what do these low beef prices mean for producers?

The market downturn will further squeeze what are currently low, and often negative, margins across the northern beef industry. This is particularly concerning for an industry where many businesses are carrying high levels of debt.

*The QCMI is an index representing current market prices based on 132 categories of slaughter animals throughout selling Queensland centres. The index is calculated by comparing current market prices to the price level in 1985 when the index started and was set at 100. So the average QCMI for January 2013 of 180.7 means that beef prices in January were 80.7% higher than in 1985. This represents accurately the changes in the cattle market over time, however it does not take into account the inflation that has occurred over the last 26 years.

Beef producers make their profits from the margin between what they get paid per kilogram of beef and what it costs their business to produce each kilogram of beef.

During periods of low prices, it is even more critical to know: what is the 'Cost of Production per kg of beef' (CoP) for the business; what drives that ratio; and what opportunities exist to improve efficiencies. As the CoP is a ratio between kilograms of beef produced and costs, in some cases, it can pay to spend money to ramp-up production to lower CoP.

While beef prices are outside the control of beef producers, their CoP is something they can influence. In fact analysis of beef businesses has consistently shown that prices received explains little (10%) of the difference in profit between beef businesses.

CoP on the other hand explains more than 60%, and Operating Margin (Price Received less CoP) explains nearly 80% of the difference in profitability between businesses.

Figure 3 shows a slight but weak relationship between 'price received' and 'profit per Animal Equivalent (AE)' of benchmarked beef businesses.

It is worth noting that there are businesses with an average price received of close to $2.00/kg that are not making a profit and businesses with price received less than $1.30/kg that are making a profit.

Figure 4 shows a much stronger relationship with profit increasing as CoP decreases. Notably, nearly all businesses with a CoP below $1.00/kg are making a profit.

Irrespective of the market, it is those beef producers with the lowest CoP that will be better off. The profitable beef business managers of the future will know their CoP, what it is doing over time, how to get it down and keep it down.

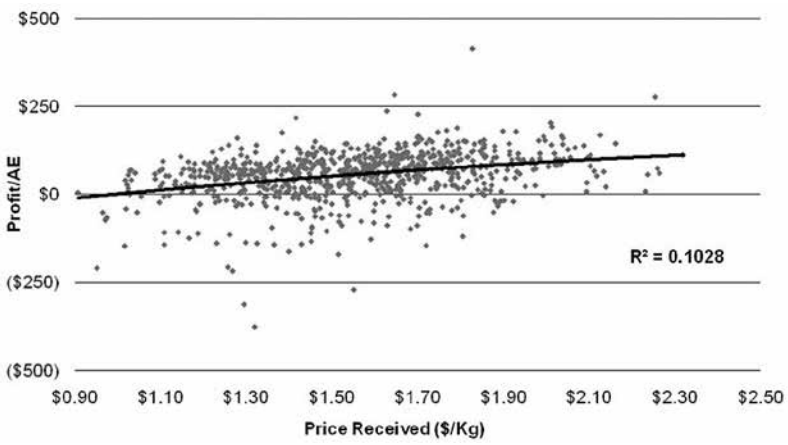


Figure 3: Relationship between price received and Profit (Source: MLA's Business EDGE)

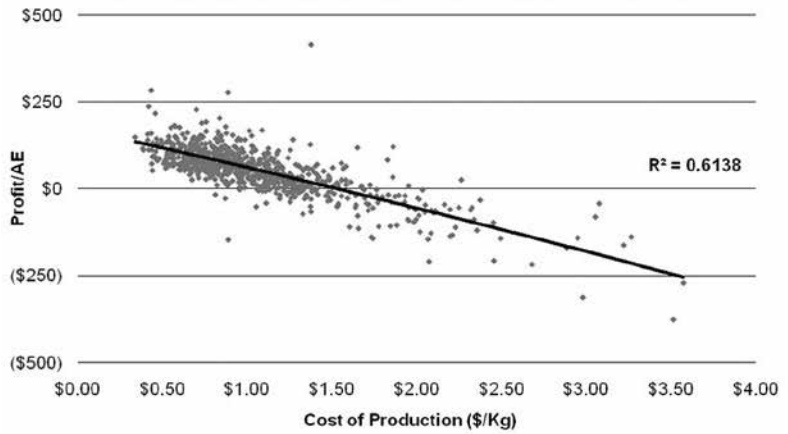


Figure 4: Relationship between Cost of Production and Profit (Source: MLA's Business EDGE)

What determines and how to influence CoP and other key performance indicators at herd and business level, along with topics such as long term economic sustainability, succession, risk management and debt management are all addressed in the BusinessEDGE course which is being held in regional venues in northern Australia. The BusinessEDGE course is a 2 day intensive workshop developed by Meat & Livestock Australia and Phil Holmes to provide Australian beef producers with better business management skills.

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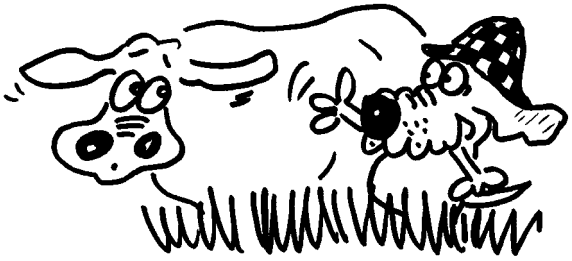
This article was run in Beef Central on the 11 February 2013. Beef Central is a free online news and market intelligence service dedicated to the Australian beef industry. You can receive a free daily email newsletter by registering your email address on the BeefCentral.com website (www.beefcentral.com/).

Productive heifers



First-calf heifers have the lowest fertility of any age group. They are still trying to grow as well as feed their calf—with lactation taking priority. If the pasture does not provide enough nutrients, the heifer will use its body reserves to produce milk and lose condition. Cycling is then delayed as both poor condition and suckling have a negative feedback on cycling and the heifer may not conceive again for many months. Calf losses can also be a problem due to poor mothering ability, predation, disease, and dystocia.

Resumption of cycling (and PPAI)

Not cycling (anoestrus) after calving allows the mother to recuperate before another pregnancy. The period of this anoestrus is called the postpartum anoestrus interval (PPAI). An extended PPAI results in low reproductive efficiency and low profitability. Lactating heifers in poor condition have the longest PPAI. Duration of the PPAI is affected mainly by nutrition and lactation status, but other factors may interact.

Nutrition

The most important factor affecting PPAI in first-calf heifers is body condition at calving and during lactation. This is largely determined by adequate nutrition prior to calving. If heifers are in good condition, moderate weight changes seem to have little effect on PPAI but they become significant when the animals are in moderate or poor condition.

Lactation

Lactation delays the resumption of cycling, directly through a hormonal feedback when the calf suckles and indirectly by reducing the body condition as a heifer strives to keep growing and feed her calf. Many first-calf heifers lose too much weight during lactation to get back into calf. They must have sufficient body reserves at calving to withstand the weight loss. Early weaning will preserve condition and increase conception at the next mating, however to have another calf within a year of the first, a heifer must re-conceive before her calf is weaned.

Time of calving

Calving should be timed so that peak milk production, peak demand from the calf and peak pasture growth is aligned. Good-quality pastures will allow the heifer to maintain condition while feeding her calf. Heifers lactating through the dry season will generally lose considerable weight and need several months on green feed during the next wet season to regain body condition and start cycling again.

Breed

Brahmans often have longer PPAIs than *Bos taurus* when nutrition is inadequate but their performances are similar when the cows are in good condition. When animals are in good condition the Brahman PPAI is short enough (less than three months) to allow a calf to be born within 12 months of the previous one. With good nutrition, Brahman heifers can re-conceive within 61 to 65 days.

Calving difficulty

The interval before the next oestrus is increased when the heifer has difficulty calving. This is probably associated with stress, injuries and general recovery time after birth. The most common cause of dystocia in first-calf heifers is a big calf unable to fit through a small pelvis that is not fully developed. Generally *Bos indicus* calves are born small and dystocia is less common than in British and European breeds. *Bos indicus*-cross heifers can however still lose 4% or more of their calves as a result of dystocia. (See *'Minimising calving difficulties'*, page 22)

Aiming for re-conception

Managing heifers from weaning to joining and the time of joining should focus on body condition and critical mating weights to get them back into calf.

From weaning to joining—body condition and critical mating weight

Much of heifer management is about managing body condition. Generally, pregnancy rates are higher when heifers are in better condition while weight also has the greatest effect on when puberty is reached. To maintain growth over the post-weaning dry season, so critical mating weight is achieved, weaner heifers need to be stocked conservatively on good pasture and may need supplementation. Critical weights can be identified and used as targets to maximise fertility.

Critical mating weight (CMW) is the weight at the start of the joining period at which 85% or more heifers will get pregnant (diagnosed 6–8 weeks after bull removal) in a 42-day joining period.

CMW ranges from 280 to 340 kg depending on genotype, and is usually 320–340 kg for *Bos indicus* heifers and lower for British breeds. Conception rates in maiden heifers are generally adequate (e.g. 75%) though re-conception after first calving is the common problem. Re-conception rates of first-calf heifers can be predicted from their weight before calving (Table 1). Brahman heifers need to have a pre-calving weight of around 430 kg (equivalent to a body condition score (BCS) of 3.5) to achieve re-conception rates of 50%. On pastures that enable heifers to put on 90–130 kg per year, heifers that are going to calve weighing more than 430 kg just before the wet season must be at least 300 kg going into the previous wet season—over which they were mated.

Table 1. Expected pregnancy rates of first-calf heifers based on pre-calving weight (includes calf weight)

Pre-calving weight (kg)	Weight at 1st round weaning (kg)	Predicted pregnancy rate
350	310	15%
380	340	24%
410	370	35%
440	400	49%
470	430	62%
500	460	74%
530	490	83%

The dry season before first calving

Weight and condition at calving are the main factors affecting re-conception rates in first-calf heifers. Heifers should be managed so they are at least in moderate condition (score 3.5 on the 1 to 5 BCS system) at calving and through lactation.

Heifers should not lose weight over the dry season before their first calf and preferably should gain weight. This means they should graze the better paddocks, be stocked more lightly and may need supplementation. Phosphorus supplements during the wet season in phosphorus-deficient country will give significant extra weight gain and improve pregnancy rates.

'Spike feeding'

Feeding a high-quality protein supplement, such as copra or cottonseed meal, for six to eight weeks before calving is referred to as spike feeding. Under marginal conditions in north Queensland, spike feeding heifers before calving increases re-conception rates by around 15%. The economics of this practice will depend on the on-farm cost of feeding and response.

Post-calving supplementation

Feeding lactating heifers high-quality protein or energy supplements does not generally induce earlier cycling or increase re-conception rates—and may well be impractical during the wet season. Feeding phosphorus during lactation is recommended in phosphorus-deficient country.

Creep feeding

Creep feeding supplements only to the suckling calves has not been found to reliably increase their mothers' pregnancy rates.

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Source: 'Heifer management in northern beef herds', MLA Phone 1800 023 100 or free download from www.mla.com.au

Photo courtesy: Tim Schatz, NT DPIF.

Controlled mating increases profit

Controlled mating occurs when bulls are put out with breeders for a set time so that most calves are on the ground when the best feed is available. It is also used to ensure cows are not lactating when nutrition is poor.

The real benefits of controlled mating come from combining it with strategic weaning, pregnancy testing and culling empty cows. These practices help to maintain breeder condition and increase calving percentage.

Mating can be timed so that breeders are milking when good feed is available. It is equally important so that you can wean early enough for breeders to maintain or regain condition before going into the dry season. This can substantially reduce supplementation costs.

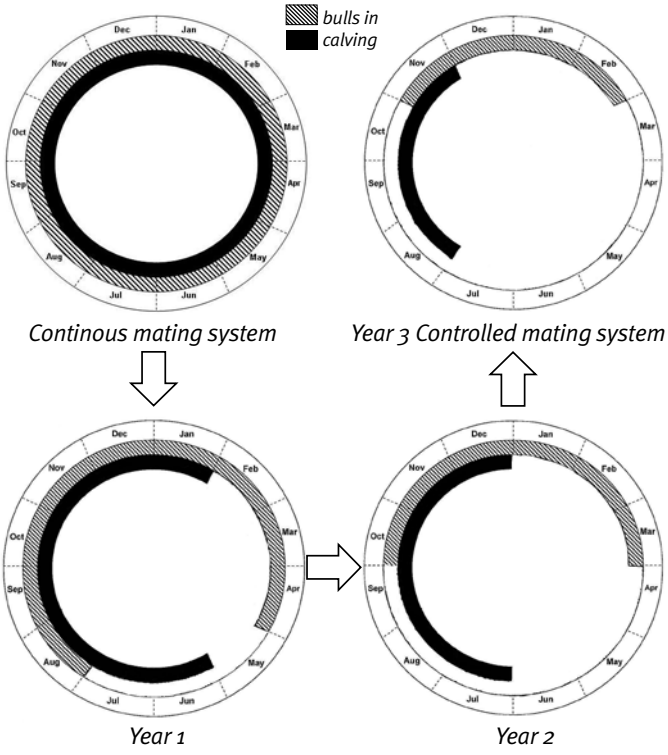
Tightening the calving period makes it possible to wean and provide weaner training once. It also becomes easier to identify which breeders calve early or late and to identify if a breeder is having a calf every 12 months. Pregnancy is a little over 9 months, leaving around 3 months for a cow to re-conceive and calve within 12 months. The oestrus cycle is 21 days so a 3 month mating period gives approximately 4 opportunities for a cow to be in calf, with calf age varying by 3 months within the calving period. A 2 month joining (63 days) would have a calf age range of 2 months.

A tighter calf crop can be achieved by selecting genetically, more fertile and fertility soundness tested bulls, culling infertile breeders and tightening the calving period. A tighter, earlier calving pattern results in heavier weaners and more consistent sale lines. It also makes it easier to manage heifers to reach target mating weights.

Pregnancy testing 8-10 weeks after removing the bulls identifies empty cows which can be converted into cash and leave more pasture for more productive breeders. There is no point keeping unproductive cattle wasting valuable pasture and belching methane into the atmosphere.

These practices result in a more efficient and productive herd, more efficient management, labour savings and improved profit.

Additional practices promoting a healthy breeder herd include adjusting stocking rates with dry season fodder budgets, wet season pasture spelling, vaccination and strategic and cost-effective supplementation.



Moving from a continuous to controlled mating system is a gradual process. The diagram above is an example from southern Queensland.

In summary, controlled mating can increase your profitability through:

1. more effective pregnancy testing, can sell culls earlier
2. easier, more cost-effective weaning, fewer weaning rounds, lower costs and labour
3. breeders being in better condition, having increased calving percentages, being in calf quicker and having more calves earlier which means more kilograms of beef
4. having fewer breeders lactating during the dry season and reducing feed costs
5. increasing returns from more even lines of cattle

Further reading about:

- controlled mating, also known as seasonal mating, http://futurebeef.com.au/topics/breeding-and-genetics/seasonal-mating/
- Improving Female Fertility factsheet, http://tbts.une.edu.au/pdfs/managing_female_fertility.pdf
- Country Life article about a Tara producer who changed to a controlled mating system, http://www.queenslandcountrylife.com.au/news/state/livestock/general-news/breeder-management-controlled-mating-delivers-85pc-brandings/25135.aspx

Preparing bulls for sale

There are many ways to prepare bulls for sale. Some are fed from weaning on small amounts of grain with access to pasture until about a 100 days from the sale when they are fed on a mostly grain ration. Others run in a paddock until about 100 days before sale when they are fed increasing amounts of grain or a silage based ration.

Paddock sale bulls are usually only grass fed but may be offered a small amount of grain. Generally, their sale price is less than a grain fed bull. The choice of paddock or sale ring bulls is the buyer's preference and there are pros and cons to both.

Choosing the right feed

Good advice from a nutritionist or a local feed mix nutritionist is needed to determine how much and what feed should be given, as this may vary depending on the producer's preference, location and feeding facilities. Feeding options could include:

- using a grain feeder, such as a feedlot feeder, where bulk grain is held
- using a silo where feed can be measured out into troughs
- using a grain mix, pellets or mixing your own grain and hay if you have a hammermill
- buying pre-mixed grain by the bag and measuring rations into an old tyre feeder or trough (suitable if you only have one or two bulls).

Pre sale homework

- Check sale conditions. Attend at least one sale of your cattle breed before preparing bulls for sale. This provides an idea of the average weight for age for that group of bulls. For example, it is no use taking a 600 kg bull to a sale when the average weight of similar aged bulls is 800 kg.
- Rules of the sale and preparation of your bulls. Most sales have information sheets that provide important details about weight, dentition, eye muscle area and fat cover. Also, carefully read any rules about the sale before you start feeding bulls.
- Nominate how many bulls you want to sell. Some sales restrict the number of bulls you can sell so check before nominating
- Vet checks. It is a condition of most sales that bulls are vet checked. Information from the assessment is put on a certificate and sent to the breed society before the sale to prepare an information sheet about the bulls. This may include:
  - » semen and morphology tests (needed for some breeds) to check the semen quality in more detail. This is an important safeguard for both the buyer and seller to confirm that the bull is fertile, even if only selling a paddock bull.
  - » scrotal size
  - » feet
  - » general conformation of the bull
  - » teeth to confirm changeover of the bull's milk teeth to adult teeth to meet breed average for that age.
- Vaccinations. They must be up-to-date and some sales have a list of those which must be done before the sale.
- Horns. Ensure bulls are neatly and evenly dehorned as no one will bid on a horny bull or one with obvious differences in horn length.
- Parasite prevention. It is best to drench bulls before the sale so they are protected from external and internal parasites, regardless of where they end up going.
- Ticks. If coming from a tick infested area, ensure bulls are pre-treated according to DAFF recommendations so they will pass inspection if going into clean country. Ticks found on a bull may result in loss of the sale or extra expenses to the seller if they have to pay for yard feeding until the animal is passed clean of ticks.

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Minimising calving difficulties

Calving difficulty (also known as dystocia) can have major financial costs due to calf and cow losses, time, labour, vet expenses and reduced rebreeding rates. The best long-term benefits come from selecting sires for calving ease and culling problem heifers and their progeny. Good heifer management, particularly from weaning to joining, will also reduce problems.

Causes

Most calving difficulties occur in first-calvers regardless of whether calving at two or three years of age. Three year olds are heavier and have a larger pelvic area but their calves are also proportionally heavier. 50–70 per cent of calving difficulty is due to large calf size relative to heifer pelvic area. 20–40 per cent is from abnormal calf presentation, while 10–20 per cent is due to weak labour with poor muscle tone in very thin or fat heifers. Sometimes difficulty is due to obstruction of the birth canal by fat deposits and constriction at the vulva, vagina or cervix. Calf size is influenced by sire and dam genetics, breed, gestation length and nutrition. Male calves are also generally heavier than female calves. Birth canal obstructions and weak labour are influenced by genetics, nutrition, exercise and stress.

Sires—low birth weight, good calving ease

Growth rate and calf size are genetically correlated. As producers select bulls for more growth, larger calves at birth and more calving difficulty can be expected. Calf size is moderately heritable and there is large variation between sires within any breed. The most reliable way to select low birth weight sires is by using BREEDPLAN estimated breeding values (EBVs). Using low birth weight sires over heifers will help to reduce the problem in the short term however if the female calves are retained in the herd it can lead to lower growth rates and heifers with smaller pelvic areas. Sometimes 'curve bender' bulls with negative or low birth weight EBVs, which also have good growth traits, can be found. Alternatively, a negative or low birth weight EBV bull can be used on the heifers and their progeny not used in the breeder herd. For the main breeder herd, aim for low birth weight bulls which also have a good balance of fertility, growth and carcase traits.

If not available, avoid using high birth weight bulls. Wherever available 'calving ease' EBVs–which take into account gestation length, birth size and calf sex—can be used. Some breeds have also made good progress using BREEDPLAN and selecting for shorter gestation length to improve calving ease. Apart from progeny testing, there is no other simple method to identify easy calving bulls.

Litter mate bulls

In some large Australian herds, heifers are joined with "litter mate" bulls to minimise any disproportion between sire and dam frame size. These are bulls from the same calf drop as the heifers and so are "genetically compatible" with the heifers. Selection of littermates is best done at birth or early life and average size calves should be selected, not the biggest or smallest. Ideally select from heifers that have calved unassisted. This is a "quick fix" and not a long term solution. In-breeding will not be a problem if at least five introduced sires are used in the main breeding herd.

Breed

Bulls of larger breeds throw heavier calves and should not be mated with heifers of smaller breeds. Crossing different breeds can also cause hybrid vigour producing a larger calf. Brahman cows are known to be easy calving by restricting their calf's size however use of Brahman sires over other breeds can cause problems due to hybrid vigour. Sometimes Jersey bulls have been used as a short-term desperate measure to reduce calving problems in heifers. This does not provide a long-term genetic solution and there could be difficulties with marketing the offspring. Selling and buying new breeders could be an option for some. The long-term solution is to select bulls with appropriate known genetics (EBVs), culling problem females and managing heifers.

Heifers—nutrition, weight, condition and exercise

Good nutrition from weaning to joining is essential to maximise pelvic growth. If heifers receive a nutritional set-back at this stage they may not recover with respect to pelvic area. To achieve good conception rates aim for heifer mating weights from around 280 kg for early maturing British breeds and up to 340 kg for later maturing Brahman and European breeds. From a dystocia perspective mating weights greater than 300 kg may help reduce problems.

High weight gains at any stage of pregnancy are associated with heavy calves and are best avoided if possible. The aim is to keep heifers growing at a moderate rate throughout pregnancy (up to 0.5 kg/day).

Net growth in the last trimester should take into account that the conceptus is growing at 0.2 to 0.3 kg/day. Having breeders in good condition at calving reduces calving problems and improves rebreeding rates. Heifers in poor condition are prone to poor uterine tone and weak labour. Overly fat heifers are prone to high calf birth weights, fat deposits causing obstruction of the birth canal, poor uterine muscle tone and weak labour. Keep heifers separate from mature breeders for best management.

Exercise may also have an influence. Physically fitter heifers have greater muscle tone and greater calving endurance and vice versa. Some producers feed hay on the hill tops or use a paddock further from water to ensure heifers get plenty of exercise during pregnancy. Deficiencies of calcium, phosphorus, copper, cobalt, selenium, iodine, sodium, zinc, magnesium and manganese have been implicated in increasing calving duration. Mineral supplements have helped in some cases and made no difference in many others.

Pelvic area measurements

Heifers with abnormally small or abnormally shaped pelvic areas are associated with greater dystocia. Pelvic measurements can be combined with a reproductive tract examination and used to identify and cull problem heifers. Producers should be aware that selection for pelvic area in isolation is likely to result in increased skeletal size of the dam and larger calf size and so perpetuate the problem.

Disturbance during calving

Calving problems can be induced by excessive disturbance during the calving period. When heifers are disturbed at the time of calving, muscles along the birth canal fail to relax and the birth process may be interrupted by constriction at the vulva and vagina. Paddock observation twice daily (not yarding) and providing assistance when necessary does not increase dystocia but dramatically improves heifer and calf survival.

If possible, restrict the joining period e.g. nine weeks —three full cycles. As well as selecting for fertility, this will allow better nutritional management later in pregnancy and reduce the supervision period at calving. Be sure to identify and cull assisted heifers and their progeny as well as dry heifers at branding time.

The future

In the near future, gene technology via a tail hair or blood sample will be able to accurately identify individuals with the required traits to reduce dystocia

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- 'Control of calving difficulty in beef heifers', Geoff Kroker, Bendigo and Lisa Clarke, Hamilton. June 2000 http://www.dpi.vic.gov.au/agriculture/beef-and-sheep/beef/breeding/control-of-calving-difficulty-in-beef-heifers

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Assisting difficult births

This article gives a basic introduction to assisting heifers and cows experiencing difficult births. It is not intended to be a comprehensive course on obstetrics, and expert veterinary attention is essential in any prolonged or difficult calving.

What to look for

Signs of a cow approaching calving usually include:

- Enlargement of the udder
- Raised tail head
- Relaxation of the vulva
- Passing of clear mucus from the vulva

When the birth is just about to occur, the cow usually becomes restless, often bellows and separates from the herd. The appearance of the membranes or 'water bag' signifies the start of true labour.

When to intervene

This time can vary considerably but as a general rule a heifer or cow should be closely examined if there has been no progress within 2 hours of the water bag becoming visible or after 1 hour of forcible straining and no progress is being made.

Remember: interference may turn off the birth process, so observations should be made as unobtrusively as possible.

What to do

The golden rules of any obstetrical procedure are **cleanliness** and **lubrication**.

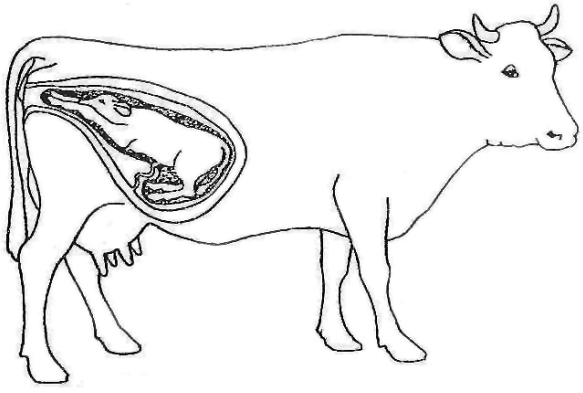
- Have all necessary gear prepared and sterilised ahead of time.
- Restrain the animal in a crush or head bail only if side gates are present. If not, tie the animal's head to a post outside the crush. If the animal goes down in a crush without side gates, access can be very difficult.
- Clean up around the anus and vulva with disinfectant (examples of good disinfectants are Savlon® and Hibitane® made up according to directions). It is important that this area be kept clean for the whole procedure. Hold or tie the tail out of the way.
- Thoroughly wash both arms with disinfectant.
- Lubricate hand and forearm well with obstetrical lubricant. Soap can be used but is not as effective.
- Gently insert the hand inside the vulva to check for the presence of feet. Make sure either both front or both back feet are present, not one of each—the difference in shape and feel of the hock on the hind leg and front 'knee' is used to differentiate front and back legs.
- If front legs are detected, check for the presence and position of the head. Never exert traction on the front legs unless the head is in the correct position to allow delivery.
- Apply calving chains or ropes to the feet. Remember that chains and thin ropes apply great force to a small area, and increase risk of fractures—wide calving straps are much less traumatic.
- Correct positioning is necessary to minimise pain and damage to the calf. Never position the ropes or chains between the foot and fetlock, as the risk of fracture or dislocation is high—go higher up the leg, well above the fetlock and onto the cannon bone.

Please note: at all times the welfare of cow and calf are of paramount importance. This is especially so when applying traction to the calf—excessive and inhumane traction is not acceptable, and will result in permanent damage to the cow and/or calf. Under no circumstances should traction be applied unless the calf is in the correct position, with no bent leg or head stopping the delivery.

As a general rule, the maximum force which should be applied is that of 2 men. This must be considered when using mechanical devices such as calf pullers.

Good lubrication of the calf's legs and head inside the vagina will make pulling much easier, and less traumatic for calf and cow—apply plenty of obstetrical lubricant inside the vagina, working it well forward towards the calf's shoulders.

For normal presentation i.e. front legs and head coming, traction should always be applied downwards and outwards.



Normal presentation

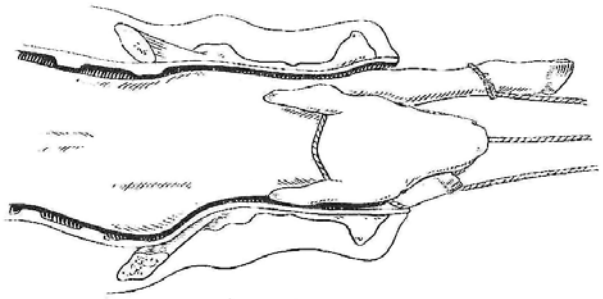
For breech presentations, the calf should be pulled more horizontally initially, until the calf's hindquarters get out past the vulva, then more downwards traction can be applied.

Attempting to remove a calf by pulling with a vehicle is cruel, inhumane and rarely effective, and often results in permanent damage to both calf and cow.

If no progress is made after 10 minutes of traction, with the calf in correct presentation, veterinary assistance should be obtained.

Anterior (normal) presentation

Position the chains or ropes as described. Make sure the head is coming straight and is not bent back. Apply gentle traction while ensuring the head is coming also. It may be necessary to apply a rope running around the back of the calf's poll and through its mouth and pull on this. Get the 'knees' past the vulva, often made easier by pulling one leg a bit at a time, then the other, until the shoulders get through the pelvis and then pull on the head.



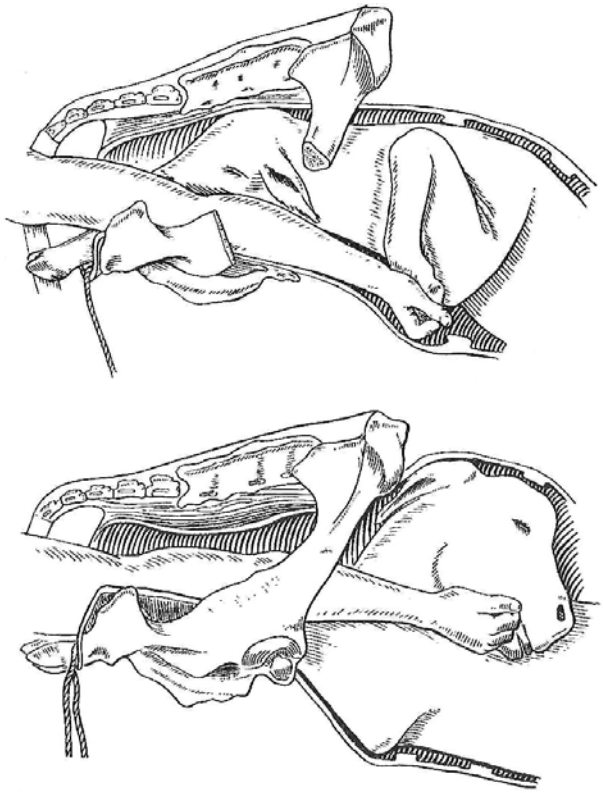
Anterior presentation—traction on head and legs

For anterior presentation it will be possible to deliver a calf if one person on each leg can pull the fetlocks 10–15 cm (about one hands breadth) beyond the vulva provided the calf's muzzle is visible at the vulva—this means the shoulders will have passed the pelvic brim. If not, seek veterinary attention immediately.

If the head or one leg is bent back, these must be straightened **before** applying traction. The following diagrams illustrate some useful techniques.

Remember—the task is much easier if plenty of lubricant is placed in the vagina and on the operator's hand each time it enters the cow.

Illustrations: Wright's Veterinary Obstetrics 3rd edition 1964 by Geoffrey H Arthur Reprinted in 1973 by Bailliere, Tindall and Cox Ltd, London



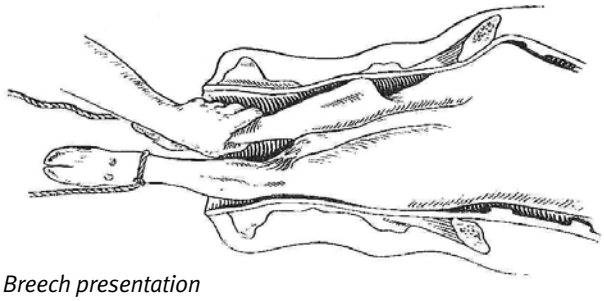
Anterior presentation—straightening head

Breech presentation

Breech presentations are more difficult because of the shape of the calf's buttocks. They can often be identified by the feet appearing with the soles uppermost. Confirm by the presence of hocks rather than 'knees' as in normal front presentation—feel the shape of the first joint up past the fetlock.

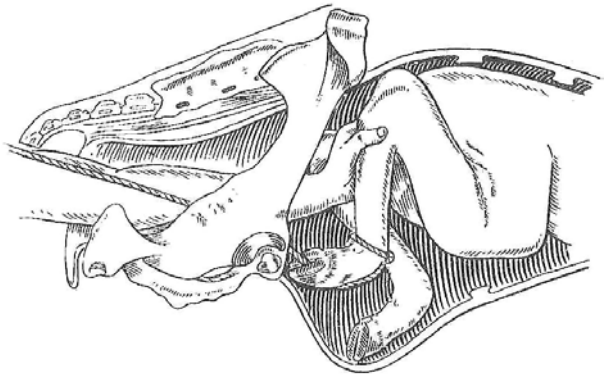
Position the ropes or chains as described. Then push one leg back in as far as possible, and pull the other leg out to get its stifle over the pelvic brim. Then pull the other leg similarly.

For breech presentation, it will be possible to deliver a calf per vaginam if one person can pull to make the calf's hocks appear at the vulva—this means the hips will have passed the pelvic brim. If not, seek veterinary attention immediately.



Breech presentation

When applying traction initially for a breech presentation, don't pull downwards at as great an angle as for normal presentation. Otherwise the calf's spine may be damaged. Traction can be more downwards once the hocks are outside the vulva. Any straightening of legs must be done before traction is applied—both feet must be coming unobstructed before pulling starts.



Breech presentation—straightening leg

After delivery

Check the calf's respiration. Nostrils and throat must be clear of membranes or mucus. Firm slapping of the calf's chest will stimulate it and help remove residual mucous from the airway. Suspending the calf by its hind legs to get rid of any mucous etc from the mouth and wind-pipe is useful, but only for a very short time, as the weight of the abdominal contents pressing on the diaphragm can make breathing more difficult. Sit the calf on its sternum, and continue firm slapping of the lateral chest to stimulate breathing.

Thoroughly disinfect hands and arms, lubricate well, and then check for visible damage to the heifer's birth canal and ensure there isn't a twin calf still present. If there are any complications (e.g. dead calf) or damage to the birth canal, seek immediate advice from your veterinarian regarding treatment.

Some common complications

Often difficult calving is followed by complications. Some more frequently encountered problems are:

Retained afterbirth

- If the afterbirth (placenta) is not expelled within 24 hours, the cow has a retained afterbirth.
- Traction must not be applied to break off the afterbirth. Rather it should be left hanging to allow gravity to apply constant steady downward force, and increase the chance of expulsion naturally. Often the administration of oxytocin by injection will increase uterine contractions, and help expulsion of the membranes.
- If not expelled within 2 days, seek veterinary advice.

Post-calving paralysis

- This is caused from bruising of the nerves supplying the heifers hind quarters as the calf forces through the pelvis.
- The best treatment is rest. Advice on individual cases should be obtained from your veterinarian. Good nursing is essential, and food and water must be provided if the cow remains down.

Uterine prolapse

- This occurs when the uterus comes out of the vulva, and is often associated with incomplete separation of the afterbirth from the uterine wall.
- If uterine prolapse occurs, first aid involves keeping it clean and moist. Seek immediate veterinary treatment.

Human health implications of dystocia

Two diseases of particular concern at calving time which can be caught by humans from cattle are leptospirosis and Q fever. Good hygiene is essential.

Leptospirosis is caused by bacteria that are present in the urine of cattle that have had the disease and recovered. The bacteria can penetrate the lining of the eye or mouth and abrasions in the skin. It causes severe flu-like symptoms—fever, headache, muscle soreness, decreased appetite and general malaise.

Q fever is prevalent in the afterbirth of carrier animals. Animals do not usually show any ill-effects from infection with Q fever. Infection of humans occurs by inhalation or ingestion of the organism. Symptoms include muscle pain, severe headache and high fever with chills and sweating. It is a very severe, debilitating disease that can cause long term problems. A very effective vaccine is available to prevent Q fever in people, and anyone handling livestock should consult their doctor to find out about vaccination.

Protective clothing should be worn to minimise contact with urine and afterbirth. Disinfectants should be liberally used during obstetrical procedures and for thorough cleaning up of personnel and equipment. Afterbirths should be burned or buried immediately. Seek medical attention if either disease is suspected.

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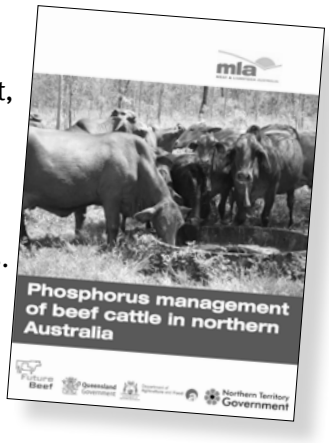
Key messages: phosphorus nutrition

Key messages from MLA's recently released *Phosphorus management of beef cattle in northern Australia* include:

- Animals that most need phosphorus (P) are growing stock, late-pregnant heifers and cows, and lactating cows.
- Deficient animals respond best to P supplement when their diet has adequate protein and energy. This is why P supplementation is most effective during the wet season.
- Signs of acute P deficiency include bone chewing, broken bones, peg-leg, poor body condition of breeders and botulism.
- There are no simple diagnostic tests for the P status of cattle. Blood and faecal P are the most useful indicators. Soil P levels are another indicator
- Deficiency is related to soil P status. As a general rule, where soil P levels:
  - » are deficient (5 mg/kg or less), all classes of stock are likely to respond to feeding P
  - » are marginal (6–8 mg/kg), young breeders are likely to respond to feeding P
  - » exceed 8 mg/kg, the economic benefit from feeding mature cows diminishes.
- If P is fed over the wet season on deficient country:
  - » young growing stock can increase their growth by 30–40 kg/year
  - » breeders can increase weaning rates by 10–30%.
- Responses to P supplement may be lower if animals running on P-deficient country have access to adjacent areas of high-P soils, such as frontage country.



- Supplements should be compared on the cost of their P content, on the practicality of feeding out and on whether the animals will be able or willing to eat target amounts.
- A typical wet season loose-mix P supplement should contain at least 8% P; a typical dry season supplement will contain 2–4% P and also non-protein nitrogen (e.g. urea).
- On deficient country, lowering the stocking rate will not reduce the need to feed P.
- Where the native pasture on deficient country contains sufficient stylo, cattle may respond significantly to P supplement during the dry season because of the extra protein in their diet.
- Because cattle eat more pasture when P supplements are fed, stocking rates should be reduced to avoid overgrazing.
- The economic benefits from feeding P are maximised when done in conjunction with other aspects of good herd management.

The full document from which this summary is taken is available at: www.mla.com.au/Publications-tools-and-events/Publications

To order a free hardcopy phone the MLA membership services hotline on 1800 675 717 or email publications@mla.com.au (refer Publication code 9781741919561)

Costing nutrients

Costing nutrients is just one step that can be used to compare supplements, for example the cost per unit of crude protein or phosphorus (P) or any particular nutrient being targeted.

Your target nutrient should be the primary limiting nutrient which is holding back better stock performance from your pasture. This is typically crude protein (CP) during the dry season and for cattle grazing pastures on P-deficient soils, P during the wet season. Dung sample tests using faecal NIRS (near infra-red reflectance spectroscopy) can help identify if these nutrients are deficient (See Beeftalk 27, *NIRS—a nutritional management tool for grazing cattle*).

There are many other factors to consider in choosing supplements. These include availability, vendor support, transport, moisture content, storage, convenience, handling, risk, feed quality and response.

To compare the cost of nutrients in supplements there are 3 things you need to know:

1. Supplement price (e.g. $/t or $/kg)
   Price is usually given on an 'as fed' basis, which means it includes whatever water is in the product. Many supplements such as grain and meals have about 10% water while silage could be 70% water.

2. Nutrient analysis
   This is usually given on a dry matter (DM) basis, which is the percentage of nutrient in the supplement if all the water is removed. Sometimes the analysis is given on an as fed (AF) basis which includes the water. You need to know how the figure is expressed to make sure all comparisons are on the same level of dry matter.
3. Dry matter percentage of the supplement
   Carefully assess the economics of very wet products as you will be buying and freighting a lot of water.

The sums are simple. For example, in Table 1 the initial information is in bold in the first 3 columns and the other figures are calculated.

Looking at the first example in Table 1, whole cotton seed (WCS) is $280/tonne (t) as fed. It is best to use landed costs. WCS is around 22% protein on a dry matter basis or 20% protein as fed when accounting for the 10% dilution with water in the seed.

Therefore, 1 t of WCS as fed contains 200 kg of crude protein. $280 for 200 kg of CP gives $1.40 for 1 kg CP. If you wanted to supply 150 g of crude protein to a breeder (and half this rate for dry stock) as a base rate protein supplement, then you would need 750 g of WCS and the ingredient cost alone would be 21 cents. This approach can be used to cost any other nutrient.

Table 1. Crude protein (CP) costing example

	A	B	C	D	E		F	
	$/t (AF)	CP% (DM)	DM%	CP% (AF)	kg CP/t (AF)	$/kg CP	To supply 150 g CP	Cost (c)
				= C/100 x B	= D/100 x 1000 kg	= A/E	= 150/ (D/100)	= A/10 x F/1000
Whole cotton seed	$280	22%	90%	20%	200 kg	$1.40	750 g	21 c
Cotton seed meal	$500	43%	90%	39%	390 kg	$1.28	385 g	19 c
Dry lick	$650	50%	90%	45%	450 kg	$1.44	333 g	22 c
Roller drum mix	$145	80%	30%	24%	240 kg	$0.60	625 g	09 c

WCS is bulk handled and is best fed regularly, at least 2–3 times weekly or daily, if practical. CSM is higher quality with more bypass protein. It can be fed twice weekly in as much trough space as possible. Dry licks usually include urea, salt and plant protein meal. The roller mix includes urea, molasses and water and requires greater investment in mixing and feeding equipment.

Table 2. Phosphorus (P) costing example

	A	B	C	D	E		F	
	$/t (AF)	CP% (DM)	DM%	CP% (AF)	kg P/t (AF)	$/kg P	To supply 5g P	Cost (c)
				= C/100 x B	= D/100 x 1000 kg	= A/E	= 5/ (D/100)	= A/10 x F/1000
Kynofos 21*	$1100	21%	~100%	21%	210 kg	$5.24	24 g	2.6 c
Dicalcium phosphate (DCP)*	$800	18%	~100%	18%	180 kg	$4.44	28 g	2.2 c
P block/lick 1	$1300	6%	~90%	5.4%	54 kg	$24.00	93 g	12 c
P block/lick 2	$1300	12%	~90%	10.8%	108 kg	$12.00	46 g	6 c

**NB Kynofos and DCP still need mixing with other ingredients (e.g. salt, molasses and meals) so cattle to will eat them.*

Before buying large quantities, trial a small amount of the product first to ensure cattle will eat it.

Energy costing example

For these comparisons energy is compared as cents per megajoule (MJ) of metabolisable energy (ME).

Table 3. Energy costing example

	A	B	C	D	E
	$/t (AF)	MJ ME/kg (DM)	DM%	MJ ME/kg (AF) = C/100 x B	Cents/MJ ME = (A/10)/D
Whole cotton seed	$280	13 MJ	90%	11.7 MJ	2.4 c
Grain	$280	12 MJ	90%	10.8 MJ	2.6 c
Silage	$120	10 MJ	30%	3 MJ	4 c

Email Roger if you would like a spreadsheet to do these sums. A cost calculator and feed nutritive value database is also available at www.dpi.nsw.gov.au/agriculture/livestock/nutrition/values

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Timely tips Autumn/Winter 2013

April–May

Dry season management

- Assess pasture quantity and quality in each paddock—estimate how much there is, its carrying capacity and for how long you can carry that number of stock.
- Assess current stocking rates—do adjustments need to be made to keep stock and country in good condition?
- Evaluate effectiveness and cost benefit of winter supplementation program.
- Start your dry season management plan (previously developed). Stick to the plan.
- Have supplements on hand to meet dry season management plan requirements.
- Check feed-out equipment.

Bulls

- Remove from breeders.
- Check for defects or physical problems e.g. sheaths, leg injuries - cull.
- Cull bulls that are older than 7 years unless they are still in good condition and not showing signs of arthritis. Plan to semen test all bulls nearer to joining time.

Breeders

- Draft cows according to body condition for tailored management and possible supplementation.
- Start dry season supplementation if the season deteriorates.

Calves

- Brand—correct legal position.
- Ear tag—NLIS in correct position OFF ear (see Beeftalk 24, page 22).
- Dehorn calves (younger the better).
- Castrate males that are not potential bull replacements.
- Vaccinate with 5-in-1 or 7-in-1.

Weaners

- Train weaners correctly to receive substantial benefits.
  - » It's less stressful on animals and people.
  - » It teaches animals to work through yards, crushes etc and animals get to know the yard layout. Once settled, animals can be tailed out to learn paddock mustering control.
  - » Teaches animals to eat supplements.
  - » Better long-term productivity.
  - » Quiet well-trained animals are usually calmer, do better and are more saleable.
  - » The process of training allows you to identify problem animals sooner and make management decisions regarding their future.
- Wean early—instantly reduces stress on cows and allows them to gain condition before winter.
- Wean, weigh and identify mothers of poor calves and sell them.

- Draft off small weaners (less than 150 kg) and give them special care.
- Feed weaners good quality hay in yards, feed in racks if possible to minimise wastage. Introduce weaners to supplements.
- Must have adequate supply of good clean water.
- Weaner yards and paddocks should be in good condition with plenty of shade.
- Consider coccidia control measures if weaners are going to be hand fed for a considerable amount of time in the yards.
- Vaccinate with booster 5-in-1 or 7-in-1.
- In tick infested areas, vaccinate for tick fever. If possible do not administer more than one vaccine at a time. Immunity produced by tick fever and other vaccines may be more reliable if vaccines are administered at different times. Generally, tick fever vaccine is administered at least 2 weeks after any other vaccine but before the weaners leave the yards.
- Wean into the best paddock available.

Assess mating and marketing program

- Do herd mating practices give the maximum number of calves on the ground, at the correct time of the year, without putting undue stress on the cows?
  If you feel that the herd should calve earlier, start by joining maiden heifers early and eventually the whole herd will calve earlier.
- Identify the best markets. Are they going to be the best for a large number of years?
- Do your cattle fit the criteria to be eligible for these markets?
- Are your cattle the best type suitable for the most profitable markets?
- Could your animals be suitable for other markets?
- What inputs are needed to make your cattle suitable for different markets? Is it worth the investment?
- Have the markets you previously supplied to changed? Are there new legal requirements?
- Were your animals produced for the least financial, labour and environmental cost? Consider suitability of the breed to your area, ease of calving, tick resistance—it all makes a difference.
- Would changing your cattle breed give you the most financial reward? Changing to new breeds is expensive but a different breed bull over your cows could make a difference to the saleability of your weaners.

Parasites

- Start strategic dipping for pre-winter treatments.
- If resistance is a problem consider using a Tick Resistant Survey Kit available from DAFF Offices or the DAFF Call Centre on 13 25 23.
- Check worm burdens in weaners. Treat if necessary.

Business plan

- Conduct tax planning meeting with accountant.
- Assess success of previous year's business plan.
- Plan management strategies for next 12 months (budget, property maintenance and development, marketing etc).
- Ensure farm Livestock Production Assurance (LPA) records are up-to-date. You need to have records for purchase of chemicals, the withholding period and use-by dates. Are chemicals correctly stored? Do you have mob records for chemical date-of-use and the withholding period expiry date?
- Would you pass a random audit?

Pastures

- Start preparing land for sowing improved pastures in spring.

June–July

Dry season management

- Re-assess pasture quantity and quality
  - » If quantity and quality won't sustain desired animal performance consider why not?
  - » If quantity is below requirements implement a selling strategy.
  - » If quality will not sustain desired animal performance how can pasture quality be improved?

Breeders

- Pregnancy test 6–8 weeks after bull removal and complete annual vaccinations of breeders at same time.
- Cull breeders from main mob (temperament, age, defects and non pregnancy). Truck to saleyards or fattening paddock.
- Access mating program and plan changes if necessary. Consider options for breeding programs, e.g. crossbreeding.
- Maintain check on condition of pregnant breeders especially maiden heifers and first calf heifers.
- Order NLIS tags.

August–September

Dry season management

- Re-evaluate dry season management plan.
- If season has not broken, check breeder and weaner condition. Sell, agist or drought feed.
- Draft cattle according to nutritional requirements.

Bulls

- Check bulls for soundness. It is important to have a semen test conducted on each breeding bull and determine numbers needed for next breeding season.
- Consider which type/breed of bull will produce the type of calves best suited for your potential markets.
- Source and evaluate potential bull supplies.
- Check young home grown bulls as potential sires.
- Annual vibriosis and 3-Day booster for bulls at least 4 weeks before joining.
- Obtain advice on breeder vaccination programs e.g. pestivirus vaccination program.

Breeders

- Assess maiden heifers. Will they be heavy enough to mate?
- Assess first calf cows. Is their condition good enough to get back in calf?
- Check calving heifers for calving difficulties and identify those that need assistance so you can sell them. Checking first calf heifers is good animal husbandry, gets them used to people moving around their paddock and keeps them quiet.

Parasites

- Plan tick control for summer. Check for resistance if control is a problem.
- Order buffalo fly tags if being used, maintain rubbers or other methods used for buffalo fly control.

Pastures

- Consider burning native pastures every 2 to 3 years in late winter or early spring after 50 mm of rain to maintain good pasture condition and control woody weed growth.
- If pasture condition needs to improve, remove stock from paddocks that have been burnt until pasture is at least 15 cm high.
- Watch SOI and other long-range forecasts for suitable time to plant pasture.
- To maintain or improve pasture composition, ensure paddocks get at least one late spring or summer spell every fourth year.

Property maintenance

- Check fences and water facilities in breeding paddocks.
- Check river and creek crossings before the next wet season.
- Make sure you have adequate wire, steel posts etc on hand for maintenance. In the event of a flood/fire and fences are wrecked the supplies you need may be in short supply.
- Maintain fire fighting equipment, extinguishers etc and ensure that fire breaks are maintained and serviceable. Slash or mow around buildings, wooden cattle yards and inside paddocks that adjoin roads as this is where most fires start.
- Clean around buildings and check that gutters are free of leaves.
- Ensure all personnel know what to do in case of fire. Do they know who to call? Ensure the property evacuation plan is available.
- Join your rural fire brigade for useful training and equipment advice.
- Complete workplace health and safety audit of property.
- Are personnel trained to use and maintain farm equipment in a safe, correct and competent manner? Legal liability.
- Complete your annual electrical safety check on all household and farm equipment.

Personal

- Animals and property are not the only things that need maintaince. You and your family are the most important assets on your property. Make annual health checks and having quality family time together a priority.

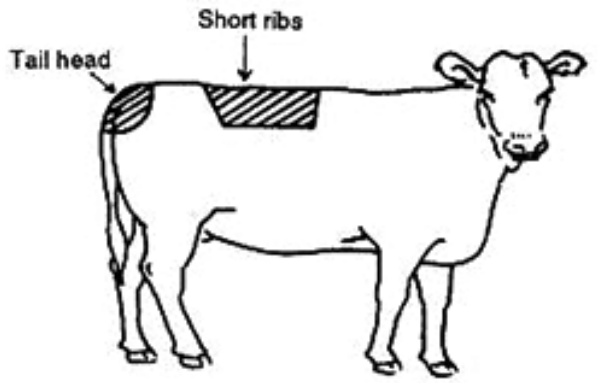
Condition scoring beef cattle

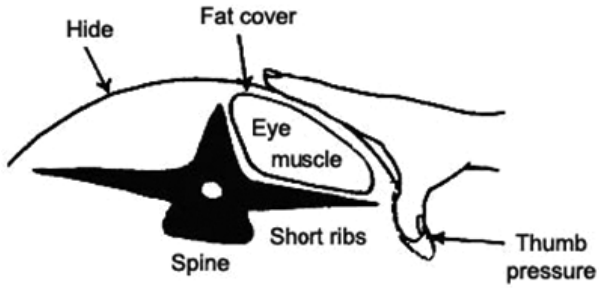
Condition scoring gives a simple and reliable estimate of the body fat reserves of live cattle. Two main areas are felt to assess fat cover:

- short ribs
- around the tail head

The short ribs

The degree of prominence of the short ribs (Figure 1) of the individual spinous processes is found by placing the fingers flat over the short ribs and pressing the thumb into the end of the short ribs (see Figure 2). A condition score is given according to the ease with which the individual short ribs can be felt with the thumb. These are described in Table 1.





The tail head

The degree of fat cover around the tail head is assessed by using the fingers and thumb and should be done at the same time as assessing the short ribs. The appropriate score is given depending upon the degree to which palpable fat can be felt.

Table 1. The description of the condition scores

0	Emaciated
1	The individual processes are sharp to the touch, no tail head fat. The hip, bones and ribs are prominent.
2	The individual processes can easily be felt, but feel rounded, rather than sharp. There is some tissue cover around the tail head. Individual ribs are no longer visually obvious.
3	The short ribs can only be felt with firm thumb pressure. Areas either side of tail head have fat cover which can be easily felt.
4	The processes cannot be felt and fat cover around the tail head is easily seen as slight mounds, soft to touch. Folds of fat are beginning to develop over ribs and thighs.
5	The bone structure of the animal is no longer noticeable and the tail head is almost completely buried in fatty tissue.

The score can be varied half a score depending upon the amount of tail head fat, for example, if the short rib palpation (using the thumb) gives score 4 but the tail head is a typical 3, the score would then be 3.5.

This condition scoring method is not equivalent to the fat scores assigned by AUS-MEAT, CALM, or the Livestock Market Reporting Service (LMRS). These groups use a scoring system that was developed for carcases rather than live animals and operates on a 1-6 scale.

Cows can be drafted at weaning on condition score so that preferential feeding can be given to those that may not achieve their target scores by calving.

Source: Department of Primary Industries Victoria, John Graham, Hamilton May, 2003 AG0113 http://www.dpi.vic.gov.au/agriculture/beef-and-sheep/beef/handling-and-management/condition-scoring-of-beef-cattle

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