



Local Land
Services
North Coast

Beef Cattle Health and Husbandry for the NSW North Coast



5th Edition

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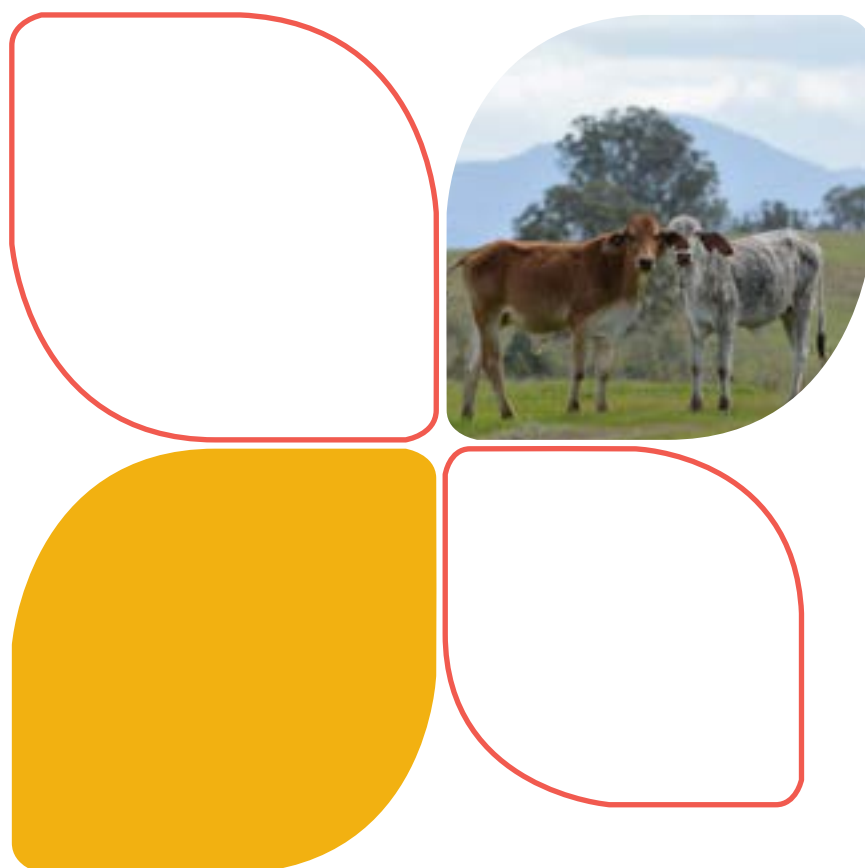
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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing May 2016. However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of Local Land Services or the user's independent adviser.





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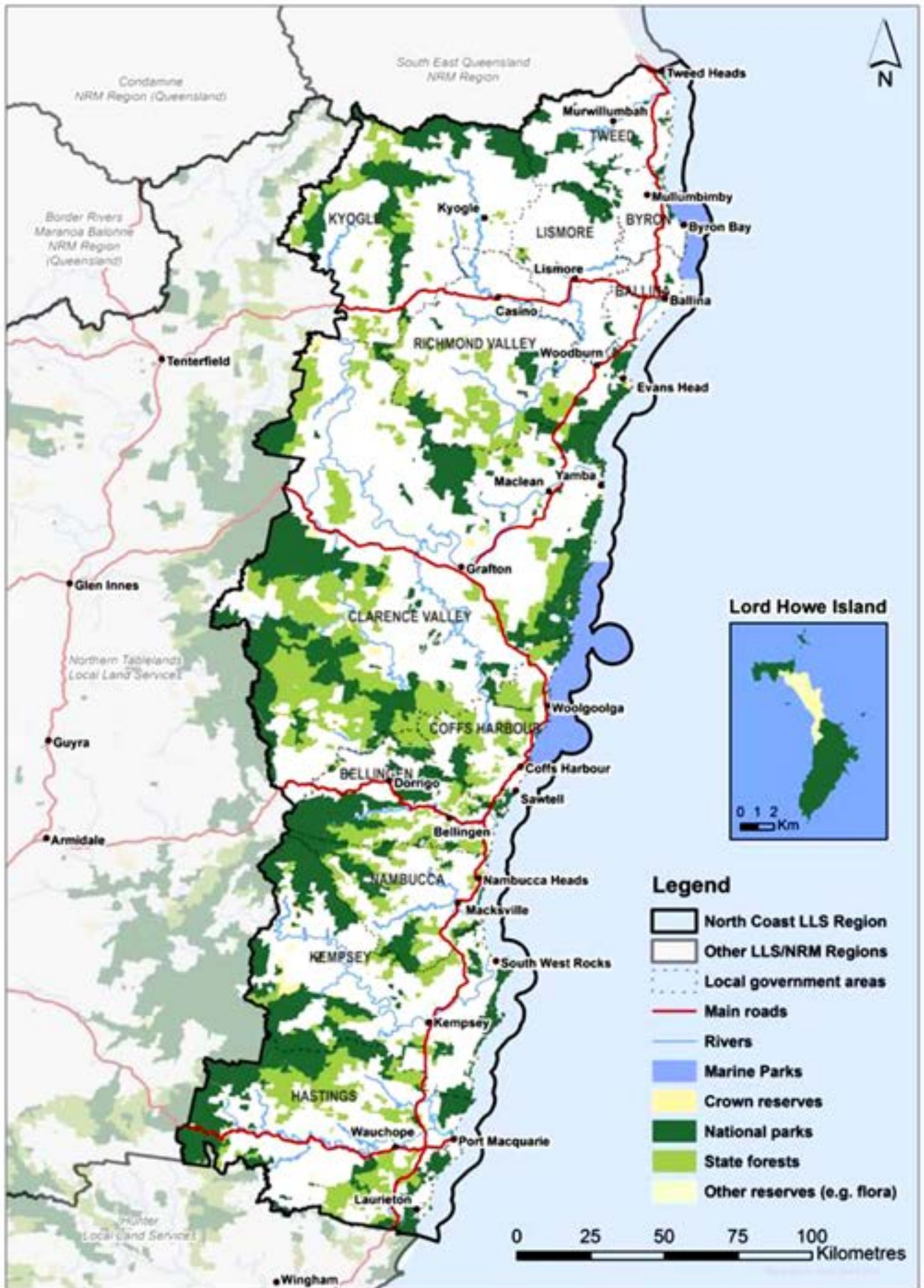


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1. Introduction

1.1 Acknowledgments

As editor of the new edition I wish to acknowledge all those who helped prepare the first four editions, in particular Paul Freeman, then District Veterinarian Casino, who wrote editions one to three.

Special thanks go to Nathan Jennings Senior Land Services Officer (Agricultural Advice), North Coast Local Land Services for writing and reviewing the animal husbandry sections. Thanks also go to Ian Poe, District Veterinarian, North Coast Local Land Services and Paul Freeman NSW Department of Primary Industries for their overview and to Stephen Carrigg North Coast Area Health Service for his words on mental health.

Phillip Kemsley

District Veterinarian Lismore

1.2 About this book

It is over 30 years since the first edition of this publication. The second edition was in 1996, the third edition in 2002 and the fourth in 2012. The aim of this book is to provide information on animal health and husbandry issues that confront beef producers in the North Coast Local Land Services Region of NSW.

On the North Coast the big ticket causes of cattle loss and reduced productivity are nutrition, internal and external parasites, a few important infectious diseases such as three day sickness, blackleg and pink eye, and plant poisonings. This edition reflects their importance with expanded sections on each of these. There is a greater focus on disease prevention, animal welfare and occupational health and safety. A new section groups common causes of disease on the North Coast according to their presenting signs. Each of these conditions is then described in more detail later in the text and for ease of access are listed alphabetically. There is also a new section on programs and calendars to assist producers plan and budget their animal health and husbandry activities.

As beef production on the North Coast is largely pasture-based, the focus of this book is on pasture management and sustainable grazing systems. In this edition other cattle production systems are recognised in a new section which includes calf rearing, store fattening, cattle in farm forestry, and cattle on forages and grain.

The aim of each section and topic in this book is to give an overview; for further information, suggested references and links are provided. To include all the detail is beyond the scope of this book and would result in it being very large indeed!


The information on disease signs, possible causes and therapy are general; this information is to improve your understanding of diseases. It is strongly recommended that you seek veterinary assistance to determine the cause and seek advice on the most appropriate programs or treatments. Quality assurance makes it imperative that any therapy given to stock is appropriate and not likely to compromise product quality or animal health.

This book is available as a downloadable PDF from www.lls.nsw.gov.au. Being electronic will allow for regular updates to be made, particularly for vaccines and animal treatments as they change continually.

It is also hoped to improve the ease of access to and navigation within the manual. For those without access to the internet, a printed copy can be collected from a North Coast Local Land Services office.

1.3 North Coast Local Land Services contacts

For more information

 Visit our website northcoast.lls.nsw.gov.au

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Lismore

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1.4 Some sources of animal health information

Internet

The internet has vastly increased the accessibility and amount of information available on all aspects of beef cattle production. Listed here are just a few websites to get started. Each section of the book also has appropriate internet sites for further information. For those using an electronic copy (PDF) and internet access, simply click on the link. There is also a list of references at the back of the book that includes the full internet address (URL) for all of these links. For those who want a printed copy of these references, contact your local district veterinarian.

Local Land Services
www.lls.nsw.gov.au/

NSW Department of Primary Industries
www.dpi.nsw.gov.au/

Department of Agriculture and Water Resources (Australian Government)
www.agriculture.gov.au/

Animal Health Australia
www.animalhealthaustralia.com.au

Meat and Livestock Australia (MLA)
www.mla.com.au
MLA's online [*Veterinary Handbook for Cattle, Sheep and Goats*](#)

Farm Biosecurity
www.farmbiosecurity.com.au
www.lls.nsw.gov.au/biosecurity

Merck Veterinary Manual (good for information on diseases)
www.merckvetmanual.com/mvm/

Books

Some sources of animal health information:

Diseases of Cattle in Australasia by TJ Parkinson, JJ Vermunt and J Malmo <https://nzva.site-ym.com/store/ViewProduct.aspx?id=7114620&hhSearchTerms=%2522Diseases+and+Cattle+and+Australasia%2522>

Livestock Diseases in Australia by T Brightling, available from booksellers online

Hungerford's Diseases of Livestock 9th Edition by TG Hungerford — out of print, but second-hand copies may be available online.

Overview of the beef industry on the North Coast

The NSW North Coast boasts a mild temperate and subtropical climate which is suited to both beef cattle production and other agricultural pursuits. The North Coast Local Land Services Region is a mixed agricultural district covering an area of approximately 3.2 million hectares. It stretches from just south of Port Macquarie to the Queensland border, covering 12 local government areas (see map). Of this area, 28 per cent (about 906,000 ha) is used for grazing beef cattle. The North Coast beef industry is valued at about \$350 million per year (2011 figures) making it the single largest agricultural industry and worth almost as much as all other agricultural industries combined. At \$92 million per annum, the dairy industry is the second most valuable agricultural industry, followed by sugar, blueberries, nursery and cut flowers, poultry and macadamias.

Excellent overviews of primary industries on the North Coast can be found at:

[*Characterisation of the Socio-Economic Landscape of the North Coast Region of NSW*](#) (EcoLogical 2015)



2. About Local Land Services – What we do

North Coast Local Land Services is helping secure the future of farming and the environment for North Coast communities. Our projects and partnerships grow farm productivity and healthy environments, but also play a vital role in helping to protect against pests, diseases and environmental threats.

North Coast Local Land Services is a locally run organisation which means we are well placed to deliver services that address the needs of the communities we work with.

Our team is here when it matters — helping you with knowledge, networks and local experience.

Our home – the North Coast

The North Coast region is the third most biodiverse region in Australia as well as supporting a progressive, diverse and engaged community and agricultural industry. Our region has a reputation for clean, green environments that grow clean, green agricultural produce.

The North Coast Local Land Services Region is located in north-east NSW, including Lord Howe Island, and covers an area of more than 32,000 square kilometres, including 568 kilometres of coastline.

More than 500,000 people live on the North Coast and the major population centres include Tweed Heads, Lismore, Murwillumbah, Grafton, Coffs Harbour, Nambucca, Kempsey and Port Macquarie.

How we're funded

The services we provide are funded in a variety of ways. The NSW Government contributes funding through the Catchment Action NSW program which provides support for biodiversity, native vegetation, threatened species and Aboriginal cultural heritage outcomes.

The Australian Government is an important funding partner, primarily through the National Landcare Programme. The National Landcare Programme supports the protection, conservation and rehabilitation of Australia's natural environment.

Ratepayers also contribute significantly to funding our biosecurity, livestock health and welfare services. Market access and healthy and productive industries rely on these services.

We also have industry partnerships which contribute to our work.

2.1 North Coast Local Land Services – we help grow and protect

North Coast Local Land Services projects and partnerships grow farm productivity and healthy environments, and also play a vital role in helping to protect against pests, diseases and environmental threats.

Growing farm productivity

North Coast Local Land Services helps farmers grow their knowledge through advice, information, training and networking. Better informed decisions help farmers balance production, profit and sustainability. We help farmers discover new ways to improve their business while protecting the environment.

We contribute to the growth of farm productivity by offering certification that livestock and livestock products are free of disease and residue. This is essential for continued and competitive access to domestic and international markets.

Growing healthy environments

Biodiversity refers to the variety of all living things that exist in an area. North Coast Local Land Services supports programs and partnerships that help to raise awareness in the community of the importance of biodiversity. Raised awareness leads to stewardship and protection of the environment which is essential for sustainable agriculture and native habitat.

Everyone has a role to play in growing healthy environments and that is why we focus on building relationships between farmers and community groups that have real outcomes for the environment, the economy and our community.

There is a strong government and community partnership that supports Landcare on the North Coast. Funding from the NSW Government and a formal partnership with North Coast Local Land Services and North Coast Regional Landcare, is unlocking the potential of the hundreds of volunteers in Landcare networks across the North Coast.

We are building relationships with Aboriginal communities to better understand and share traditional land management knowledge with the wider community. Our programs and partnerships help grow opportunities for Aboriginal people to care for Country.

An environment worth protecting

Healthy environments are essential for farm productivity which is why we build strong relationships between farmers and community groups. Working together on issues such as pest animals, protects farm productivity and vital natural habitats.

Individually and collectively we can, and must, find ways of living sustainably and without impacting the biodiversity around us. Our programs and partnerships bring people together to work towards a shared goal to protect our natural, living wealth – our biodiversity – for future generations.

We regularly consult and engage with the Aboriginal people to better understand and share traditional land management knowledge with the wider community.

An agricultural industry worth protecting

The North Coast region is home to the third most biodiverse region in Australia that also supports a progressive, diverse and engaged community and agricultural industry, including beef, dairy, sugar cane, macadamias and blueberries just to name a few.

Our economy, environment, agricultural industries and communities are all dependent on our biosecurity measures and these are strengthened with support from the entire community and through everyone playing their role.

We'll work closely with you to protect against crop and livestock disease and our district veterinarians will provide you with up-to-date technical advice and frontline services including stock inspections and disease screening.

At North Coast Local Land Services we take the time to understand your situation, providing you with the right training, networking events and best advice. We ensure you have a complete understanding of crop and livestock disease and who to contact when an animal disease or exotic plant pest or disease outbreak is suspected.

We help farmers protect their business by being prepared for natural disasters and when disasters do happen, we'll be there to assist you in getting back to business faster.

By sharing knowledge we help to safeguard your farm's productivity well into the future.

Livestock health and biosecurity

North Coast Local Land Services aim to protect and enhance livestock health and production. Their activities also enhance and protect human health, market access, the environment and animal welfare. These activities are essential to make sure we have markets to sell our stock and by-products to, and ensure that livestock and their products are safe to use. In addition, the team remains prepared for any emergency disease outbreak, such as foot-and-mouth disease.

North Coast Local Land Services staff have valuable local knowledge, so please consult them for advice before putting animals on your land, undertaking new enterprises or stock purchases. Simple advice may prevent the heartache of unnecessary disease from poor choice of animals and/or lack of knowledge on local disease problems.

District veterinarians undertake post-mortems for unexplained stock deaths and investigate herd disease problems such as ill thrift. They do not provide treatments for animals or do activities normally done by private veterinarians. North Coast Local Land Services does not charge for these services. If laboratory testing is necessary for a diagnosis, charges for laboratory fees are common although some tests for exotic or notifiable disease exclusions are exempt.

North Coast Local Land Services provides advice on any livestock health matters including topics such as animal husbandry, disease prevention and regulations such as the National Livestock Identification Scheme (NLIS). Information on regional disease trends is released by North Coast Local Land Services and health certificates are issued for stock movements and properties. The team often has a presence at saleyards, events and field days.

Agricultural advice

North Coast Local Land Services works in partnership with farmers and farming groups to provide support, advice and best practice examples to increase productivity and profitability.

They work closely with organisations such as the NSW Department of Primary Industries to provide up-to-date technical advice and support. They also work together with Department of Primary Industries to implement strategic plans such as the *NSW Animal Biosecurity and Welfare Strategic Plan 2013–2015*. This plan will safeguard the economy, environment and community from diseases and pests that affect animals, as well as improve animal welfare outcomes.

North Coast Local Land Services agricultural advisory officers coordinate local producer groups and hold field days on timely and locally relevant topics, including pasture management, disease management, feeding and nutrition, animal husbandry, breeding and selection, as well as drought preparedness and flood recovery. They also deliver education programs such as the PROfarm range of short courses, including 'Beef Care and Handling' and 'Stock Assess'.

Pest animals

Pest animals and insects can cause serious economic losses to agricultural production, pose a risk for exotic diseases, threaten the survival of many native species and cause environmental degradation. Wild dogs are a particular problem on the North Coast and they will attack both livestock and native fauna. Small livestock such as sheep, goats, alpacas and calves are especially at risk from wild dog attacks, as are domestic pets such as dogs and cats. Management of wild dog attacks focuses on minimising the impacts and this is best achieved by landscape group control programs using 1080 baits. It is important to be proactive with wild dog management and to seek assistance before attacks occur.

Wild dogs can often go unnoticed when the obvious signs (such as sightings, howling or attacks) are not occurring. Landholders also need to consider other signs of wild dog presence such as tracks and scats; increased flightiness of livestock, wallabies or kangaroos; or your own dog barking for no apparent reason. If any of these signs are occurring, it is important to talk to neighbours to get further information on wild dog activity and contact a biosecurity officer to arrange a control program.

North Coast Local Land Services biosecurity officers can also assist landholders with the control of other pest animals such as wild rabbits, feral pigs and foxes and can provide advice on best practice control methods, baits or traps, depending on the circumstance and compliance with relevant legislation. Biosecurity officers can also provide training for landholders to use 1080 and Pindone products (the 'Vertebrate Pest Induction Training' course) and canid pest ejectors. The training is at no cost to North Coast Local Land Services ratepayers. 'Vertebrate Pest Induction Training' takes about 3 hours and provides accreditation for 5 years. 'Canid Pest Ejector' is a 2-hour course that is completed once.

Some useful websites on pest animal control include:

- www.lls.nsw.gov.au/biosecurity/pest-control
- www.invasiveanimals.com.

3. Looking after livestock trade and markets

Owning cattle involves some responsibilities to help protect Australia's reputation as a producer of 'clean and green' animal products, free of diseases and chemical residues. To do this requires good animal identification and traceability and vigilance for diseases that could threaten our industry and economy.

3.1 Biosecurity

Biosecurity means protecting the economy, environment and community from the negative impacts of pests, diseases and weeds. Biosecurity is essential to ensuring the safety, wellbeing and prosperity of all people.

Australia is in a unique position because of its isolation and strong quarantine regulations. We have managed to remain safe from many threats as a result of this. NSW, by extension, has been able to maintain good biosecurity measures.

Changes in a number of external factors have meant that more and more we must be vigilant about strengthening our measures and upholding biosecurity.

North Coast Local Land Services works with landholders, industry and the community to uphold biosecurity.

3.2 Emergency diseases

Australian agriculture benefits enormously from its freedom from the more devastating disease outbreaks that plague livestock industries in other parts of the world. Emergency livestock diseases are ones which require a coordinated response from government, the livestock industries and emergency management organisations. Many of these are **exotic**, others are **endemic notifiable** or **emerging**. The term '**exotic disease**' means those diseases that occur overseas and are not in our country, such as foot-and-mouth disease, but should they ever occur in Australia they need to be acted on immediately. '**Endemic notifiable diseases**' include those that may be established in one part of Australia, but attempts are being made by authorities to contain their spread, such as tick fever. '**Emerging diseases**' are new or newly identified diseases such as Hendra virus of horses.

Emergency diseases need a coordinated response because they could have one or more of the following impacts:

- major national socioeconomic consequences such as serious international trade loss and/or national market disruptions
- significant production loss
- significant public health impacts
- significant environmental consequences.

Our livestock industries could be devastated by an outbreak of an exotic disease. The 2001 foot-and-mouth disease outbreak in the United Kingdom (UK) is estimated to have cost the UK economy between \$10 billion and \$30 billion. It is vital that diseases such as foot-and-mouth disease, mad cow disease and rabies are never allowed in Australia. With increased international travel the world is becoming a smaller place and the opportunity for diseases entering our country is increasing. The price of freedom is eternal vigilance.

Across the NSW North Coast, and throughout Australia, livestock are regularly examined and tested to ensure their freedom from exotic diseases. This allows Australia to provide our trading partners with proof of our freedom from a range of exotic diseases.

The earlier the recognition and coordinated response to these diseases are made, the better the outcome for everyone.

North Coast Local Land Services biosecurity staff are experienced and trained in emergency diseases and are the key players in any emergency disease response.

Experience and studies have shown that the most important people in the initial recognition of emergency diseases are you, the cattle producer. Look out for any unusual signs. The following syndromes are very important to get investigated by your North Coast Local Land Services district veterinarian. Contact your district veterinarian if you notice any of the following:

- sudden death of more than one animal
- sudden death with blood discharges
- lameness of more than one animal affecting all four feet
- abortion 'storm'
- blisters in mouth, on feet or udder
- drooling and reluctance to eat in more than one animal
- red urine
- yellow skin
- high fever and reluctance to eat and or weight loss in more than one animal
- behavioural or nervous changes such as staggering, head down or dullness
- a tick you cannot identify.

We all need to be on the lookout for emergency diseases. Help protect our industry. If you suspect an emergency animal disease, please report as soon as possible to one of the following:

- Emergency Disease Hotline 1800 675 888
- your North Coast Local Land Services district veterinarian (see "[1.3 North Coast Local Land Services contacts](#)" on page 2 for contact details)
- NSW Department of Primary Industries office
- your private veterinarian.

www.outbreak.gov.au/

[Emergency Animal Diseases in NSW](#) (DPI 2014)

See [Emergency Animal Disease](#) (Animal Health Australia)

3.3 Animal welfare

Achieving a high level of animal care is important, both to the individual cattle producer and to the industry as a whole. The aim of all cattle producers is to be in the business of producing quality livestock for quality meat and quality animal products. To do this requires and demands a high level of animal welfare.

What is animal welfare?

There are misconceptions by some about what animal welfare is. Animal welfare lies in the middle of the spectrum of human attitudes toward animals. It aims for the best possible outcomes for the animal, the producer and in meeting community expectations.

There is a spectrum of human attitudes and beliefs towards animals:

- animal abusers — view cruelty as acceptable and are prepared to break the law
- animal users — believe animal wellbeing is secondary to production
- animal welfare — believes that animal wellbeing is paramount for animal health and production
- animal rights — believe that animals have equal rights to humans
- animal liberation — believe that humans should have no control over animals; includes activists who are prepared to break the law.

Animal welfare standards

In recent years, animal welfare has come under close public and political scrutiny. A range of animal welfare standards set the minimum legal standards to be met for the husbandry and transport of livestock. These are imbedded in national Australian animal welfare standards and guidelines. They are being developed by Animal Health Australia for the Australian Animal Welfare Strategy. This a Commonwealth initiative developed in consultation with state and territory governments, animal industry organisations, animal welfare groups and the general public. For details see www.animalwelfarestandards.net.au/.

Animal welfare legislation

Checks are in place to ensure that when animal welfare problems are suspected or do occur, that they are dealt with in a prompt and professional manner. The humane rearing and movement of animals is covered by the [NSW Prevention of Cruelty to Animals Act 1979](#) which is policed by the RSPCA through its inspectors. The Act outlines minimal standards of care, including housing, transport, age at castration or dehorning, nutrition and health to enable humane animal production. Stockowners should be aware of their responsibilities under this Act. Periods of low pasture availability and quality caused by overstocking, drought, floods, waterlogging or financial difficulty do not exempt producers from meeting the minimum standards. The Act and Regulation can also be found at:

<http://www.legislation.nsw.gov.au/#/>

While the welfare standards and Prevention of Cruelty to Animals Act set the legal minimum requirements, the aim for producers should be much higher to achieve the best possible outcomes for their stock. For example it is important to keep breeders at a minimum body condition score of 3, regardless of seasonal conditions (see [“5.1 Condition, fat and muscle scoring” on page 35](#)). This is not only for their benefit, but for their calf at foot and in order for cows to quickly get back in calf.

See:

[Visual and Manual Assessment of Fatness in Cattle](#) (DPI 2006)

[Welfare Decisions for Beef Cows](#) (DPI 2010)

3.4 Is it fit to load?

This is a handy guide for cattle producers to know the minimum welfare requirements for transport and for saleyards and abattoirs. This guide summarises the [Australian Animal Welfare Standards and Guidelines: Land transport of livestock](#) (DAFF 2012) in a short, easy to read format. Cattle being transported are at greater risk than they are in the paddock and there are standards to be met for abattoirs. The guide also gives information on time off feed and water.

Cattle are not fit to load if they are:

- not strong enough to undertake the journey
- in poor condition, emaciated or visibly dehydrated
- in the last month of pregnancy
- blind in both eyes
- actively infected with pinkeye (they will only spread it)
- affected with cancer eye that affects vision, or the eye is offensive, weeping or bleeding
- unable to walk normally or unable to bear weight evenly on all four feet
- overheated, panting, fevered or exhausted, including from three day sickness
- suffering from severe visible distress, injuries, cuts or abscesses
- cows with prolapses
- bulls with pizzle injuries where they may stand on it
- cattle with ingrown horns, if horn tip has penetrated the skin.

If in doubt leave it out or contact the abattoir.

Download a copy of [Is it Fit to Load?](#) (MLA 2012) or contact your Local Land Services office.

3.5 Avoiding chemical residues

Consumers and governments, both in Australia and overseas, are increasingly conscious of food safety. Australia's continued access to many international markets depends on us demonstrating that our beef products are free of significant chemical residues.

Local Land Services district veterinarians provide advice on avoiding residues. They also have the responsibility of undertaking investigations should residue detections ever occur. Our district veterinarians maintain records and have access to information on a property's residue event and testing history which can be accessed for solicitor's searches and quality assurance programs.



Sources of residues

There are four main sources of chemical residues in cattle:

- environmental contamination from the past use of agricultural chemicals
- stock feed
- heavy metal exposure, in particular to lead
- veterinary chemicals used to treat livestock.

Avoiding chemical residues from environmental contamination

In 1987 the Australian beef industry faced a crisis due to very low, but unacceptable, levels of organochlorine residues found in a small proportion of export beef consignments. Organochlorine chemicals like dieldrin have a long half-life in the soil and in animal tissues. Most of the residues associated with the 1987 incident occurred from trace levels remaining in the soil from these chemicals being used for agricultural purposes in the past. An intense testing program followed which identified affected properties and measures were put in place to ensure that there was no further risk. The vast majority of these holdings now no longer pose a threat of residues in cattle.

Searches from the chemical residue database are available through the Local Land Services for quality assurance programs and for solicitor's searches when buying a property. They can also be made if you are concerned about past land use and wish to be certain that there were no identified sites on your property. NSW Department of Primary Industries has produced a factsheet that provides information on some of the issues that buyers should consider when buying rural land, including chemical residues.

See:

["8.48 Poisonings – Chemicals" on page 151](#)

[Considerations Before Buying Rural Land](#) (DPI 2016)

Avoiding lead residues

The potential for cattle deaths and residues from lead is present on many properties. Cattle are particularly attracted to lead and its salts and will lick at old vehicle batteries and lead-based paints on old sheds and farm dwellings. Posts treated in the past with sump oil from vehicles run on leaded petrol are also a source. Cattle are attracted to eat ash. The ash after lead painted timber is burnt can cause problems as lead is not destroyed by fire and remains in the ash. Cattle with lead poisoning show nervous signs or blindness, but cattle exposed to sublethal doses could have tissue residues for 12 months or more.

It is important to ensure that cattle do not have access to these sources of lead. If you suspect that they may have it is important to have them tested for residues (see lead poisoning in ["8.48 Poisonings – Chemicals" on page 151](#)).

[Lead Poisoning in Livestock](#) (DPI 2011)

Avoiding chemical residues from stock feed

Stock feeds introduced to your property can pose a residue risk. When purchasing supplementary feed be sure to request one of the following commodity vendor declarations (CVDs):

1. Commodity Vendor Declaration Form (SAFEMEAT)
2. By-product Vendor Declaration Form (SAFEMEAT)
3. Fodder Vendor Declaration Form (Australian Fodder Industry Assoc. Inc.)
4. Stock Food Supplier Declaration Form (Stock Feed Manufacturers Association of Australia).

These are important for on-farm quality assurance records and are also needed when completing the National Vendor Declaration Waybill for cattle. The National Vendor Declaration requires feeding history for livestock in the 60 days prior to sale; commodity vendor declarations provide the documentary evidence.

To register and order commodity vendor declarations see <http://edec.mla.com.au/commodity/>.

Information on commodity vendor declarations is available at:

[Commodity Vendor Declarations for Stock Feeds](#) (DPI 2006)

[Vendor Declarations webpage](#) (MLA 2015 at www.mla.com.au)

Information on minimising the risk of residues from purchased feed is available at:

[Buying Stock Feeds: Minimising chemical residue risks](#) (DPI 2014)

[About FeedSafe® webpage](#) (Stock Feed Manufacturers' Council of Australia at www.sfmca.com.au)

Avoiding residues from veterinary chemicals

Agricultural and veterinary chemicals are widely used on beef properties and may produce unacceptable residues in animals if the withholding periods and export slaughter intervals (ESI) are not observed.

Labels of chemicals used in agriculture provide details on how long residues take to fall below acceptable limits before meat or milk can be processed and sold as food.

The *withholding period* is the period of time required to wait after treatment to satisfy Australian laws. However, some of our overseas markets have different laws regarding residue levels and their residue requirements may be different.

Because there is no international uniformity on maximum residue levels of chemicals, a term called an *export slaughter interval* is used to describe the waiting period after treatment with a chemical that stock can then be slaughtered for the *export* market. ESI's are always equal to the withholding period or longer.

Most chemicals used for internal and external parasite treatments and antibiotics have withholding periods and ESIs. Vaccines generally do not. The withholding period and ESIs are extended when treatments have been repeated.

Before using any agricultural or veterinary product on the farm, read the label and check the ESI and withholding period. Sometimes chemicals are used in agriculture at a dose rate or in a manner not listed on the label. Such use is called 'off-label' and residue avoidance is vital. Off-label use may be illegal. Always seek professional advice for any off-label use of chemicals on livestock.

Extensive testing occurs at abattoirs to ensure we market clean beef. This protects both our health and our markets, as many countries will not accept any levels of certain chemicals in their beef. If residues are identified at the abattoir, the producer is penalised.

When administering products that have a withholding period or ESI, identify treated animals and keep records of treatments in a notebook.

To check a withholding period or export slaughter interval see: www.apvma.gov.au.

3.6 Quality assurance programs

Livestock production assurance

Livestock Production Assurance (LPA) is a Meat and Livestock Australia (MLA) program to assure our markets that Australian beef meets safety requirements. Your tick on your National Vendor Declaration form is your pledge that meat has been produced safely from cattle that meet the requirements of the program in terms of history and treatments. This needs to be supported by on-farm records. LPA is the first tier and the entry level for all producers to ensure food safety management.

The Livestock Production Assurance On-Farm Quality Assurance (LPA QA) program represents the second tier of the LPA framework. To progress to LPA QA, producers need to be fully LPA accredited. LPA QA incorporates the CATTLECARE™ program.

National Vendor Declarations are a critical part of the beef industry to guarantee the integrity of Australian beef. They are required whenever cattle are sold, either from property to property, through a saleyard or to an abattoir. For further details see “3.8 Movement requirements for moving or selling cattle” on page 22. When you sign a National Vendor Declaration, you are claiming compliance with Livestock Production Assurance program requirements.

Livestock Production Assurance has five key elements which focus on food safety and on-farm risk. These elements are:

- Property risk assessment — Livestock are not exposed to areas on a property that are contaminated with organochlorines or other persistent chemicals.
- Safe and responsible animal treatments — Livestock intended for human consumption do not contain unacceptable chemical residues or physical hazards.
- Stock foods, fodder crops, grain and pasture treatments — Livestock are not exposed to feeds containing unacceptable contamination, specifically any food containing animal products and/or unacceptable chemical residues.
- Preparation for dispatch of livestock — Livestock to be transported are fit for the journey, are not unduly stressed and contamination is minimised during on-farm assembly and transport to the destination.
- Livestock transactions and movements — Purchasers of livestock can access the chemical residue or food safety status of the animals and any animals or products purchased can be assessed for chemical residue status. The movement of livestock can be traced through the National Livestock Identification Scheme (NLIS) database.

Local Land Services maintain records on diseases and chemical residue testing should this information be required for your quality assurance programs.

[Livestock Production Assurance Guidebook](#) (MLA 2015)

For information on Livestock Production Assurance On-farm Quality Assurance program see [Livestock Production Assurance webpage](#) (MLA 2015 at www.mla.com.au)

CATTLECARE™ and Agrisure

CATTLECARE™ was developed as an on-farm quality assurance program by Safe Meat for producers raising grass-fed beef cattle. The program was an industry self-regulated initiative to ensure correct practice without government intervention or supervision. Participation in the program was voluntary. CATTLECARE™ has largely been incorporated within Livestock Production Assurance. This is under review with the principles of CATTLECARE™ to be embodied in a new program called AgriSure.

The CATTLECARE™ emphasis is on:

- minimised risks of chemical contamination through safe, responsible use of chemicals
- minimised bruising and hide damage and improved animal welfare
- more effective management and herd improvement through better record keeping.

Its key elements are:

- assessment of chemical residues in soil
- staff training with chemical user course and on CATTLECARE™
- labelling, storage and safe use of chemicals
- adherence to withholding periods and export slaughter intervals
- treatment records of animals, pastures and crops
- ensuring purchased stock feeds do not have unacceptable chemical contamination
- stock identification and records, transaction and movement records
- animal welfare and transport
- internal check procedures to verify compliance and corrective action required.

For information on Livestock Production Assurance On-farm Quality Assurance program see [Livestock Production Assurance webpage](#) (MLA 2015 at www.mla.com.au).

European Union Cattle Accreditation Scheme

To meet the demands of the European Union (EU), all beef and offal exported to the EU must come from animals raised on properties accredited by the Australian Quarantine and Inspection Service (AQIS) under the EU Cattle Accreditation Scheme.

This scheme is a national animal production system that allows full traceability of all cattle through the use of the National Livestock Identification Scheme.

The scheme also requires that all cattle must not have been treated with hormonal growth promotants (HGP) at any time. To ensure HGP freedom there are introduction, movement, identification, record keeping and documentation requirements. Cattle implanted with HGP must have a triangular earmark hole in the centre of the right ear.

When cattle are sold, the saleyard must be EU-accredited and an EU vendor declaration form completed. When cattle are slaughtered the abattoir concerned needs to have EU accreditation. Cattle sold or moved outside the closed EU system lose their EU eligibility.

To apply for EU accreditation and lists of EU-accredited farms, feedlots or saleyards see: [Exporting Meat and Meat Products webpage](#) (Department of Agriculture and Water Resources at www.agriculture.gov.au)

Information on HGP can be found at in DPI's [Understanding Hormonal Growth Promotants](#) (DPI 2008).

Pasture Fed Cattle Assurance System (PCAS)

The Pasture Fed Cattle Assurance System (PCAS) is a certification program that enables grass-fed cattle producers to prove claims relating to pasture-fed or grass-fed production methods.

Underpinning PCAS are the *PCAS Standards* which govern the on-farm feed requirements and traceability of the cattle as well as animal handling practices which influence eating quality. The PCAS Standards also include two optional modules to support claims relating to the freedom from antibiotics and hormonal growth promotants (HGPs).

PCAS enables producers to prove that they operate grass-fed production systems through having their systems certified. To gain certification, producers need to ensure that their on-farm practices comply with the requirements of the *PCAS Standards* and that they maintain accurate records to prove their compliance. The requirements of the *PCAS Standards* mean that eligible cattle:

- have access to graze open pasture their entire life
- have not been confined for the purposes of intensive feeding for production
- are fully traceable for their entire life
- are guaranteed to eat well, based on Meat Standards Australia (MSA)

and if required

- are free from hormonal growth promotants (HGPs) and/or
- are free from antibiotics.

The third party on-site audits ensure that the PCAS program has a high degree of integrity because this process allows for independent verification that on-farm practices and records demonstrate that production methods comply with the requirements of the *PCAS Standards*.

Producers that comply with the *PCAS Standards* and successfully complete an on-site audit are eligible to claim their product is 'Certified Pasturefed' and use the Certified Pasturefed suite of certification marks.

For further information and to register for PCAS, see: www.certifiedpasturefed.com.au/.

Organic certification and production

The *National Standard for Organic and Bio-dynamic Produce* sets out the requirements for the organic industry in Australia. This standard provides assurance and access to the export and domestic markets for Australian organic produce. Organic certification ensures that what is purchased by consumer meets organic standards. The national standard is administered by the Commonwealth Department of Agriculture (formerly AQIS).

To achieve organic certification, cattle need to be home-bred and meet feeding, animal health, treatment, animal welfare, environmental impacts and other requirements on a farm management plan. Audits are conducted to ensure compliance. Off-farm certification includes transporters, processors, labelling and retailers.

There are several certification organisations in Australia, including:

- National Association for Sustainable Agriculture www.nasaa.com.au
- Australian Organic (formerly Biological Farmers of Australia) <http://austorganic.com>
- Organic Food Chain www.organicfoodchain.com.au
- Demeter Bio-Dynamic Research Institute www.demeter.org.au.

See [Exporting Organic and Bio-dynamic Products webpage](#) (Department of Agriculture and Water Resources at www.agriculture.gov.au)

[National Standard for Organic and Bio-Dynamic Produce](#) (DAWR 2015)

3.7 Cattle identification & proof of ownership

Cattle are given identification such as brands, ear tags and ear marks for three reasons:

1. disease and residue tracing
2. legal proof of ownership and to help prevent against theft
3. management.

Disease and residue tracing – NLIS tags and Property Identification Codes

The National Livestock Identification Scheme (NLIS) is designed as a national system that provides information relating to animals such as disease and residue status, market eligibility and other information.

The Property Identification Code (PIC) forms the basis of the NLIS system. This is an essential part of the tracing system to ensure the disease and residue status of livestock and their products. A landholder must register a PIC if they intend to have cattle on their land. To apply for a PIC, contact your North Coast Local Land Services office.

NLIS ear tags should be applied in the right ear of the animal. All cattle are required to have an identifier (ear tag or rumen bolus) before leaving the property to a saleyard, abattoir or to another property. In the case of movement to another holding, it is the responsibility of the person receiving the cattle to transfer the tag numbers on the NLIS database. This is termed a property to property transfer (or P2P).

In the past PICs related to a person, however, this has been changed so that PICs now relate to a property. This change is to assist in chemical residue and disease investigations.

Cattle are identified by the property of birth PIC using an electronic device either as an NLIS ear tag or as a rumen bolus. The ear tags are more commonly used than the bolus. The rumen bolus is administered orally and is swallowed to remain in the rumen (first stomach). Both the devices contain a microchip with no battery and require an external source to provoke signal transmission.

Each chip has its own individual radio frequency identification device (RFID) number, with 15 numbers. These numbers are displayed when the device is read by an NLIS reader. When this number is entered into the NLIS database it is automatically matched to the PIC and to an individual identification code called the NLISID. This code has the same letters and numbers that are printed on the ear tag.

For more information see:

www.dpi.nsw.gov.au/agriculture/livestock/nlis/cattle

[Tech Tips NLIS Database: Program and status codes](#) (NLIS 2009)

To order tags, contact your rural produce store. Tags are no longer ordered through Local Land Services.



The NLIS database

This database operates nationally and allows information on the history of an animal to follow it whenever it is traded in Australia. It relies on information concerning NLIS tags and cattle movements being entered onto the database. Animal movements that need to be reported to the NLIS database include:

- whenever cattle change ownership
- property to property (P2P) transfers which include:
 - moving cattle between your own properties, if the holdings have different PICs
 - moving cattle to and from leased or agistment properties
 - moving cattle to and from camp drafts, shows etc.
- transfers into and out of saleyards
- movement to abattoirs.

It is the responsibility of the cattle owner or manager to report these movements within 7 days. The person receiving stock has the responsibility of entering P2P movements on the database. When notifying the database of a P2P transfer, the following information is required:

- NLISID (printed on the tag) or RFID (when read on a scanner) identification of the animals being transferred
- PICs of the property that the cattle are moving from and the property that they are going to
- National Vendor Declaration number (if cattle are being sold)
- date of movement and date of transfer on the database.

The database is extremely useful for providing information on lost or stolen animals or when tracing stock that may have been exposed to a serious disease such as tuberculosis or anthrax. Carcass information can also be linked to NLIS identifiers for feedback to producers.

The database is administered by Meat and Livestock Australia. It is important to be registered with the database to ensure that movements of cattle are documented. For further information or to register see [NLIS database webpage](#) (MLA 2015 at www.mla.com.au/) or call the NLIS Help Desk on 1800 654 743.

Understanding the NLISID codes on an ear tag or bolus

Each NLISID is made up of the PIC and further information pertaining to the property and to the individual animal. Take for example the tag: NA124567LBE00089:

PIC is made up of:	
N	The first letter 'N' denotes a NSW PIC
A	The second letter is a check to allow computers to automatically confirm that the PIC is valid and has been correctly entered
12	The first two numbers are for the original Rural Lands Protection Board district and remain unchanged with any amalgamations. 12 is the code for Casino.
4567	The next four numbers are specific for a given property
Tag information follows the PIC information:	
L	This is the code for the tag manufacturer (e.g. L is Leader, X is Allflex)
B	This is the code for the device type: B is for breeder (born on property) tags which are white E is for post-breeder (not born on the property) tags which are orange
E	Is the year of tag manufacture: A is 2005 B is 2006 etc.
00089	The last 5 characters are unique to the tag

Cattle ownership – Local Land Services stock identification scheme

This scheme commenced on 1 January 2006 and covers registered brands, earmarks and tattoos for stock. Registered marks are the only system acceptable by law as legal proof of cattle ownership. They may be applied as a hide brand, ear mark or ear tattoo.

The scheme was introduced as a means of identifying stock, to provide evidence of stock ownership and to help act as a deterrent against stock theft. The identification of cattle under this scheme is voluntary. It is not compulsory in NSW to brand or earmark, but if using the prescribed sites you must use a registered mark. The scheme is administered by the District Registrar located at each Local Land Services regional head office.

The three legally recognised means of cattle identification are: hide branding, ear marks and tattoos.

Hide branding

This can be done by either fire or freeze brand. Brands must be registered to use as a proof of ownership and applied only at certain prescribed sites on the animal. Fire branding is quicker and more widely used than freeze branding. The two registered types of hide brands are:

- symbol brands
- board brands.

Symbol brands have been used for many years and often have strong personal and heritage value. No new symbol brands can now be registered and all new brands are board brands. To be maintained, symbol brands need annual renewal with the Local Land Services District Registrar. This is important as once the registration of a symbol brand is cancelled or otherwise lapses, it cannot be re-registered.

The site of the brand on cattle should be the left rump. If any subsequent brands are applied then the site should be the right rump (followed by the left thigh, then the right thigh). There should be no more than one brand at a site.

Board brands have a board prefix (for example Casino is ) followed by the registered numbers.

Ear marks

These are one or two marks applied to the left (near side) ear and in the location specified by the District Registrar. As with brands, registration of ear marks is through the District Registrar.

Tattoos

There is a scheme for registered tattoos at the discretion of the District Registrar.

[Standard Operating Procedures: Cattle branding](#) (DPI)

Use of identification in management

Individuals or groups can be identified to assist in management. Many quality assurance systems require permanent individual identification. Ear tags are the most common method for individual identification. They all have a failure rate so often a backup system is used to allow identification if a tag falls out (for example double ear tags, ear tattoos, freeze brand). The advantages of ear tags are that they are cheap and easy to apply and they can be read from a distance. In all cases of identification, whether temporary or permanent, the procedure should cause minimal discomfort to the stock involved if done correctly.

NLIS tags

These were originally intended as a means of tracing cattle for diseases and residues. However, with the ability of the devices to be read either by a handheld or a race-mounted reader and linked to computer software and databases, they are fast becoming a valuable management tool. Some of the ways in which they are being used include:

- automated milk feeding systems for calf rearing
- individualised feeding of dairy cattle in the bales
- monitoring and recording weight gains
- recording reproductive information, pregnancy status and calving records
- recording treatments — this is of particular importance for quality assurance and adhering to withholding periods and export slaughter intervals
- stud and pedigree information
- carcass information feedback from the abattoirs.

For product information on brands, ear marks, ear tags, NLIS devices and readers:

<http://www.leaderproducts.com.au/>

<http://www.allflex.com.au/>

For further information on carcass feedback see

[NLIS Cattle: Using electronic identification and carcass feedback in cattle management](#) (DPI 2008)

National Cattle Pregnancy Diagnosis Scheme tail tags

These tail tags are applied by your private veterinarian for the identification of cattle at the time of pregnancy testing (see [“5.9.11 National Cattle Pregnancy Diagnosis Scheme”](#) on page 58).

‘Bangtails’

This technique involves cutting the hair at the end of the tail (or brush). It is a common temporary method for identifying groups of stock, often for those to be culled, such as cows that are pregnancy tested empty.

Ear marks

Unregistered ear marks are used in the off-side (right) ear and are another herd identifier but are not legal proof of ownership. A triangular ear mark hole in the centre of the right ear must be used whenever cattle are implanted with hormonal growth promotants (HGPs).

See [Implanting Hormonal Growth Promotants](#) (DPI 2008)

Identification into the future and DNA technology

DNA testing of hair samples is already being used in the cattle and horse industries as a means of stock identification and verifying bloodlines. This system utilises a 13-digit European Article Number barcode for each individual.

3.8 Movement requirements for moving or selling cattle

Movement checklist

Road transport to a saleyard or abattoir

- ✓ Ensure that welfare and meat quality standards are met — see [“3.4 Is it fit to load?”](#) on page 12
- ✓ National Vendor Declaration
- ✓ Cattle are identified with NLIS tags
- ✓ National Cattle Health Statement (not mandatory), may be required by some saleyards

Road transport between holdings when cattle are sold

- ✓ Ensure that welfare standards are met
- ✓ National Vendor Declaration
- ✓ Cattle are identified with NLIS tags
- ✓ Person receiving cattle to ensure that NLIS tag numbers are transferred on NLIS database
- ✓ National Cattle Health Statement (not mandatory), may be required by buyer

Road transport between holdings when cattle are not sold

- ✓ Ensure that welfare standards are met
- ✓ Transported Stock Statement or alternatively a National Vendor Declaration
- ✓ If the properties have different Property Identification Codes (PICs) then person sending cattle must ensure cattle are identified with NLIS tags of the property of origin

- ✓ If the properties have different Property Identification Codes (PICs) then person receiving cattle to ensure that NLIS tag numbers are transferred on NLIS database

Road transport interstate

- ✓ Ensure that welfare standards are met
- ✓ National Vendor Declaration
- ✓ Interstate Movement Permit / Waybill
- ✓ Cattle are identified with NLIS tags
- ✓ Person receiving cattle to ensure that NLIS tag numbers are transferred on NLIS database
- ✓ National Cattle Health Statement (not mandatory), may be required by buyer

Show and event movement

- ✓ Transported Stock Statement or alternatively a National Vendor Declaration
- ✓ Cattle are identified with NLIS tags
- ✓ Most show societies have health certification requirements for entry onto the grounds

Walking or grazing cattle on roadways or travelling stock routes

- ✓ Walking Stock Permit or
- ✓ Grazing Stock Permit or
- ✓ Roadside Grazing Stock Permit or
- ✓ Annual Stock Movement Permit

For details see ["Stock permits" on page 26](#)

Animal welfare requirements for road transport

Is it Fit to Load?

Cattle are not fit to load if they are:

- not strong enough to undertake the journey
- in poor condition, emaciated or visibly dehydrated
- in the last month of pregnancy
- blind in both eyes
- actively infected with pinkeye (they will only spread it)
- affected with cancer eye that affects vision, or the eye is offensive, weeping or bleeding
- unable to walk normally or unable to bear weight evenly on all four feet
- overheated, panting, fevered or exhausted, including from three day sickness
- suffering from severe visible distress, injuries, cuts or abscesses
- cows with prolapses
- bulls with pizzle injuries where they may stand on it
- cattle with ingrown horns, if horn tip has penetrated the skin.

If in doubt leave it out or contact saleyards management or the abattoir.

Download a copy of [Is it Fit to Load?](#) (MLA 2012) or contact your Local Land Services office.

Meat and hide quality expectations for abattoirs

Abattoirs have a high standard for the quality of cattle that they receive for slaughter. As food processing establishments, they are in the business of turning quality cattle into quality beef and animal products.

Cattle producers are in the business of producing quality cattle that meet market specifications for age, fat cover and muscle score. But consideration also needs to be made of presenting cattle that are of low risk of carcass, offal or hide downgrades, condemnations or chemical residues. And as a minimum, meet the animal welfare standards expected by the industry as detailed above.

To reduce the risk of hide downgrades:

- maintain fences, in particular tension on barbed wire fences, to reduce cuts
- control lantana, cockspur and other plants likely to cause skin injury
- have control programs in place for external parasites, such as ticks, buffalo fly and lice
- where possible, seek alternatives to branding.

To reduce the risk of meat downgrades through bruising and muscle damage:

- ensure yards do not have protruding objects
- breed for polled cattle (see 'Dehorning and disbudding' and 'Breeding polled cattle' in ["5.6 Calf management" on page 42](#))
- trim horns
- draft and load cattle according to class and weight
- vaccinate and give injections high on the neck and as directed
- treat downer cattle or those affected by three day sickness early (see 'Treatment' in ["7.9 Downer cattle" on page 97](#)).

To reduce the risk of offal downgrades:

- check whether liver fluke is on your holding and implement a control program (see ["8.36 Liver fluke" on page 142](#))
- reduce hydatids through wild dog control, drenching of farm dogs for tapeworms and on-farm offal disposal (see ["8.30 Hydatid disease" on page 135](#))
- treat infectious diseases, such as pneumonia, early.

To reduce the risk of residues:

- ensure that National Vendor Declarations are completed in full and correctly
- keep records of all treatments given, product, dose rate, cattle treated and date
- observe withholding periods for all treatments
- exclude cattle from risk areas such as around houses, sheds, chemical stores, chemical mixing areas, dip sites and farm dumps (see ["3.5 Avoiding chemical residues" on page 12](#))
- never use unregistered 'bush' remedies, for example oil of turpentine, it is illegal to do so.

National Vendor Declarations

National Vendor Declarations are a critical part of the beef industry to guarantee the integrity of Australian beef. The focus of the National Vendor Declarations is food safety, specifically exposure to agricultural and veterinary chemicals. They enable the industry to provide domestic and international customers with assurances on food safety and product integrity. They also enable the producer to verify

the food safety status of animals in the event of chemical residue detection or a disease outbreak. Therefore, National Vendor Declarations play a crucial role in the overall quality assurance system and our 'clean, green' image in world beef markets.

The National Vendor Declarations for cattle provide a practical means of identifying:

- animals with exposure to residues
- animals treated with hormonal growth promotants (HGPs), and untreated livestock
- management history
- compliance with withholding periods and export slaughter intervals
- compliance with feeding restrictions (for example meat meal, access to chicken litter)
- use of supplementary feeding and grazing history
- trading name of the vendor and the vendor's Property Identification Code (PIC).

Since 2004 National Vendor Declarations were combined with the Waybill or Travelling Stock Statement. This inclusion of animal movement information allows the document to be legally used for declaring stock movements as required within and between states. For most movements across state boundaries a Border Crossing Health Certificate is also required.

When cattle are simply being moved without any sale, a Travelling Stock Statement or Routine Stock Movement Permit may be used as an alternative to a National Vendor Declarations.

There is a specific declaration for the sale of bobby calves which covers issues in relation to animal welfare and chemical residues. There is also a specific National Vendor Declaration for European Union-accredited cattle.

To order National Vendor Declarations see [Vendor Declarations webpage](#) (MLA 2015) or phone 1800 683 111.

The electronic National Vendor Declarations /Waybill are available on line ([e-DEC](#) or [lpa.ausmeat.com.au](#)) and are much cheaper than the printed version.

A signed National Vendor Declarations must accompany all consignments. Only the vendor or person responsible for the husbandry of the animals can complete a declaration. The information recorded on a National Vendor Declarations is underpinned by state legislation making a person signing the declaration accountable under law for false or misleading statements. Remember:

- National Vendor Declarations must be fully completed
- agents cannot alter National Vendor Declarations or accept declarations over the telephone
- outdated versions of National Vendor Declarations must not be used
- NLIS ear tags attached to cattle must relate to the PIC recorded on National Vendor Declarations.

National Cattle Health Statements

National Cattle Health Statements (Animal Health Statements) for cattle are not mandatory in NSW, however, they may be required for some movements such as interstate, through some saleyards, or at the request of the buyer. Cattle producers can use the National Cattle Health Statement to provide information about the animal health status of their herds when selling or agisting cattle. As part of good on-farm biosecurity, request a National Cattle Health Statement when buying cattle or receiving cattle on agistment.

For more information see [Cattle Health Statement webpage](#) (Animal Health Australia 2015).

Copies of the National Cattle Health Statement are available from Local Land Services offices or at the [Declarations and Statements webpage](#) (Farm Biosecurity 2013 or [www.farmbiosecurity.com.au](#)).

Transported Stock Statements

Travelling Stock Statements (TSSs) can be used in situations in which cattle are not being sold, for example, when transporting stock for agistment. The National Vendor Declaration still qualifies as a valid travel document and is an alternative to use in these situations. However, if you are not selling your stock but are simply moving them, you can save money and instead buy a book of 10 TSSs which is cheaper than using a National Vendor Declaration.

Travelling Stock Statements must not be used when cattle are sold and moved to another holding, or for journeys to or from saleyards or to abattoirs. In these situations, a National Vendor Declaration is required.

A TSS provides details of stock being transported. The system was introduced to assist police in tracing stolen stock. Part 1 is completed by the owner, or his employee or his agent, prior to the commencement of the journey; and part 2 by the driver of the vehicle. Copies of TSS must be kept for 2 years.

TSS books can be purchased from your Local Land Services office. For more information see DPI's [Transported Stock Statement \(TSS\): Questions and answers webpage](#).

Stock permits

Stock movement permits are used for walking or grazing stock on public land. There are four classes of stock permits under the *Local Land Services Act 2013*. To obtain a stock movement permit, contact your Local Land Services office. Permit fees may vary according to region, so talk to your local office before sending in your application form.

Walking Stock Permit

This type of permit is used for long-distance travel by travelling stock walking from one region to another. Local stock may also use this type of permit in times of drought to travel throughout the region.

Grazing Stock Permit

This is generally issued to the landholder adjoining an enclosed travelling stock reserve (TSR) for use over an extended period. It is a condition of the permit that travelling stock are still permitted to access the TSR.

Roadside Grazing Stock Permit

This type of permit is issued for a short period of time over a specific section of road in times of drought or for hazard reduction. It is also normally issued to the landholder adjoining the area as there are no watering facilities and so stock are moved back to the property at night.

Annual Stock Movement Permit

These permits apply to routine movements of stock between two properties owned or occupied by the same person and are therefore issued to local stock owners. See Local Land Services [Stock Permits webpage](#).

Interstate movement

Each state and territory has its own animal health requirements for the introduction of cattle. They generally cover diseases such as Johne's disease, enzootic bovine leucosis and cattle tick. These conditions vary from state to state and with time. Western Australia also has requirements for freedom from weed seeds and liver fluke. For the current requirements contact your Local Land Services district veterinarian or biosecurity officer or visit the website of the state of destination.

4. Looking after yourself

Unfortunately, farming ranks high as a hazardous profession. There are many reasons for this, including use of tractors, quad bikes, livestock handling and infectious diseases. The stress of earning an income from the land and conflict with nearby holdings can be significant factors in mental health in rural areas. This section of the book explores these occupational hazards and steps that can be taken to minimise the risks.

4.1 Zoonoses

Zoonoses are diseases that are transmissible from animals to humans. Cattle are generally safe to handle in terms of human diseases. However, there are several important diseases that cattle producers should be aware of for their own personal health. These include:

- Q fever
- leptospirosis
- hydatid disease
- salmonella
- cryptosporidium
- dermatophilus
- ringworm.

The basic principles to reduce risks are:

- be vaccinated for Q fever — see your doctor
- vaccinate your breeding cattle with 7 in 1 (reduces risk of leptospirosis)
- wear a mask, gloves, then wash hands if assisting a calving or handling an aborted foetus (reduces risk of Q fever and leptospirosis)
- wash your hands after handling farm dogs (reduces risk of hydatids)
- wear gloves and then wash hands if handling cattle with diarrhoea, particularly calves (reduces risk of salmonella and cryptosporidium)
- wear gloves and then wash your hands if handling calves with skin lesions (reduces risk of dermatophilus and ringworm).

[Zoonoses: Animal diseases transmissible to humans](#) (DPI 2015)

Q fever

Q fever is a disease that is carried by cattle without causing any symptoms in cattle but which can make people very sick. It is largely an occupational disease, mainly of abattoir workers and farmers. The highest concentration of the infectious agent is in foetal tissue and fluids, with people infected by assisting calving or kidding. Symptoms are often attributed to the flu, but may progress to being a very serious illness with high fever, joint pain, headaches and hepatitis, and can lead to long-term complications including fatigue, liver or heart problems. A vaccine for people at risk is available and it is strongly recommended for anyone handling livestock. Before receiving a vaccination you will need to have some tests done by your doctor to see if you have already been exposed.

[Q Fever: Communicable diseases factsheet](#) (NSW Health 2012)

Leptospirosis

Leptospirosis is transmitted to people through the urine of a number of species including cattle. The majority of leptospirosis cases in humans are *not* from cattle. In humans it is known as Weil's disease. Signs of leptospirosis in humans are flu-like and include high fever, muscle soreness, headaches, vomiting and red eyes. Leptospirosis can also lead to long-term problems such as liver or kidney disease. Vaccination of cattle for leptospirosis is an effective means of reducing the risk to you and those working with you.

[Leptospirosis: Communicable diseases factsheet](#) (NSW Health 2012)

Hydatid disease

Hydatids is a tapeworm with a two stage lifecycle. In dogs, the final host, it is an intestinal tapeworm. Eggs passed in dog faeces can then infect an intermediate host (including people, cattle, sheep, goats, wallabies and kangaroos) causing cysts in internal organs. In humans it is a serious disease. To prevent human infection, treat dogs every 3 months with a wormer containing praziquantel, prevent dogs having access to offal and wash hands after handling dogs, particularly before eating.

For more detail see "8.30 Hydatid disease" on page 135.

[Hydatids: You, too, can be affected](#) (DPI 2007)

Salmonella

Salmonella in people is a gastroenteritis, usually from undercooked chicken or meat, or poor food handling. However, it may also be transmitted from cattle with the disease. In cattle it causes scours and in calves this can be a blood scour. If handling scouring cattle, wear gloves and then wash hands.

[Salmonellosis: Communicable diseases factsheet](#) (NSW Health 2012)

Cryptosporidium

Cryptosporidium can infect people and calves causing gastroenteritis. People can be infected from a variety of sources including contaminated drinking water and from handling infected livestock and pets. Like salmonella, wearing gloves and washing hands thoroughly is advised after handling scouring cattle, particularly calves. See "8.19 Cryptosporidium" on page 129.

[Cryptosporidia: Communicable diseases factsheet](#) (NSW Health 2012)

4.2 Care with chemicals and injections

There can be safety issues when handling cattle chemicals, particularly external parasite treatments. Some, like organophosphates, can cause severe poisoning and can be absorbed into the body through the skin and through breathing. Others, like synthetic pyrethroids, can cause a skin reaction in some individuals. It is important to read the safety directions on the label and wear the appropriate personal protective equipment.

Many producers are not aware how hazardous some injections can be if accidental self-inoculation occurs, in particular copper glycinate and some vaccines. Accidental injection can result in severe tissue reaction requiring multiple surgeries or even amputation. Ensure cattle are well restrained to minimise movement when injecting. Vaccination guns with sheathed needles are available.

4.3 Cattle handling

The correct handling of cattle is a vital component of quality food production, good animal welfare, and above all the safety of the cattle handler. Handling cannot improve the basic product, but good handling will minimise product quality loss and lessen stress on animals and handlers.

There are various guides devoted to safe cattle handling and we recommended you explore the links at the end of this section for more detailed information. The intent of this section is to provide the basics.

To handle cattle correctly, an understanding of animal behaviour is essential. Cattle, because of their size, strength, speed and potential for aggression, need to be handled thoughtfully and with confidence.

The most important aspect of handling any livestock is to be able to recognise and interpret an animal's reactions. The beast's 'body language' will indicate its probable actions.

Behavioural characteristics of cattle

- Cattle remain immobile when first threatened. Their first reaction is to stand and assess the situation. If frightened, their natural instinct is to escape.
- Cattle try to maintain other animals within their vision. They have a field of view of 330° and have the ability to see threats from almost all directions.
- Within a mob of cattle, there is an order of dominance, or 'social order'. This can be seen in action at the water or feed trough where certain animals are always first to drink or eat. Order is maintained through pushing and head butting. Other animals tend to stand back until the dominant animals have finished. Dominance may also be seen when cattle are on the move. The same animals will usually lead the mob. They will also be the first to enter gateways. Dominance and the need to maintain hierarchy in a group of cattle becomes a problem when the animals are in confined spaces such as holding yards. This can be a cause of significant stress within a mob. Crowding of cattle will also increase aggression as the animals try to maintain personal space.
- Social behaviour varies with age, sex and breed — *Bos indicus* and *Bos indicus*-cross animals are more sensitive and temperamental than British or European breeds.
- Young bulls, when moved in groups, show a degree of playfulness (pushing and shoving), but bulls become more aggressive and territorial with age. Adult bulls have large personal space requirements of 6 metres or more. When adult bulls are crowded, fighting will occur at gateways or in yards.
- Bulls are uncontrollable when fighting. They become highly aroused and will break away suddenly. Handlers have to be extremely careful to avoid injury.
- Cows with young calves can be very protective, so handling them in the presence of their mothers can be dangerous.
- Cattle, particularly *Bos indicus* breeds, do not like being singled out either in the paddock or in yards. They can become extremely agitated and aroused.

Principles of cattle handling

Arousal

Arousal is the state of activity of animals and ranges from deep sleep to fight/flight. Handling techniques raise the level of arousal. However, if you control the level of arousal, you control the animal.

Problems occur though when this arousal is too high. Highly aroused ('stirred up') animals are more likely to make sudden violent movements, and they behave in a self-protective way either by running away or fighting back. Highly aroused animals are also more responsive to further stimulation (a bull which is highly aroused needs little provocation to attack).

It is desirable to keep animals as calm as possible so that they can move quietly. When necessary, however, handlers may temporarily raise arousal for particular purposes, such as forcing lead animals through a gateway.

Mustered cattle should be allowed to settle down before handling in yards.

Instinctive behaviour

The usefulness of instinctive behaviour is that it is predictable and requires no training of the animals. The instinct to escape is helpful when handling cattle.

With infrequently handled animals that are flighty and have less chance of learning the flow system of paddocks and yards, instinctive behaviour is used so that animals 'escape' to where you want them to be.

To do this, the stock person must learn the rules of position and movement. A person moving alongside animals at just the right moment can turn a mob exactly when needed, but someone positioned wrongly can cause havoc.

Instinctive behaviour is also an important trait to consider when designing yards.

Learning/training

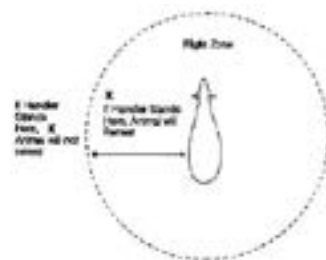
Cattle have good memories. *Bos indicus* cattle, in particular, can be taught to be mustered and worked through yards. Every time cattle are handled, therefore, it should fit into an overall training plan, for example, they enter and are worked through yards in a consistent direction.

The best time to educate cattle is at weaning. This experience should also be made as pleasant as possible. Yard weaning is becoming a very favourable tool to educate young calves to handling processes (see "[Yard weaning](#)" on page 46).

Flight distance

Flight distance is an important concept in livestock handling. It can be described as a circle of safety around an animal.

When a person penetrates the flight zone, the animal moves away. A good stock handler knows when to penetrate this zone and when to retreat so that the cattle move quietly in the desired direction.



Cattle move most effectively if they can see the handler at all times.

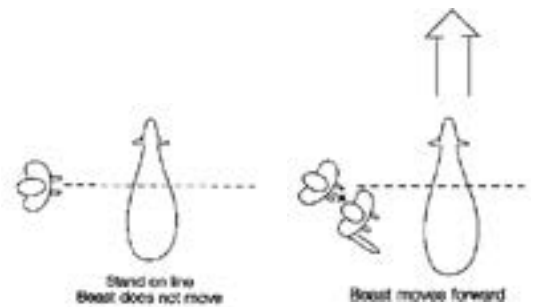
Attempting to drive animals by standing directly behind them is often not efficient because they turn and look at the handler. A beast is best driven when the handler is situated at a 45–60° angle from a line perpendicular to an animal's shoulder. This same principle applies to driving mobs of cattle.

The flight distance varies with the tameness of the animal. The distance may be up to 200–300 metres for feral cattle, but for feedlot cattle it may be only 1–5 metres. Very tame cattle are difficult to move because they no longer have a flight zone.

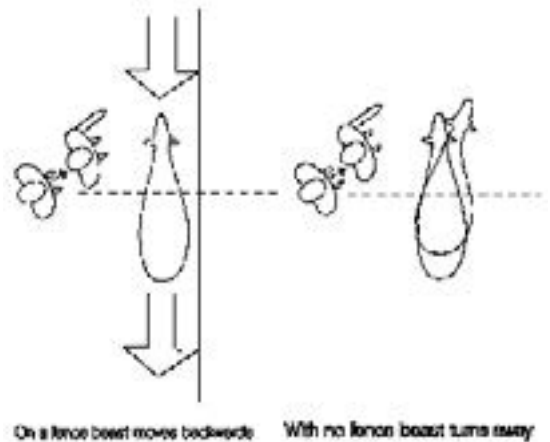
If a handler shouts and excites cattle, this can enlarge the animals' flight zone.

Point of balance

Experienced stock handlers use the point of balance of an animal to move it. Looking from a side view, this means behind the shoulder, and from in front, it is from the centre of the head.

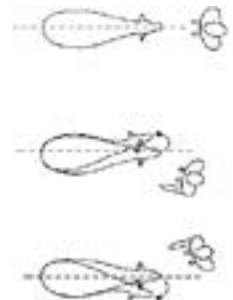


When close to cattle, the stock handler's position in relation to an animal's shoulder can affect which direction the animal will head. The line through the shoulder is the point of balance. If the stock handler goes behind this line, the beast moves forwards.



By moving towards the front of the animal, the beast will move backwards or turn away.

From the front, you can deflect cattle sideways by moving either side of an imaginary line drawn through the middle of the animal's length.



See:

DPI's [Handling Cattle webpage](#)

T Grandin's [Recommended Basic Livestock Handling webpage](#)

Cattle handling facilities

Cattle yards design

Regardless of the number of cattle you run, a well-designed, functional set of yards is essential for good cattle management. The yards should allow safe, efficient handling of cattle for drafting and loading-out as well as restraining the animals for husbandry procedures such as drenching, vaccination, ear tagging and pregnancy testing.

Cattle yards should ideally be:

- well drained to reduce slips, trips and falls — cattle balk at drops/steps as they have poor depth perception
- on level ground or slightly uphill — cattle resist going downhill
- oriented so that cattle in the race or on the loading ramp aren't moving into shadows — cattle balk at shadows and resist moving from light to dark areas
- oriented so that the handler is not looking into the sun
- built strong enough for the type of cattle to be handled
- built with gates that all swing/slide fully open and closed with no obstructions, and latches should all be in working order
- located so that livestock carriers do not reverse on or off properties onto a public road, and located so that when loading or unloading the carriers do not block or partially block traffic.

There are numerous local companies that specialise in designing and manufacturing cattle yards, as are there various designs available for download off the internet. A yard design that is based around a circular forcing yard has proven better for cattle flow than traditional 'sharp angle', forcing yard systems. This is because cattle tend to bunch up with their heads in corners, which is time consuming and can be dangerous to move them from as they perceive that there is nowhere to go. See DPI's [Cattle Yards and Equipment webpage](#).

Overcrowding of yards is the most common and dangerous mistake handlers make. Too many animals in a yard arouses cattle as they fight for their personal space. They are often unable to move freely so they panic and, in some cases with young stock, they go down and can be trampled. The correct number for a particular yard will depend on the size of the yard, the size and sex of the beast. But a guide for efficient cattle movement through yards is that all animals in the yard, with the exception of the race, should be able to turn right around without hitting a fence or another animal. Hence the rule 'half the number – twice as fast'. There will be times when a mob will be larger than the first entrance pen to the yards can hold. This is why it is a good idea when planning yards to consider a small holding paddock or laneway leading up to the first pen of the yards. This will enable you to split a bigger mob into more manageable size before trying to push them into the yard system.

Cattle crush

The cattle crush is the most essential part of a yard system. At some point you will need to catch a beast to perform some management or animal health procedure. While head bails are significantly cheaper and may suit small producers they are the least safe option for restraining an adult beef animal. Breeding enterprises that will be handling adult cows and bulls should aim to have a crush with at least the following attributes:

- veterinarian access gates on both sides
- veterinarian gate for access to the rear of the animal
- slam-shut gates or catches



- chin bar / head restraint
- no overhead protrusions such as those on sliding gates or bail closing mechanisms
- front and rear head bail operation (preferred), capable of being operated with one hand only
- safety locks on the bail release
- easy, quick and quiet operation
- a slide-through hock bar or backing bar
- a side squeeze facility for safer cattle control
- split side opening access gates, preferably with catch at rear
- lower side panels closed in to avoid kicks and animal legs getting caught between rails
- ease of maintenance with greasing points
- a crush exit designed to allow processed animals to be separated from the work area
- crush gates, bail and latches free of nip or crush points
- a design allowing for a safe and easy release operation should an animal go down
- solid and secure anchorage points (preference to be set in concrete)
- gates and head bails that operate effectively in capturing and securing stock, and do not fly open when kicked or struck.

4.4 Mental and social health

Let's face it, being on the land can be a great challenge, particularly when cattle prices are low or when stock health or seasonal conditions aren't all they should be. Economic, climatic and regulatory uncertainty can have significant consequences for your mental health with risk factors relating to:

- high stress levels
- financial hardship
- relationship problems — home and work
- isolation — work and social
- increased consumption of alcohol and other drugs
- feelings of hopelessness.

How do you stay mentally healthy at times of stress?

- eat well
- exercise
- get adequate sleep
- stay socially connected
- don't shut the family out
- reduce intake of coffee, cigarettes and alcohol
- do something that makes you feel good
- practice relaxation techniques.

Signs that a person may be experiencing a mental health problem can include:

- low mood and/or irritability

- sleep problems
- constant worry about physical health, finances, family, self
- appetite change
- low energy, drive and motivation
- feelings of nervousness, being on edge or even panic
- trouble concentrating, difficulty making decisions
- using more alcohol
- loss of libido / sexual dysfunction
- loss of confidence in themselves
- feeling useless and losing interest and hope in the future
- thoughts of death or even suicide.

It is very important not to ignore these signs. Watch for these signs in those close to you and encourage the person to get help. Help is available. Further information can be found by talking to the following people:

- General practitioner. A family GP is well placed to provide support to someone who is experiencing a mental health problem. They are often aware of what other support is available in the local community
- Lifeline 13 11 14
- Mensline 1300 789 978
- New Access 1300 137 934.

If the matter is urgent and someone is at risk, please call 000 or the NSW Mental Health Line available 24/7 on 1800 011 511.

Beyond Blue www.beyondblue.org.au

Black Dog Institute www.blackdoginstitute.org.au

RUOK? www.ruok.org.au

Your local Rural Adversity Mental Health Program coordinator in your area provides information on how to access services. www.ramhp.org.au

Avoiding and managing conflict with neighbouring farms

Moving to a rural property has its pleasures, but can have its share of problems. An excellent resource is available for free — [*Living and Working in Rural Areas: A handbook for managing land use conflict issues on the NSW North Coast*](#) (Learmouth et al. 2007).

It includes factors to consider before purchasing a rural property, a property inspection checklist, legal aspects, answers to the most common issues and mechanisms for conflict resolution.



5. Looking after your cattle – Cattle management

5.1 Condition, fat and muscle scoring

Assessing body condition of cattle is a very important management skill especially at critical stages of the production cycle, such as pre-calving or pre-joining. It is very important prior to periods of known feed shortages or for determining the suitability of animals for specific markets.

In the breeding enterprise, assessing condition of breeding females prior to calving will help determine the amount of feed required to ensure satisfactory ongoing reproductive performance. The objective of condition scoring is to obtain a simple and reliable estimate of the body fat reserves of live cattle. The condition score provides an estimate of fat reserves that is independent of size and is a more reliable descriptor than live weight alone.

5.2 National Livestock Language system

There is a variety of terminology used to describe beef cattle, examples include poor, backward, fat, well finished etc. Producers across Australia also became accustomed to assessing cattle using either a muscle and fat scoring system or a body condition scoring system. There has now been a new body condition score (BCS) system developed to co-exist with the existing National Livestock Language – Cattle system (referred to as ‘muscle score fat score’ or ‘MS FS’). BCS and MS FS remain independent description systems, however, each classification has an equivalent in the other system as table below demonstrates.

National Livestock Language – Cattle (MS-FS)		Body condition score (BCS)
Muscle score	Fat score	
E	0	0
D	0	1
B-E	1	2
A-E	2	3
A-E	3	4
A-E	4	5
A-E	5	5
A-E	6	5

Assessing fatness in beef cattle

Three ways to assess fatness: visual fat assessment, manual fat assessment and objective fat assessment.

Visual fat assessment

Key sites to assess are the tail head and pin bones, twist, flank, cod or udder, brisket, ribs and hindquarter muscle seams. As cattle become progressively fatter, ribs become less visible; hindquarter muscle seams fill with fat and are less evident; fat becomes visible beside the tail head; and the brisket, flank, cod and twist fill out and give the beast a square appearance, contrasting with the roundness of muscle.

Manual fat assessment

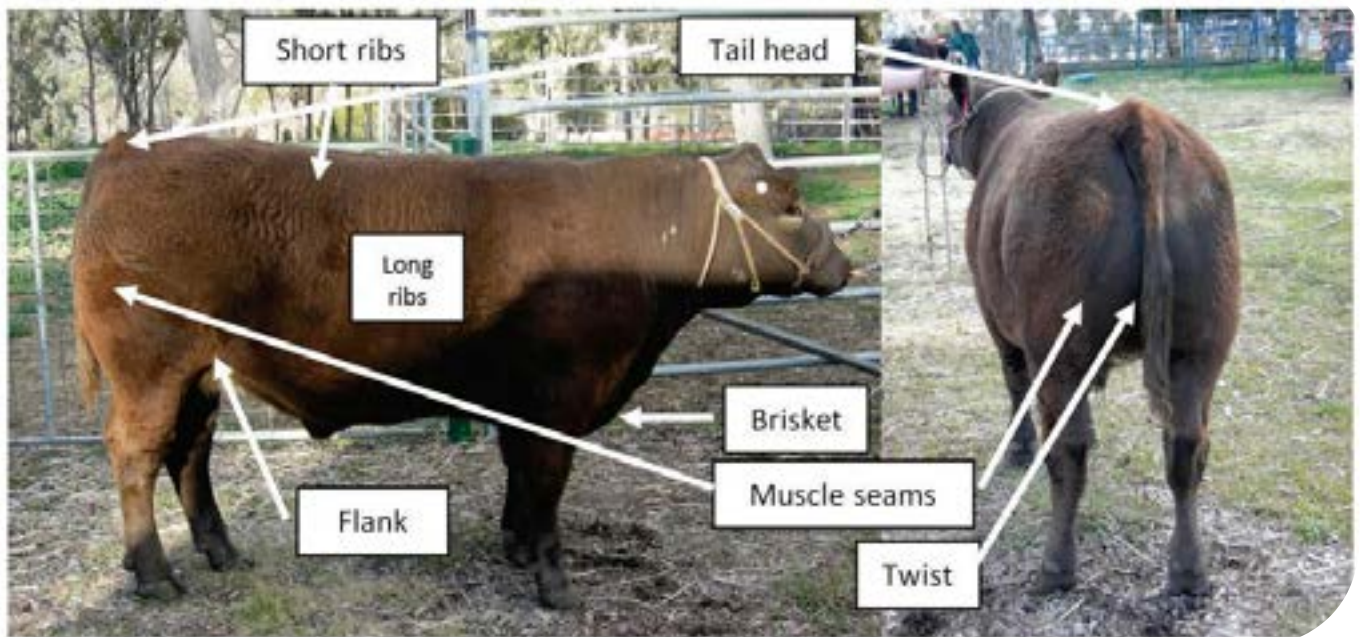
Fat depth can also be assessed by manually palpating animals. The most informative locations are those where fat overlays only bone, so that fat can't be confused with muscle. Manual palpation and feeling for tissue softness on the pin bone, hip bone, long ribs, short ribs (this position is less accurate when animals are heavily muscled) and the back line allow fatness to be estimated. If there is no 'give' or softness felt at these sites, then the animal has less than 4 mm of fat at the P8 site. If some softness is felt, this indicates 4–7 mm fat at the P8 site; while if the tissue is easily depressed, the P8 fat depth is more than 7 mm. See table below.

Objective fat assessment

Live animal fatness can be objectively assessed using ultrasound scanning at the P8 or rib (12/13th) sites. The P8 site is defined as the point at the junction of a line centred on the crest of the 3rd (high) sacral vertebra and a line parallel to the backbone, centred on the pin bone. Rib fatness is assessed on the eye muscle at the carcass quartering site, usually between the 12th and 13th ribs. This position is found by locating the last long rib (13th rib) and moving three-quarters of the width across the eye muscle away from the spine. A range of ultrasound scanning devices can be used to determine subcutaneous fat depth at these positions on the live animal.

Fat score and P8 fat depth

Fat score	P8 fat depth (mm)
1	0–2
2	3–6
3	7–12
4	13–22
5	23–32
6	Above 32



Sites used to assess fatness (visually or manually) (photo courtesy NSW DPI 2015)

Target fat scores for breeding animals:

- breeding females prior to calving — fat score 3
- heifers prior to 1st joining — fat score 3
- bulls prior to joining — fat score 3.

Weaning calves or supplementation should be considered if breeding females fall into fat score 1. Lactating 1st calvers should be maintained as best as possible in fat score 2 and seldom allowed to drop lower than this.

Fat score 1 (0–2 mm P8, 0–1 mm 12th rib)

Animal is emaciated. Ribs and short ribs are sharp. There is no fat around the tail head. Hip bones, tail head and ribs are prominent. Consider weaning calves from lactating cows in fat score 1 to reduce energy demand on the cow.



Fat score 2 (3–6 mm P8, 2–3 mm 12th rib)

No fat beside tail head. Short ribs and long ribs are easily distinguished. Spines feel rounded rather than sharp. Hip bone and ribs are hard. Ribs are no longer visually obvious.



Fat score 3 (7–12 mm P8, 4–7 mm 12th rib)

Short ribs are prominent, rounded but still easily felt. The ribs are easily felt using firm pressure to distinguish between them. Fat that is easily felt covers either side of the tail head. This is the target fat score for cows at the start of calving.



Fat score 4 (13–22 mm P8, 8–12 mm 12th rib)

Short ribs cannot be felt. There is some fat cover around the hip bone. Small mounds of fat which are soft to touch are present around the tail head. Ribs are hard to feel.





Fat score 5 (23–32 mm P8, 13–18 mm 12th rib)

Short ribs cannot be felt. Tail head and hip bones are almost buried in fat. Ribs appear 'wavy' due to fat folds. There is fat in the brisket and udder, and squaring-off in the flank area.



Photo courtesy McCosker & Smith QLD DPI

Fat score 6 (32+ mm P8, 18+ mm 12th rib)



Short ribs cannot be seen. Tail head and hips are completely buried by large 'rounds' of fat. Ribs are 'wavy' due to fat folds. The brisket and udder are heavy. The flank is squared-off and has a blocky appearance.

Assessing muscle in beef cattle

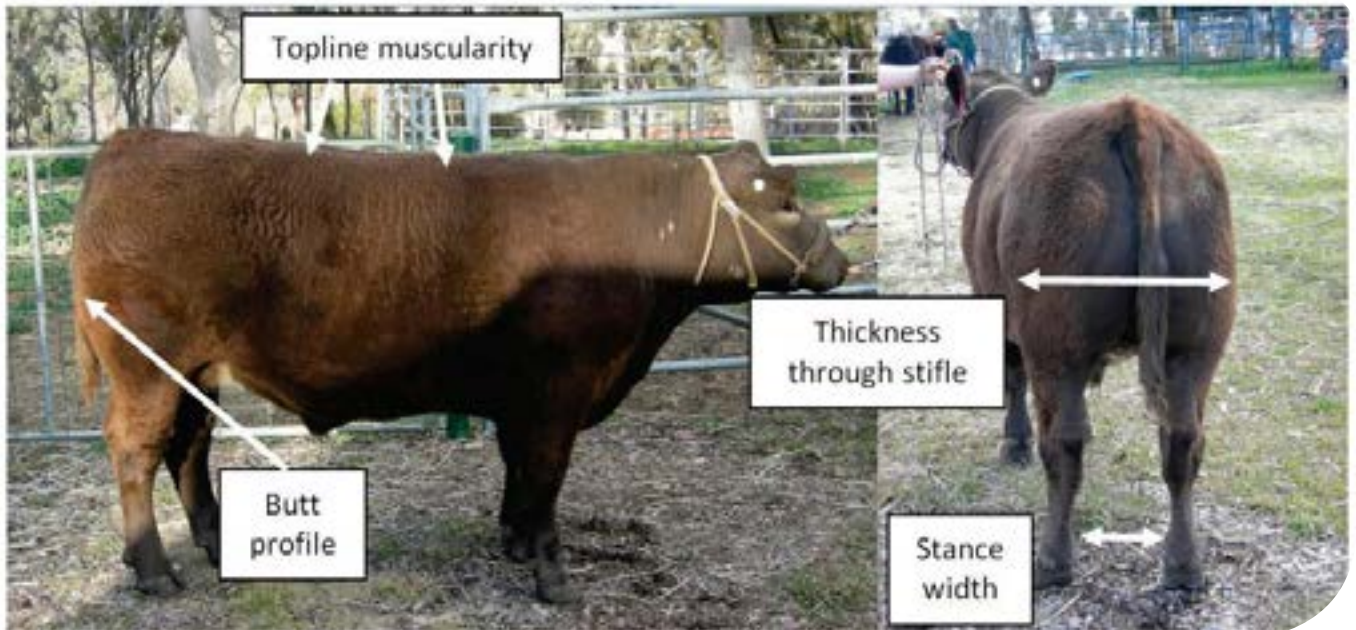
It is important not to confuse muscle and fat when assessing cattle. Most heavily muscled breeds tend to be leaner (have less fat) than lightly muscled breeds, so when assessed they may actually appear as if they have less fat available as an energy reserve. But in fact they can mobilise some energy from muscle tissue; of which they have more than lightly muscled animals.

Muscling is scored on a scale from A (very heavy) to E (very light). This scoring system can be increased to a 15-point scale by including pluses and minuses around each score (for example A+, A, A-... to ...E+, E, E-). Muscle score describes the shape of cattle and is the degree of thickness or convexity of an animal relative to its frame size, after adjustments have been made for fatness. Note that very fat (more than 18 mm at the P8 site) animals may look more muscular than they are.

Well-muscled animals tend to display:

- a convex or well-rounded butt profile when viewed side-on
- noticeable muscling that bulges above the backbone (top-line)
- a wider stance
- noticeable muscle movements, such as the 'jump' muscle located above the hip bone, when they walk.

Sites used to assess muscularity (visually or manually) (photo courtesy NSW DPI 2015)



Muscles core categories for beef cattle

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E+	E	E-
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1



[Live Cattle Assessment](#) (DPI 2015)

[A National Guide to Describing and Managing Beef Cattle in Low Body Condition](#) (Blackwood et al. 2013)

[Welfare Scoring Nutritionally Deprived Beef Cattle, Dairy Cattle and their Crosses, Sheep and Horses](#) (DPI 2013)



5.3 Some normal values for beef cattle

Heart rate	60–80 per minute
Respiration rate	15–30 per minute
Temperature (rectal)	38.5°C (101.5°F)
Cycle length	21 days (18–24)
Heat period	18 hours (10–24)
Gestation period	280–290 days

5.4 Ageing cattle

The front teeth (incisors) are used to age cattle. Young stock will have all their temporary teeth, and the replacement of their temporary teeth with permanent teeth occurs at predictable times.

Age	Teeth
0 – 18 months	All milk teeth
1½ – 2 years	2 permanent teeth
2 – 2½ years	4 permanent teeth
2½ – 3 years	6 permanent teeth
Over 3 years	8 permanent teeth

After about 7 years, the front teeth are worn flat and progressively fall out over the next 2–4 years. However, the wearing or loss of teeth can be variable and depends on the pasture and soil type (sandy soils can accelerate wear) and also vary from cow to cow grazing the same area.

'Mouthing' breeding cattle is the term given to checking the wear on teeth and should be done on an annual basis, preferably at joining. Cattle with front teeth missing are not able to graze efficiently and usually lose weight, especially when the pasture is dry such as during winter. They should be culled.

[Cattle Must have Sound Teeth](#) (DPI 2002)

5.5 Beef breeds

The question of what breed is best, runs closely behind football clubs and brands of beer. There are some 100 cattle breeds represented in Australia with new breeds constantly being introduced and developed. Generally speaking, most breeds fit into one of five types:

1. British breeds, such as Hereford, Angus
2. *Bos indicus*, such as Brahman
3. European breeds, such as Charolais, Limousin, Simmental
4. composite breeds which are fixed crosses based on one, two or more of the above, for example, Santa Gertrudis, Brangus, Braford
5. crossbreeds of one, two or more of the above, for example, F1 Brahman x British breed.

The general rule of thumb for breed selection is: 'Pick the cows for your type of country and the bull for your market'.

Breeding cows make up the bulk of a breeding herd and it is important that the breed suits the climate and feed type. Bulls contribute 50 per cent of the genetic makeup of calves and it is important that the calves that they produce match the desired market. For example, if you want early maturing calves then use a breed of bull that is early maturing.

An example of a common crossbreeding program on the North Coast is running F1 Brahman x British breed cows for their heat and tick tolerance and ability to forage, and then putting them to a European bull for lean, muscled, late maturing calves, or to a British breed bull for early maturing or vealer calves. On the 'softer' country, producers may choose a British breed such as the Murray Grey or Hereford.

These are only a couple of examples. Ultimately the decision often rests on:

- personal preference
- type of climate, country and feed
- the end market
- handling and temperament.

Bear in mind that to meet their genetic potential cattle must have adequate nutrition and disease control.

See:

DPI's [Beef Cattle Breeding and Selection webpage](#)

[Cattle Breed Types](#) (DPI 2007)

[Beef Cattle Breeding Systems](#) (DPI 2007)

5.6 Calf management

Care of the orphan calf

To rear or not to rear? Rearing calves requires daily commitment for at least 2 months. When confronted by the challenge of an orphan calf the first question to ask is: Should I rear it or have someone with more time or experience to do it. There may be considerations such ethics, emotions, education or economics, as well as the genetic value of the calf.

First assess the calf. It should be bright, alert with clear eyes, standing soon after birth and have a strong suckle reflex. (Check this by putting your fingers in its mouth). If it is from a difficult birth it may be traumatised. Check that no limb bones or ribs are broken. If it is orphaned because the cow has rejected the calf, check the cow for mastitis or other problems.

Clean the navel with a disinfectant such as tincture of iodine. Hygiene is critical in the first 2 days. The navel can absorb bacteria, causing blood poisoning. Also the stomach does not produce acid in the first day or two, making the calf vulnerable to bacteria.

If the calf is newborn or less than 24 hours old it is important that it receives colostrum (the first milk a cow produces after birth) as soon as possible. If the calf is over 24 hours old and has not received colostrum, it could be vulnerable to a range of diseases and difficult to rear. The ability to absorb essential antibodies falls by 5 per cent each hour after birth; so at 12 hours only about half the antibodies will be absorbed, and almost none at 24 hours. If the mother has died calving you may attempt to milk her, alternatively, milk another freshly calved cow. By planning ahead you can freeze colostrum. Defrost at no more than 50°C or the antibodies will be destroyed. Warm to 38°C and feed 2 litres. If possible, give another 2 litres in 12 hours.

If the calf is weak and has difficulty suckling, give small frequent feeds. Or you may stomach tube. These are available from produce stores. Mark the distance from the mouth to the point of the elbow with a pen, so that you don't over insert. Lubricate the tube and with the calf standing and the milk container held low, pass the tube over the tongue and allow the calf to swallow the tube without forcing it. Feel the tube going down the neck (to check that it is not in the windpipe) and on reaching the stomach lift the milk container up. Give the milk slowly and only withdraw the tube when the container is empty.

If available, colostrum can continue to be fed past the first day. Even though the antibodies won't be absorbed, colostrum is highly nutritious and has a local antibody protective effect in the gut. The calf can then go on to whole milk or a good quality calf milk replacer. If introducing young 'bobby' calves for rearing it is important to know whether these calves have had adequate colostrum on the property of origin.

Calves require 10–12 per cent of their body weight in milk per day. For a 30 kg calf this is 3–3.5 litres per day, given in 2 or 3 feeds. Milk bypasses the rumen and enters the 4th stomach where it quickly clots. This curd then takes up to 12 hours to digest. It is important that calves are not overfed (no more than 5 per cent body weight in a feed) or fed too frequently as this may overwhelm ability to curd, with whole milk passing into the intestines. This can result in scouring. Likewise, poor quality milk replacer or milk replacer made too dilute can also fail to clot. Feed milk close to body temperature (35–38°C).

Milk bypassing the rumen is initiated by the suck reflex and the physical nature of milk. Stomach tubing, incorrect bucket feeding and poor quality or too dilute milk replacer can result in milk going into the rumen, where it ferments and can cause scours. The key to successful bucket feeding is to have the bucket at least 300 mm off the ground and to teach the calf to drink by allowing calf to suck fingers first to stimulate the suck reflex.

Milk is an ideal medium for bacteria so ensure that equipment is cleaned after use. Calves water requirements are not met by milk, so ensure that clean water is available at all times.

Calf meal or pellets can be introduced in the second or third week of life. This should be high protein (e.g. 18–20 per cent). This encourages rumen development. Hay or straw can also be provided, but not at the expense of concentrates. Aim for 10 per cent hay and 90 per cent calf meal. Remove uneaten feed daily (this can then be fed to older calves). As intake increases, milk feeds can be reduced to once a day. Opinions vary, but the general rule for weaning is at 6–9 weeks, when meal intake reaches 1 kg/day. Change to a lower protein, cheaper weaner concentrate at weaning and continue at levels of up to 3 per cent body weight for 1–2 months, depending on pasture quality.

Housing or shelter is important for calves. The ideal is closed on the southern and western sides, to protect from weather, and closed to no more than 1–1.5 m high on the other two sides, to prevent draughts at calf level and to allow for ventilation. Bedding of wood shavings or sawdust will provide some insulation and absorb moisture and nitrogen from urine, this helps keep ammonia levels low. Straw provides good insulation, but has poorer absorption, and calves may be tempted to eat contaminated straw.

Hand-reared calves can be more prone to worms, so give the first drench soon after the calves start to graze. They are also more prone to clostridial diseases, so vaccinate with 5 in 1 as early as 6 weeks. Pestivirus and *Mannheimia haemolytica* (MH) pneumonia (formerly known as *Pasteurella*) can also be significant problems in hand-reared calves so vaccination for both of these is also recommended.

Most of the literature on rearing calves is based on rearing dairy replacements, but the principles for rearing beef calves are the same.

[Growing Heifers](#) (DairyLink series) (Johnston, Buesnel & Moran 1997)

See also "5.11.6 Specialist calf rearing" on page 64.

Creep feeding

Creep feeding allows calves access to additional feed while they are still suckling the cow. Calves access feed supplement through an opening large enough for calves to pass through but too small for the cows. For more details see [“5.11.7 Creep feeding of calves” on page 64.](#)

Castration

There are many different ways of castrating calves and all have advantages and disadvantages.

- Non-surgical methods like Burdizzos are effective and painless in experienced hands but can be unreliable for bigger calves. The cord must be crushed for the procedure to work.
- Banding involves special pliers that apply a rubber band around the cords.
- Knife castration is more popular because you can see the result and be certain of success if done correctly. Scalpels are becoming more popular because they are disposable and do not need sharpening.

In all cases, the earlier castration is done the less pain and bleeding to the animal. Delaying castration to enhance meat leanness and growth rate is not widely used because of the difficulty of managing groups of entire weaners and yearlings. In NSW, it is a restricted act of veterinary science under the Veterinary Practice Regulations 2013 to castrate calves over the age of 6 months.

Infections are not common but avoid castrating in muddy or dirty conditions, or wet weather.

[Castrating Calves](#) (DPI 2004)

[Beef Cattle Vaccines](#) (DPI 2007)

Dehorning and disbudding

Bruising is a major problem in the beef cattle industry and horns are the major cause. Cattle without sharp horns (achieved by disbudding, dehorning or from being polled) have reduced risk of bruising downgrades and hide damage.

Cattle without horns are generally quieter to handle and less of an occupational health and safety risk.

Dehorning

Be aware of the animal welfare and legal requirements when considering dehorning. The NSW Veterinary Practice Regulation 2013 prescribes the dehorning of cattle over 12 months of age to be a restricted act of veterinary science that must be undertaken by a veterinarian.

Disbudding

This should be done before calves are 2 months, prior to the horn bud becoming attached to the skull and when the horn bud can be felt. The most popular methods are 'hot irons' (thermal cautery) available as gas or electric, knife or scoop (tube) dehorners. Chemical disbudding with caustic paste is not recommended. Hot irons are preferred for animal welfare. Consider the following safety points:

- use a circuit breaker with electric irons
- work with an assistant
- wear long sleeved overalls and leather gloves to prevent burns to hands and arms.

This technique is to be carried out by, or under the supervision of, a suitably trained/experienced operator.

Procedure:

- test cauterly iron to ensure that it is hot, it should burn dry wood within 1 second
- work out of the wind as this will cool the iron
- clip/shave the hair over the horn bud
- restrain the calf in a head bale or on its side with head held back over shoulder
- hold the iron firmly for 2–4 seconds, but do not hold too long as this could cause damage — usually the bud will then come off easily
- clean the iron tip and allow it to reheat before doing the other side.

Knives are used to remove the horn bud before 2 months of age. Start the cut about 2 cm away from the base of the horn, then cut swiftly and firmly with the knife, slicing the horn and skin level with the skull. After 2 months of age the horns are attached to the skull. Total removal requires using cup or scoop (tube) dehorners. Be sure to include at least 1 cm of skin around the horn. These should not be used after 6 months of age without anaesthetic.

After all techniques, keep calves in a clean and dry environment for 2 days and check them daily for the next 10 days for infection or fly strike and treat if needed. Partial removal or tipping is used in grown stock with wire, saws or guillotines. Tipping has not been shown to reduce the incidence of bruising. It is commonly used where horns are growing in towards the head. Some producers choose to tip as they are of the opinion that a blunt horn will be less likely to puncture a handler or another animal. Blunt horns can still cause severe injuries. Tipping is no replacement for correct handling, observance of animal behaviour and temperament selection. In time, dehorning or disbudding at the correct age, and of course breeding for polls, will reduce the need to tip.

See:

DPI's [Dehorning Cattle webpage](#)

[Standard Operating Procedures: Cattle dehorning](#) (DPI)

Breeding polled cattle

The better long-term solution to dehorning and disbudding is to breed polled cattle. To assist producers in breeding more polled cattle in breeds that have both polled and horned animals, the Cooperative Research Centre (CRC) for beef genetic technologies developed an Australian Poll Gene Marker test which allows producers to identify animals that are genetically true polled. Hair samples can be taken from young animals, well before breeding age, which enables producers to make selection or bull purchase decisions with some certainty around the number of horned progeny they can expect based on the genetics of the parents.

The poll gene test is currently available in the following breeds: Brahman, Brangus, Charolais, Droughtmaster, Hereford, Limousin, Santa Gertrudis, Shorthorn, Simmental and Tropical Composites. Many stud cattle breeders are beginning to adopt the poll gene testing technology and there are an increasing number of tested bulls being offered for sale each year.

[The Australian Poll Gene Marker Test Fact Sheet](#) (CRC for Beef Genetic Technologies)

5.7 Weaning management

Weaning and weaning management are the most effective tools to manipulate important factors in beef cattle management. These factors include:

- the breeding efficiency and fertility of the cow herd
- a considered response to a cow's future fertility, given the season and their body condition
- feed utilisation
- animal behaviour (managing and selecting for quieter and well trained cattle)
- future carcass merits of steer weaners
- future breeding efficiency of heifer weaners.

The weaning of calves reduces the nutritional stress on cows. Weaning allows the cow to transfer nutrition, previously going into milk production, to her own normal body functions including improving her own condition and preparing herself for the next calving.

The important aspects of herd fertility — calving percentage, calving pattern and calving span — are strongly affected by cow condition. The better the condition of a cow at calving, the better her milk supply and the sooner she will show oestrus after calving.

See DPI's [Weaning Beef Calves webpage](#)

Age at weaning

Calves are generally weaned between 8 and 10 months of age. Weaning of calves earlier at 6–7 months should be considered for first-calf heifers, light condition and later calving cows. This allows the cows to improve in condition, calve in better condition and show oestrus earlier. The actual age depends on several factors:

- Feed availability — cows can continue lactation without losing condition in good years, but early weaning should be considered in drier years.
- In drought situations calves can be weaned as young as 2 months provided they are provided with a high quality diet. See [Feeding Calves in Drought](#) (DPI 2006).
- Condition and age of cow — cow condition is a key factor to joining success. Cows in poor condition have greater difficulty in returning to service than those in good condition; particularly first calvers and old cows. They may end up skipping a year, which is very costly. Wean calves earlier to allow these cows to gain body condition before the next calving.
- Heifer calves — if heifers become too fat at puberty, their future milk production is affected as the laying down of fat in the udder affects the development of the milk secreting tissue.
- Type of production — calves sold straight off cows as vealers or store weaners may be left on the cow for up to 10 months, depending on feed availability and cow condition. Calves destined for sale as yearlings or older can be weaned younger with little effect on their eventual weight and condition.

Yard weaning

Yard weaning is becoming the preferred industry method of weaning calves and is now seen as an essential part of the overall education and management process. It can require more labour and may be more expensive than some other methods, however, it has several benefits:

- the calves become accustomed to the yards and being handled and worked through the yards
- it introduces calves to handfeeding

- group socialisation, which may reduce stresses in later life from confinement and overcrowding
- cattle which have been yard weaned are quieter and easier to handle as adults
- yard-weaned cattle are also less susceptible to respiratory disease if finished in feedlots later in life.

The weaning and training program may last up to 10–14 days and includes feeding, drafting, working through the race and yarding from adjoining paddocks. To make the most of yard weaning, for both you and your calves, ensure there is:

- well-built, weaner-proof yards (rubber belting 1.2 metres high is ideal)
- well-drained, non-boggy surface
- pen stock density of 4 m²/head for calves 180–260 kg, or 2.5 m²/head for calves 100–170 kg
- reasonable quality hay or silage fed ad lib — the younger the calves the better quality feed required
- good quality drinking water in a trough
- opportunity to remove shy feeders and manage them separately to prevent excessive weight loss
- routine human contact each day, for example, walking quietly through the yard 2–3 times each day
- time to encourage calves to approach you, and handle them calmly aiming to leave them with a memory of positive associations.

[Yard Weaning Methods for Preparing Feeder Cattle](#) (MLA 2008)

Abrupt separation

Abrupt separation is a common weaning practice. The calves are drafted from the cows and moved as far away as possible. The cows and calves are difficult to move to their respective paddocks and both take longer to settle down. It is more stressful than other methods for both the cow and calf. The more determined animals often break through fences to get back to each other or, alternatively, walk the fences. A common practice on the North Coast is to remove and sell calves straight off the mothers. These calves appear more 'bloomy' at sale and suit the butcher's trade. However, if purchased as stores they often drop more condition once landed at their new home. As a seller you may not be concerned at this, but store buyers are increasingly aware of this and searching in favour for properly weaned calves.

Gradual separation

The cows and calves are put in adjoining paddocks on either side of a secure fence. The cows will move to water and graze away for extended periods while the calves will group together on the fence. After 4–5 days the cows are moved to a more distant paddock.

It is important that the calves find the water. A few older animals in the mob may help settle the calves and teach them the run of the paddock. Good fencing is essential if this is to work effectively.

Creep weaning

Creep weaning is a gradual 'self-weaning' process. It causes minimal stress to the calves but requires more preparation and supervision.

As the calves approach weaning age, give them access to a good quality pasture, or a supplement crop in an adjoining paddock. A specially constructed 'creep gate' or opening in the fenceline or gateway

allows the calves to pass through but not the cows. The openings in the creep should be 400–450 mm wide. Good fencing is essential.

The calves become accustomed to grazing away from the cows in the adjoining paddock. Close the creep gate off at weaning time, leaving all the calves on one side of the fence, cows on the other. After a few days move the cows away.

See:

DPI's [Weaning Beef Calves webpage](#)

MLA's [Weaning webpage](#)

5.8 Bull management

Bulls make a 50 per cent contribution to pregnancies and to the genetics of offspring, so they cannot be neglected. Often the problem is not one of 'infertility' (i.e. no pregnancies) but 'subfertility' (i.e. fewer pregnancies).

Selecting and purchasing bulls

Conformation and feet

Select bulls with good conformation taking care to note knees, hips and feet. Very straight or very angular conformation can result in early joint damage and arthritis. Watch the bull walk around. Stringhalt is sometimes seen in bulls with *Bos indicus* content. Watch for bulls that stumble on uneven ground — it usually indicates some musculoskeletal problem. Check the feet carefully. Fibromas are common in many bulls. Unevenly grown claws usually indicate uneven weight bearing and may indicate joint pain. Corkscrew claws also appear to be heritable and should be avoided. Avoid inspection in muddy yards because you cannot get a good look at the feet.

Reproductive organs

Watch for sheaths that hang low, close to the ground. They can be easily injured. Testicles should be free of lumps or swellings and equal in size. Bulls with a high scrotal circumference have greater fertility and have daughters who are more fertile. For Brahmans you want 32 cm at 2 years of age; for British and European breeds you want 32 cm at 15–18 months of age.

Age

Young bulls (18 months to 2 years) are quite fertile, but inexperienced. By using bulls earlier, you can increase the working life and uptake of the new genetics and save money, but they are also prone to more injuries because they mount more often than older bulls.

Diet

Be careful about grain-fed bulls. They may not do as well on an all pasture diet. Bulls should not be more than condition score 3.

Serving

If it is possible, observe the bull trying to serve. Spiral deviation and persistent frenulum are two common penis problems that can only be detected with the penis extended. Spiral deviation is seen most commonly in polled breeds (up to 20 per cent) and can increase with age.

Temperament

Bulls can be very dangerous, so some idea of the temperament is important.

Disease status

Pestivirus and bovine Johne's disease status should be checked.

Estimated breeding values

Estimated breeding values are available for many bulls and provide estimates of the likely performance of the bull's progeny for a variety of traits.

See DPI's [Beef Cattle Breeding and Selection webpage](#)

The reputation of the bull breeder and of their stock is probably the most important consideration of all. In many cases you have to rely on their honesty and integrity. Most are in it for the long term and realise that the performance of their stock will determine their future reputation and repeat sales.

BREEDPLAN and estimated breeding values

BREEDPLAN is a performance recording and genetic evaluation system for estimating breeding values for cattle. These breeding values, called estimated breeding values or EBVs, are estimates based on performance records for both the individuals and their relatives (parents, progeny). The more records that are available, the greater the accuracy of the EBVs. Often the accuracy of the EBV is listed next to the number on the catalogue.

By using computers to analyse the large numbers of performance records, it is possible to separate out the influence of environmental factors such as nutrition, as well as age and sex, so that the genetic component is measured for a range of traits.

This allows comparisons with animals of the same breed in different localities and under different nutrition. The program for between-herd comparisons is called 'Group BreedPlan'. EBVs are also available for within-herd comparisons; but EBVs for comparisons between breeds are not yet available.

EBVs are available in the following areas:

- growth — 200 days, 400 days and 600 days growth, mature cow weight, feed efficiency
- milk — 200 days milk
- fertility — birth weight, calving ease, gestation length, days to calving
- carcass — eye muscle area, fat depth, meat yield
- feed intake — various ranges.

EBVs are always expressed relative to a set base level. A 200 days growth EBV of +10 kg means the bull's calves will be 5 kg heavier than calves from base level bulls under the same conditions at 200 days (only half the genes are supplied by the bull so only half the benefit passes to the calf).

By looking at a range of EBVs for each bull on sale, you can pick the ones that best meet your production needs.

For example, a bull with good EBVs for 400 days or 600 days growth would not be much use to a vealer producer because the calves would be dead before they showed the benefit of the above average growth rate at 400 or 600 days. Similarly, a high birth weight EBV bull would not be good to use to join heifers.

See DPI's [Beef Cattle Breeding and Selection webpage](#)

Veterinary certificates

When buying bulls, always ask for a veterinary check or get one done before you buy. It is like an insurance policy and essential because a high percentage of bulls are unsound and can set your breeding program back a long way. The veterinarian soundness certificate will usually address the following areas:

- conformation and mobility
- examination of reproductive organs — testes, penis, seminal vesicles
- semen quality assessment — sperm count, mobility and shape
- serving ability — serving capacity tests
- scrotal circumference.

See [Veterinary Bull Breeding Soundness Evaluation webpage](#)

Health considerations

There are a number of other health issues you should consider, including:

- purchase bulls that are tested free for pestivirus (see “8.45 Pestivirus” on page 148) and with a reduced risk of bovine Johne’s disease (see “8.9 Bovine Johne’s disease (BJD)” on page 121)
- vaccination status — vibriosis (see “8.66 Vibriosis” on page 184) and three day sickness (see “8.61 Three day sickness” on page 177)
- ticks — use effective products on arrival to farm to reduce the chance of introducing cattle tick and reduce the chance of theileria
- worming — quarantine drench before putting in paddock
- buffalo fly — as needed; bulls generally carry more flies than cows
- seek professional advice.

[Bull Health](#) (DPI 2007)

Mating preparation before each joining

Before mating, undertake the following preparation on the bull:

- feet — trim claws if overgrown, check for corns
- vaccinations — three day sickness and vibriosis boosters given
- parasites — treat for worms, liver fluke and lice
- body condition — if too fat it limits mobility and too thin limits durability; change feed appropriately
- consider mineral and vitamin supplements.

Joining rates

Joining rates will vary with property size and topography, management type and the age and fertility of bulls.

- high joining rate of 4 per cent (1 bull:25 cows) — use this for young bulls when first used or if uncertain how good bulls are
- a common joining rate for older bulls is 3 per cent (1 bull:33 cows)
- a well-managed herd can use 2.5 per cent (1 bull:40 cows)

- a low joining rate of 2 per cent (1 bull:50 cows) can be used for bulls with proven fertility (such as a high serving capacity test result).

Single vs multiple sire mating

Using multiple sires of a similar age will usually result in more bull activity, a larger group of sexually active females and higher conception rates. Watch out for fighting between bulls. Some bulls can spend all their time fighting and be too worn out to serve the cows. Injury rates in multiple-sire matings tend to be higher than single-sire, particularly if bulls in the group are of different ages.

It is good to let bulls sort out their pecking order with other bulls they will be run with before you put them with the cows, so you can see if problems arise. Single-sire mating groups are particularly sensitive to individual bull fertility. Having a spare bull can be handy because breakdowns, for whatever reason, can be quite common. Bulls lose a lot of weight during joining so changing bulls over regularly can help as well.

Use of young (yearling) bulls

There is a trend toward using young bulls. These young bulls may be yearlings (12–18 months if well grown and scrotal circumference is at least 32 cm) with British breeds; or 2 years old for most European and *Bos indicus* (they are usually not mature enough as yearlings). Don't use young bulls with old bulls, they tend to get bullied by the dominant bull and may get permanently injured or at least distracted from the job. Instead, if multiple-sire mating use young bulls of the same age together. It is best to introduce young bulls with 10 quiet females then add another 15 cows after 2–3 weeks. This gives a high joining rate with young bulls of 4 per cent (1 bull:25 females). Remove them after a total of 6–8 weeks and give them 3 months rest on good feed. It is critical not to have young bulls drop below condition score 2 as this can ruin their fertility and lifetime performance.

See DPI's [Yearling Bulls: Tapping their immense potential webpage](#)

Joining period and time of year

Heifers

It is normal to join heifers one month before the cows are joined to allow an extra month after they calve for the heifers to get back into calf again. First-calf heifers with calves at foot can be slow to get back in calf because they are usually still growing as well as lactating, and can be slow to cycle if they lose a lot of body weight. Preferential feeding and allowing that extra month will allow them to come in line with the rest of the herd for their second calf.

Restricted vs unrestricted joining

The joining period should be timed according to the production system. For store weaners sold in autumn, a restricted spring joining (for a winter calving) will give the best return. Some herds may prefer cows calving a little later in spring when the feed situation improves. Of course if you calve later (in spring) your weaners will take longer to reach the correct weight and may return less. Many producers comment that late calves do not do as well. For vealer producers the demand is more constant and many opt for all-year-round joining and leave the bulls in all the time. Another alternative is to have the bulls in 3 months and out 3 months, to streamline management. It really depends on what market you are targeting.

A restricted join requires that all cows are back in calf within 3 months of calving. For lower input herds, this may not be achievable every year. For this reason, some producers leave bulls in the herd all year for ease of management.

Mating problems

A bull's job is to get your cows pregnant. To do this he must have:

- good libido
- the ability to serve
- fertile sperm.

Problems in any of these areas can affect results.

Libido

Bulls that are not interested in serving cows have poor libido. This may be due to a lack of male hormone. Testosterone is produced by the testes and is responsible for the male sex drive. Inadequate testosterone production may be due to small and underactive testes. This may be a heritable trait, which can be passed on to both male and female progeny, and is a very undesirable trait to have in a bull. Testes may also be small and inactive due to poor nutrition, stress or a previous injury.

Young bulls may not be sexually mature, but in time will be more interested. Old bulls may have less interest in sexual activity than bulls in their mid-years. Be realistic in your expectations. Heat stress can affect the bull's libido.

Bulls tend to be most fertile between the ages of 2–4½ years. Research has found that after 4½ years of age, libido, sperm quality and serving capacity drop markedly. So culling bulls at 4½ is a good rule of thumb (unless proven to still have high fertility and libido). Bulls of high genetic value may be kept beyond this age and joined to fewer females.

Brahman cattle tend to cycle shorter and often at night so you may not see Brahman bulls doing much during the day but their libido can still be satisfactory.

Ability to serve

A penis should be straight to enable successful joining. If it is not, the tip of the penis may become traumatised from hitting the rear end of the cow and painful ulcers may develop. Persistent frenulum and spiral deviations are the most common causes of bent penises.

Persistent frenulum

This is a little piece of tissue attaching the tip of the penis to the sheath. It will pull the penis downwards and may also limit how far the penis can extend out of the sheath. It must be removed to enable a bull to mate successfully and this can be done in a simple surgical procedure.

Spiral deviation of the penis

A spiral deviation, or twist, of the penis may interfere with normal mating. Often it doesn't occur with each mating and may not appear until a bull is a few years old. It can only be detected by watching the bull mating so it is often overlooked as a cause of low fertility in a herd. It is seen most commonly in polled breeds (up to 20 per cent) and increases with age. Spiral deviation is a heritable condition and affected bulls should be culled.

Other conditions

Abnormal swellings, wounds or growths on or around the penis of a bull may inhibit his ability or desire to serve. They should be examined and assessed by a veterinarian without delay as some conditions can be treated successfully if treated rapidly, however, permanent damage may occur if left unchecked. Some conditions are progressive and it may be best to send the bull for slaughter before his condition deteriorates.

The most common reasons for swellings or growths are:

- *Broken penis.* This appears as a swelling along the midline somewhere between the sheath and the testes. If the swelling is small, medical treatment is often successful. This involves antibiotics and anti-inflammatory drugs and most importantly sexual rest. When the swelling is extensive, recovery is less likely unless surgery is performed and culling should be considered.
- *Sheath injuries.* Trauma of the sheath, or prepuce, can lead to eversion and considerable swelling so that the penis may no longer be able to pass through. If the condition is not treated, scar tissue may form adhesions and restrict penis movement. For the best chances of recovery, veterinary attention is required as soon as possible. While waiting for the veterinarian, hosing of the damaged tissue can help and using a hessian truss around the belly for support of the sheath is useful.
- *Warts.* Penile warts are seen in young bulls and usually disappear by 3 years of age. Large warts may prevent normal retraction of the penis and have to be surgically removed.

Physical ailments

Any physical discomfort associated with mating will discourage a bull from serving. This includes arthritis, lameness, illness and blindness. Sore backs are fairly common in bulls.

Sperm problems

Sperm quality can be variable. Poor sperm quality may be a permanent condition, such as when the trait is inherited, or when the bull is old and producing faulty sperm. Temporary infertility can occur when the body temperature is elevated too high and may result in infertility for up to 3 months. Causes of elevated temperature include fevers (as in three day sickness), heat waves, excessive fat (especially around the scrotum) and moving cattle in hot weather.

Infected accessory glands can result in degraded sperm cells. The bull may have pain in his lower abdomen and be reluctant to mount, and may have semen that looks like pus. The infection can be passed onto cows at joining so that both bull and cow fertility is reduced. Testicular infection or trauma may reduce the production of sperm, either temporarily or permanently, depending on how well the testicular tissue recovers.

Semen testing is the only way to assess the quality of a bull's sperm and can be organised by your private veterinarian.

[Bull Health](#) (DPI 2007)

5.9 Cows and heifers

5.9.1 Setting and achieving breeding targets

The aim in breeding management is for each cow to produce a calf every year. Cattle are pregnant for 280 days so in order to get her calving each 12 months, you have 85 days after calving for her to get pregnant. For the first six weeks she is probably not cycling, so that leaves about two cycles to achieve your goal.

When you consider the herd targets for reproduction you have to allow for abortions, deaths and bull breakdowns as some of the factors which will reduce the number of calves produced. Nutrition is probably the most important limitation on achieving breeding targets. If you can meet the cow's needs she has a good chance, but if you don't she may take longer and the inter-calving interval will increase.

5.9.2 Nutrition levels

Some suggested targets for different herd nutritional levels are shown below.

	Level of nutrition		
	High	Medium	Low
Pregnancy rate	95%	90%	80%
Calving rate	92%	85%	75%
Weaning rate	90%	82%	70%

High: High output system with heavier and later weaning weights and heavier cows. For example, fully pasture improved and attention to supplementary feeding when required.

Medium: Moderate weaning weights and ages. For example, partially pasture improved properties with no or low levels of supplementary feeding.

Low: Low output system with light weaning weights and earlier weaning ages and lighter adult cows. No pasture improvement or supplementary feeding.

High, medium and low would normally relate to stocking rate and reflect soil fertility and level of improved pastures. However, by using supplementary feeding programs, producers in low or moderate fertility soils are still able to pursue high output systems if they desire.

Which system you choose will usually depend on your country, what markets you are chasing and attitude and ability to have higher financial inputs.

5.9.3 Getting ready for joining

Heifers

- Heifers must be at least two-thirds of their expected adult weight at joining — for most British breeds this is 320 kg.
- Aim to join heifers 1 month before the rest of the herd.
- To calve as 2 year olds, you will need to join at 15 months and supplementation would normally be needed to reach the target weight at 15 months. This may be difficult to achieve on many North Coast properties.
- On medium planes of nutrition (with supplement according to season), join heifers at target weight of 320 kg at 18–20 months of age.
- On low planes of nutrition, heifers may be 2 years of age before reaching target weight (of 320 kg with supplement, 360 kg without supplement).
- Watch that heifers don't get too fat during pregnancy as they can have trouble calving. Encourage them to move around. Hilly paddocks can be good.
- Fertility is heritable so you should select to keep heifers that go in calf early. It is recommended to join 15–20 per cent more heifers than you need and use pregnancy testing to cull those heifers that are slow to go in calf. You test 3 months after the bull is put with the heifers and you can then see if they conceived to the first, second or third cycle. The slow ones can be sold as surplus heifers.
- First-calf heifers with calves at foot are the most difficult group in the herd to get back in calf because they are usually still growing as well as lactating, and can be slow to cycle if they lose a lot of body weight. This group requires preferential nutrition, such as supplementary feeding or better quality pastures, to keep the body score above 2 while rearing their first calf.
- Seek professional assistance as to whether your heifers are likely to be protected against disease such as pestivirus, vibriosis, leptosporosis, three day sickness and akabane virus before they become pregnant. These diseases can cause loss of unborn calves in unprotected cattle. In some herds, pestivirus vaccination may be recommended.



Cows

- Cull cattle that calve late or are empty. Fertility is heritable so retaining those cattle will lower the herd fertility.
- You may want to keep cattle that abort or produce stillbirths if they got in calf early; as long as they have not had problems previously or don't have other problems to cull on. However, if neospora is suspected, then culling cows that have aborted is advised because these cows have a higher risk of aborting next time.
- Seek professional assistance as to whether your cows are likely to be protected against disease such as pestivirus, vibriosis, leptosporosis, three day sickness and akabane virus before they become pregnant. These diseases can cause loss of unborn calves in unprotected cattle. In some herds pestivirus vaccination may be recommended.

5.9.4 Health management at joining

Vaccination

- Leptospirosis and 5 in 1 (or can be purchased combined as 7 in 1).
- Three day sickness if introduced from western or southern areas.
- Vibriosis if a history of the disease and recommended by your veterinarian.
- Pestivirus.

Drenching

- Heifers may benefit from a pre-joining drench for worms, particularly if back in condition.

Correct deficiencies

- As necessary, address protein and energy needs and supplement copper and selenium.

5.9.5 Problems at joining

- Cow infertility (see ["7.13 Infertility – Less calves born" on page 101](#)).
- Poor nutrition with low numbers of cows actually cycling is a big problem on the North Coast. Cows need to be in good condition and a rising plane of nutrition at joining, see ["5.9.2 Nutrition levels" on page 54](#).
- Bull breakdown, infertility, poor condition or lack of libido. In larger herds it is wise to have a spare bull to back up. Finding a suitable replacement bull at short notice is difficult.
- Unwanted pregnancy (mis-mating). When cows are served by the wrong bull or when heifers are served too young. Seek veterinary assistance as soon as possible — drugs (prostaglandins if less than 4 months or cortisone if in later pregnancy) may be used to terminate the pregnancy.

5.9.6 Problems during pregnancy

- Abortion (see ["7.1 Abortion \(pregnancy failure, premature calves and stillbirths\)" on page 91](#)).
- Vaginal prolapse (see ["8.51 Prolapse" on page 171](#)).
- Pregnancy toxemia (see ["8.31 Ketosis" on page 136](#)).
- Hydrops — fluid accumulation (of up to 250 litres!) in the uterus. The cow will look bloated, gradually stop eating and either die from a rupture or not be able to calf normally unless treated.

5.9.7 Problems at calving – Dystocia (difficult birth)

In a normal calving, just prior to giving birth the cow will bag up and the area around the vulva will soften and swell. There is usually a clear mucoid discharge from the vulva. She will tend to be restless and separate herself from the rest of the herd.

Most calves are born front feet first. Calves that are coming backwards have the hind legs protrude through the vulva. When the hind legs of a calf coming backwards are still inside the womb facing forwards the birth is termed a 'breech'.

Signs of dystocia

Look out for:

- restlessness with an elevated tail and/or marked straining for 1 hour with no progress
- visible feet or a waterbag but little progress after 1 hour may indicate a head back or a big calf — a brown vaginal discharge is usually a sign of problems.

Get the cow in and either have a quick feel or call a veterinarian. Do not delay.

Assisting a cow in trouble calving

When the calf is mal-positioned, it is sometimes possible to rearrange the calf inside the cow so that it can come out naturally. This should be done with clean hands and arms, which are well lubricated (obstetric lubricant, or if not available use soap) and repositioning efforts should be firm but not rough. It is easy to rupture the womb or break a calf's leg.

Always remember that the longer the delay in calving the less the likelihood of a successful outcome. If things are not sorted in 10 minutes don't persist. Call a veterinarian.

Twins are possible; so make sure that the legs you are manipulating are part of the same calf. Deformed calves can also occur and may be impossible to reposition. Calves coming backwards get their umbilical cord shut off earlier than normal positioned calves and are often dead inside if there is any delay in delivery.

When the calf is too large for the birth canal it is unlikely that the problem can be solved without veterinary assistance. In some cases the uterus is twisted and the calf cannot present the legs. In these cases a caesarean may be required. Applying excessive force may get the calf locked in the pelvis or cause severe trauma. Many cows have died because inexperienced people have tried to force calves out of birth canals that were too small.

If the calf is dead, an embryotomy may be required — contact your veterinarian. (The calf is cut up while still inside the cow into removable pieces). Joining heifers with smaller breed bulls and restricting heifer joining until the heifers are large enough to cope with giving birth may reduce the problem of foetal oversize.

Cows that have abortion, premature calving, difficult birth, caesarean, embryotomy or retained membranes are likely to have reduced fertility and consideration should be given to culling rather than re-joining. If they are retained they should be veterinary checked before joining.

Induced calving

When cows are overdue, or having problems calving, or are in calf to a bull that produces big calves, it is wise to seek veterinary advice. An induced calving may be required. The closer to the expected calving date, the better the chance of a healthy live calf. If the service date is known, cows should be in the last 3–4 weeks and preferably in the last week. If not known, you have to judge by the degree of vulval softening and udder development. Cortisone is the main drug used, sometimes followed by prostaglandins. Retained placentas are common and the colostrum may not be of good quality. Induced premature calves are slower to stand, are poor suckers and are more prone to infections.



5.9.8 Problems after calving

Immediately after calving

- Prolapse of the female reproductive tract. If only the vagina, this can be readily returned. However, if it is a prolapse of the uterus then immediate veterinary attention or destruction is needed (see [“8.51 Prolapse” on page 171](#)).
- Retained placenta (afterbirth, foetal membranes) — failure to expel membranes by 24 hours (see [“8.53 Retained afterbirth” on page 172](#)).
- Calving paralysis, due to damage to nerves that lie in the birth canal or damage to muscles, ligaments or nerves of the back legs during calving (see [“7.9 Downer cattle” on page 97](#)). Tears of the uterus; usually after a difficult birth. Your veterinarian will assess whether stitches and antibiotics required.
- Milk fever (see [“8.42 Milk fever” on page 146](#)).

Problems in the weeks after calving

- Infections of the uterus (metritis) and blood poisoning from retained placenta or damage to the uterus. Cows will be listless and show signs of straining or colic, see retained placenta (see [“8.41 Metritis” on page 145](#)).
- Ketosis (see [“8.31 Ketosis” on page 136](#)).
- Wire disease — straining at calving can cause wire in the 2nd stomach to penetrate the wall (see [“8.28 Hardware disease” on page 134](#)).

5.9.9 Buying in females

In most cases the females for sale will be the ones that the breeder did not want to keep, so care should be taken with purchases. Buying cattle with a known pregnancy status is wise. Cattle vets who are accredited can issue striped tags for cattle that identify their stage of pregnancy (see [“5.9.11 National Cattle Pregnancy Diagnosis Scheme” on page 58](#)).

Beware of introducing cattle from western or southern areas because akabane (see [“8.2 Akabane disease” on page 115](#)), three day sickness (see [“8.61 Three day sickness” on page 177](#)) and theileria (see [“8.60 Theileria” on page 176](#)) are potential problems during pregnancy. Also, cattle from western areas can take a couple of seasons to adapt to the coastal environment. If the cows are aged, check the teeth as cows with poor teeth will never do well.

If in calf, find out details of the bull in case there is a likelihood of calving problems. Keep the National Vendor Declaration in your records for quality assurance purposes.

[Cattle Must have Sound Teeth](#) (DPI 2002)

[Selecting and Managing Beef Heifers](#) (DPI 2007)

For further information see [“5.11.1 Introducing cattle – Biosecurity” on page 60](#).

5.9.10 Pregnancy testing

Identifying which cattle are pregnant and when they are likely to calve is an important management tool for breeding cattle. Beef producers should aim for each cow to produce a calf each year. To join at the same time each year requires each cow to maintain a 12 month breeding cycle. This leaves only a 3-month window after calving to get pregnant again.

Pregnancy testing is best carried out 3 months after the bulls are put with the herd. Cows found to be empty at a pregnancy test should be assessed to see if there are reasons for their slowness to conceive. This would include age of any calf at foot, their body condition, age, teeth, recent illness or diseases such as vibriosis and pestivirus.

Management options available to get empty cows in calf as soon as possible may include better nutrition, a change of bulls, or temporary calf removal. Even synchronised breeding may be used.

Alternatively, some may be culled if they are unlikely to respond or if better nutrition is not available or economic. Many producers who do not want late calves, or do not want cows that will be out of season with the rest of the herd the following year, will cull all empty cows at the time of pregnancy testing.

If you wait till after the bulls are removed to do pregnancy testing the options for the empties are limited (sell or miss a year) and the calving period prolonged. This depends on the length of joining. Most veterinarians can accurately diagnose pregnancies down to 6 weeks by rectal palpation or ultrasound.

5.9.11 National Cattle Pregnancy Diagnosis Scheme

This is a quality assurance scheme used by cattle veterinarians to provide assurance that the pregnancy testing that they undertake is accurate. For veterinarians to be accredited with the scheme they must be experienced with over 2000 pregnancy tests and have over 99 per cent accuracy. They are also required to keep records of each cow tested and these records are audited. Veterinarians identify cows with special tail tags indicating whether they are empty and the stage of pregnancy. The tags are individually numbered and have an identity code for the veterinarian who did the testing. This allows independent investigation of a result if it differs from the prediction. Tested cattle attract a significant market premium at store sales.

The National Cattle Pregnancy Diagnosis Scheme tags divide cows into three different categories: red tags for over 4 months pregnant; blue tags for under 4 months pregnant; green tags for not detectably pregnant.

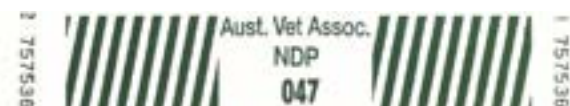
04 tag Wrap around Tag: Red background with yellow stripes and printing denoting over 4 months pregnant.



U4 Wrap around tag: blue background with orange stripes and printing denoting under 4 months pregnant



NDP Wrap around tag: White background with green stripes and printing denoting not detectably pregnant.



04 tag Ratchet tag: red background with yellow printing denoting over 4 months pregnant.



U4 Ratchet tag: blue background with printing denoting under 4 months pregnant



NDP Ratchet tag: Green background with white printing denoting not detectably pregnant.



See [Pregnancy Diagnosis Scheme webpage](#)

Tips on achieving targets

Optimum reproductive performance requires a lot of skill, but is vital for breeding operations to run profitably. This applies whether you have all-year-round joining or restricted joining. You need to be producing the most calves per annum that you can. Some tips to achieve your targets include:

- Get heifers up to critical mating weight of 320 kg at joining. This may require supplementary feeding.
- Join 15–20 per cent more heifers than you need and use early pregnancy testing to select females who get pregnant early. Fertility is heritable.
- Join heifers 1 month before you join the cows. This allows an extra month recovery after calving for first-calf heifers before being joined again — they need the extra time.
- Decide what market you are chasing and set your calving time to best meet that market.
- Vaccinate cows against leptospirosis and pestivirus.
- Vaccinate bulls against leptospirosis, pestivirus and vibriosis.
- Ensure that nutrition is adequate to maintain a minimum body condition score of 3 for cycling.
- Use early pregnancy as a tool to select for fertility.
- Use sound fertile bulls.

5.10 Artificial breeding

5.10.1 Artificial insemination

Artificial insemination can be an effective method of introducing superior genetics to a herd. It also allows you to try a number of different bulls at the same time without having to go to the expense of buying the bull. To get good results, you need to ensure that the cattle are cycling and that they are in good body condition. Brahman type cattle may only show heat for short periods so you may need to use heat detection aids such as teasers or tail paint to try and catch them on heat. Always use experienced inseminators — it is a skill that requires experience for good results. Artificial insemination is usually part of synchronised breeding programs.

5.10.2 Embryo transfer

Embryo transfer is the process of removing embryos from females of superior genetic merit (known as the donor) and placing them in another female (the recipient), where they develop. The surrogate mother then gives birth to an offspring that is genetically unrelated to her. It is a means of increasing the number of offspring from genetically desired females.

Costs will depend on the embryo transfer technician, however, given the level of hormone injections and cattle handling costs, it is more typically suited to stud breeders using very superior genetic lines.

As cattle are handled intensively throughout the embryo program, good cattle handling facilities are required which are out of direct sun and weather. Keeping animals stress-free and on a rising plane of nutrition throughout the program are important.

Embryo collection from donors

Donors selected for embryo transfer are given a series of hormone injections to induce superovulation. These are done at a precise time of the cycle. The embryo transfer technician provides a hormone treatment timetable and this will provide dates and doses for the different hormones used in the program.

Embryos are flushed from the uterus and can be transferred fresh to suitable recipients, or frozen for later use. Provided they are stored properly in a well maintained liquid nitrogen tank, they can have an infinite life span.

Transfer of embryos to recipients

Recipients should be reproductively sound with no history of infertility. The herd of origin should be carefully selected to ensure it is free of unwanted diseases such as bovine Johne's disease or pestivirus.

Recipients have their cycle manipulated by hormone treatments so they will be at the correct stage of their cycle to receive an embryo. Implantation can be done surgically or non-surgically. Conception rates will vary for a number of factors, however, conception rates for implanted embryos are typically 60–70 per cent.

5.10.3 Synchronised breeding

It is possible to get groups of cattle to be on heat at the same time to enable batch matings (artificial insemination or natural) to be carried out and have the cattle calve around the same time. This procedure is called synchronisation and requires a lot of management skill to achieve good results. There are many different programs used by veterinarians, but all depend on a number of key components:

- the cattle must be cycling — temporary weaning may be needed to get cattle cycling
- cattle should be calved 60 days or more
- the cattle must be in a rising plane of nutrition — they should be forward store or prime
- if numbers are large, heat detection is vital and aids such as tail paint or teaser bulls are paramount
- an experienced inseminator is a must because of the large number needing insemination over a very short period
- you need extra labour — heat observation, mustering, inseminating and giving treatments
- a source of feed for the duration of the program.

You should talk to your veterinarian before you start on any program. It is common to have too high expectations for the success rate — anything over 60 per cent is good.

5.11 Cattle management in specific situations

5.11.1 Introducing cattle – Biosecurity

When you introduce cattle you may also be introducing some unwelcome guests as well. It is important to:

- know the history of the cattle
- decide on the necessary treatments
- hold the cattle in or near the yards for 6 days.

Potential problems include weed seeds, worms, liver fluke, external parasites and vaccination status.

For further information see [Farm Biosecurity webpage](#).

Weed seeds, either on their coat or inside their gut

Inspect cattle before on arrival for burr seed such as Noogoora burr or Bathurst burr. Feed hay and hold the cattle in the yards or a small paddock for at least 6 days to allow them to empty out any seed. It will be much easier to get rid of any weeds such as tropical soda apple in a small area than over a whole farm. This will also give the cattle a chance to settle.

Worms, in particular those that may have drench resistance

Treat cattle on arrival with a combination drench or with two drenches of different groups; such as a macrocyclic lactones (ML or mectin) pour-on or injectable *and* a BZ oral drench. Hold the cattle in the yards or small paddock for at least 6 days to allow any viable eggs to pass.

Liver fluke

If they have come from a 'flukey' property they will need a liver fluke drench on arrival. Alternatively, cattle may have come from an area or holding that does not have fluke (especially cattle from dry western or Queensland properties) and are therefore naïve and could be exposed to liver fluke for the first time on your holding. In this situation give a fluke drench that kills immature fluke about 6 weeks *after* arrival (see "[8.36 Liver fluke](#)" on page 142).

External parasites

Inspect the cattle for ticks on arrival and notify the NSW Department of Primary Industries if you suspect cattle tick. Regardless of your findings, treat with a macrocyclic lactones (ML or mectin) drench; these will also treat for buffalo fly, lice and worms. Alternatively, spray with a combined cypermethrin and chlorfenvinphos product (these will also treat for buffalo fly and lice). Amitraz-containing products will only kill ticks (see "[10.5 External parasite \(ticks, flies and lice\) programs](#)" on page 204).

5 in 1 vaccination status

Unless you are confident that calves or weaners have had *both* 5 in 1 vaccinations, give 5 in 1 on arrival and again 4–6 weeks later. In the case of breeders, give 7 in 1.

Pestivirus

Seriously consider vaccination on arrival for pestivirus, both for young stock and breeders. In the case of bulls and stud females, request a test for pestivirus carrier or do this on arrival.

5.11.2 Introducing cattle from outside the district

Most cattle brought into the North Coast from western or far southern areas will experience some set back, locally called 'coastal setback'. This is mainly a combination of climatic and nutritional adjustments, as well as internal and external parasites. The degree of setback will vary depending on the class of stock, time of year and management of cattle on arrival to the North Coast. While North Coast pastures look green, they are mainly tropical pasture species of lower nutritional value. This translates to slower cattle growth rates. This begs the question as to the viability of introducing cattle from other areas, therefore it is seldom practised.

Females

There are significant health risks associated with moving pregnant female cattle to the North Coast region, particularly from western areas. Exposure to diseases that they have not previously been exposed to can result in abortion or stillbirths (from three day sickness or theileria), malformed calves (akabane) or even death (theileria). The decision to move pregnant female cattle to the North Coast should not be taken lightly (see "[8.61 Three day sickness](#)" on page 177 and "[8.60 Theileria](#)" on page 176).

Weaner-aged heifers intended as future breeders may still experience some setback, but they are at a safer age for disease than adult breeders. Their growth rates may be slower, but if they need supplementary feeding they eat considerably less than a mature cow. They will also have the opportunity to be exposed to parasites and local diseases well before they reach an age to join.

Bulls

Each year bulls are brought in from New England, Queensland and further afield in the pursuit of desired genetics. However, there are health risks associated with bulls coming to the North Coast, including ill thrift from dietary change, temporary infertility from three day sickness, and potentially fatal diseases such as theileria. Bulls (and cows) from drier western or Queensland areas may be naïve to worms or liver fluke. Introduce bulls well before joining time, to give time to adjust to the new environment. Vaccination for three day sickness, drenching for worms and fluke and supplements will ease the adjustment. Check bulls overall fitness very frequently throughout the year, even when not working.

There are many very good local stud breeders on the North Coast, across almost all breeds, who have bulls with less potential to experience health problems than a bull naïve to the area.

5.11.3 Leasing land and agistment of cattle

When contemplating leasing land for cattle or agistment, either as the owner of the stock or the owner of the land, consider:

- the use of a formal written agreement
- a negotiated rate of agistment (usually per head), or lease (usually per hectare)
- the property; the quality and quantity of the feed; infrastructure such as yards, fences and water; and areas that may harbour wild dogs or be a problem for paralysis ticks
- who is responsible for repairs and maintenance of yards, fences and water, pasture maintenance (for example slashing) and weed control
- who is responsible for rates, including those to Local Land Services
- a reasonable stocking rate that will not result in degradation of the land or pastures
- public liability — this is important should cattle stray onto roads
- whether to amalgamate the Property Identification Codes (PICs) or maintain separate PICs — applications for PIC amalgamations are to your Local Land Services office
- in the case of separate PICs, ensure that the owner of the cattle transfers the ear tag identifier numbers (NLISIDs) on the National Livestock Identification Scheme (NLIS) database
- whether there are residues issues on the land or any notifiable disease problems such as cattle tick or bovine Johne's disease — these can be confirmed by a search through your Local Land Services office
- the potential for introduction of unwanted weeds, parasites or disease (see [“5.11.1 Introducing cattle – Biosecurity” on page 60](#)).

[Agistment Guidelines](#) (DPI 2007)

5.11.4 Buying rural land

When contemplating a rural holding, be it for the first time or an additional holding, there are important checks and searches to do in the conveyancing process:

- ensure that the land does not have a record of chemical residues or notifiable diseases
- undertake searches for outstanding rates, including to Local Land Services

- if necessary, make enquiries about any quality assurance programs for diseases or management such as bovine Johne's disease, Livestock Production Assurance On-Farm Quality Assurance or organic certification
- if you plan to graze cattle, you will need to register a Property Identification Code (PIC) if the holding does not already have one
- you may also wish to check for potential risk for natural disasters, including flood.

If you are new to the cattle or to the area, it is wise to speak to local producers and to agricultural and veterinary advisors. Local Land Services have staff to provide local advice.

[Precautions when Buying Rural Land](#) (DPI 2016)

5.11.5 Fattening steers

Some producers choose to grow out steers to increase the flexibility of the farm business so it is not entirely a breeding operation. The decision to grow out steers will depend on each farm system. Typically, you have to be able to provide steers with a high quality diet for the entire time they are on the farm.

Some properties only attempt this over the summer–autumn period in order to take advantage of excess pasture growth and plan for only very minimal supplementary feeding or forage crops. Others grow out steers on improved, temperate (winter) forage crops through the autumn to spring, these are typically higher in quality at the same growth stage than tropical species.

There are some producers who specialise in steer trading. These operations are prepared to supplementary feed steers when required and often have high stock turnovers year-round.

Finishing steers can result in some very good economic returns. Two key aspects are precise understanding of the business cost of production and end market specifications. There is a market trend to have steers better finished at heavier weights and at a younger age; therefore, good nutritional management is essential.

If your property is not suitable for steer fattening without significant supplementary feeding, it would be wise to speak with your advisor to assess if this is an economically viable option for your farming system and location.

Animal health programs need to be of a high standard to ensure that there is no check in growth. Drench for worms and liver fluke on arrival. If the steers are off country that has little liver fluke and your own country is fluke prone it is better to defer the fluke treatment until 6 weeks after arrival.

Because steers are often on improved pasture, fodder crop or supplementary feed vaccination with 5 in 1 is critical. Unless you know their history, do not assume that they have been previously vaccinated — give two doses 4–6 weeks apart. To reduce the risk of pulpy kidney, give a 5 in 1 booster every 3 months while on improved pasture or on feed. As steers are often sourced from various properties of differing disease status, seriously consider vaccination for pestivirus. *Mannheimia haemolytica* (MH) pneumonia (formerly known as *Pasteurella*) should be considered if they are being backgrounded for future entry into a feedlot.

Handy [calculator for cost of production](#) for basic enterprise (MLA 2015)

Handy [calculator for assessing cattle market suitability](#)

5.11.6 Specialist calf rearing

Many cattle producers have reared orphan calves from time to time. However, to establish a specialist calf rearing enterprise requires equipment, time and skills that are often beyond the scope of many beef producers.

Rearing calves requires high labour input, sheds or shelters, as well as feeders for milk, grain and roughage. The economics of calf rearing are a balance between the vagaries of the cattle market and grain prices. Simply buying bobby calves because they seem cheap may be an expensive choice by the time milk replacer and grain are fed to bring them to a marketable weight.

Niche markets, such as for Wagyu, dairy replacement heifers or for veal do exist and have led to the establishment of specialist calf rearing enterprises.

The major health problems of calves are bacterial scours, pneumonia and worms. Immune suppression from inadequate colostrum and from pestivirus can have a major impact on calf health. Vaccination is should be considered for pestivirus, *Mannheimia haemolytica* (MH) pneumonia, as well as 5 in 1.

For more information see [“5.6 Calf management” on page 42](#).

[Growing Heifers](#) (DairyLink series) (Johnston, Buesnel & Moran 1997)

5.11.7 Creep feeding of calves

Creep feeding is a simple management practice allowing calves access to additional feed while they are still suckling the cow. Calves gain access to the feed supplement through a 'creep', which is a fence opening or a gate opening large enough for calves to pass through but too small for the cows. Creep feeding is typically achieved with self-feeders, but can also be by a creep gate allowing calves access to higher quality pasture.

Introducing grain-based supplements to calves should follow the same rules as introducing grain to older stock.

Creep feeding provides benefits for having calves better finished and capable of fitting into a finished veal market opposed to the store weaner market. A cost-benefit budget should be conducted to decide if creep feeding is viable for your enterprise.

There are varying opinions around when calves should begin the creep feeding system — many have access from a week old, others only the last couple of months before weaning. There is little evidence that creep feeding before a calf is actively sourcing most of its diet from pasture provides much economic benefit. Seasonal conditions and cow condition may be more of a driving factor as to when creep feeding should commence to provide the most economical benefit.

See DPI's [Creep Feeding Beef Calves webpage](#)

5.11.8 Cattle on grain feeding

Before contemplating a grain feeding program, plan what it is you are trying to achieve for the animals you're planning to feed. Do a feeding budget to calculate the potential cost of a feeding program.

Grain feeding can be for:

- maintenance — supplementation for stock to maintain weight during dry times, to fill the late winter to early spring 'gap'
- growth — to finish fattening stock, either with self-feeders or creep feeders in the paddock, or in an opportunity feedlot situation.



Problems on grain feeding:

- grain poisoning (see “8.26 Grain poisoning” on page 133).
- grain scour
- gastric ulceration
- founder (see ‘Laminitis (founder)’ in “8.32 Lameness” on page 136).

Safe grain feeding

- Grain needs to be introduced gradually into the diet, building up to the desired level over several weeks. Digestive upsets, grain poisoning and even death can occur when introduction to grain or pellets is too quick. A typical introductory program for increasing grain content in rations for cattle in a paddock feeding situation is shown in the following table.

Day	Amount of hay	Cereal grain (kg/head/day) as fed for cattle
1	To requirements	0.5
2–3	To requirements	0.5–1.0
3–4	Decrease hay	1.0–1.5
5 on	Decrease hay	Increase by 0.5 kg/head/day until desired feeding level is reached

- Manufactured beef cattle diets (pellets and meals) often have fibre included. Read product labels for recommended feeding levels.
- Don’t make sudden changes.
- To reduce the risk of acidosis, a rumen modifier such as monensin may be used.
- Ensure vaccination for 5 in 1; and give a booster if there has not been one in the previous 3 months.

General principles of grain feeding

- For a healthy rumen, at least 20 per cent of intake should be fibre (hay, silage or standing paddock feed).
- The basic rules for feeding pellets or meals are the same as for feeding grain.
- A manufactured feed or pellet may be a complete ration and contain fibre, but the more finely it has been processed, the less roughage it contains.
- Whole grain can be fed. However, if feeding any cereal grain other than oats it is best to either crack or roll the grain to reduce wastage. Approximately 20 per cent of the grain will not be digested if it is not cracked or rolled.
- Grain feeding is best conducted through the use of self-feeders, to enable sufficient quantities of grain to be available while protecting it from the weather. Ensure the selffeeder has a working adjustable flow control which enables you to regulate the flow of grain to the cattle.
- Cattle often eat in several ‘shifts’ through the day, so provided the feeder always has grain in it, space per head is seldom an issue. The shyer feeders tend to wait until the feeder is free from other stock before attempting to eat.
- Rules of thumb for feeder eating space are: calves and weaners 100–150 mm, yearlings 150–250 mm, adults more than 300 mm.
- Draft cattle into management groups according to age and class, for example weaners, yearling steers, first-calf heifers, cows and calves. Cattle of similar age, size and condition have similar nutritional requirements and need similar amounts of grain.
- Attempting to feed grain to mixed classes of cattle runs the risk of bullying and variable intake. This can lead to digestive upsets or poor growth rates as some cattle get more than they need and others won’t get enough.

Economics

Cattle are brilliant at substituting feed. As soon as grain is introduced they will begin to favour it for palatability and ease of access as opposed to eating pasture in the paddock. Careful management of the amount of grain fed is required to balance animal intakes of pasture and grain. It is often a fine line. The economics of high grain feeding levels at the expense of grazing pasture are questionable. In a pasture-based beef system, feeding grain-based supplements above 5 kg/head/day is seldom economical.

See:

DPI's [Opportunity Lotfeeding of Beef Cattle webpage](#)

DPI's [Feeding Pelleted Rations webpage](#)

5.11.9 Silage feeding

Silage is becoming a more common supplementary feed for beef cattle. Like hay, it can be used to either supplement or replace available pasture. Typically, it is used to:

- help finish weaners or yearlings to meet market specifications
- improve the condition of heifers pre-joining
- supplementary 'gap' feeding of cattle during times of feed shortage, typically the late winter and early spring period.

Principles of feeding silage

- Silage can be fed ad lib to cattle.
- Like hay and other supplements, be careful that cattle do not become dependent and fail to utilise existing pasture.
- Round bale silage is the most common form of silage fed to beef cattle on the North Coast. Wastage can be high if not fed in hay/silage rings.
- Because of the quantities consumed, silage is expensive to transport long distances due to its moisture content.
- Silage quality determines the potential live weight gain. Good parent forage material and ensiling process is essential to maximise animal intakes and growth rates.
- Shorter chop length will improve silage preservation and will usually improve animal intakes and production, particularly in young animals.

Animal health precautions

- Ensure cattle are fully vaccinated against botulism before commencing feeding silage. There have been examples of very heavy stock losses on the North Coast from botulism in silage (see "[8.8 Botulism](#)" on page 120).
- Botulism proliferates in silage if it fails to reach the desired pH (i.e. not acidic enough), or if animal matter, such as a snake, decomposes in the silage. The final pH (acidity) of silage is determined by the sugar content of the pasture it is made from. More mature grasses and legume fodders are generally lower in sugars and their silage has a higher pH (i.e. is not as acidic).
- Silage wrap can be consumed by cattle and cause impaction or torsion. Ensure that it is disposed of wisely.

[Successful Silage Manual](#) (DPI 2004)

5.11.10 Hay feeding

Hay has traditionally been fed out during the winter and spring months to supplement when pasture may be in short supply. It is also used as a roughage source in opportunity feedlots with young cattle. Hay is either from fodder conserved on-farm or introduced. It may be in small bales, large rounds or large squares.

Compared with grains, hay can be an expensive energy source. Cattle consume more of it, on a nutrient content basis it is more expensive to transport, and it can be more expensive to store and feed out. However, it may be the only option if there is little remaining pasture and available roughage is a problem. This is termed 'replacement feeding'.

When hay is used to supplement paddock feed, be careful because cattle may substitute hay for existing pasture and become 'welfare dependant', hanging around the feeder rather than going out and grazing.

Check that the quality of hay is suitable for the class of stock. Better quality hay is needed for young cattle. Coarse hay, cut when the plant is seeding, may be useful to provide roughage when feeding concentrates such as grain or pellets, but should not be used as the sole feed.

Ensure that the hay does not contain unwanted plant material — many weeds have been introduced this way. Also ensure that it does not contain poisonous plants such as fireweed because the toxins are not lost in the drying process. Cattle usually preferentially graze around fireweed, but are much less able to do this when it is in hay. Unlike silage, hay is not a risk for botulism.

Hay netting and twine are potential sources of foreign bodies (cattle can eat them) and should be removed and disposed of when feeding out.

5.11.11 Cattle on forage crops

Forage crops are grown to provide cattle with a higher quality diet than would be expected at that time of year, and enable better animal performance. They are classified as either winter growing (temperate) and summer (tropical) forage crops. Winter crops are becoming popular to fill the winter feed shortage. Summer crops are valuable to help finish weaners for the autumn sales.

- Examples of winter forage crops include ryegrass, oats, barley, triticale, wheat and brassicas.
- Examples of summer forage crops include millet, sorghum, cow peas and lab lab.

To maximise usage and to improve regrowth potential of forage crops, rotational or strip grazing methods are preferable to set stocking. Re-entry time for repeat grazing is determined by the stage of growth of the particular crop, and will be influenced by soil moisture, temperature and fertiliser use.

Potential animal health problems on forages include:

- clostridial diseases, particularly pulpy kidney — it is recommended to give a booster 5 in 1 prior to grazing fodder crops if the cattle have not had a booster in the past 3 months
- nitrate poisoning on ryegrass, cereals, sorghums and brassicas (see "[Nitrate poisoning](#)" on page 167)
- cyanide poisoning on sorghums (see "[8.49.26 Sorghum cyanide](#)" on page 169)
- bloat on legumes (see "[8.49.8 Clovers, lucerne and kikuyu bloat](#)" on page 158)
- photosensitisation (see "[7.17 Photosensitisation \(sunburn\)](#)" on page 106)
- polioencephalomalacia (polio or PEM) on brassicas (see "[8.50 Polio](#)" on page 171).

5.11.12 Cattle in farm forestry

Forestry has become a major land use on the North Coast in recent decades. Cattle are often grazed in plantations once the trees are big enough and before canopy closure. There are several significant management and animal health issues to be aware of before introducing cattle. Some of these issues may also be encountered on holdings adjoining plantations.

Management issues

- Lack of infrastructure such as stock-proof fencing, water or stock yards.
- Difficulties in mustering, due to cover from trees. Cows may 'hide' calves among trees or scrub making them hard to locate.
- Cattle left in forestry situations and seldom handled for long periods of time can become very 'bush smart', particularly old bulls and bullocks, making them more challenging to muster.
- Good results have been achieved with dry stock that have previously been exposed to frequent mustering and handling operations.
- Rip lines at planting and low limbs are a hazard when mustering on horseback.
- Nutrition may also be a problem. Pastures in more mature forestry situations tend to be lower quality natural grasses, such as blady grass. Assessing the pasture species and how much is available under the trees is important when deciding what class of cattle are to be put into the forest.

Animal health issues

- Forestry plantations make good homes for wild dogs, so cows with young calves may not be suitable.
- Paralysis tick; also more of a problem in young cattle (see 'Paralysis tick' in ["8.63 Ticks"](#) on page 179).
- Poisonous plants, in particular bracken fern and red lantana (see ["8.49.4 Bracken fern and rock fern"](#) on page 157 and ["8.49.21 Red lantana"](#) on page 166).

5.11.13 Cattle on floodplains and wet pasture systems

Cattle on floodplains and wet pasture systems

Much of the coastal floodplain wetlands were drained in the last century and planted to introduced pasture species, such as setaria and Rhodes grass. This was based on the view that these were superior to native floodplain grasses such as water couch. In some areas, drainage achieved the desired results and the introduced pastures were highly productive. Unfortunately, in other areas (typically the very low areas) drainage wasn't as successful, pasture production was poor, and negative impacts on the environment arose such as acid sulphate soils and poor water quality.

Challenges of floodplain grazing:

- regular floods and the need to move cattle to high country
- despite drainage, many low-lying areas may remain inundated for long periods and this does not suit introduced grasses; this can result in 'scalding' and loss of feed for considerable periods
- frosts can be quite severe in low-lying areas and winter feed quality can be poor
- under these conditions (during floods, inundation or after severe frosts) cattle require supplementation feeding
- water in rivers and creeks may be tidal and too salty for cattle to drink or too salty to use as irrigation water

- low soil pH limits the pasture species that can be grown
- most low-lying floodplain areas are underlain by acid sulphate soils.

Opportunities of flood plain grazing:

- high, reliable water table compared to the upper catchment, so floodplain farms fare better in droughts
- large areas of fertile alluvial sediment
- generally good access to water and most floodplain farms contain natural freshwater lagoons, wetlands or creeks
- low-lying freshwater wetlands provide ideal areas for establishing native, wet pasture systems.

Wet pasture systems

Many of the most successful graziers on the floodplain find the key to running a viable grazing enterprise on the floodplain is developing a wet pasture system.

A wet pasture system involves the controlled retention of water in formerly drained swamps to enhance the growth of native wet pastures. These are much more adapted to the extreme environmental conditions, such as flooding events and low soil pH, than introduced pasture species. Excessive surface water is still removed, but groundwater levels are kept intact to foster vigorous wet pasture establishment and growth.

Native species like water couch have feed quality equal to and in some cases above introduced grasses like setaria and Rhodes grass. Water couch produces yields exceeding 10 tonnes of dry matter per hectare per annum.

Key points for successfully grazing a wet pasture system

- Grow pastures that are best suited to different parts of the farm. Low country that can flood regularly and stay inundated better suits water couch. Levees rarely flood and have the most fertile soil and so suit introduced pasture species.
- Rotational graze to allow pastures to recover. Do not overgraze. Longer pastures are better able to handle floods and are more competitive against weeds.
- Maintain soil health to help avoid common soil problems such as compaction, pugging, acid scalds and lack of organic matter. Rotational graze, adjust stocking rates, minimise cultivation and maintain groundcover.
- Manage acid sulphate soils; reducing drainage is the key. Drains can be redesigned so they are wide and shallow or install drop-board weir structures to hold water on low-lying areas.
- Manage weeds. The main weeds of importance are smart weeds (which can be toxic to stock), rushes, tussocks and *Cuphea* spp.. These are seldom eaten by cattle and aggressively compete against preferred pasture species. Control by maintaining competitive pastures, manual removal or herbicides. Mechanical control gives mixed results and wet conditions often prevent slashing or mulching at the right time. However, they can increase the palatability of rushes, and cattle may eat the fresh growth. Selective broadleaf herbicides are available for smart weed species. Glyphosate is the only chemical registered for rushes and it needs to be applied by a wiper to avoid killing pasture species. At the time of writing, *Cuphea* had no registered chemical control option for grazing in NSW, but hopefully this will change in coming years. Aquatic weeds can be harder to manage so speak with your local weeds authority.
- Consider animal health. The most common issue on the floodplain is poor nutrition. Have the pasture species best suited to the growing conditions on your property. Well-managed wet pasture systems provide cattle with the most nutritious pasture available on the floodplain, a far superior option to patchy introduced species mixed with unpalatable weeds. Supplement during the lean months. Develop a cattle health program and calendar (see “10.6 Cattle health &

[management calendar – July calving example” on page 206](#)). Appropriate stocking will reduce worm burdens. Check if your cattle have liver fluke — some floodplain country does not suit this parasite. Stomach fluke problems can occur in young cattle during winter, including in wet pasture systems (see [“8.58 Stomach fluke” on page 175](#)).



Compare overgrazed smart weed dominant paddock on the left with productive managed water couch dominant pasture on the right

See DPI's [Floodplain Grazing Project webpage](#)

6. Looking after your cattle – Nutrition

6.1 The digestive system

To understand the nutritional requirements of cattle and to make management decisions to meet their needs, it is important to have a good understanding of the digestive system.

Most of the North Coast pastures are high in fibre. Fibre is a group of large, structural carbohydrates such as cellulose. The digestive system of ruminants like cattle, sheep and goats allows them to break down these large carbohydrates into a simpler form and provide nutrients for the animal. Very few other animals have the ability to digest fibre.

The mouth

Digestion begins in the mouth where pasture is eaten, ground by the teeth and mixed with saliva. The water in the rumen originates from swallowed saliva. Saliva is also high in bicarbonate which helps keeps the rumen pH stable and begins to break down fibre. Ruminants chew their cud. They return partially digested feed from the rumen to the mouth for further chewing, grinding and mixing with saliva. If a cow is unable to swallow (for example in choke, see ["8.14 Choke" on page 127](#)) they quickly become dehydrated.

Unlike other animals, ruminants have four stomachs:

- 1st stomach — rumen (or paunch)
- 2nd stomach — reticulum (or honeycomb)
- 3rd stomach — omasum (or bible)
- 4th stomach — abomasum (or true stomach).

Rumen (paunch)

The rumen and reticulum are fermentation vats home to millions of fibre-digesting microorganisms. These rumen microbes and cattle have an important working relationship. Cattle provide them a home and supply the forage. The microbes digest the forage to supply their own needs and the nutrients cattle require.

In the rumen, fibre is broken down and most proteins are converted to microbial protein. Carbohydrates are fermented into volatile fatty acids which are absorbed across the rumen wall into the blood stream and are converted to glucose and fat, the main energy sources for cattle.

The rumen microbes have specific requirements for temperature, moisture, energy, pH and nitrogen. Feed quality and type can alter and effect this rumen environment. Dry mature grass is often low in protein and carbohydrate on the North Coast. This limits microbe growth and the amount of protein they produce. Normal rumen pH is neutral to slightly acid (pH 6.5–7). High grain diets can make the rumen acidic, which is toxic to many rumen microbes and compromises digestion (see ["8.26 Grain poisoning" on page 133](#)).

Young calves have a very small, non-functioning rumen. Milk is shunted directly to the 4th stomach and bypasses the rumen. When the calf eats pasture or grain, the rumen develops. Calves copy their mother, nibbling at increasing amounts of pasture from about 3 days of age. By about 8 weeks of age the rumen is able to break down plant material reasonably well. Rearing orphan bobby calves has some challenges in helping the calf develop its rumen properly (see ["Care of the orphan calf" on page 42](#)).

Reticulum (honeycomb)

The reticulum is a small pouch separated from the rumen by a ridge of tissue. It has a honeycomb-like pattern and its main function is to sort feed particles by size before passing through to the rumen. It often captures foreign objects (see traumatic reticulopericarditis or hardware disease). The digestive function of the reticulum is very similar to the rumen, hence it is often referred to as one organ.

Omasum (bible)

The omasum has many leaves (hence the name 'bible') to absorb water. This reduces the amount of water passing out of the rumen to the abomasum. It also grinds and squeezes the partially digested material through to the abomasum. If the omasum stops working the rumen becomes very full of liquid and the animal dehydrates. This happens when the omasum is inflamed in kikuyu poisoning ("[Kikuyu poisoning](#)" on page 161). The omasum is prone to impaction if feed is very coarse ("[8.25 Gastrointestinal tract obstruction, impaction & torsion](#)" on page 132).

Abomasum (true stomach)

The abomasum is the true stomach. Its function is very similar to the stomach of monogastric (single stomach) animals such as pigs and humans. The abomasum uses hydrochloric acid and enzymes to digest protein and fats. Interference in its function (for example brown stomach worm) causes loss of protein, wasting and an acidic foul-smelling scour.

Small intestine (small bowel)

Enzymes and solvents from the bile and pancreatic ducts enter the small intestine and continue breakdown of fats and proteins. The small intestine is also the main site for absorption of nutrients.

Small intestinal disease causes wasting and diarrhoea (for example intestinal worms, immature stomach worm and bovine Johne's disease).

Large intestine (large bowel) and caecum

Their main function is to absorb water and to collect waste material before excretion. Conditions of the large bowel lead to failure to absorb water (seen as diarrhoea). Conditions of the small and large intestines often occur together, seen as weight loss and scour.

6.2 Nutrient requirements

What are nutrients?

A nutrient is a substance that provides nourishment or sustenance. There are five broad categories of nutrients essential for beef cattle:

- water
- energy
- protein
- minerals
- vitamins.



Plants are made up of:

- water
- structural carbohydrates (cellulose, hemi-cellulose and lignin)
- non-structural carbohydrates (sugars and starches)
- protein
- minerals
- fats.

Plant components are digested by cattle to produce:

- volatile fatty acids (namely acetic, propionic and butyric)
- microbial protein plant protein (plant amino acids)
- fatty acids and triglycerides
- carbohydrates (glucose).

Common nutritional terms and units of measure used in this section of the book include:

MJ	megajoules
ME	metabolisable energy
CP	crude protein
RDP	rumen degradable protein
UDP	un-degraded dietary protein (i.e. bypass protein)
DM	dry matter
kg	kilograms
kg DM	kilograms of dry matter
ppm	parts per million
DMI	dry matter intake

Water

Water is the main constituent of an animal's body. While it provides no nutritional value (energy or protein), it is essential to maintain vital bodily processes.

The table below provides a guide to daily water requirements of beef cattle. Note that water requirements will increase with increasing temperature. The values presented below assume atmospheric temperature of 30°C. Water intake will decrease with high levels of contamination (salt or organic matter) and may pose health issues to livestock.

Live weight (kg)	Water required (L/day)
Growing steers, heifers and bulls	
200	36–41
300	54–60
Finishing / Dry stock	
350	57–70
450	78–91
Lactating cows	
400	60–81
550	110+
Mature bulls	
800	100+

Adapted from *Nutrient Requirements of Domesticated Ruminants* (CSIRO 2007).

Water quality, at least with regard to chemical composition, is mainly related to total dissolved solids (salinity) and nitrate content.

A guide to water quality for beef cattle, in relation to total dissolved solids of saline water, is provided in the table below.

Total dissolved solids (ppm)	Water salinity	Guide for beef cattle
< 1,000	Fresh water	No serious issues to livestock
1,000–2,999	Slightly saline	Should not affect health or performance, but may cause temporary mild diarrhoea
3,000–4,999	Moderately saline	Generally satisfactory, but may cause diarrhoea on initial consumption
5,000–6,999	Saline	Can be used with reasonable safety for adult ruminants, but should be avoided for pregnant cattle and young calves
7,000–10,000	Very saline	Should be avoided if possible — pregnant, lactating, stressed or young animals can be affected
> 10,000	Brine	Unsafe, should not be used under any conditions

ppm = parts per million.

Energy

Cattle use energy for a number of functions in the body, namely:

- maintenance
- growth
- reproduction
- lactation.

The energy content of feed is not a discrete substance that can be measured like protein. Rather, it represents the capacity of different feed components to allow the cow to perform its regular functions. The main components of feed that contribute to its energy content are carbohydrates, fat and protein.

Energy requirements of cattle are expressed as megajoules of metabolisable energy (MJ/ME). Metabolisable energy is the amount of energy that is available to a cow for its metabolism or bodily functions. The energy content of various feeds is commonly expressed as megajoules of metabolisable energy per kilogram of dry matter (MJ/ME/kg DM).

When energy intakes by growing cattle do not meet maintenance requirements the beast will not be able to gain weight, rather they will lose weight, using the energy released for maintenance. To gain 1 kilogram of weight, cattle need between 35 and 45 MJ/ME above their maintenance requirement, depending on their stage of production. Young growing cattle tend to lay down more muscle than fat so they have a lower energy demand for growth, whereas mature adult stock lay down more fat so they have a higher energy demand for the same rate of weight gain.

Energy required by pregnant or lactating cows becomes a bit more complex as the female is unable to shut down the pregnancy or lactation when energy intakes are not meeting maintenance requirements. While the level of energy available for either function is reduced she will lose weight and use the energy released to maintain the pregnancy or milk production. In extreme cases the breakdown of products from this kind of weight loss can lead to significant metabolic health issues in very fat cows, such as pregnancy toxæmia. Aim to keep energy levels at or above maintenance in late pregnancy.

Values presented in the following table are intended as a guide only. For more specific information, seek professional advice.

Live weight (kg)	Growth rate (kg/day)	Metabolisable energy requirement (MJ/ME/day)	Minimum crude protein of dietary dry matter (%)
Steers and heifers			
200	0.5	48	11
	1.0	68	13
300	0.5	64	10
	1.0	89	13
400	0.5	77	9
	1.0	100	13
Dry pregnant heifers and cows			
400	0	63	7
	0.5	76	10
500	0	73	7
	0.5	88	8
550	0	78	6
	0.5	94	7
Lactating first-calf heifer (range depends on level of milk production)			
450	0	85–120	10
	0.5	120–140+	11
500	0	90–130	10
	0.5	130–153+	11
Lactating mature cows (range depends on level of milk production)			
500	0	90–130	10
550	0	95–133	10
Mature bulls			
600	0	63	10
800	0	81	10

Adapted from *Nutritional Requirements of Domestic Ruminants* (CSIRO 2007).

Protein

Cattle require protein for almost all bodily functions, and their requirements vary according to age, growth rate and pregnancy or lactation status. Young cattle have a higher requirement for protein than do adult stock as they are growing more muscle than fat. Cows in late pregnancy or those in lactation also have a higher protein requirement than dry adult stock as protein is an important component for the growing foetus and for milk production.

Protein requirements of cattle are expressed as grams per day (g/day). The protein in feed can be measured as percentage of crude protein in the diet (CP per cent / dry matter). There are three sources of protein for cattle:

- Protein in the diet which is broken down by the rumen microbes and then rebuilt by the microbes into microbial protein. This usually accounts for most of the protein absorbed from the small intestine.
- Microbial protein which is built from non-protein nitrogen sources by the rumen microbes. They use ammonia sources such as urea, ammonium sulphate. To do this they also need energy. Approximately 12 MJ/ME is required for the microbes to produce 100 g of microbial protein.
- Bypass protein which is not degraded in the rumen, but remains unchanged until it reaches the abomasum and small intestine where it is then digested.

Principles of protein supplementation

- Rumen microbes cannot produce enough protein when pasture protein level is low. This occurs during the winter months for native and tropical pastures, when crude protein levels fall below 6 per cent. If there is sufficient paddock feed, non-protein nitrogen such as urea can be used at this time.
- Energy and protein levels must be balanced, as microbes need both. Winter pastures are usually low in both energy and protein, so producers need to provide an energy source with the non-protein nitrogen. For many years, cattle producers have used urea with molasses to achieve this.
- There is an upper limit on microbial protein synthesis. High producing cattle, like lactating cows or rapidly growing young stock, have a requirement above that which can be provided by microbial protein production. Under these circumstances the extra protein can only be delivered by protein that is not degraded in the rumen (bypass protein). Examples of this type of protein are cottonseed meal and copra meal fed on the North Coast during winter when pasture quality has declined.

6.3 Pastures

Feed intake

The amount of feed a cow can consume is the most important factor determining the amount of nutrients supplied to the animal and the resulting level of production.

Intake is referred to as kilograms of dry matter (kg DM) and is often expressed as a percentage of live weight.

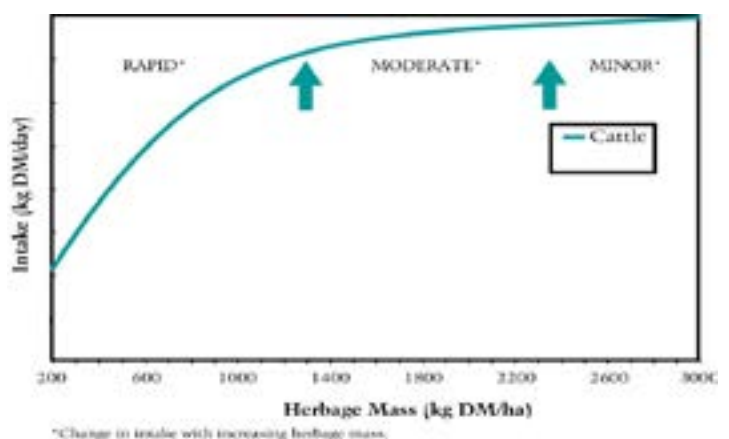
For moderately digestible pastures, the daily dry matter intake (or DMI) is approximately 2.5% x body weight. So for example, a 450 kg cow grazing tropical pastures in summer would have a dry matter intake of 11.25 kg (450 x 0.025). This is 37.5 kg of pasture each day, at 30 per cent dry matter.

The three main factors that influence feed intake by cattle are:

- feed quality
- feed quantity
- physiological status (for example pregnancy restricts the available room for rumen expansion).

There are many interactions with feed quality and quantity that influence feed intake by cattle. Essentially the better quality the feed (i.e. the more digestible it is) the more cattle are able to utilise nutrients from it, the quicker it passes through the digestive system, the sooner the cow becomes hungry again and continues to graze thus increasing the amount of feed consumed over the day.

The amount of good quality feed on offer also influences how much will be consumed. Intakes are reduced when dry matter levels are below 1200 kg DM/ha (this is very short pasture) as cattle have to work harder to 'fill' themselves. Likewise, intakes only marginally increase above 2300 kg DM/ha as cattle only prefer to graze for 11–13 hours per day.



Source: ProGrazey, NSW Department of Primary Industries.



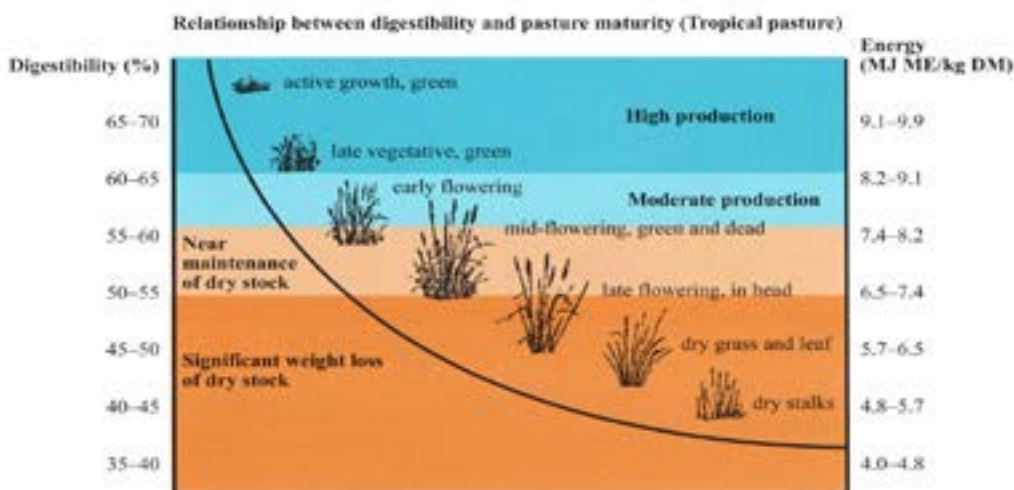
Pasture quantity

Pasture quantity is measured in kilograms of dry matter per hectare (kg DM/ha). Dry matter refers to the amount of material remaining once the water is removed. Dry matter will vary with stage of growth and species. For example, young rapidly growing setaria can be around 24 per cent dry matter, opposed to old mature setaria which is around 50 per cent plus.

To determine the dry matter content of pasture, cut samples and place into a microwave with a separate cup of water and repeatedly heat the pasture, measuring its weight each time until there is no further decline in the sample's weight. The final weight of the sample divided by the initial weight multiplied by 100 gives the pastures dry matter content as a percentage. There are a series of calculations that can convert this to kg DM/ha, contact your livestock officer for further information.

Pasture quality

Pasture quality refers to the concentration of nutrients within the pasture. The most important nutrients are energy and protein. Energy and protein directly relate to the digestibility of a feed, which is another measure of pasture quality. Essentially, as pastures mature the digestibility decreases and so does the energy and protein content.



Source: Prograze NSW Department of Primary Industries.

Digestibility is expressed as a percentage, and relates to the amount of feed that is utilised by the animal. If a cow consumes 10 kg of dry matter and 3 kg is excreted in dung, then the feed is said to be 70 per cent digestible.

Principles of pasture growth on the NSW North Coast

The most productive pastures on the North Coast are fertilised kikuyu pastures oversewn with ryegrass or oats for the winter. See ["6.6 Options for winter shortages – Filling the gap" on page 83](#). North Coast pastures are dominated by perennial summer growing, winter dormant tropical grasses such as carpet grass, kikuyu, Rhodes grass, setaria and paspalum. Tropical pasture species grow well in the warm seasons, but they have more fibre and tend to be less digestible than temperate pasture species at the same growth stage.

Temperate perennial grasses like ryegrass, fescue and phalaris do not persist well on the North Coast. This is due to the summer-dominant rainfall, high temperatures and humidity, all of which do not coincide with the growing season of temperate grasses. Selective grazing of temperate species when mixed with tropical grasses also leads to poor persistence. The upside is that most tropical grass species can produce high volumes of dry matter quickly and, if well managed, quality can be very high.

Maintaining temperate legumes in a subtropical environment is difficult. Temperate legumes require a high level of management to persist even with adequate soil fertility. This is because of strong grass competition during summer/autumn, variable rainfall during hot spring months and parasite problems such as root knot nematode. White clover is the most widely used and naturalised perennial temperate legume on the North Coast. White clover has two important survival methods. With adequate moisture and good grazing management it can survive by using stolons, that is, living plants. White clover is also a heavy seeder, with the naturalised types producing large amounts of hard seed which ensures a residual seed bank. Good grazing management aimed at reducing grass competition is essential for persistence of white clover.



Glycine Setaria mix



White clover mix

Tropical legumes include glycine, siratro, shaw creeping vigna and greenleaf desmodium. These are all vines. They are more suited to the higher rainfall areas of the North Coast in frost-free sites. They need strategic spelling after grazing, especially during their main growth period of mid summer to mid autumn. The challenge is that this coincides with the main period of growth for the tropical grasses and often they need to be re-grazed before the legume is ready. Shaw creeping vigna is the least susceptible to overgrazing of all the tropical legumes as it has a prostrate, stoloniferous growth habit. Other tropical legumes that can handle heavy grazing rotations are wynn cassia and lotononis. Rotational grazing (see [“6.5 Grazing systems” on page 81](#)) is the best management process producers can employ to encourage the persistence of tropical legumes on the North Coast.

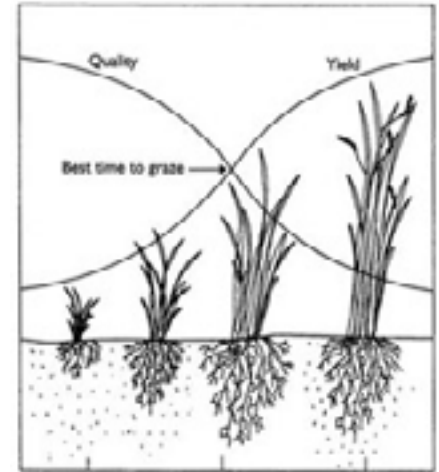
There are four phases of pasture growth and development:

- **Phase 1:** Pastures are growing rapidly following germination or reshooting after the season break. The plants are developing and growing new leaf material. Quality of pastures in phase 1 is very high, but they are very susceptible to overgrazing as they haven't yet bulked up, hence there is low pasture quantity which will restrict intakes in grazing cattle. Also, overgrazing pastures in phase 1 of growth slows the speed in which plants can recover. Phase 1 mainly occurs from October–December on the North Coast.
- **Phase 2:** This is the most favourable stage for grazing pastures in terms of trade-off between pasture quality and quantity (see 'Best time to graze' in above graphic). The pastures have begun to grow some stem material and tillers, with high levels of green leaf still present. Quality is still high and there is sufficient quantity to satisfy animal intakes in most cases. Phase 2 mainly occurs from December–February on the North Coast.
- **Phase 3:** Pastures begin to flower and set seed. There is a rapid increase in stem material and leaf growth slows as the plant transfers its energy from growth to reproduction. There will be little pasture growth from now on. Quality declines significantly at this stage and fibre

levels increase, which becomes the intake limiting factor for grazing cattle. Quantity is seldom limiting. Phase 3 occurs from April–June on the North Coast.

- **Phase 4:** Pastures have set seed and become dormant. Quality is low and declines further with frosting. Quantity depends on pasture utilisation at the phase 3 stage. It is mainly quality, however, that is restricting intake. Phase 4 occurs from June–September on the North Coast.

You can manage tropical pastures to manipulate the growth stages of the plants to your advantage. It does take a higher level of management to try and extend the phase 2 of growth window, but it can be done. Rotational grazing and adjusting stock numbers in paddocks or reducing paddock sizes with temporary fencing are the most common and cost-effective methods, as they utilise the cattle as the management tool. Strategic slashing or fodder conservation are mechanical options for those with the equipment and time. Results are often more consistent but tend to be more costly.



Results from a demonstration site west of Casino are shown below. It shows the quality increase that occurred in setaria due to adaptive management practices. This site uses a mixture of frequent rotational grazing and strategic slashing to prolong the phase 2 of growth. Since this time the amount of legume present has increased as it has been able to compete with the setaria. The follow-up measurements were at the following spring.

	Setaria un-managed	Setaria managed	Setaria un-managed (follow up)	Setaria managed + legume (follow up)
Crude protein (%)	9.7	21.9	8	22.7
Metabolisable energy (MJ/ME)	8.1	10.4	7.5	11.2
Digestibility (%)	57	70	53	74
Yield (kg DM/ha)	7893	2016	5145	2257



Setaria Phase 2

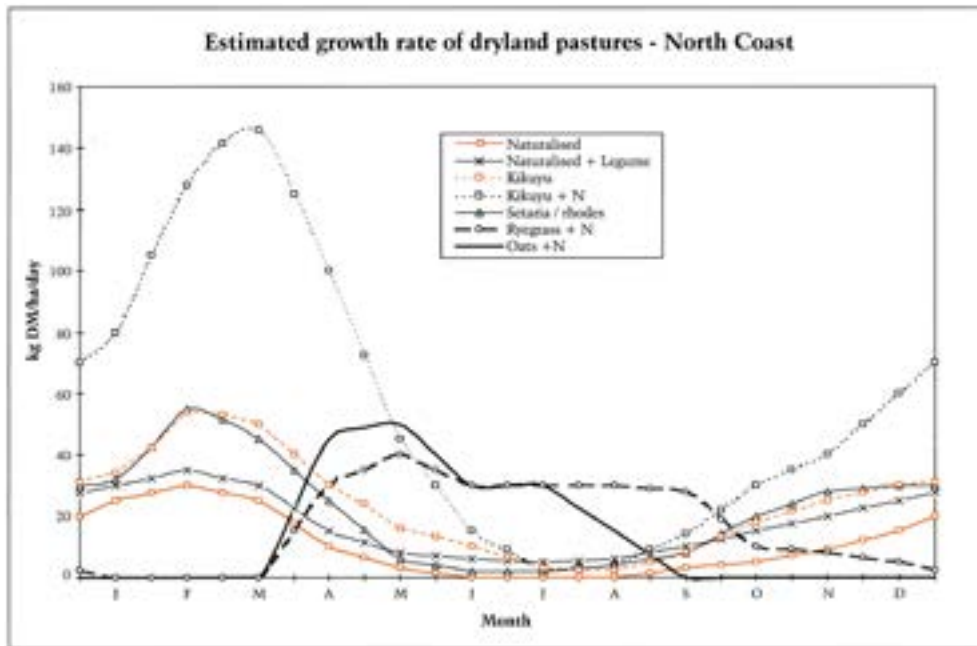


Setaria phase 3

The climatic conditions on the North Coast favour tropical pasture species due to our warm temperatures and summer-dominant rainfall. During winter, temperatures and rainfall are too low for most tropical pastures to continue to grow at an acceptable rate. Some enterprises plant annual temperate pastures or forage crops to help fill the winter feed gap, while others use energy and/or protein supplements to help cattle increase intakes of carryover tropical grasses.

Estimated growth rate of dryland pastures – North Coast

A following diagram is a guide to the growth rate of common pasture species on the North Coast.



Source: Prograze NSW Department of Primary Industries.

See DPI's [Richmond, Tweed and Upper Clarence: What and when to sow webpage](#)

See DPI's [A-Z Listing of all Pasture Species, Types and Varieties webpage](#)

6.4 Grazing management – Seasonal guidelines

The following are brief seasonal guidelines for the grazing management of grass-dominant subtropical pastures on the North Coast.

Summer to early autumn

This is the main period of rapid tropical pasture growth on the North Coast, and keeping pasture in phase 2 of growth is a challenge. Increase stocking rates on pastures that contain the higher quality species (kikuyu, setaria, Rhodes grass, paspalum). Rotationally graze the mat-forming grasses like kikuyu at the five-leaf stage or from about 15 cm high down to 5 cm. For tussocky grasses like setaria, graze at the four-leaf stage, so from about 30 cm high down to 10 cm. Rotational grazing with a high stocking rate for a short duration is best. This leads to faster pasture recovery and better pasture utilisation. Periods of rest will favour the viny tropical legumes.

Paddocks with white clover potential or those planned to be sown to temperate annuals need to be grazed heavily to suppress grass growth during this time.

Grazing newly sown tropical pastures should be limited in the first year to assist in establishment and seeding. Grazing needs to be strategic to control excessive vigorous growth and/or self-sown annual weeds such as crows foot grass.

Strategic slashing to remove seed heads may help extend the quality window into winter. Forage conservation such as hay/silage can also be considered to conserve high quality excess feed.



Late autumn to early winter

Late autumn to early winter can be a very wet time. Continue heavy grazing of pastures to be direct drilled or surface sown with temperate annuals (such as ryegrass or oats), but remove stock prior to sowing. Rotationally graze winter pastures or forage crops. Irrigation and strategic nitrogen fertiliser applications are important for maximising temperate pasture growth.

Depending on the cattle classes, cattle condition, seasonal conditions and pasture available, protein supplementation may need to commence for stock grazing tall, mature tropical grasses. Viny tropical legumes can be grazed heavily prior to frosting in order to use the remaining green leaf before quality decline occurs from frosting and cool temperatures.

Late winter to spring

This is commonly the driest and hardest time of the year. With rising temperatures in late spring, tropical pastures can be suffering severe moisture stress. Protein and energy supplementation may be required for stock on frosted tropical grasses until the spring break arrives and new growth commences.

Annual temperate (ryegrass or oats) pastures will need adjustments made to stocking rates as they begin to run to head in late spring. Increasing stocking rates and maintaining irrigation can slightly increase the time taken before temperate species run to head, but temperature will be the main driver.

Start planning the rotation system for tropical pastures for when they begin to grow rapidly. This will be dependent on rainfall and when the season 'breaks' in spring. Rotations are likely to be slow and at lower stocking densities until the spring break arrives, but having the rotation system ticking along slowly now allows the ability to immediately place control on tropical grasses once they begin to grow.

6.5 Grazing systems

Continuous stocking

In a continuous stocking system, pastures are continually stocked and rarely, if ever, receive a spell from grazing. Cattle will graze and exhibit a high level of selectivity for the most palatable, best quality pasture species. This often results in the decline of these preferred species and is commonly seen as patch grazing and uneven growth. How likely this is to happen depends on the stocking rate, suitability of the pasture species to the location and their tolerance to grazing. Continuous grazing is not suitable for the persistence of climbing tropical legumes such as siratro.

There are many reasons why continuous grazing is seldom the most appropriate method:

- lack of management control over the pasture quality and quantity and subsequent animal performance
- potential loss of preferred species and increases in less desired species (like blady grass) and weed invasions
- increased risk of poor groundcover.

Continuous stocking does however minimise inputs such as labour and infrastructure, but the potential for reduced animal performance is far greater than other grazing systems in most cases.

Set stocking

This is a term applied to a period where stock are not moved or pastures are not rested for an extended period of time, for example, cattle remain in the same paddock for the duration of calving. Immediately after the period of set stocking the paddock is spelled. How long a paddock can be set stocked depends on the pasture type, time of year, season and class of cattle.

At times, set stocking can be the best option for the pasture, for example when there is a need to suppress the growth of tropical grasses prior to planting temperate annual pastures like ryegrass or oats. At other times, set stocking is more appropriate for the cattle, for example when you don't want to disturb them too much or too often, such as during calving. Set stocking systems can be used strategically through the year with a high level of success, but the key is to allow the pasture time to recover once stock are removed. Input costs in terms of fencing and water points are lower than intensive rotational grazing.



Continuous grazing (left) vs rotational grazing (right)

Rotational grazing

Rotational grazing is a period of grazing followed by a period of rest. This is the most recommended form of grazing on the North Coast for beef production. The length of rest period is usually determined by the pasture growth, with the aim to have the pasture regrown to a given stage of growth before the next grazing. There are often well-defined rules which determine the grazing and rest periods, but they are usually based on time and they vary throughout the year. For example, 1 week grazing followed by a 3 or 6 week rest. Other forms focus on pasture utilisation as the trigger for grazing and rest. For example, once a paddock and pasture has reached 3000 kg DM/ha stock graze it until it reaches the desired residue of 1500 kg DM/ha.

The most productive pasture system on the North Coast is fertilised kikuyu or setaria pastures that are oversown with ryegrass or oats for the winter, particularly when rotationally grazed.

Rotational grazing may be implemented for some or all of the year. There is wide variation in how many paddocks are required per herd in the rotation system, commonly a minimum of four is required but in some intensive systems there can be up to 30 or more. The size of the paddocks and herds grazing them will often determine how successful the rotation system is. Remember, the aim is to be grazing tropical pastures in the phase 2 to early phase 3 of growth as often as possible and for as long as possible. As such, big paddocks with low stock numbers will seldom keep on top of tropical pasture growth especially in summer/autumn, so even though the cattle are rotating paddocks they may not be getting the best quality feed in this case.

Rotational grazing often leads to being able to increase stocking rates to some point and allows the farmer to be in control of what and how much pasture the cattle are consuming. Another added benefit for livestock is that it can help in the control of internal parasites when used in conjunction with a drenching program. Stock are frequently moved to fresh pasture that has had a period of rest and this reduces the potential parasite burden.

There are various names applied to rotational grazing systems such as cell, block, and strip etc. The levels of inputs in terms of fencing, water and labour all vary between systems and properties. One of the simplest ways of starting rotational grazing is temporary electric fencing which is used to split larger paddocks into smaller blocks or cells.

As most breeding properties on the North Coast are stocked to cater for the winter–spring period, it is very hard to control and utilise rapid pasture growth in summer and early autumn. Increasing the rotation speed by 'dropping' a paddock or cell from the rotation is the easiest way of dealing with this growth, but try not to let this feed go to waste. Conserving it as hay or silage in phase 2 of growth is far better nutritionally than conserving it when it's mature. For some, buying in more trading stock may be an option, and other options include strategic slashing or letting pasture become carryover feed for the winter.

Rotational grazing has huge benefits for grazing enterprises on the North Coast. A range of factors need to be considered:

- planning the rotation system in terms of trigger points for grazing and rest
- what classes of cattle and how many
- which paddocks to use and for how long
- what the winter feeding strategy will be.

6.6 Options for winter shortages – Filling the gap

Late winter is typically the time of year when feed availability and quality on North Coast pastures are at their lowest (see graphic "[Estimated growth rate of dryland pastures – North Coast](#)" on page 80). The most economical way to have cattle meet the protein and energy requirements for maintenance, growth, lactation and pregnancy is through sowing winter forage, like ryegrass or oats. The alternative is to fill the nutritional gap with conserved or purchased supplementary feed.

Doing nothing and waiting until pasture growth in spring often results in cows losing weight and not cycling. Most North Coast producers join the cows in the spring, and weight loss during winter can result in a delay in conception and an increase in late calves the next year.

Winter forages – Ryegrass and oats



Sowing winter forage

The most productive year-round pastures on the North Coast are fertilised kikuyu or setaria pastures oversown with ryegrass or oats for the winter. While there is an establishment cost in planting, well-managed oats or ryegrass produce relatively cheap winter feed. Recent input costs and dry matter yields on the North Coast suggest that oats or ryegrass can provide quality winter feed for approximately \$0.10 to \$0.20 per kilogram of dry matter.

The benefit of oversowing with improved winter pastures depends largely on the soil types, on-farm infrastructure, class of cattle that will graze the forage, and grazing management. It is seldom possible or necessary for a beef enterprise to plant the entire property to improved winter pastures. However, many producers are planting some small areas, typically the areas with better soil types, to improved winter pastures and using them strategically to provide high quality feed for certain classes of cattle for example finishing steers, lactating first-calf heifers etc.

Planning to plant oats or ryegrass needs to commence in late summer. Evaluate the volume of standing summer pastures in the chosen areas and begin to plan grazing events and, if needed, mechanical intervention to remove excess pasture prior to planting in autumn. Ryegrass prefers clay to clay loam soils with a soil pH of 5.3 (as measured on CaCl test) — growth and dry matter yield will be reduced if soil pH falls below this. If below pH 4.8, lime should be applied. Oats are more tolerant of lower pH and will handle lighter soils better than ryegrass. In more sandy soils, moisture availability may slow post-grazing recovery.

Planting times. The optimal maximum/minimum temperature to establish annual ryegrass and oats into a seedbed is 24°C maximum/19°C minimum. But the ideal temperature to establish them into an existing summer grass pasture is a minimum of 15°C. It is a compromise between a higher temperature which favours germination of ryegrass and oats, and a lower temperature to keep summer grass growth in check. In an average season the ideal temperatures will occur from about the first week of March on the lower North Coast of NSW, and from about the last week of March on the mid and far North Coast. Sowing may need to be delayed further in frost-free areas near the coast where summer grass continues to grow later into the winter. Ryegrass needs to be sown into setaria and Rhodes grass based pasture 1–2 weeks later than kikuyu as these grasses remain more competitive later into autumn. The later in the year either are planted, the lower the yields therefore making them more expensive as a feed source.

Planting method. The most common pre-sowing preparation in kikuyu, paspalum and setaria based pasture is to graze, mulch or slash hard (to below 2 cm stubble height with some soil exposed) then drill or broadcast the seed. Being a larger seed, it is preferable to drill oats. Problems arise if there is

too much mulch residue which may restrict light and smother the emerging seedlings. If the seed is broadcast, the seedlings may root in the mulch (aerial rooting) leaving it vulnerable to losses if a dry spell hits.

Alternatively Glyphosate™ (450 g/l) at 300–500 ml/ha can be used to get suppression of kikuyu and setaria. But repeated use will reduce persistence of both over time and lead to their replacement by couch. Glyphosate at very low rates (100 ml/ha) has been used to suppress kikuyu growth for about 1 week and this does not affect persistence of kikuyu.

Grazing management. Ryegrass is best grazed at the three-leaf stage. If planted early and summer grass is risking shading the new seedling, grazing lightly every 10–14 days to help keep summer pasture suppressed will not hurt ryegrass.

Oats grazing can commence when there is enough root development to ensure plants will not be pulled out. This is about 25 cm of growth for upright types and 10–15 cm for prostrate varieties. For quick recovery, do not graze oats too low. Where possible, only graze down to the height of the lowest stem node; about 12–15 cm above ground level.

To get the best use from improved winter pastures, rotational or strip grazing with a back fence will allow pasture to recover for the next grazing. Simply letting the herd in to walk all over the paddock until it is eaten out will lead to suboptimal results due to repeated overgrazing of some plants.

[Over-sowing Summer Grass Pasture with Annual Ryegrass on North Coast Farms](#) (North Coast Local Land Services 2014)

See North Coast Local Land Services [Pastures webpage](#)

6.7 Supplementary feeding

The decision to undertake supplementary feeding of stock should be made after consideration of the resources available (time and money) and the aim of the program.

For instance, supplementation required for growth in weaner steers would be different to a maintenance ration to breeders during a dry season. You need to be clear on what you are trying to achieve.

It is wise to talk to your livestock officer, nutritionist or veterinarian before you commence a supplementary feeding program so that the cost and expectations are clear.

It is important to have the infrastructure to support a supplementary feeding program in place before you start. This may include tanks or silos for bulk storage, feed-out troughs and mixers, feed bins etc. Also, as seasonal or market conditions or feed prices change during the course of a season, you may need to adjust the program accordingly.

What to feed and when

Typically feed shortages on the North Coast occur during the late winter and early spring months. It is then that both feed quality and quantity are at their lowest. Feed shortages may also occur at other times depending on seasonal conditions and stocking rate. It is important to predict when feed shortages are likely to occur because supplementation is more cost-effective when commenced before the obvious feed deficit has occurred and animals have begun to lose too much weight.

[Supplementary Feeding of Cattle](#) (DPI 2007)

A good ready reckoner on the typical nutrient content of supplementary feeds and their relative value and cost is the NSW Department of Primary Industries [feed cost calculator](#).

Protein

If standing feed of low quality (tall, dry mature tropical pastures in winter) is available then protein supplementation is probably the best choice. Protein supplements will increase the intake and utilisation of low quality pastures. To do this there must be adequate dry standing feed.

Cottonseed meal is one of the most popular protein supplements used but soybean meal, copra meal and sunflower meal are sometimes used as well.

Recommended feeding rates for protein meals, assuming adequate dry standing pasture is available, are as follows:

- weaners — up to 1 kg/head/day as fed
- yearlings — 1–1.5 kg/head/day as fed
- dry cattle — up to 2 kg/head/day as fed
- lactating cows — up to 2.5 kg/head/day as fed.

These rates are calculated daily but fed twice weekly. They are mentioned as a guide. Variations in feeding levels may be required as conditions change. It is wise to consult your advisor to develop a cost-effective supplementation program.

[Making your own Protein Blocks for Cattle](#) (DPI 2006)

Energy

If the quantity of feed is low or the quality and energy level of pasture is very low then energy supplementation may also be needed. Examples of low energy pastures during winter are dry frosted native grasses and setaria.

Molasses and molasses–urea mixes

On the North Coast molasses is probably the cheapest energy supplement but it has limited availability and is most economical if purchased in bulk. It can be labour intensive to feed out.

Molasses is an energy source, so either protein (such as cottonseed meal) or urea is added to molasses to balance energy and protein. If using urea, it is vital that it is mixed thoroughly with no lumps. Small amounts of urea can be highly toxic. Urea is normally capped at a maximum of 3 per cent in the mix. If urea–molasses mixes get wet the urea can separate out and be a poisoning risk.

Molasses is high in sulphur, so sulphur supplements, including sulphur blocks should not be given when feeding molasses (see Sulphur in [“6.8 Trace elements” on page 89](#)).

Molasses is naturally low in phosphorus, and phosphorus deficiency can be seen on the North Coast when cattle are grazing dry standing feed for prolonged periods. This is also the time when molasses is used. So be sure to include phosphorus if feeding molasses for long periods (see Phosphorus [“6.8 Trace elements” on page 89](#)).

In addition to urea, up to 15 per cent protein meal can be added for lactating cows. Intakes of fortified molasses mixes are typically aimed as follows:

- adult stock — up to 2.5 kg/head/day
- weaners and yearlings — 1–1.5 kg/head/day.



Feeding rates for molasses on its own are aimed as follows:

- weaners — up to 1–1.5 kg/head/day
- yearlings — up to 2 kg/head/day
- adult cows — up to 3 kg/head/day.

Higher feeding rates can be achieved, however adequate fibre must be present to avoid digestive upsets and the diet needs to be more accurately balanced. Consult your advisor. Several companies have commercially available fortified molasses mixes on the North Coast.

[*Fortified Molasses Mixes for Cattle*](#) (DPI 2006)

Grains

Grains and grain-based rations are another option. Grains provide both protein and energy and are easy to store and feed out, but are usually more expensive than fortified molasses supplements. Use the feed cost calculator to help compare the relative cost.

A guide to grain feeding rates for maintenance:

- weaners 200 kg live weight — 2.5–3 kg/head/day as fed
- yearlings 250 kg live weight — 3–4 kg/head/day as fed
- dry adult stock — 4–5 kg/head/day as fed
- late pregnant cows — 5–6 kg/head/day as fed.

Weaners and yearlings really need to be gaining weight, so consult your advisor to develop an appropriate grain-based supplement.

Hay and silage

During dry periods with little paddock feed, hay and silage are commonly used as energy sources. Large amounts are consumed, so significant costs can be involved if having to purchase hay or silage, particularly if it needs to be transported over long distances.

Whole cottonseed

Whole or white cottonseed is another commonly used supplement. It is a source of both protein and energy and is usually purchased in bulk. Transport costs are high, and availability and storage can be a problem. It is not a suitable supplement for calves under 4 months of age, (may contain gossypol which can be toxic to young calves). Rates for adult cattle are up to 2.5 kg/head/day, fed twice weekly. An adequate fibre source is essential.

[*White Cottonseed: A supplementary feed for beef cattle*](#) (DPI 2007)

Lick blocks

Lick blocks rarely provide sufficient protein and energy unless fed at very high levels, which can make them quite an expensive method of supplementary feeding. Lick blocks can be used as a means of delivering non-protein nitrogen (urea) and trace elements such as copper or sulphur.

[*Making your own Protein Blocks for Cattle*](#) (DPI 2006)

Correcting protein and energy is the most important task when addressing nutritional deficiencies. First ensure that protein and energy levels are correct, then address trace element and mineral levels.

Too often producers try and correct nutrition problems by concentrating on a mineral only, such as selenium or copper, without checking that protein and energy levels are correct.

Typical introductory program for increasing grain content in rations for cattle in a paddock feeding situation

Day	Amount of hay	Cereal grain (kg/head/day) as fed for cattle
1	To requirements	0.5
2–3	To requirements	0.5–1
3–4	Decrease hay	1–1.5
5 on	Decrease hay	Increase by 0.5 kg/head/day until desired feeding level is reached (A diet must contain at least 20 per cent fibre for a healthy rumen, this need to be provided by either paddock feed or by hay. Manufactured beef cattle diets — pellets and meals — often have fibre included. Read product labels for recommended feeding levels.)

NSW Department of Primary Industries has good information on supplementary feeding, with a large number of useful Primefacts on cattle nutrition free to download via their [Beef Cattle Feeding and Nutrition webpage](#).

Before purchasing any supplementary feeds, consider the residue risks and on-farm quality assurance aspects. When purchasing supplementary feed, ensure you request a commodity vendor declaration. These are important for on-farm quality assurance records as well as for completing the National Vendor Declaration Waybill for cattle. The National Vendor Declaration requires feeding history for livestock in the 60 days prior to sale. The majority of stockfeed suppliers will supply a commodity vendor declaration with your feed purchase as part of the purchase process. If they don't, remember to ask for one before feeding.

[Commodity Vendor Declarations for Stock Feeds](#) (DPI 2006)

See MLA's [Livestock Production Assurance webpage](#) (MLA 2015)

6.8 Trace elements

Copper

Inadequate copper is quite common on the North Coast, because many soils are low in available copper. Copper availability is strongly affected by soil molybdenum, sulphur levels and iron. The use of Mo Super (molybdenum–superphosphate mixes) to establish legumes has induced copper deficiency in some areas.

Ill thrift, anaemia and scouring are the main signs of copper deficiency. A lightening of the coat is a useful indicator: red cattle become orange and black cattle have an orange tinge to the coat. Young cattle are the most common class affected with ill thrift from low copper.

Knowing blood copper levels by testing is valuable. Copper levels can vary according to the season and existing copper reserves in the liver, so consult your veterinarian. A positive response in growth performance and coat colour will confirm response to supplementation.

The most common methods of copper supplementation are:

- Injectable copper tops up liver reserves which last 6 months. Traditionally copper glycinate has been the main product, however, this can cause severe tissue reactions in cattle and sometimes collapse and death. Accidental self-inoculation in humans may require surgery and can be life threatening. ***work health safety risk***
- Injectable aqueous chelated copper is a safer alternative and is marketed in a product containing selenium, zinc and manganese.
- Copper capsules given orally.
- Copper-containing licks and supplementary feeds.

High iron and some other elements in North Coast soils can bind copper in the gut, resulting in reduced copper absorption into the body. Injectable copper products avoid this problem by bypassing the gut.

Copper sulphate (bluestone) blocks are often used in water troughs to help with algae control. These may also have benefit in providing copper.

Selenium

Selenium interacts with vitamin E and has vital functions in detoxification, the immune system's resistance to disease, and reproduction. Low selenium soils are often acid and in high rainfall areas.

True selenium deficiency, seen as white muscle disease on some very deficient tableland soils, is not seen on the North Coast. Selenium is attributed to having a role in ill thrift, mastitis, retained placenta, poor reproductive performance and perhaps lameness. Many producers on the coast claim a productive response with selenium supplementation. Therefore, these are probably best termed 'selenium responsive conditions' rather than true deficiency.

Blood tests are important to establish whether your cattle would benefit from selenium. Selenium supplementation can be toxic if levels are already high. Seasonal variation occurs, similar to copper, with lowest levels in the autumn/winter. But the ultimate test is the response to supplementation in a control vs treated trial.

In beef cattle there are a number of ways of providing selenium supplementation:

- Long acting injections of selenium last for up to 2 years, are easy to administer but may cause tissue reactions if given into the muscle.

- Medium-term injections last for 3–4 months.
- Pour-on products are easy to administer but short acting.
- Oral pellets provide slow release selenium that lasts for 12 months.
- Oral products are short-acting. Selenium is also included with some oral internal parasite drenches.
- Selenium-containing licks or feeds.
- Selenium fertiliser increases the pasture level. Whole areas have to be treated.

Sulphur

Sulphur is an essential element. Together with nitrogen it is used for rumen microbes to produce protein. Dry feed and forage sorghums are low in sulphur. Sulphur should be included when using urea when cattle are on dry feed. But if the urea is with molasses, additional sulphur is *not* required because molasses is naturally high in sulphur.

Some producers use high (e.g. 12 per cent) sulphur blocks for tick control during the paralysis tick season in late winter and spring. There is anecdotal, but not as yet scientific, support for this. If sulphur is used for this purpose ensure that it is only short-term use during the paralysis tick season.

Long-term use of high sulphur blocks can create nutritional imbalance and can be detrimental. Excess sulphur can induce polioencephalomalacia (polio) in calves (see [“8.50 Polio” on page 171](#)). Sulphur is an antagonist to selenium and copper; elements that are naturally low on many North Coast soils. Brassicas are high in sulphur, so sulphur should not be given when grazing brassicas.

Phosphorus

Phosphorus is also a vital component of bones. Much of the North Coast pastures are phosphorus deficient as evidenced by their response to phosphate fertilisers. Phosphorus deficiency is mainly seen on unimproved country during prolonged dry periods, with cattle grazing dry grasses. This is also the time when molasses is fed, which is naturally low in phosphorus. The most common signs seen are an arched back, shifting lameness and swelling of the joints. Stunted growth and poor fertility may also be seen. Cattle with phosphorus deficiency often develop ‘pica’, a desire to chew objects not normally considered food. Bone chewing from phosphorus deficiency can be a cause of botulism (see [“8.8 Botulism” on page 120](#)). Silage and oats are low in phosphorus, while most oilseed meals (cottonseed, sunflower) are good sources of phosphorus. There are a wide range of phosphorus supplements available commercially. Some provide calcium as well, in the right proportion, and some are sources of phosphorous only. You should talk to a professional advisor to see what the best option is. Superphosphate fertiliser is the most widely used method of correcting low phosphorus in the soil and improving pasture production.

It is difficult to consider trace elements and mineral deficiencies singly because they tend to interact with each other and the level of one may influence the level of one or more others. There tends to be a natural balance. If you suspect mineral deficiency in your stock, blood tests and looking for a response to supplements may be useful.

[Assessing Stock Feed Additives and Mineral Supplements](#) (DPI 2009)

7. Looking after your cattle – Animal health diseases, signs & common causes

How to use this section

Use this section of the book to ask yourself: 'I am seeing this sign of disease...What could it be?'

Cattle can present with many different signs of disease. The list of conditions for the following syndromes is only a guide. It indicates some of the most common diseases on the North Coast and also some serious **exotic or notifiable diseases** that should be considered. There are many other possibilities for the signs of disease beyond those listed below. The individual diseases are described in more detail later in the book in "8. Looking after your cattle – Disease problems (in alphabetical order)" on page 115.

For users of the book who have downloaded a PDF copy of the book from the Local Land Services website, internal cross references are given; simply click on the link to go to that page. For those using the printed book the page number is given.

Veterinary assistance is needed for sick cattle or stock deaths to determine the cause and appropriate action. Early diagnosis, before a problem becomes significant, is vital.

Resources and references

See:

The online [Veterinary Handbook for Cattle, Sheep and Goats](http://www.veterinaryhandbook.com.au/) (MLA 2016 or www.veterinaryhandbook.com.au/) written for live export, but has good lists

DPI's [Cattle Health and Disease webpage](#)

The online [The Merck Veterinary Manual](http://www.merckvetmanual.com/mvm/index.html) (Merck Manuals or www.merckvetmanual.com/mvm/index.html)

7.1 Abortion (pregnancy failure, premature calves and stillbirths)

The term 'abortion' in cattle means loss of the developing calf during pregnancy. If this occurs early in pregnancy, it may be difficult to distinguish from infertility (failure to conceive). The normal background abortion rate in North Coast beef cattle is less than 1 per cent. However, from time to time outbreaks of abortion ('abortion storms') occur. Many abortions go unnoticed because the foetuses are not found or they occur early in pregnancy. Abortions can occur at any stage of pregnancy and can have many causes.

A large study of over 700 cases of abortion on the North Coast found causes of abortion fell evenly into three groups:

- Neospora is the most common cause and responsible for about one-third (see [page 147](#)).
- Another third are from pestivirus (see [page 148](#)), vibriosis (see [page 184](#)), leptospirosis (see [page 139](#)), fungal infection (mycotic abortion) and mixed 'other' infections.

- The remaining third have no infectious cause, but rather are caused by nutrition, uterine inertia, hormone problems, congenital defects and separated placenta.

The non-infectious and mixed 'other' infections usually involve single abortions and little can be done to prevent them. The rest may be seen as 'storms'.

Abortions may also be in response to any condition that causes a fever, such as:

- three day sickness (see [page 177](#))
- salmonella (see [page 174](#))
- theileria (see [page 176](#))
- tick fever ***notifiable*** (see [page 178](#))

It is important to find the cause of abortion, particularly if more than one cow is affected. Many of the infective causes are preventable or can be treated. We also need to ensure that NSW remains free of brucellosis ***exotic*** and tick fever ***notifiable***. Sending a foetus for post-mortem is the best way to diagnose the cause of the abortion, however, they are not always available or fresh. Taking blood samples of affected cows and others in the mob may also be useful for diagnosis.

[Diseases Causing Reproductive Losses in Breeding Cattle](#) (DPI 2005)

7.2 Anaemia (pale gums)

The term 'anaemia' means low numbers of red cells in the blood. In cattle it is seen as white in the soft tissue around the eyes, unpigmented gums and unpigmented muzzle. In healthy cattle these are normally pink, the same as in humans.

Common causes of anaemia in cattle on the North Coast are outlined here.

Reduced red blood cell production caused by:

- chronic malnutrition (see [page 83](#))
- copper deficiency (see [page 89](#))
- liver fluke infection (see [page 142](#))
- chronic liver disease from fireweed poisoning (see [page 159](#))
- bracken fern poisoning (see [page 157](#)).

Increased red blood cell breakdown (haemolysis), may be in conjunction with jaundice ('the yellows'), which occurs with:

- tick fever ***notifiable*** (see [page 178](#))
- theileria in local bred calves and introduced adults (see [page 176](#))
- leptospirosis in calves (see [page 139](#)).

Red blood cell loss from blood sucking parasites or haemorrhage (bleeding) caused by:

- barbers pole worm in calves and weaners (see [page 188](#))
- heavy bush tick or cattle tick ***notifiable*** burdens (see [page 179](#))
- blood loss from bleeding (see below).



7.3 Bleeding (haemorrhage)

Bleeding, or haemorrhage, is loss of blood. Loss of blood can lead to anaemia (or pale gums, see “7.2 Anaemia (pale gums)” on page 92). It is important to distinguish bleeding from anaemia. There are several types of haemorrhage in cattle:

- from physical trauma
- due to a failure of the ability of the blood to clot
- due to toxic, physical or infectious damage to the skin or internal organs.

The signs and cause of haemorrhage depend on the part of the body which is bleeding.

From the skin

There will be as frank blood, and can be caused by:

- bracken fern poisoning (see page 157)
- dog attack or trauma (see page 130 and page 183).

Into the muscle

This may only be noticeable as a swelling, or often not at all, and can be caused by:

- blackleg (see page 118)
- dog attack or trauma (see page 130 and page 183).

From the bowel

The nature of the faeces will depend on the site of the tract affected:

- if it is very low in the bowel, the blood will be red and on the outside of the faecal mass, usually from straining (see “7.6 Colic (abdominal pain) and straining” on page 95 for causes)
- if from slightly higher up, there will be red blood throughout the faecal mass
- if the bleeding is from high in the small intestine or stomach (for example stomach ulcer) the faeces will be black (the term for this is malena) because the blood has been digested.

Black or red faeces can be seen with:

- coccidiosis (see page 127)
- salmonella (see page 174)
- stomach ulcers
- bovine viral diarrhoea form of pestivirus (see page 148)
- bracken fern poisoning (see page 157)
- arsenic poisoning (see page 152)
- black bean poisoning (see page 156).

Blood from the nose

Bleeding from the nose will be red. Blood brought up from lower in the lungs may be red tinged mucous or pink tinged froth. Causes include:

- blackleg (see [page 118](#))
- anthrax ***notifiable disease***
- crow pick after death.

Haemorrhage into the bladder

This is seen as red urine (see [page 107](#)). But urine may also be red from the products of red cells rupturing in the body. The two look very similar.

7.4 Bloating (swollen abdomen)

The term 'bloat' or 'bloating' is swelling of the abdomen (belly). It can be from a variety of causes:

- gaseous or frothy bloat seen high on the left side (see [page 119](#))
- choke, obstruction of food pipe and unable to expel gas (see [page 127](#))
- kikuyu poisoning which causes excess fluid in the paunch, with nervous signs — shows low on left side (see [page 161](#))
- free fluid in abdomen (ascites or water belly) usually seen with bottle jaw, from low blood protein with worms (see [page 186](#)) or malnutrition
- free fluid in abdomen (ascites or water belly) from heart failure (see [page 134](#))
- late pregnancy (normal)
- hydrops — an abnormal build-up of fluid in the uterus in late pregnancy
- gastrointestinal obstruction, torsion or indigestion (see [page 132](#))
- displaced abomasum (4th stomach) — common in grain-fed and dairy cattle (see [page 132](#))
- large hernias.

7.5 Bottle jaw

The term 'bottle jaw' is used to describe swelling under the jaw and between the lower jaw bones. There are several causes. It is usually soft due to fluid under the skin, but some cases are hard swellings.

Bottle jaw from fluid build-up is soft and pendulous. There may also be similar swelling under the skin of the brisket. Most cases are due to low blood protein from:

- insufficient protein made in the liver — as seen with liver fluke (see [page 142](#)) and in chronic liver failure from fireweed poisoning (see [page 159](#))
- protein loss from the gut — seen with worms (see [page 186](#))
- protein not being absorbed from the gut — seen with bovine Johne's disease (see [page 121](#))
- insufficient protein in the diet — seen in malnutrition ('poverty lump').

Other causes of jaw swelling:

- bottle jaw from fluid build-up can also occur with congestive heart failure — the most common cause of this in cattle is hardware disease

- occasionally injuries from drenching guns or ingested sharp foreign bodies such as grass seeds can cause abscesses or soft swelling under the jaw
- firmness of the base of the tongue is usually from wooden tongue
- firmness of the jaw is usually lumpy jaw or tooth abscess.

7.6 Colic (abdominal pain) and straining

The term 'colic' means abdominal pain. It may be accompanied by teeth grinding (a sign of pain in cattle), groaning, restlessness, kicking at flanks and straining. Cattle in pain do not often call out. Being a herbivore it is natural for cattle not to vocalise when in pain, as this attracts predators. The term 'straining' is when cattle have repeated attempts of what appears to be urination or defaecation. It is usually a sign of lower abdomen pain. The most common causes are outlined here.

In calves in the first month of life, from scours from infectious agents such as:

- *Escherichia coli*
- rotavirus
- cryptosporidium.

In calves from 2 months age and weaners, caused by:

- worms; small intestinal worm (*Cooperia*) (see [page 188](#))
- coccidiosis.

In adult cattle, caused by:

- prolapse of the vagina in late pregnancy (see [page 171](#))
- impending calving or abortion (see [page 91](#))
- prolapse of the vagina or uterus immediately after calving (see [page 171](#))
- retained membranes from after calving or abortion (see [page 172](#))
- bladder infection or stones (see [page 118](#))
- kidney pain from the infection pyelonephritis or from kidney stones (see [page 184](#))
- any cause of scouring such as flood mud scours (see [page 130](#))
- constipation (see [page 95](#))
- hardware disease (see [page 134](#))
- torsion or obstruction of the 4th stomach or intestines (see [page 132](#)).

7.7 Constipation

The term 'constipation' refers to signs of cattle passing little or no faeces, or hard dry faeces, sometimes covered in mucous. This may occur with:

- any condition which causes cattle to go off their food
- cattle that are dehydrated
- rumen or intestinal foreign bodies (see [page 132](#))
- impaction, particularly from dry bible (impacted omasum) (see [page 132](#)).

Constipation is treated by addressing the underlying cause. Impactions may sometimes be relieved by administering oral paraffin oil.

7.8 Deaths

‘Found dead’ or ‘sudden death’?

Terms like ‘acute’, ‘peracute’, ‘found dead’, ‘sudden death’ and others abound in veterinary texts. In this book the term ‘found dead’ means just that: the cattle could have been sick for almost any length of time without signs being seen. The term ‘sudden death’ refers to death within 24 hours of the cattle first showing signs of illness. If cattle are seen infrequently, for example weekly, then deaths may appear to be ‘sudden’, when in fact they may have been sick for several days before dying.

The term ‘acute’ will be used for those cattle that are sick for over 24 hours and up to a week. The term ‘chronic’ will be used for those cattle that are sick more than a week.

Deaths in calves

This group of conditions occur between birth and weaning. Sometimes the cause is obvious, however, in more extensively run holdings the problem may not be noticed until marking or weaning, and may be confused with fertility problems (less calves born).

The most common causes of calf deaths on the North Coast are:

- paralysis tick (see [page 180](#))
- dog attack (see [page 130](#))
- calf scours, including worms and bacterial scours (see [page 186](#) and [page 109](#))
- blackleg in calves over 3 months of age (see [page 118](#))
- pneumonia (see [page 150](#))
- coccidiosis (see [page 127](#))
- theileria (see [page 176](#)).

Apart from tick and dog attack, the immune suppression from pestivirus infection should always be considered with disease problems in calves (see [page 148](#)).

Deaths in weaners and yearlings

Weaning can be a stressful event, and can place calves at risk of a wide variety of disease conditions. Weaners are naïve and away from their mothers for the first time. Calves are often in a new environment with a range of new diseases, pastures and poisonous plants. Consider:

- plant poisoning, including bracken fern (see [page 153](#))
- blackleg (see [page 118](#))
- pneumonia (see [page 150](#))
- worms (see [page 186](#))
- coccidiosis (see [page 127](#))
- tick paralysis (see [page 180](#))
- dog attack (less of a risk compared to calves) (see [page 130](#)).



Deaths in adult cattle

There are too many causes of individual, one-off deaths in adult cattle to list. However, some of the more common or serious conditions that can cause more than one death include:

- flood mud scours, seen during the cooler months (see [page 130](#))
- plant poisoning, particularly in recently introduced cattle (see [page 153](#))
- tick fever (see [page 178](#))
- botulism (see [page 120](#))
- theileria in adult cattle recently introduced from the west or far south (see [page 176](#)).

7.9 Downer cattle (recumbency)

The term 'downer' refers to cattle that are down on their brisket or side and unable to rise. Downers can be from a variety of causes. It may be from weakness from another disease process, for example, due to an imbalance in electrolytes from scouring, from infectious causes, from injury or muscle soreness. The age of the cattle and the presenting signs may give some clues. Listed below are some of the more common causes, but the lists are by no means exhaustive and there are many other possibilities.

Downer in young calves

- paralysis tick (see [page 180](#))
- fluid and electrolyte loss from bacterial scours (see [page 109](#))
- rapid loss of body fat and hypothermia from failure to suckle (see [page 42](#))
- lameness from joint ill (see [page 147](#))
- injury from dog attack (see [page 130](#)).

Downer in weaners and yearlings

- three day sickness (bovine ephemeral fever) (see [page 177](#))
- fluid and electrolyte loss from scouring due to worms (see [page 186](#))
- paralysis tick (see [page 180](#))
- grain poisoning (see [page 133](#)).

Downer in adult cattle

In late pregnancy:

- impending calving (see dystocia [page 56](#))
- pregnancy toxaemia, particularly in overweight cows that have sudden food shortage (see ketosis [page 136](#)).

After calving:

- calving injury, calving paralysis (see [page 57](#))
- milk fever, from low blood calcium (see [page 146](#))
- mastitis (see [page 145](#)).

At any time:

- injury or trauma, including from joining or bullying
- lameness including footrot (see [page 136](#))
- botulism (see [page 120](#))
- three day sickness (see [page 177](#))
- calcium imbalance from setaria (oxalate) poisoning (see [page 168](#))
- grain poisoning (see [page 133](#)).

Treatment of downer cattle

Treat the cause, if this can be established. But be aware that whatever the initial cause, secondary complications soon set in from cattle being down, and these will keep cattle down even if the initial cause has been resolved. Adult cattle are heavy animals and the weight of being down can cause pressure damage to nerves, muscles and tendons, and can cause circulation problems. They can develop pressure 'bed' sores. They are also at risk of dehydration and exposure.

The general principles of nursing the 'downer cow' are:

- establish the cause and treat early and appropriately
- protect from the elements — sun, cold, wind and rain
- use a lifting device or, at the very least, turn the cow twice a day
- calcium-containing injections (4 in 1, Calcigol) given under the skin prior to lifting may help
- ensure that the cow is in the sitting-up position and not lying on her side
- provide fresh food and water.

Cows with a reasonable outlook are those that:

- are bright, aware of their surroundings, and are eating and drinking
- are able to stay upright on their brisket without support
- have some movement in their back legs and hold them in a normal position
- attempt to use the back legs when hoisted.

However, the outlook is not good for cows that:

- are not alert and are disinterested in food or water
- are unable to support themselves upright on their brisket and go down on their side, particularly if their head is downhill
- have limited movement or 'creep' attempts
- hold their back legs in an abnormal position (the 'splits', straight out the front or straight out the back).

7.10 Drooling or reluctance to eat

Drooling or reluctance to eat can be a sign of conditions of the mouth or tongue, the inability to swallow, or a fever. A range of important and exotic diseases may present with signs of drooling, so it is very important to have cattle with these signs investigated by a veterinarian. The term 'exotic' means

those diseases that occur overseas and are not in our country, but should they ever occur in Australia need to be acted on immediately.

Conditions of the mouth or tongue

- foot-and-mouth disease ***exotic*** (see [page 131](#))
- vesicular stomatitis ***exotic*** (resembles foot-and-mouth disease)
- pestivirus (mucosal disease) can cause ulcers in the mouth (see [page 148](#))
- bovine papular stomatitis causes ulcers of mouth, lips and muzzle of young cattle (see [page 122](#))
- wooden tongue (see [page 186](#))
- lumpy jaw (see [page 144](#))
- malignant catarrhal fever — a rare fatal disease that causes swollen eyes, nasal discharges, mouth ulcers and diarrhoea.

Inability to swallow

- choke from bush lemons, mangos, chokos and other fruit (see [page 127](#))
- wooden tongue and lumpy jaw (see [page 186](#))
- calf diphtheria (see [page 126](#))
- botulism (see [page 120](#)).

Heat stress or fever

- heat stress, particularly downer cattle in hot, humid weather with little shade or wind (see [page 135](#))
- three day sickness (see [page 177](#))
- grain poisoning (see [page 133](#))
- theileria in cattle recently introduced from west or far southern areas (see [page 176](#))
- tick fever ***notifiable*** (see [page 178](#)).

7.11 Eye conditions and blindness

The first sign of eye problems in cattle is often watery eyes with tears running down the face. As the problem progresses, the eye may become red and inflamed and then become white and opaque. It is important to know the difference between the causes, because treatment and the outcome is different for all.

Common eye conditions in cattle include:

- pinkeye — mainly in younger cattle (see [page 149](#))
- cancer eye in older cattle (see [page 126](#))
- foreign bodies such as grass seed, particularly foxtail
- photosensitisation (see [page 106](#))
- infectious bovine rhinotracheitis (IBR) (see [page 150](#))
- malignant catarrh fever

- skin conditions around the eye, such as ringworm in young cattle (see [page 173](#)).

Apparent blindness, which involves the brain rather than the eye itself, can be seen with some nervous diseases. These cattle have eyes that look normal but do not respond. Causes include:

- lead poisoning in younger cattle (see [page 151](#))
- meningitis in calves (see [page 147](#))
- polio in calves (see [page 171](#))
- ketosis in cows in late pregnancy to soon after calving (see [page 136](#)).

7.12 Ill thrift

The term 'ill thrift' refers to weight loss without diarrhoea. It is common on the North Coast in both adult cattle and young stock. Usually some or most of the mob are affected. Most cases of ill thrift are nutritional or caused by parasites.

Ill thrift in calves

Ill thrift in calves is usually due to insufficient milk supply from the mother. This forces the calf to graze at an age when the rumen is not fully developed and the calf demands a higher protein and energy source than can be found from pasture alone.

Grazing at an early age can also result in a high worm burden at an age when the calve's immune system is not yet able to cope (see "[8.69 Worms](#)" on [page 186](#)). Individual calves that are doing poorly, without an obvious cause, should be tested for pestivirus.

Ill thrift in weaners and yearlings

In weaners and yearlings the most common cause of ill thrift is nutritional, in particular, inadequate energy and protein in winter pasture. This can be complicated by trace element deficiencies such as copper or selenium (see [page 89](#)).

Barbers pole worm causes weight loss and anaemia without diarrhoea in yearlings and weaners in the late summer months (see [page 186](#)).

Heavy bush tick burdens can also cause ill thrift, usually with anaemia (see [page 179](#)).

Ill thrift in adult cattle

Nutritional ill thrift is commonly caused by insufficient energy and protein in pasture (see [page 83](#)). In particular, cows during late winter and spring (with the demands of a calf afoot) may also be suffering copper and selenium deficiency (see [page 89](#)).

Phosphorus deficiency can occur during abnormally prolonged dry periods on dry feed, causing ill thrift and, if severe enough, lameness (see [page 90](#)).

After nutrition, internal parasites are the second most common cause of ill thrift in adult cattle on the North Coast. These parasites include:

- liver fluke, in which weight loss usually occurs without scouring (see [page 142](#))
- type II brown stomach worm (*Ostertagia*) is a common cause of individual cows doing poorly when the rest of the mob looks reasonable (see [page 186](#)).

There are many other causes of ill thrift affecting individual adult cattle. Most of these require a veterinary examination and perhaps samples to determine the cause.

7.13 Infertility – Less calves born

The term 'infertility' means failure to conceive. It is important to distinguish infertility from 'abortion' (i.e. the loss of developing calf during pregnancy), although, without pregnancy testing these may be difficult to distinguish in the grazing situation. Reduced fertility is a common and widespread problem on the North Coast. The main income for most beef breeding herds is from the sale of weaned calves, so any reduction in the number of calves has a direct impact on the profitability of a herd.

There are many causes of fewer calves born, and more than one cause may be involved at a given time. The number one cause of reduced fertility on the North Coast is nutrition, although sometimes bull factors or infectious disease may be the cause. Causes can be divided into problems with the bull or problems with cows. Like most conditions, prevention is the key.

Bull problems

Any problem involving the bull can have catastrophic consequences for the herd. Bulls are a big investment and so it is important to have an annual check-up prior to joining to prevent problems. This should include testing semen quality, physical soundness and libido (see [page 48](#)).

Causes of bull problems include:

- Reduced semen quality. This may be from fever of any cause (particularly three day sickness), age, trauma or abnormality of the testes.
- Diseases transmitted by the bull, such as vibriosis (see [page 184](#)) and trichomoniasis (a similar disease to vibriosis).
- Reduced ability to serve. This may be from trauma, malformations or infections of the sheath; poor body condition due to nutrition, internal parasites or disease; and any physical abnormality (particularly of the hind legs) such as structural problems, injury, arthritis or lameness.
- Reduced desire to serve (libido). This may be from competition from other bulls, learned behavioural problems or age (see [page 52](#)).

Cow problems

Conditions affecting individual cows do not have a great impact on the total number of calves born. Cows affected with these conditions can be identified at pregnancy testing and culled. Problems include:

- Freemartinism. This is an abnormality that causes infertility in the female calf born with a male twin. These female calves are infertile for life. Most have obvious external abnormalities, but some may have normal looking external genitalia.
- Acquired damage or scarring of the reproductive tract from past difficult births or from uterine or vaginal infections.
- Cystic ovaries. The cow appears to have either no heat or she appears to be in a permanent heat. Either way, she is not joining successfully and not producing a calf. Cystic ovaries are diagnosed by rectal palpation and can be treated by a veterinarian.

Herd infertility, involving a significant number of cows, can have a huge impact on the number of calves born and herd profitability. The main causes of herd infertility include:

- Reduced cycling due to nutritional stress prior to joining. Nutrition is the single most common cause of reduced fertility on the North Coast. Joining is typically in late winter – early spring, a time of year when tropical pastures are at their worst. This is compounded by the nutritional demands of a calf at foot.
- Early loss of the foetus from diseases such as vibriosis (see [page 184](#)), pestivirus (see [page 148](#)) or trichomoniasis
- Abortion in mid to late pregnancy due to neospora, pestivirus, leptospirosis or vibriosis or any disease causing a fever, such as tick fever ***notifiable*** (see [page 91](#))
- Stillborn or non-viable calves from difficult births (see [page 56](#)), neospora (see [page 147](#)) or pestivirus (see [page 148](#))
- Predation by wild dogs after birth (see [page 130](#)).

7.14 Jaundice (the yellows)

The term 'jaundice' is the yellowing of the tissues and is most noticeable in the eyes and unpigmented gums. There are two reasons why cattle may have jaundice.

Jaundice from a build-up of bile when the bile ducts are blocked, as seen with liver disease:

- red lantana poisoning is the most common cause (see [page 166](#))
- fireweed poisoning (see [page 159](#))
- poison peach poisoning (see [page 164](#))
- green cestrum poisoning (see [page 160](#))
- occasionally seen with liver fluke (see [page 142](#)) .

Jaundice from the rapid breakdown of red blood cells (haemolysis). This is seen in:

- tick fever ***notifiable*** (see [page 178](#))
- theileria in cows introduced from the west or far south (see [page 176](#))
- leptospirosis in calves (see [page 139](#))
- copper poisoning
- Red-bellied black snake bite (see [page 174](#)) .

7.15 Lameness or difficulty walking

It is important to work out if the animal is:

- able to rise and walk — if not (see Downer cattle on [page 97](#))
- lame (which is usually due to pain in the feet) — lame cattle are usually bright, alert and normal in the eyes and have full control of their walking (see [page 136](#))
- suffering from the staggers — i.e. lack of control of the limbs, usually the hind limbs (see [page 104](#))
- knuckling over at the fetlock or dragging the feet
- having difficulty walking because it is sick — there will be other signs, and depending what these are, see that section.



Causes of lameness include:

- footrot
- strawberry footrot
- scald
- sole bruising, ulcer or abscess
- hoof wall separation or wall abscess
- hoof cracks
- overgrown or malformed hooves from chronic feet problems or conformation defects
- corns
- founder
- dislocations
- fractures.

For details on each of these conditions see [page 136](#).

Causes of staggers include:

- plant poisonings, for example zamia (see [page 170](#)), grass tree (see [page 159](#)), hoyo vine
- pastures at certain times, for example kikuyu (see [page 161](#)), paspalum (see [page 164](#)), nitrate ryegrass (see [page 166](#))
- chemical poisoning, for example, grain poisoning, urea, organophosphate, arsenic, lead (see [page 151](#))
- infections, for example botulism (see [page 120](#)), blackleg (see [page 118](#)), meningitis, polio (see [page 171](#)).

Causes of knuckling of the fetlock or dragging the feet are outlined here.

Both hind feet:

- spinal injury from being ridden by other cattle
- nerve injury from calving
- zamia poisoning (see [page 170](#)), grass tree poisoning (see [page 159](#))

One hind foot:

- nerve damage after being down for several days (see [page 97](#))
- injections given into the back rump affecting the nerve.

Front feet

- knuckling over in calves at birth can be seen and often rights itself after several weeks
- in adults is seen in one foot and is usually due to nerve or muscle injury.

7.16 Nervous signs (tremors, seizures, abnormal behaviour or staggers)

The term 'nervous disease' is a broad one and can cover a variety of signs. These can include:

- blindness, apparent blindness or abnormal eye movements
- unusual walking such as circling, staggers, knuckling, dragging the feet or dog sitting
- unusual carriage of the head or head tilt
- muscle tremors, shaking or convulsions
- behavioural and mood changes such as aggression, depression or aimless wandering
- cattle with nervous disease often die on fencelines or in unusual places because they are blind or have abnormal behaviour (see [page 144](#)).

Exotic disease alert ***Mad Cow Disease*** — always report adult cattle with nervous signs. A subsidy is available if you need an investigation into eligible cattle aged between 30 months and 9 years .

There are many causes of nervous disease. Use the table, based on age and presenting signs, as a prompt go to the individual section for that condition.

Age / Presenting signs	Probable/Likely condition
Newborn calves	
<ul style="list-style-type: none"> • Wide range of signs and causes • Weak, curly calves, deformed 	<ul style="list-style-type: none"> • Genetic and congenital problems • Pestivirus infection in mid pregnancy (see page 148)
<ul style="list-style-type: none"> • Curly calves or domed head and depressed • Calves born to cows introduced to the North Coast in mid pregnancy 	<ul style="list-style-type: none"> • Akabane (see page 115)
<ul style="list-style-type: none"> • Difficult birth • Depressed, bloodshot eyes 	<ul style="list-style-type: none"> • Lack of oxygen and trauma (see Dystocia page 56)
Young cattle and weaners	
<ul style="list-style-type: none"> • Blind, head pressing, aimless, convulsions, death • Access to old paint, car batteries, sump oil 	<ul style="list-style-type: none"> • Lead poisoning (see page 151)
<ul style="list-style-type: none"> • Usual navel infection • Range of signs 	<ul style="list-style-type: none"> • Meningitis
<ul style="list-style-type: none"> • Depressed, appear blind, head pressing, aimless, convulsions, death • From thiamine imbalance when on grain, brassicas or excess sulphur 	<ul style="list-style-type: none"> • Polio (see page 171)
<ul style="list-style-type: none"> • Flaccid (floppy) paralysis • Access to scrub in late winter/spring 	<ul style="list-style-type: none"> • Paralysis tick (see page 180)
<ul style="list-style-type: none"> • Some calves with coccidiosis become depressed, develop tremors, convulsions and die 	<ul style="list-style-type: none"> • Nervous coccidiosis (see page 127)
<ul style="list-style-type: none"> • Injuries to the head 	<ul style="list-style-type: none"> • Trauma
In cows at or soon after calving	
<ul style="list-style-type: none"> • Appear sleepy and unable to rise soon after calving 	<ul style="list-style-type: none"> • Milk fever (see page 146)
<ul style="list-style-type: none"> • Late pregnancy to 1 month after calving • Weight loss, depressed, blind or aggressive 	<ul style="list-style-type: none"> • Ketosis / pregnancy toxaemia (see page 136)

Age / Presenting signs	Probable/Likely condition
On improved pasture, fodder or ryegrass	
<ul style="list-style-type: none"> Staggers, often death in minutes Lush feed, first or second grazing, wet or cloudy weather, previous crop a legume such as soybean 	<ul style="list-style-type: none"> Nitrate (see page 166)
<ul style="list-style-type: none"> Staggers, convulsions and death, often bloated 	<ul style="list-style-type: none"> Pulpy kidney (see page 172)
<ul style="list-style-type: none"> Depressed, appear blind, head pressing, aimless, convulsions, death 	<ul style="list-style-type: none"> Polio (see page 171)
<ul style="list-style-type: none"> Staggers, pretend to eat and drink, bloated with fluid, death Lush kikuyu in autumn after a dry spell 	<ul style="list-style-type: none"> Kikuyu poisoning (see page 161)
<ul style="list-style-type: none"> Excited, aggression, muscle tremor, convulsions, death High potassium fertilising, lush feed, cloudy weather 	<ul style="list-style-type: none"> Grass tetany (see page 134)
<ul style="list-style-type: none"> Staggers, high step, muscle tremor, head nod, overreact, recover when left alone Orange or black ergot replaces seed in autumn 	<ul style="list-style-type: none"> Paspalum ergot (see page 164)
On blocks, loose mix or molasses	
<ul style="list-style-type: none"> Aggression, staggers then death in minutes 	<ul style="list-style-type: none"> Urea poisoning (see page 152)
<ul style="list-style-type: none"> Molasses can be high in sulphur Depressed, appear blind, head pressing, aimless, convulsions, death 	<ul style="list-style-type: none"> Polio from excess sulphur (see page 171)
On silage	
<ul style="list-style-type: none"> Head tilt, circling, death 	<ul style="list-style-type: none"> Listeria (see page 66 and page 141)
<ul style="list-style-type: none"> Staggers, flaccid (floppy), especially tongue, death 	<ul style="list-style-type: none"> Botulism (see page 66 and page 120)
On grain or in feedlot	
<ul style="list-style-type: none"> Staggers, depression, laminitis, severe cases die 	<ul style="list-style-type: none"> Grain poisoning (see page 133)
<ul style="list-style-type: none"> Staggers, convulsions and death, often bloated 	<ul style="list-style-type: none"> Pulpy kidney (see page 172)
Access to old sheds, old houses, dips or dumps (think chemical poisonings)	
<ul style="list-style-type: none"> Blind, head pressing, aimless, convulsions, death 	<ul style="list-style-type: none"> Lead poisoning (see page 151)
<ul style="list-style-type: none"> Muscle tremor, stiff, stagger, salivate, diarrhoea 	<ul style="list-style-type: none"> Organophosphates (see page 153)
<ul style="list-style-type: none"> Depression, staggers, convulsions, black or blood scour 	<ul style="list-style-type: none"> Arsenic (see page 152)
Access to scrub (think plant poisonings)	
<ul style="list-style-type: none"> Sunburnt, restless, shake head, aggression, muscle tremor 	<ul style="list-style-type: none"> Red lantana (see page 166)
<ul style="list-style-type: none"> Staggers, lurch and fall easily, dribble urine, recover 	<ul style="list-style-type: none"> Grass trees (see page 159)
<ul style="list-style-type: none"> Stiff hind staggers, drag back feet, hind limb paralysis, don't recover 	<ul style="list-style-type: none"> Zamia (see page 170)
<ul style="list-style-type: none"> Stagger, tremor, paddling, seizures, eye tremor, days to die 	<ul style="list-style-type: none"> Hoya vine
Liver failure	
<ul style="list-style-type: none"> When the liver cannot detoxify properly due to damage, toxins affect the brain 	<ul style="list-style-type: none"> Liver fluke (see page 142) Chronic fireweed poisoning (see page 159)
Any animal in severe pain	
<ul style="list-style-type: none"> Aggression and photosensitisation Aggression and may be lame 	<ul style="list-style-type: none"> Red lantana (see page 166) Trauma and injuries (see page 183)

Age / Presenting signs	Probable/Likely condition
Infections (encephalitis and meningitis)	
	<ul style="list-style-type: none"> • Tick fever (see page 178)
<ul style="list-style-type: none"> • Cattle tend to walk in circles 	<ul style="list-style-type: none"> • Listeria (see page 141)
<ul style="list-style-type: none"> • Head tilt 	<ul style="list-style-type: none"> • Middle ear infection, often from grass seed
<ul style="list-style-type: none"> • Typically in feedlot cattle, sometimes on pasture-fed 	<ul style="list-style-type: none"> • Meningitis
<ul style="list-style-type: none"> • Staggering and flaccid paralysis 	<ul style="list-style-type: none"> • Botulism (see page 120)
<ul style="list-style-type: none"> • A very stiff paralysis 	<ul style="list-style-type: none"> • Tetanus (see page 175)
Abscesses or tumours	
<ul style="list-style-type: none"> • Occasionally occur in the brain or spinal cord resulting in paralysis 	

7.17 Photosensitisation (sunburn)

The term 'photosensitisation' means increased sensitivity of the skin to sunlight, resulting in sunburn. This is a common condition on the North Coast. It is usually from a plant poisoning, including several pasture species. Red lantana is the major cause of photosensitisation on the North Coast.

Photosensitisation is caused by the reaction of sunlight with photosensitive chemicals which have accumulated in the skin. The energy given off from this reaction causes damage to cells and results in the typical appearance of severely sunburnt skin.

There are two types of photosensitisation: primary and secondary.

Primary photosensitisation

Chlorophyll is found in all plants and is broken down to photosensitive pigments in the rumen, which are absorbed into the blood and can accumulate in the skin. These pigments can reach high levels in some pastures, particularly with young fresh growth during periods of overcast weather. This can occur with a wide range of weeds and pastures including bishop's weed, lucerne, clovers, oats, barley, ryegrass, brassicas and sorghum. Finding the plant that is responsible can sometimes be difficult.

Secondary photosensitisation

The body normally produces small amounts of photosensitive chemicals each day and the liver quickly breaks them down into safe by-products. Some plants directly damage the liver by impairing its ability to break down photosensitive toxins or by blocking the bile ducts. As a result, these by-products quickly accumulate in the skin, causing jaundice. This can occur with red lantana (see [page 166](#)), also smartweeds (see [page 168](#)), blue-green algae poisoning (see [page 156](#)), panics and millets. Occasionally occurs from liver fluke (see [page 142](#)).

Signs

Early on, affected cattle show discomfort: restlessness, head shaking, ear flicking, tail flicking, licking their nose, kicking at their flanks or teats and seeking shade. Lighter skinned areas — particularly around the nose, eyelids, ears and teats — swell and start to ooze and form large scabs. Large areas of skin may be affected.

Severely affected animals are in pain and may be reluctant to move or may become aggressive. Cattle with the secondary form are also jaundiced (the yellows) and can die. Lactating cows can dry up or not allow suckling because of sore teats. Calves can be affected through the chemicals passed in the milk.

Treatment

Affected cattle should be protected from sunlight. Emollient creams are valuable for sore teats. Antihistamines, non-steroidal anti-inflammatory drugs and cortisone injections have been used to relieve the discomfort and hasten recovery, which can take many weeks in severely affected animals.

Prevention

If at all possible, move the rest of the mob to alternative grazing. Have an active program to control red lantana. Avoid allowing cattle access to red lantana particularly if they are recently introduced.

7.18 Redwater (blood-coloured urine)

The term 'redwater' means red or brown urine. It is caused by the presence of the breakdown products of red cells, or from blood in the urine.

Notifiable disease alert. Redwater on the North Coast should always be notified to a veterinarian to check for tick fever (see [page 178](#)).

However, other conditions are occasionally seen that can cause redwater. These include:

- chronic bracken fern poisoning (see [page 157](#))
- leptospirosis in calves (see [page 139](#))
- kidney and bladder infections, such as pyelonephritis (see [page 184](#))
- bladder stones (see [page 118](#))
- grazing brassicas (see [page 157](#))
- after calving in high-producing cows
- snake bite (see [page 174](#))
- some septicaemias (blood poisoning).

7.19 Respiratory signs

'Upper respiratory' signs refer to discharge from the nose or eyes and perhaps coughing.

'Lower respiratory' signs refer to difficulty breathing, coarse loud breathing, increased breathing rate, exercise intolerance or a deep cough.

Respiratory infections are common in calves, weaners and feedlot cattle. The incidence can be very high in calf-rearing enterprises, especially when calves are housed. Pneumonia can also be seen in calves at foot on pasture, in weaners and in fattening cattle. It is not as common in mature cattle. When it does occur in mature cattle, the triggers are the same as for weaners.

Often there are triggers for respiratory disease such as stress and disease, and efforts should be made to reduce these, depending on your enterprise.

Triggers for respiratory disease in calves include:

- failure to receive full feed of colostrum in the first 12 hours
- poor milk supply from the mother, often seen in drought years
- pestivirus infection from exposure to carriers (either persistent or transient infection) — this virus suppresses the immune system for several weeks following infection
- upper respiratory viruses (such as infectious bovine rhinotracheitis) which pave the way for bacterial pneumonia
- creep feeders provide opportunity for nose-to-nose contact and rapid disease spread.

In calf-rearing establishments and with rearing orphan calves, additional triggers may be involved such as:

- the stress of transport and a new environment
- mixing with calves of different disease status and exposure to new diseases
- feeding of poor quality calf milk replacers
- poor ventilation and air quality or chilling on concrete in calf sheds.

Introduced weaners for fattening are also at risk from triggers such as:

- the stress of weaning, transport, saleyards, dipping
- exposure to new disease agents, either in transit or on arrival
- changes in environment and diet
- self-feeders and disease spread from nose-to-nose contact.

Most cases start out as viral infections, including pestivirus and upper respiratory viruses. This can progress to bacterial pneumonia, in particular the bacteria *Mannheimia haemolytica* (MH) pneumonia, formerly known as *Pasturella* and *Histophilus*. Severe lung damage such as collapse, abscess and scarring are common outcomes of bacterial pneumonia.

Lungworm can occur in young cattle, or introduced naïve cattle. This is seen as a deep chesty cough (see [“8.69 Worms” on page 186](#)).

Signs

Watery eye and nose, fever with drooped ears, off-colour and separated from the rest of the mob are the first signs. These signs progress to thick nasal discharge, increased breathing rate, coughing, lethargy, failure to drink, and exercise intolerance. If the pneumonia is severe enough, deaths can occur.

Chronic cases from severe lung damage have weight loss, runting and failure to thrive.

Treatment

- Antibiotics are needed early in the outbreak and need to be continued for at least 3 days. Separate affected stock from healthy ones if possible.
- If significant lung damage has occurred, their outlook is not good.

Prevention

- Take steps to minimise the triggers.
- Ensure calves get colostrum, but this can be difficult to monitor in the beef situation.

- If rearing calves in sheds or yards, provide shelter and protection from the weather, particularly winds, but watch for poor ventilation.
- Vaccination of the breeding herd for pestivirus will greatly reduce the impact of this powerful immune suppressing virus.
- With ongoing problems in calves, consider vaccination of the breeders for *Mannheimia haemolytica* (MH) pneumonia.
- In young cattle introduced for fattening or backgrounding, consider vaccination for pestivirus and *Mannheimia haemolytica* (MH) pneumonia / infectious bovine rhinotracheitis (IBR), on arrival as part of induction. It is even better to have these vaccinations done on the property of origin.
- For more information see “8.47 Pneumonia” on page 150.

7.20 Scours (diarrhoea)

The terms ‘scours’ or ‘diarrhoea’ means faeces that are more loose and watery than normal, and which are passed more frequently. There may or may not be a difference in colour or smell from normal.

Scours in calves

Calf scours is a very common problem in beef calves and often occurs as an outbreak. Causes include:

- Nutritional scours due to overfeeding. Common in calves born late in the season and in hand-reared calves. The scour is usually yellow and sour smelling. It is usually not serious and often resolves without treatment, but can predispose to other scours (see [page 42](#)).
- ‘White’ scours (can actually be any colour). Seen more commonly in hand-reared calves. Causes include rotavirus (see [page 174](#)), *E. coli* (see [page 128](#)) and cryptosporidium (see [page 129](#)).
- Black or blood scours is less common than white scours but has a higher death rate. Salmonella is often the cause in young calves (see [page 174](#)). Coccidiosis is the main cause in calves 2–6 months of age (see [page 127](#)).

Predisposing causes include:

- inadequate colostrum in the first 12 hours of life
- inadequate milk supply from the mother, causing the calf to graze too early in life
- in the case of calf sheds or intensive rearing, poor hygiene or overstocking.

General treatment

It is important to identify the cause early in an outbreak so that specific treatment and prevention can be given. However, general treatment is the same, regardless of the cause.

Damage to the bowel lining causes loss of vital salts and fluids, resulting in dehydration and shock. Replacing the water and electrolytes lost from the body is the most important task in scour treatment.

Commercial electrolyte replacers are available that are mixtures of salts (to which water is added). Most calves with scours would be between 7–10 per cent dehydrated, meaning you have to provide at least that amount in fluids. For a 30 kg calf, that equates to 2–3 litres a day. (30 kg x 7% = 2 litres, 30 kg x 10% = 3 litres). This is best given in three or four doses. For bucket reared calves, take off milk for the first 24 hours then alternate electrolyte with milk on the next day and return to full milk on the third day. Milk should not be fed within 1 hour of electrolytes.

Sucking calves are more difficult to manage. Mildly affected cases can be given electrolytes while left on the cow but most cases should be removed from the cow for 24 hours, given electrolytes and then returned to the cow.

Calves with scours have poor circulation, low energy reserves and are unable to maintain their body temperature. General nursing support, artificial warmth and shelter from the weather are critical.

Specific antibiotics are necessary for blood scours, but many cases of nutritional and white scours are not bacterial so antibiotics are unnecessary and can result in meat residues. Always record treatments and identify treated animals. Probiotics to assist in re-establishment of a normal gut flora may be of benefit.

Prevention

Ensure calves get colostrum; but this is often difficult in most beef situations. Colostrum contains antibodies that provide protection against gut pathogens, which is why animals that do not get adequate colostrum often succumb to the scours. At least 2 litres is needed within 12 hours of birth, after which time colostrum antibodies cannot be absorbed through the gut wall. If unsure if a calf has had colostrum, you can use frozen colostrum which can be stored frozen for up to 12 months. To avoid damaging the antibodies when thawing, don't heat too rapidly.

Cleanliness in calf rearing enterprises is vital. Feed troughs, buckets and pens need to be cleaned regularly and where groups of calves are reared, operate on an 'all in all out' basis with all pens cleaned once the sheds or yards are empty. Rodent control is important, especially with salmonella problems.

To prevent nutritional scours in hand-reared calves, ensure that the calf milk replacer is made at the recommended strength, do not overfeed and do not feed too frequently.

Specific medications are available for both coccidiosis and cryptosporidium. There are vaccines against *E. coli* and *Salmonella*. Breeders are vaccinated prior to calving and the immunity is passed to the calf in the colostrum.

[Preventing Calf Scours in Suckler Beef Enterprises](#) (MLA 2006)

[Treating Calf Scours](#) (MLA 2005)

Scours in weaners and yearlings

The causes of scours in this age group differ from suckling calves and adult cattle. Most are parasite related (worms, coccidiosis, stomach fluke) or nutritional (copper). Stress at weaning plays a major role. Many beef producers sell their entire steer portion at weaning and keep replacement heifers. Others buy in weaners to grow them on.

Weaning, particularly if done early, comes with a number of challenges to young cattle. These stresses can weaken their immune system and make them more vulnerable to disease. They include:

- adapting to a grass-only diet
- stress of being removed from their mother
- the stresses and exposure to new diseases with sale, including trucking, saleyards, mixing with other cattle, dipping, more trucking and adapting to a new environment
- exposure to pestivirus often occurs at weaning, which further weakens their immune system, see [page 127](#).

The most common causes of diarrhoea and weight loss in weaners and yearlings on the North Coast are:

- worms, in particular small intestinal worm (*Cooperia*) and brown stomach worm (*Ostertagia*), which cause a watery green and sometimes foul-smelling scour and weight loss and, if severe enough, death, see [page 186](#)
- coccidiosis, which causes blood or black scour, straining and sometimes death, see [page 127](#)
- stomach fluke, particularly on low-lying and lower river country during the cooler months, causing a watery green scour, dramatic weight loss and sometimes death, see [page 175](#)
- copper deficiency, with associated change in coat colour and ill thrift, see [page 89](#).

Scours in adult cattle

Unlike scours in calves and weaners, scouring in adults usually presents as an individual animal problem rather than as a group. Exceptions to this are flood mud scours (yersinia) and nutritional scours.

It is important to determine the cause because the treatment differs for each cause. This is usually done by laboratory tests on faecal samples.

The most common cause of scours in adult cattle on the North Coast are:

- type 2 *Ostertagia* (brown stomach worm) — the most common cause of scours in individual adult cattle and is usually secondary to old age, malnutrition or other problems (see [page 186](#))
- nutritional scours when moving onto green feed, not usually associated with weight loss
- flood mud scours — acute onset in the winter months (see [page 130](#))
- bovine Johne's disease (BJD) (see [page 121](#))
- salmonella (see [page 174](#))
- inadequate copper, selenium or cobalt can cause scours and well as ill thrift (see [page 89](#)).

Liver fluke causes weight loss and bottle jaw, but usually without diarrhoea.

Occasionally toxicities may also cause scours. These include plant poisonings such as:

- oats, ryegrass and other crops causing nitrate toxicity (see [page 166](#))
- black bean from eating the seeds (see [page 156](#))
- wild passionfruit — cattle will have the staggers as well
- fireweed — cattle will have weight loss and death as well (see [page 159](#))
- mother of millions and oleander — blood scour may be seen as the first sign before death from heart attack; and survivors in a poisoning episode may also have blood scour (see [page 161](#) and [page 163](#)).

Several chemical poisonings may also have signs of scouring:

- organophosphate (see [page 153](#))
- arsenic (seen as a black or blood scour) (see [page 152](#))
- salt poisoning.

Grain poisoning (see [page 133](#)).

7.21 Skin signs

The skin is the largest organ in the body. Because it is the first and often the only part of the body we see, skin problems are more noticeable than other conditions.

Some skin disorders are superficial and cause cosmetic problems only. Others, like warts and ringworm, are unsightly and can cause loss of value at the saleyards or restrict entry into shows. Parasites like ticks, buffalo fly and lice can cause appreciable downgrading of hide value at the abattoir. Some other conditions, like vetch poisoning and some cases of photosensitisation and extensive dermatophilus, can be life-threatening. Lumpy skin disease is a debilitating disease which is exotic to Australia.

Different types of skin signs are outlined here.

Lumps and bumps:

- warts (see [page 185](#))
- abscesses (see [page 115](#))
- reaction at injection sites
- allergies (see [page 116](#))
- demodectic mange (see [page 145](#))
- lumpy skin disease ***exotic*** and pseudo lumpy skin disease.

Matted hair:

- dermatophilus (see [page 129](#))
- lumpy skin disease ***exotic*** and pseudo lumpy skin disease.

Itchy skin disorders:

- buffalo fly allergy (see [page 122](#))
- lice (see [page 140](#))
- woolly pod vetch poisoning (see [page 170](#))
- chorioptic mange (see [page 145](#)).

Hair loss:

- ringworm (see [page 173](#))
- photosensitisation (see [page 106](#))
- dermatophilus in calves (see [page 129](#))
- urine or faecal scald, particularly in calves (see [page 109](#)) or downer cattle (see [page 97](#))
- lice (see [page 140](#))
- buffalo fly allergy (see [page 122](#)).



7.22 Urinary tract disorders

Conditions of the urinary tract are seen as:

- frequent urination, often with only small amounts of urine
- dribbling urine
- straining to urinate and arched back
- there may be a foul smell to the urine, or sometimes flecks of blood.

Causes include:

- crystals in the kidney from oxalate poisoning on lush setaria (see [page 168](#))
- bladder stones (see [page 118](#))
- urinary tract infection (pyelonephritis) (see [page 184](#)).

8. Looking after your cattle – Disease problems (in alphabetical order)

This section describes the more common diseases found in cattle on the North Coast, listed alphabetically. Links for more information are given and the full url for each is given in “11. Further information and references” on page 213.

Useful websites and documents:

DPI's [Cattle Health and Disease webpage](#) for DPI Primefacts on individual conditions

The online [Veterinary Handbook for Cattle, Sheep & Goats](#) (MLA 2016 or <http://www.veterinaryhandbook.com.au/>) diseases listed alphabetically and by signs

The online [The Merck Veterinary Manual](#) (Merck Manuals or <http://www.merckvetmanual.com/mvm/index.html>)

Meat and Livestock Australia at www.mla.com.au/

[Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015) an excellent overview of the significant diseases of beef cattle in Australia, their priority and cost to the industry.

8.1 Abscesses

Abscesses are pus which is separated from normal tissue by a capsule of fibrous tissue. They occur in cattle of any age. Abscess may be caused by contaminated needles when injecting medication or vaccines. This is more likely to happen if cattle are wet when injected. They may also be the result of penetrating foreign bodies, such as grass seeds or thorns, or occasionally from dog attack. Treatment is by lancing. Antibiotics are usually not required unless the abscess is large, or there are multiple abscess, or the animal is unwell.

Reactions at injection sites can occur with some vaccines, particularly oil-based products. These reactions don't usually cause infections and do not require treatment. Reaction to copper glycinate injection can be quite severe.

work health safety risk Care should be exercised when injecting cattle, including with some vaccines and copper glycinate, as accidental self-inoculation can cause severe reactions in humans.

[Abscess](#) (in the online *Veterinary Handbook for Cattle, Sheep and Goats*)

8.2 Akabane disease

Akabane disease is a viral disease carried by biting midges. Heifers or cows exposed to the virus for the first time during pregnancy may abort or give birth to malformed calves.

For over 30 years, district veterinarians have done monthly monitoring for akabane and other insect-transmitted diseases as part of a national program. Akabane and midge activity on the North Coast is regular each summer with the majority of young heifers exposed to the virus each year. Those summers of low activity are usually followed by a summer of high activity; so the vast majority of heifers on the North Coast have immunity before their first pregnancy.

Akabane disease is seen on the North Coast when naïve cattle are introduced and experience their first contact with the virus during pregnancy. In the northern tablelands and slopes and on the south coast, virus transmission is much more irregular and these regions may experience outbreaks every decade or so.

When infected in early pregnancy (30–105 days), the cow may abort or may go to full term with damage to the calf's brain. The calf may show an unusually domed forehead and it may stand and appear dopey or blind. It may not be able to see the cow, find the teat or suck.

Infection in mid pregnancy (105–150 days) produces deformity in the limbs and joints, making them bent and stiff. This is called arthrogryposis or 'curly calves'. These deformities may cause calving problems and your veterinarian may have the awful task of cutting limbs off the calf inside the cow to allow delivery.

When a non-pregnant cow or heifer is infected there is no apparent sickness and she develops strong immunity.

For over 30 years Local Land Services district veterinarians have undertaken monthly monitoring for akabane and other insect-transmitted diseases as part of a national program. As well as adding to our knowledge of these diseases, this monitoring is an important part of Australia meeting international trade requirements. The monitoring is also an early warning system to detect incursions of new viruses into Australia.

Treatment

No treatment is available.

Prevention

Breeders from southern and inland regions are unlikely to have any natural immunity to akabane. Care should be taken in introducing them to this region, especially if they are already pregnant. Replacement heifers may also lose calves if they do not become infected till after they are mated. No vaccine is currently commercially available.

[Akabane Viral Infection](#) (in the online *Merck Veterinary Manual*)

8.3 Allergies

Skin allergic reactions are seen on the North Coast, particularly in some cattle in response to buffalo fly bites. They start as small 5–10 mm lumps. They may develop large ulcers from rubbing. See "[8.11 Buffalo fly](#)" on page 122.

Chorioptic mange can also initiate an allergic skin reaction, causing cattle to rub. It usually is seen on the tail base, but may spread to the heels, the udder of cows and the scrotum of bulls. See "[8.39 Mange](#)" on page 145.

Generalised allergic reactions (urticaria) can be seen in individual cattle from reactions to stings and some injectable drugs. Grazing pastures that are dominated by woolly pod vetch can also cause a generalised allergy. Affected cattle have focal swellings on the skin (wheals) and swelling of the face and eyelids. Intense itching can cause secondary skin damage. In vetch poisoning the condition may be severe enough to kill cattle. See [page 170](#).

Treatment of allergies is usually focused on addressing the underlying cause, so it is important to seek advice on the cause.

8.4 Arthritis

The term 'arthritis' means inflammation of the joints. Being an enclosed space, any inflammation or swelling in the joints results in marked pain and lameness.

Infectious arthritis or joint ill

This is a common condition in calves usually less than 2 months of age. Lameness is usually the first symptom and on inspection one or more joints may be swollen and painful. Bacteria are the most common cause, usually picked up through the navel. In some cases, destruction of cartilage can cause permanent damage to the joint.

Treatment

For calves with joint ill, early antibiotic treatment with a broad-spectrum antibiotic at high dosages is recommended. See your veterinarian for details.

Prevention

Calve down into well-grassed paddocks if possible. Spraying the navel of newborn calves with a disinfectant such as iodine can be done with dairy calves, but is not practical with beef cattle.

Non-infectious arthritis

Adult cattle may also develop arthritis. Causes vary and include phosphorus deficiency, trauma and genetics. Cattle with straight leg conformation have undue stress on their joints and are particularly prone to degenerative joint disease.

Phosphorus deficiency can cause arthritis and is generally seen in cattle grazed on poor soils, particularly when grazing dry feed for prolonged periods. These areas are sometimes referred to as 'bone-chewing country' because deficient animals often chew bones to supply missing minerals. Eating old bones is dangerous because it can cause botulism.

Treatment

Little can be done for animals suffering from non-infectious causes of arthritis. Pain from arthritis may be temporarily relieved with drugs in valuable individuals but this is rarely desirable. Prevention is most important.

Prevention

Avoid buying bulls with poor conformation and which have been reared on concentrated diets. Deficiencies can be addressed by supplements. Reduce external factors which may cause traumas, such as slippery surfaces and obstacles in cattle yards.

[Arthritis in Large Animals](#) (in the online Merck Veterinary Manual)

8.5 Blackleg (clostridial myositis)

Blackleg is a rapidly fatal bacterial infection of the muscle that occurs as outbreaks in young cattle. It is the most common of the clostridial diseases. In fact, blackleg is the most common cause of death in calves and weaners on the North Coast. Deaths from blackleg are often seen as an outbreak involving several head in a short period of time. Normally young cattle between 4 months and 2 years are affected. However, it can be seen in calves from 2 months of age and occasionally in mature cattle. The fastest growing, best conditioned animals are more likely to be affected.

The dormant spore is found in the soil and properties with a past history of infection have high burdens of spore. When ingested the spore passes through the intestinal wall and spreads via the blood to muscle tissue. There it lies dormant, as it cannot grow in the presence of oxygen. However, when an animal is bruised the bacteria in the damaged tissue multiply and release toxins. Bruising can occur from yarding, young cattle riding each other or 'play' fighting. These toxins produce a local gas gangrene and make the animal sick.

Usually animals are found dead, but occasionally they are seen alive. In early stages, lameness may be detected before the animal goes down, but because the disease progresses quickly, this is not always seen. A sick or dead animal will have a crackly feel over the affected muscle. When cut, the muscle is dark, has a distinctive sweet smell and lots of gas bubbles. Blackleg can occur in any muscle including the heart and the tongue.

The carcasses of cattle which die with blackleg have many millions of spores which can then lie dormant in the soil for many years.

Treatment

As with all clostridial diseases, advanced cases have a poor prognosis. If cases are identified early, treatment with penicillin at high doses may be successful. However, in most situations the cattle are simply found dead.

Prevention

Blackleg is easily and effectively prevented by vaccination. Vaccinate calves twice, 4 weeks apart, and then give annual boosters. Do not assume that introduced cattle are vaccinated. There are a number of 5 in 1 vaccines available, as well as some other combinations.

[*Blackleg in Cattle*](#) (DPI 2007)

8.6 Bladder stones (urolithiasis)

Steers may develop stones or calculi in the bladder or sheath if given high grain diets. These stones can cause the bladder to rupture due to urine build-up.

Signs

Restlessness and discomfort are seen and the animal will make frequent attempts to urinate. Urine may dribble from the urethra if it is not totally blocked. Often after the bladder or urethra ruptures, the animal seems a bit improved but quickly gets worse and dies of toxemia. Treatment is not usually economic.

Similar signs may be seen with oxalate poisoning on setaria, so speak with your veterinarian.



Prevention

Ensuring the diet is balanced will help limit this problem (particularly calcium:phosphorous ratios). Access to adequate water and dietary additives, such as salt and ammonium chloride, may be necessary.

[Urinary Tract Obstruction](#) (in the online *Veterinary Handbook for Cattle, Sheep and Goats*)

8.7 Bloat

Bloat occurs from gas or foam produced in the rumen, which results in rapid swelling of the abdomen and often death. Bloat usually occurs on lush pastures or high grain diets. This condition is prevalent in years when there is abundant clover. Because it is pasture related, bloat tends to occur as outbreaks, with several cattle affected on the property.

Deaths from bloat can be quite quick as they are caused by asphyxiation (compression of the lungs by the expanding rumen) and compression of the blood supply (again by the expanding rumen).

Bloat can also occur when there is an obstruction from a foreign body, such as a bush lemon, choko or mango (see “[8.14 Choke](#)” on page 127), or when there is a twist of the 4th stomach (displaced abomasum). Bloat can be confused with distension of the rumen with fluid, rather than gas. This occurs with kikuyu poisoning.

Treatment

Moderate cases can be effectively treated with a dose of surfactant, such as bloat oil. Surfactants act by breaking down the foam and can be delivered by drench or stomach tube. Beware of stomach tubing as a dose of surfactant to the lungs instead of the stomach can kill an animal.

Suitable surfactants include:

- 100–200 ml vegetable oil
- 100–200 ml paraffin oil
- 350 ml bloat oil.

Severe cases must be treated immediately. If a veterinarian can not arrive within 10 minutes, the swelling must be relieved with a sharp trocar or other sharp instrument to relieve pressure. Veterinary follow-up is necessary to minimise complications and to provide antibiotics.

Prevention

The risk of frothy bloat can be reduced by the following:

- do not improve the entire pasture but leave some rough fodder around the outside
- do not graze hungry stock on bloaty pasture — feed hay or dry feed to achieve gut fill first
- strip graze questionable pasture after spraying with bloat oil (according to manufacturer’s directions)
- medicate animals to reduce the risk of bloat (for example with bloat blocks, medicated water, feed supplement containing monensin or rumen capsules).

[Bloat in Cattle and Sheep](#) (DPI 2014)

8.8 Botulism

Botulism is a highly fatal flaccid (floppy) paralysis caused by the ingestion of a toxin in food or water. Bacteria *Clostridium botulinum*, which multiply in decomposing animal and vegetable matter in the absence of oxygen, produce the toxin. Often the source of an outbreak is never detected as the organism may grow in stagnant water, feed, old bones or the gut.

Situations in which outbreaks are seen include silage feeding, access to poultry manure dumps, decaying animal or plant material in water sources, and in phosphorus-deficient soils from bone chewing.

Locally, deaths from botulism are a significant cause of death, particularly in the winter months, and nationally it is ranked in the top 10 causes of economic loss to beef producers. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

Cattle with botulism are not the cause of the botulism in humans, which is from eating poorly made processed foods.

Signs

The toxin affects the spinal nerves that control muscles. When first affected, cattle may drool saliva, their tongues may hang out and they may have a stiff gait when walking. They deteriorate rapidly and are soon unable to stand or rise. Often the condition is first noticed when cattle go down with their heads twisted back on their flank.

As the condition worsens, the muscles controlling breathing are affected and respiration becomes more laboured. Most cases die within 1–2 days from respiratory failure. Recovery is very rare.

Treatment

Treatment is unsuccessful.

Diagnosis

The diagnosis of botulism is based on the typical clinical signs and by your veterinarian eliminating other possible causes. There are no typical changes at post-mortem. A test is available for tissues and suspect material. However, as cattle are very sensitive to botulism, the amount of toxin required to cause clinical signs can be so minute that it is usually not detectable in samples.

Prevention

Vaccinate your herd. Large numbers can be lost, so vaccination is strongly recommended particularly in herds in at-risk situations, such as feeding silage, poultry manure application and in phosphorus-deficient areas.

Provide adequate nutrition. Bone chewing is associated with phosphorus and protein deficiencies so provide supplements where necessary. Feed or water contaminated with dead animals and animal faeces may be another source of the disease and should be avoided.

[Botulism in Cattle](#) (DPI 2007)

8.9 Bovine Johne's disease (BJD)

Johne's disease is a chronic wasting disease caused by bacteria *Mycobacterium avium paratuberculosis*. Tuberculosis is caused by related *Mycobacterium* bacteria.

BJD in cattle is caused by a different strain of bacteria from the disease in sheep and the strains rarely cross-infect, so the diseases in cattle and sheep are regarded as separate.

Spread

The cattle Johne's organism is very hardy and can survive up to 12 months on the ground. Animal-to-animal spread within the herd is through faeces and usually occurs at suckling from faecal contamination on the teat. However, any feeding utensil or area contaminated with the BJD bacteria can be a source of infection. Calves are highly susceptible to infection in the first 30 days but can be susceptible up until 12 months of age. Cattle over 12 months of age are considered resistant to picking up infection. Although oral infection is the main method of BJD spread, calves can also be infected in the womb and from milk from infected cows.

The most common method of spread between herds is from an introduced infected animal. Usually these animals will be showing no clinical signs. Spread via flooding or by contaminated vehicles or people are regarded as uncommon methods of spread.

Signs

The Johne's bacteria usually remain dormant in the animal's body till at least 18 months of age. These animals do not show any clinical signs. The incubation period can be as long as 15 years. Eventually the BJD bacteria increase in number and may be detected in the faeces, although the animal will probably still not be sick. This animal is termed a 'shedder'.

After a variable time (usually months) the bowel lining will be damaged and the animal will lose weight and develop a watery scour. These are called 'clinical cases' and the animals eventually die after 3–6 months.

Clinical cases usually have good appetites and are not fevered, but the weight loss and diarrhoea can be severe. BJD spreads slowly within a herd, so very few clinical cases may be seen.

Diagnosis

Clinical cases are easily diagnosed with blood and faecal tests. However, cattle that are infected but not yet showing clinical signs are far more difficult to diagnose, usually requiring slaughter and collection of bowel tissues to determine whether BJD is present.

Growing the organism in cultures is time consuming and takes at least 3–4 months.

Treatment

There is no effective treatment for BJD cases.

Eradication

BJD ceased to be a notifiable disease in mid 2016.

When considering control or eradication the key points are:

- BJD bacteria can survive on the ground for up to 12 months.
- Cattle over 12 months of age are considered resistant to infection.
- Infected cattle do not shed BJD bacteria in their dung till at least 2 years of age.

Where infection is detected in an introduced cow, eradication is usually straight forward if stock that were under 12 months of age at any time from the date of introduction to 12 months after the infected cow left the property, are culled for slaughter.

However, where infection is detected or suspected in home-bred stock, the problem is more difficult because many more animals may be involved. The most reliable method of eradication in these herds is destocking. After the infected herd has been removed, the property needs at least 12 months for the infection on the ground to die out. During this time, short-term rotation of trade stock may occur on the property. Yearling cattle can be grazed for no more than 12 months and then sent for slaughter. At the end of the 12-month destocking period, and removal of any remaining trade stock, the property is considered clean and restocking can commence.

In some situations BJD eradication can be attempted by a test and cull program. However, the blood tests are poor at finding infected animals so at least three clean herd tests at 2 year intervals are needed as well as management changes to stop calves becoming infected.

Prevention

BJD is more common in dairy herds than in beef herds because the stocking rates are higher and calves may be exposed to a higher level of faeces from adult cattle. BJD is uncommon in beef herds on the North Coast. Beef herds with dairy origins, or herds adjoining dairy farms, are at higher risk.

Cattle owners can minimise the risk of introducing BJD by only introducing stock from low-risk sources and by minimising straying of cattle on to the property. If sending calves less than 12 months old to agistment or lease paddocks, restrict any contact with cattle whose BJD status is unknown.

See:

DPI's [Bovine Johne's Disease \(BJD\) in Cattle webpage](#)

Animal Health Australia's [Johne's Disease webpage](#)

8.10 Bovine papular stomatitis (BPS)

This is a mild and self-limiting viral infection in young cattle. It causes small lumps (called papules) which mature to ulcers in the mouth and on the lips and muzzle. The ulcers are shallow, about 15 mm wide and surrounded by a round, red rim. Its main importance is that the lesions can be confused with the **exotic** diseases foot-and-mouth disease and rinderpest. The ulcers in the mouth can also be seen with the mucosal disease form of pestivirus. If you suspect bovine papular stomatitis it is important to contact your veterinarian to have it confirmed.

8.11 Buffalo fly

Buffalo flies are a cattle-biting fly that occur during the warmer months and cause nuisance, allergies, sores and loss of production through less time grazing. The cost of treatment for buffalo fly is also a significant part of a cattle producer's annual animal health budget.

Buffalo fly is ranked the third most important disease for the Australian beef industry. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

They are seen mainly in the warmer months, usually from December to May. However, in the warmer areas of the North Coast, for example the Tweed area, activity may be seen in winter. They entered Australia from Asia in the mid 1800s and have steadily moved south. They were first detected on the North Coast in the late 1970s. They are now firmly established on the North Coast and are now regularly seen on the Mid North Coast and occasionally detected in areas such as the western slopes.

Life cycle

The buffalo fly is a small, dark grey fly about half the size of the common housefly. Like a flying fox, when resting and feeding it has its head facing downwards. It has a short piercing mouthpiece adapted for blood sucking. The adult fly spends most of its life on a beast, only leaving to lay eggs in fresh dung. While on a beast it is very mobile, moving over the body and between animals. Eggs are laid in fresh dung, and hatch and emerge as adults within 9–11 days.

The flies are sensitive to cool weather and are found in only a few areas, mainly on the coast. In milder conditions however, significant populations may survive over winter and rapidly build up in spring. Climate prediction models suggest that buffalo fly may eventually spread as far south as Sydney.

Spread between herds is easy as the flies can travel 10 km in search of a host. Movement of infested stock has also been responsible for the spread of the fly around northern NSW.

Signs

The buffalo fly feeds on blood. It bites the animal's skin then sucks blood from the damaged area. When present in sufficient numbers, buffalo flies cause severe irritation and rubbing, with raw, bleeding areas around the eye and on the neck. Apart from the obvious distress suffered by the animal, there will be loss of productivity. Some animals are allergic to the fly bite and sores may be seen with low fly numbers. Bulls are often found to have the heaviest fly burdens.

Treatment

- Cull animals that appear to be allergic to the flies.
- Start treating only when fly numbers are significant (>200).
- Resistance by the fly to chemicals is becoming a problem so it is important to coordinate treatments with neighbours to maximise the effectiveness of the chemicals.
- Rotate the chemical groups that you use. Don't use organophosphates (OPs) or macrocyclic lactones (MLs or mectins) for more than two seasons in a row. If there is resistance on your farm to synthetic pyrethroids (SPs) these should not be relied upon.
- If using ear tags, consider a rotation system of one year using macrocyclic lactones (ML) tags, then one year using organophosphate (OP) tags. Don't use synthetic pyrethroid (SP) tags for more than one year.
- Observe the withholding periods and export slaughter intervals (ESIs) to ensure undesirable residues do not remain in treated stock.
- Dung beetles can assist in buffalo fly control by burying dung pats. If dung beetles are not active on your property consider introducing some. Summer-active beetles are more likely to have an impact on buffalo fly than winter-active species. They are also great for soil health.

- Cattle back-rubbers are convenient, because the cattle treat themselves. The rubs are slung between posts or trees. Have it hung on a slight angle and at the right height for both adult cattle and calves. When first used, cattle may need to be held in a small paddock with the rub to learn to use it.
- Buffalo flytraps are of use on some farms where cattle have to pass through the trap on a regular basis.

Deciding the best chemical application method

Application method	Advantages	Disadvantages
Ear tag	<ul style="list-style-type: none"> • Effective for up to 16 weeks • Usually only need one application per season • Nil withholding period and ESI for most tags (check the label) 	<ul style="list-style-type: none"> • Labour intensive to apply • Cost of tags • Tags should be removed at the end of the registered use period • Tags should be removed before slaughter • Not removing tags may promote resistance
Spray	<ul style="list-style-type: none"> • Relatively cheap • Treatments can include tick and lice control 	<ul style="list-style-type: none"> • Multiple treatments required throughout season due to short duration of effect • Up to 21 day ESI for some products • Chemicals must be mixed and applied correctly
Pour-on	<ul style="list-style-type: none"> • Easy to apply • Some products treat other parasites e.g. worms, ticks and lice • Macrocyclic lactones (MLs) are good to finish the season on to help avoid chemical resistance 	<ul style="list-style-type: none"> • Long ESI for some products • Repeated treatments required if the sole treatment • Cost
Back-rubbers	<ul style="list-style-type: none"> • Low cost • Cattle treat themselves 	<ul style="list-style-type: none"> • No control over dose per animal • Cattle need to learn to use • 10 day ESI



Chemicals for buffalo fly treatment of cattle

At the time of publication, the following treatments were available for buffalo fly.

Application method	Chemical group	Chemical
Ear tag	Organophosphates	<ul style="list-style-type: none"> • Diazinon • Diazinon & chlorpyrifos • Diazinon & coumaphos
	Synthetic pyrethroids	<ul style="list-style-type: none"> • Zelta cypermethrin & piperonyl butoxide • Beta-cyfluthrin & piperonyl butoxide
Overspray	Macrocyclic lactones	<ul style="list-style-type: none"> • Abamectin • Piperonyl butoxide
	Organophosphates	<ul style="list-style-type: none"> • Chlorfenvinphos
	Synthetic pyrethroids	<ul style="list-style-type: none"> • Cypermethrin • Pyrethrin, piperonyl butoxide & repellants
Backrubber	Organophosphate–synthetic pyrethroids combinations	<ul style="list-style-type: none"> • Deltamethrin & ethion • Cypermethrin & chlorfenvinphos
	Organophosphates	<ul style="list-style-type: none"> • Diazinon • Chlorfenvinphos
Pour-on	Synthetic pyrethroids	<ul style="list-style-type: none"> • Deltamethrin • Zelta cypermethrin • Permethrin
	Macrocyclic lactones	<ul style="list-style-type: none"> • Ivermectin • Doramectin • Eprinomectin • Abamectin • Moxidectin

[Buffalo Flies and their Control](#) (DPI 2007)

[The Cattle Parasite Atlas](#) (MLA 2005)

Dung beetles

The introduction of dung beetles has greatly assisted the control of nuisance flies and buffalo fly. New species have been introduced to extend the climatic and geographical range of the beetles. For further information and dung beetle suppliers see:

[Dung Beetles: Working for you](#) (DPI 2007)

Dung Beetle Australia's website at www.dungbeetle.com.au/

8.12 Calf diphtheria (necrobacillosis)

This is a bacterial infection of the upper throat or, less commonly, the mouth in calves and weaners. It is caused by the bacteria *Fusobacterium necrophorum*, usually secondary to an upper respiratory infection. Affected cattle drool, mouth breath, cough, have difficulty swallowing and foul-smelling breath. They lose condition and may die. Due to the fact that it may resemble some exotic diseases, it is important to contact your veterinarian.

Treatment

Treatment early in the disease with antibiotics is usually successful. See your veterinarian for details. Like any infection in young cattle, immune suppression from pestivirus may be the trigger for this disease, so a pestivirus test should be done.

[Necrotic Laryngitis in Cattle](#) (in the online Merck Veterinary Manual)

8.13 Cancer eye

The disease was common in Herefords in the past. Stud and commercial breeders should be proud of the way selective breeding has greatly reduced the incidence in recent years. Abattoir statistics show that the condition is now at a very low level. Other white faced cattle, including Friesians, are also susceptible.

Signs

Cancer eye occurs on the eyeball, lid or third eyelid. The cancer is usually slow growing and is initially quite small and wart-like. It then grows in size and may spread to the lymph glands under the jaw. Pigmentation of the eyelid and eyeball are genetically related and highly heritable, and 'hooded' eyes are less susceptible to cancer.

Treatment

Surgical treatment is available and early detection and surgery increases success.

In early cases, your veterinarian may scrape and/or freeze the tumour. In later cases, the eye may have to be removed. Early detection is best.

Prevention

Selection for pigmented, hooded eyelids and pigmented eyeballs will reduce the occurrence in a herd. Do not breed replacements from affected or surgically treated cows. Cull susceptible cattle with unpigmented, prominent eyes.

Cattle with lesions that are affecting vision, or lesions that are bleeding, discharging or have an odour, should not be transported or sent to a saleyard or to an abattoir. Even small tumours can be damaged during transport and become unsightly by the time cattle reach their destination.

Even if an animal has even a small cancer eye, check that there are no lumps below the ear. This indicates that there has been metastasis (spread) to the glands and that the animal is at much higher risk of condemnation at the abattoir. Apart from the welfare implications, holding and testing suspect carcasses only to have them condemned, costs the meatworks and the producer money. Likewise,

saleyards and animal welfare authorities take a dim view of cancer eye cattle being presented in a public place.

Cancers that begin in the third eyelid or outer eyelids usually invade the deeper tissues more quickly and should be culled at an early stage. It is critical therefore that cancer eye cases are culled at an early stage, and not left to rear another calf.

[*Is it Fit to Load?*](#) (MLA 2012)

[*Cancer Eye in Cattle*](#) (DPI 2015)

8.14 Choke

Cattle are notorious for attempting to swallow objects that are too large. For this reason, oesophageal foreign bodies are common in cattle. Each winter on the North Coast, cattle are treated for bush lemons caught in the throat. Other causes of obstructions include other citrus, mangoes, chokos and corn cobs. Because they are then unable to swallow saliva, it tends to hang like thick strings from their mouth. If gas cannot pass, then bloating may occur. See your veterinarian for treatment.

[*Esophageal Obstruction in Large Animals*](#) (in the online Merck Veterinary Manual)

8.15 Clostridial diseases

Clostridial diseases are caused by a group of related bacteria which produce harmful toxins. These bacteria are widespread, and may be found in the soil and in the gut of animals, existing in a dormant state (spores) for many years. Disease occurs when the bacteria multiply under favourable conditions and release toxins. This may be in feed in the case of botulism, in muscle tissue in blackleg, in the gut in pulpy kidney, in the liver in black disease, or in a wound in tetanus or malignant oedema.

Blackleg and botulism are common on the North Coast, tetanus and pulpy kidney are sporadic, and black disease and malignant oedema are uncommon. All are prevented by vaccination. See ["8.5 Blackleg \(clostridial myositis\)" on page 118](#), ["8.59 Tetanus" on page 175](#), ["8.52 Pulpy kidney \(enterotoxaemia\)" on page 172](#).

[*Clostridial Diseases in Cattle*](#) (DPI 2007)

8.16 Coccidiosis (black or blood scours)

This is the main common cause of black or blood scours in calves 2–6 months of age. It can also be seen in weaner and sometimes yearling cattle. The protozoa which causes the disease is produced in high numbers in affected calves, causing heavy contamination of paddocks, particularly on cattle camps.

Affected calves have dark or black faeces and are often seen with their tails held up and straining to pass faeces. The straining can be severe enough to cause rectal prolapse. The hair at the base of the tail may be scalded. Diarrhoea may not always be seen, but blood clots and casts in the dung are common.

Occasionally coccidiosis can affect the brain causing nervous coccidiosis, in which calves become depressed, tremor, have convulsions and die. Treatment of nervous coccidiosis is unrewarding.

Treatment and prevention

Sulphonamide antibiotics are effective, but have the potential to cause residues. Toltrazuril as a single oral drench should be given to all calves at the beginning of an outbreak to both treat and to prevent further cases. Sick calves may require oral electrolytes to correct dehydration. An iron supplement may also be needed.

Because of pasture contamination, it is wise to change paddocks in the event of an outbreak.

See MLA's [Coccidiosis webpage](#)

8.17 Colibacillosis (*E. coli* calf scours)

Escherichia coli is a common cause of scours in calves in the first month of life, particularly in the first week. The scour is watery, of rapid onset and usually not accompanied with straining. *E.coli* often follows infection with rotavirus or cryptosporidium, or the gut imbalance that occurs with nutritional scours. Infection is more common in intensively reared calves and in mild, moist conditions.

Treatment

Oral electrolytes to correct dehydration, pH and electrolyte imbalance are important. Severe cases may need fluid therapy by a veterinarian. Antibiotics are often unnecessary and can result in meat residues. If used, always record treatments and identify treated animals. Some cases also benefit from use of natural yoghurt or similar products called probiotics, which assist in the re-establishment of a normal gut flora.

Prevention

For intensively reared calves, ensure calves get colostrum. At least 2 litres is needed within 12 hours of birth, after which time colostrum antibodies cannot be absorbed through the gut wall. If unsure a calf has had colostrum, you can use frozen colostrum which can be stored frozen for up to 12 months. To avoid damaging the antibodies when thawing, don't heat too rapidly.

Cleanliness in calf rearing enterprises is vital. Feed troughs, buckets and pens need to be cleaned regularly and where groups of calves are reared, operate on an 'all in all out' basis with all pens cleaned once the sheds or yards are empty.

For calves on cows, a commercial vaccine against *E. coli* has given good results in some herds. Breeders are vaccinated prior to calving and the immunity is passed to the calf in the colostrum.

For more information on treatment and control see "[7.20 Scours \(diarrhoea\)](#)" on page 109.

[Preventing Calf Scours in Suckler Beef Enterprises](#) (MLA 2006)

[Treating Calf Scours](#) (MLA 2005)

8.18 Congenital diseases

Congenital diseases are those that exist at the time of birth. The signs or symptoms may be present at birth, or more commonly, not be evident until some time later.

The disease or defect can involve only a part of the body (for example locking kneecap) or complete body function (for example mannosidosis). The latter category is obviously more likely to be lethal.

Some congenital diseases are genetic (i.e. inherited from parents) and therefore repeatable while others are due to a specific insult occurring during pregnancy. Chemicals, viral infections, nutritional deficiencies and physical agents are common causes of congenital defects.

If you suspect your stock may have congenital problems, seek veterinary assistance which can be vital if the problem is genetic.

[Congenital Contractural Arachnodyly \(‘fawn calf syndrome’\) in Angus Cattle](#) (EPI 2010)

8.19 Cryptosporidium

This protozoa infection is a common cause of diarrhoea in calves in the first month of life. The scour is pasty through to watery, and yellow to grey. It often occurs with or following rotavirus infection. The disease is a **zoonosis** and can cause diarrhoea in people, particularly children in contact with infected calves.

Treatment

A specific treatment for cryptosporidium is available, halofuginone, available only through your veterinarian, and should be given within the first 24 hours of signs. Before use, it is essential to have had the disease confirmed by your veterinarian. As with other causes of scours, fluid and electrolytes to correct dehydration and general nursing are important.

Prevention

In the event of a confirmed cryptosporidium outbreak, treat all future newborn calves with halofuginone as long as a risk of infection continues to exist. Hygiene in the calf rearing area is critical.

work health safety risk

Personal hygiene, such as hand washing, is important to minimise the risk of human infection.

[Overview of Cryptosporidiosis](#) (in the online Merck Veterinary Manual)

[Cryptosporidia: Communicable diseases factsheet](#) (NSW Health 2012)

8.20 Dermatophilus (‘dermo’ or rain scald)

This skin infection is seen in cattle of any age in humid, moist conditions. It is caused by a bacteria that invades the skin when it is wet for long periods or damaged by ticks or flies, and the bacteria multiplies at these sites.

The affected hair coat has a matted, tufted, ‘dried paint brush’ appearance. It is mainly seen along the backline and around the mouth. Dermo is not itchy. In young calves it can cause the skin to be scalded over a large area and in severe cases calves become debilitated and can die. Occasionally the infection is restricted to the back of the heels.

The disease is treated with antibiotics. Calves with extensive dermo may require fluids, nursing and prolonged treatment with antibiotics. These severe cases are often immune suppressed, for example from pestivirus, and a check should be made to see if the calf is a PI, or persistently infected (see [page 148](#)).

Isolation of affected cattle and disinfection of any grooming equipment will help prevent the spread. Control ticks and flies if these appear to be involved.

work health safety risk

Gloves should be worn when handling affected cattle and hands washed afterward as dermatophilus has the potential to cause a skin infection in people.

[Overview of Dermatophilosis](#) (in the online Merck Veterinary Manual)

8.21 Dog attack

In those areas where wild dogs frequent the North Coast, dog attack is the single most common cause of calf deaths. The range for wild dogs, including dingoes, feral dogs and their hybrids, appears to be increasing. There are several reasons for this, including increased cover due to forestry plantations, tree crops and land infested with tree weeds such as camphor laurel and privet.

Wild dogs also carry *Neospora* (see ["8.44 Neospora abortion" on page 147](#)) and hydatids (see ["8.30 Hydatid disease" on page 135](#)), both significant diseases of cattle on the North Coast. They also threaten native wildlife, compete with native carnivores such as quolls, and kill domestic dogs and cats.

The first signs of the presence of wild dogs are increased restlessness of cattle, wallabies and kangaroos; more flighty cattle bellowing at night; and farm dogs barking at night. Watch out for these signs and wild dog tracks and scats, particularly at calving time.

Local Land Services assist landholders with wild dog control, run training courses, develop management plans and monitor wild dog activity.

For information on treatment see ["8.64 Trauma and injuries" on page 183](#).

[NSW Wild Dog Management Strategy 2012–2015](#) (DPI 2012)

8.22 Enzootic bovine leucosis (EBL)

This virus of cattle rarely causes solid tumours or leukaemia. The importance of the virus is that it became a marketing issue for the dairy industry. To this end it was subject to a successful eradication program in the dairy industry in the 1990s. However, a low prevalence reservoir of the virus may still be present in beef cattle.

To prevent the reintroduction of enzootic bovine leucosis into the dairy industry, it is important that any beef cattle that are introduced into dairy herds be tested negative for evidence of the virus. The test used is an ELISA test which can be conducted on blood or milk samples.

8.23 Flood mud scours (yersinia, yersiniosis)

Flood mud scours is a severe, often fatal scour caused by the bacteria *Yersinia pseudotuberculosis*. It is seen in adult cattle during the winter and early spring months on the North Coast. Because the disease

is driven by seasonal and paddock conditions, it tends to occur as outbreaks and can cause significant losses in affected herds.

The *Yersinia* bacteria require cool temperatures and mud on dry feed, so it is usually seen on low-lying or poorly drained pastures, commonly after flooding (hence the name). Cases also occur as lagoons and dams dry out in winter and cattle enter the mud to feed. However, yersinia can also occur on high ground, particularly when hay around self-feeders is contaminated with mud from cattle feeding.

Adults are usually affected although it is also seen in yearlings. There is often significant stress on the affected animals, both physiological (lactation, pregnancy) and environmental (wet weather, wind). The disease affects all breeds, but Brahmans and their crosses appear to be more susceptible.

Signs

Flood mud scours often occurs as an outbreak, involving several cattle in a herd. Neighbouring properties and others in the immediate district may experience similar pastoral conditions and have outbreaks. Many affected cattle are found dead. If seen early, cattle will be depressed, not eating, drooling saliva and have high temperatures. They then develop a watery, smelly scour occasionally tinged with white casts or blood. Some cattle may linger for a week and have a profuse watery scour and dramatic weight loss.

Treatment

Best results are achieved if treatment is given early using broad-spectrum antibiotics, so consult a veterinarian. Supportive therapy such as electrolytes, antidiarrheal preparations and vitamin injections are helpful.

Prevention

In the event of a flood mud (*yersinia*) outbreak, move the cattle to a fresh paddock. However, this may be difficult as farms with the disease often have no dry areas during the risk period. Careful observation is essential to ensure early treatment of any suspicious cases. If hay around feeders is the problem, remove spilt hay and move the hay ring to a fresh site.

[Yersiniosis in cattle](#) (Kemsley 2006-16)

8.24 Foot-and-mouth disease ***exotic***

Foot-and-mouth disease is exotic, that means that it does not occur in Australia. Of all the diseases that Australia is free of, foot-and-mouth disease poses the greatest threat to our livestock industries and exports. An outbreak would be devastating to our economy and to the livelihoods of livestock producers. It could take considerable time, money and heartache to eradicate should it occur.

Signs

Be on the lookout and report cases of drooling, fever or lameness involving numbers of cattle. In particular, look for blisters or ulcers in the mouth, teats or feet. Contact your Local Land Services district veterinarian or the Emergency Disease Hotline on 1800 675 888. Do not feel as though you are an alarmist. There are several other diseases that can resemble foot-and-mouth disease. Negative results from examinations are important; they demonstrate to our trading partners that we have active in looking for this disease.

Minimise the risk; play your part

Never feed meat, meat products or any food that has been in contact with meat to pigs.

Ensure that overseas visitors who have returned from overseas in the past week do not have contact with livestock (unless it was an foot-and-mouth disease free country). In particular, ensure that their shoes are cleaned.

[Swill Feeding](#) (DPI 2015)

See Farm Biosecurity's [Emergency Animal Disease Responses webpage](#)

See [Emergency Animal Disease webpage](#) (Animal Health Australia 2015)

8.25 Gastrointestinal tract obstruction, impaction & torsion

Foreign matter and feed that can form masses are usually of no consequence, but can sometimes cause obstruction. These tend to be individual animal problems, however, if they are feed-related several cases may be seen in a mob.

Sites include:

- *Oesophagus* (foodpipe). Obstructions with fruit such as bush lemons, mangoes or chokos. See "[8.14 Choke](#)" on page 127.
- *Rumen*. Cattle with access to rubbish (such as cloth, silage wrap and baling twine) can develop a large twisted matt of this material in the rumen. It is surprising what cattle will eat if given the chance. Pet cattle are particularly prone. The long stems of kikuyu in the late autumn or winter months can also cause impaction of the rumen. Calves that have the vice of licking themselves and each other can develop hair balls.
- *Omasum*. Cattle on very dry feed such as setaria or blady grass can develop impaction of the bible (omasum). This is also known as 'dry bible'. Affected cattle lose their appetite, are depressed and have weight loss without diarrhoea. Diagnosis is usually made at autopsy as it may be difficult to identify in the live animal. If you suspect dry bible contact your veterinarian. Treatment is by mineral oil given orally.
- *Intestine*. Some fibrous feeds, particularly onion grass, can become matted together into a hard ball which may lodge in the intestine.

Signs

Cattle with obstruction pass small amounts of faeces and are off their food. They may have signs of abdominal pain (colic) and kick at their flanks. Treatment with paraffin oil may be of benefit if the obstruction is small enough to pass.

Torsions of the stomach (abomasum) or intestine, while common in dairy cattle after calving, are quite rare in pasture-fed adult beef cattle. They can be seen in hand-reared calves. Signs vary according to the site and severity, from reduced appetite, through to acute colic, shock and death.

8.26 Grain poisoning (acidosis)

Sudden introduction of readily fermentable carbohydrate sources such as grains, bread, fruit, molasses etc. can result in severe intestinal upsets. Normal rumen (paunch) pH is neutral to slightly acid (pH 6.5–7). High grain diets can make the rumen far more acidic (pH less than 5.5); this kills rumen microbes causing indigestion. It may also damage the rumen wall, drawing water out of the blood into the rumen and causing dehydration, electrolyte (salt) imbalance and diarrhoea. The rumen damage may allow bacteria to enter the bloodstream, causing fever and abscesses in the liver and elsewhere. Secondary chronic fungal infections of the rumen wall may also occur. Lower down the gut in the 4th stomach (abomasum), ulcers can form causing bleeding into the tract.

Signs

The signs seen depend on the amount of acid produced and rumen wall damage. Mildly affected animals may only show dullness and stop eating, or appear to have sore feet (laminitis). More severely affected animals may show colic (abdominal pain), dehydration and scouring and may go into shock and die quickly. Cattle with gastric ulcers will have black faeces and anaemia (pale gums).

Treatment

The treatment of acidosis in cattle is best carried out under veterinary supervision. If no signs are yet apparent, cattle should be removed from the carbohydrate source and offered hay only. If cattle are showing signs seek immediate veterinary attention.

Recumbent (downer) cattle have a poor outlook even with veterinary care. In the case of very valuable animals, care may include surgery to empty and wash out the rumen, and the administration of intravenous fluids, but the prognosis remains poor.

Chronic fungal rumen infections cause relapses and their outlook is poor.

Prevention

Make sure that stock access to grain stores and standing crops is controlled. Stubble-fed animals should be introduced to some grain before being turned onto stubble paddocks.

For a complete ration, grain content in diet should be increased gradually (see “[5.11.8 Cattle on grain feeding](#)” on page 64) and the cattle monitored closely during this time. If diarrhoea is noticed in a number of animals, the hay content of the diet should be increased.

Feed additives may be included in rations with a high grain content. These include buffers (for example bi-carb of soda, sodium bentonite, lime), salt, ionophore antimicrobial drugs (for example monensin, lasalocid) and selective antibiotics. These act by decreasing either palatability or the production of acid in the stomach.

[Grain Poisoning of Cattle and Sheep](#) (DPI 2006)

[Grain Overload in Ruminants](#) (in the online Merck Veterinary Manual)

8.27 Grass tetany (hypomagnesaemia)

Low blood magnesium levels cause grass tetany or hypomagnesaemia. It ranks as one of the most important diseases in southern NSW, but is usually not common on the North Coast. When seen it is in the cooler, higher elevation areas and on lush pastures (like kikuyu, ryegrass or oats) with little or no legume component. Like milk fever, there is a strong association with high potassium levels in feed from the use of potassium fertilisers.

Hypomagnesaemia is also seen periodically in recently transported cattle when it is called transit tetany or travel sickness.

Affected cattle are found down, showing nervous signs such as muscle twitching, staggers and aggression. This can progress to convulsions and death soon after.

If seen alive, treat with calcium–magnesium injections and the response, if treated early, is good. If it becomes an ongoing problem, supplementation with magnesium is required. CausMag (magnesium oxide) can be used on hay and some producers have had good results with oral magnesium bullets. Magnesium is also available in lick blocks and there are several home recipes available for loose mixes.

[Grass Tetany in Cattle](#) (DPI 2009)

8.28 Hardware disease (wire disease, traumatic reticuloperitonitis)

As ruminants, cattle have the ability to adapt to a wide range of often low nutritive value forage. They also actively seek out minerals found in some soils and in ash. For these reasons it is common for cattle to eat a variety of foreign bodies such as sticks, ropes, bags, wire, nails etc.

Smooth objects cause little problem. However, sharp objects can pierce the 2nd stomach (reticulum) wall and cause a severe infection. Occasionally sharp objects can move forwards from the 2nd stomach and go through the diaphragm, into the chest cavity and pierce the heart sac or heart causing heart failure. These cattle often have bottle jaw and swelling of the sternum, an enlarged jugular vein, weight loss, cough and tire easily when moved.

Some cattle die from perforation of the 2nd stomach leading to peritonitis. This may be seen as swelling of the abdomen with fluid, or just sudden death. In others, adhesions form from the leakage, which localise the damage temporarily but they can cause ill thrift.

Treatment

Treatment is usually futile. Methods of treatment used include confinement on a raised ramp, intensive antibiotic course, magnets given orally and surgical removal of the foreign body.

Prevention

Remove all small sharp objects such as nails or short pieces of wire from areas where cattle graze. Steel belted tyres, when burnt, are a common source of sharp short wire pieces. For this and environmental reasons car tyres should not be burnt. Cut pieces of wire and nails in building materials which are burnt are also a source. Cattle like to lick ash and can easily ingest nails and wire. Cattle can also pick up wire from tyres cut in half and used as feed troughs.

[Traumatic Reticuloperitonitis](#) (in the online Merck Veterinary Manual)



8.29 Heat stress

Heat stress causes production loss through reduced grazing. In extreme cases it can result in deaths. It is highest when there is a combination of high temperature, high humidity and little wind. Some factors that contribute to the problem are obvious, such as dark coat colour, lack of shade, limited access to water, mustering and yarding, and diseases like ephemeral fever (three day sickness). Other less obvious factors that can precipitate heat stress include grain feeding, ergot poisoning, vitamin A or E deficiency (on grain diets), and recumbency (unable to rise) for any reason.

The following signs may be observed, in order of increasing severity of the heat load:

- alignment of the body with the sun
- seeking shade
- refusal to lie down
- reduced food intake
- crowding over the water trough
- splashing the body
- agitation and restlessness
- reduced rumination (cud chewing) or none at all
- grouping to seek shade from other animals
- open-mouth breathing or panting
- excessive salivation
- ataxia (inability to move)
- collapse, convulsions, coma.

8.30 Hydatid disease

Hydatid disease is a significant cause of economic loss to the North Coast beef industry, through condemnations of liver and other offal at abattoirs. It is an important **zoonosis**, with people being infected from farm dogs. Hydatid disease also has significant environmental impacts with some species of wallabies under threat from this disease. A heavy hydatid infection can also cause sickness and death in cattle, with signs depending on the organ affected.

Hydatids are a tapeworm parasite that live in the intestine of the final host; dogs and to a lesser extent foxes. Wild dogs are more likely to be infected than domestic dogs and also carry far higher tapeworm burdens.

The eggs, which are shed in the faeces of dogs, are infective to the intermediate host. These include sheep, goats, cattle, wallabies, kangaroos and humans. In these species cysts are formed in internal organs. If these cysts rupture, multiple cysts are spread through the body, like a cancer.

The main lifecycle for hydatids on the North Coast is a wildlife cycle; with wild dogs the main final host and wallabies and kangaroos the main intermediate hosts.

Control of hydatid disease focuses on wild dog control. A vaccine for cattle is currently being researched.

work health safety risk

To reduce risk of becoming infected with hydatids, always wash your hands after handling dogs, particularly before eating. Treat farm dogs every 3 months for hydatid tapeworms. Keep dogs restrained to reduce risk of their access to dead wallabies or kangaroos. And ensure that dogs do not have access to offal from home killed meat (particularly from sheep and goats).

Charles Sturt University supported by North Coast Local Land Services are currently involved in a hydatids research project, the largest of its type undertaken in Australia

[Hydatids: You, too, can be affected](#) (DPI 2007)

8.31 Ketosis

This is a metabolic disorder of cattle caused by persistent low glucose in the blood. Ketosis causes cattle to quickly mobilise fat reserves, resulting in high ketones in the blood. It occurs soon after calving or less frequently in late pregnancy. Ketosis is more common in dairy than beef cattle. Affected cattle are depressed, lose appetite and weight and have an acetone (ketone) smell on the breath. Some cows may show nervous signs such as aggression or compulsive chewing or licking. Prompt treatment is needed with propylene glycol orally or with calcium–magnesium infusion (this contains glucose) into the vein or under the skin.

[Overview of Ketosis in Cattle](#) (in the online Merck Veterinary Manual)

8.32 Lameness

Lame cattle spend less time grazing and so are less productive. Lame cows are less likely to hold their condition in a dry time and therefore less likely to get back in calf. In bulls, lameness is a significant cause of reduced ability to serve and is a major reason for culling.

There are many causes of lameness in beef cattle. The majority of problems are in the feet and inspection should always start there. This is particularly true in higher rainfall areas such as the North Coast.

[Overview of Lameness in Cattle](#) (in the online Merck Veterinary Manual)

Foot problems

The foot is a confined space. It is bound by the hoof and sole externally and by bone within. Any pressure on the tissues within the foot due to inflammation or infection will result in acute pain. This pain will be intensified by the pressure of weight bearing. So cattle at rest will tend to hold the affected foot off the ground. Cattle will try to take weight off the foot when walking by throwing the head up, in the case of a front foot, or by a shortened step, in the case of a sore hind foot.

The various causes look different and have different treatments (see below). It is important to detect and treat early as these conditions can progress to difficult to treat chronic forms, overgrown claws, abscesses and even arthritis. This may require expensive surgery, aggressive therapy or culling.

Note: Cattle that are unable to bear weight on all four feet are unfit to be trucked to a saleyard or abattoir until the problem is resolved.

Some of the more common types of foot problems are discussed here.

Footrot

Prolonged wet conditions or injury can cause a fissure (crack) in the skin between the digits which allows soil-borne bacteria to invade the soft tissues of the foot.

This causes a sudden and severe lameness from the pain, usually in one foot. The claws appear to be wider apart and the skin above the claw (coronet) is swollen. On lifting the foot there is a foul smell, and a crack or ulcer may be seen. The outer claw of the hind feet is the most common site. Affected cattle are often fevered and lose their appetite. Unless treated, the infection may move up the foot into the joints causing arthritis.

Injectable antibiotics are the best treatment, such as a single dose of long-acting penicillin. When the infection is deeper, a longer course of antibiotics may be needed. Seek veterinary advice.

[Interdigital Phlegmon \(Footrot, Foul in the Foot\) in Cattle](#) (in the online Merck Veterinary Manual)

Strawberry footrot (heel warts)

This is an infection of the heels, at the back and bottom of the foot. In the early stages it is red, moist and swollen (hence the name strawberry footrot). If left untreated the heels can become wart-like or even hairy (heel warts or hairy footwart).

Pain in the heel will cause cattle to attempt to walk on the toe.

Treatment of the early 'strawberry' form is with footrot spray. However, the chronic wart form may require surgery to remove and antibiotics.

[Interdigital Phlegmon \(Footrot, Foul in the Foot\) in Cattle](#) (in the online Merck Veterinary Manual)

Scald (interdigital dermatitis)

This is a superficial infection of the skin between the claws caused by prolonged exposure to wet conditions and mud. Cattle have only mild pain (footsore) with minimal lameness. On inspection the interdigital skin has a water-affected look and a foul smell. One or more feet may be affected. Unlike footrot there is no swelling.

Even though scald is a mild disease, detection and treatment early in the disease is important as it may to progress to footrot or strawberry footrot. Because the infection is superficial, injectable antibiotics are not effective. However, topical treatment with footrot spray or 10 per cent bluestone footbaths are effective.

[Interdigital Dermatitis \(Stable Footrot, Slurry Heel, Scald\) in Cattle](#) (in the online Merck Veterinary Manual)

Foot injuries and sole abscesses

The hooves of cattle bear a lot of weight, and sharp rough objects can bruise the sole, or even pierce it, particularly if the feet are already soft from mud. Cattle that walk on sharp stones or spend a lot of time on concrete are often affected. This can result in haemorrhage into the sole (sole bruise or sole ulcer) or in localised infection of the sole (sole abscess).

Damage to the outer part of the sole can cause separation of the outer wall of the hoof (akin to a lifting fingernail), in which dirt can pack. This is known as white line disease and can lead to an abscess under the hoof wall. It is more common in the outer claw. Both these conditions are very painful.

To treat, the veterinarian will lift the leg and trim and open up the infected area (sole or wall) with a hoof knife to allow drainage, and will give antibiotics for the infection.

[Interdigital Dermatitis \(Stable Footrot, Slurry Heel, Scald\) in Cattle](#) (in the online Merck Veterinary Manual)

Hoof wall cracks

Cattle sometimes develop cracks in the hoof wall as a result of the hoof being overgrown, deformed or too dry. Cracks may also introduce infection into the sensitive area of the hoof and produce lameness. The veterinarian will usually open the crack to stop the crack spreading further. Antibiotics are usually prescribed. In serious or long-standing cases infection may spread to the joint causing arthritis, and more aggressive treatment is needed.

Corrective trimming of overgrown hooves or cracks and drainage of abscesses is a specialist task requiring good restraint, the correct tools and sometimes a local anaesthetic.

[Interdigital Dermatitis \(Stable Footrot, Slurry Heel, Scald\) in Cattle](#) (in the online Merck Veterinary Manual)

Overgrown or malformed hooves

Overgrown or malformed hooves can cause lameness because of the abnormal way weight is borne. They are a sign of either a chronic ongoing lameness from another cause; or they are the result of poor conformation, either too much angle in the pastern or too straight in the leg. Corrective trimming should relieve the problem, at least in the short term.

Interdigital fibromas (corns)

With age, cattle may develop warty growths between the hooves, which if large enough can result in lameness. Often more than one foot is affected. Affected claws may be trimmed around small corns to relieve the pressure. Larger fibromas may need to be cut out surgically. There is some evidence that the condition is inherited, so avoid purchasing bulls with a family history of corns.

[Interdigital Hyperplasia \(Corns\) in Cattle](#) (in the online Merck Veterinary Manual)

Laminitis (founder)

This is from toxins in the bloodstream, secondary to grain poisoning or infections such as pneumonia. Laminitis is mainly seen in cattle on high grain diets (feedlots). All four feet are affected and cattle stand with feet wide apart. They tend to lie down to avoid constant weight bearing. When walking they tend to be stiff and have an arched back.

Taking off grain and feeding roughage will resolve most cases. Prevention is by ensuring cattle are introduced to grain gradually and that additives are included in the ration. Feedlot rations often have additional components to lessen the risk of laminitis occurring. Cattle on high grain diets require a lot of care and it is advisable to discuss the issue with your professional advisor.

[Laminitis in Cattle](#) (in the online Merck Veterinary Manual)

Upper limb problems

Arthritis

The main upper limb problems in cattle are degenerative arthritis of the hip, stifle and hock joints, especially in those cattle with straight leg conformation. Arthritis is a major cause of bulls being culled before their time, so be careful not to buy bulls that are too straight in the hind.

Arthritis of the joints of the feet is usually the result of untreated footrot or abscesses of the foot sole or wall.

Septic arthritis is seen in calves following bacterial infection of the navel. See “8.43 Navel ill or joint ill (infectious arthritis)” on page 147.

[Degenerative Arthropathy in Cattle](#) (in the online Merck Veterinary Manual)

Locking kneecap (‘stringhalt’, patella luxation)

A condition seen in adults in which one or both hind legs will lock in extension when the animal starts to move. This is due to the kneecap slipping off the groove at the end of the thigh bone (femur) and cattle have to shake the leg to try to release it.

In some cases a clicking sound will be heard. It may be mild with infrequent locking occurring or it may be almost continuous. The condition is most commonly seen in cattle with Brahman content and is thought to be hereditary. For this reason, affected stock should not be used for breeding. The condition is easily treated by veterinarians surgically by snipping a small ligament in the knee.

See ABBA’s [Stringhalt in Cattle webpage](#) (Australian Brahman Breeders’ Association Ltd)

Fractures and dislocations

Other upper limb problems include fractures and dislocations; these are usually from trauma. Affected cattle should be destroyed on-farm and not sent to a saleyards or abattoir.

8.33 Leptospirosis

Leptospirosis is an infectious disease that causes abortions, stillbirths and loss of milk production in cattle. It is also a zoonosis, meaning that humans can catch the disease from animals. In humans it causes a serious flu-like disease which may be life-threatening. Most cases of leptospirosis in humans are not from cattle, however, precautions should be taken when in contact with cattle urine.

Two closely related serovars, or types, of the *Leptospira* organism are responsible for disease of cattle and people on the North Coast. These are serovars *L. pomona* and *L. hardjo*. The serovar *hardjo* is most prevalent and is primarily associated with cattle. *Pomona* is primarily associated with pigs and, since pigs and cattle are not often found on the same farm like they used to be, this type is much rarer now.

Signs

Infection can cause abortion or the birth of weak or stillborn calves and may also reduce fertility and result in fever and mastitis (milk drop syndrome). The udder feels soft and flaccid and is not painful to touch. Milk production drops and the milk may appear yellow and clotted, like colostrum.

In general, young animals are more seriously affected than older animals. Calves may become very sick when infected with *pomona*, and develop high fevers and ‘redwater’ (dark coloured urine). This can be fatal.

Spread

Transmission of the organism is from host to host by contact with infected urine, placental fluids and milk. Transmission occurs when infected fluids come in contact with mucous membranes or damaged skin. The organisms enter the body and replicate in many tissues, especially the kidneys and

reproductive tract, and are then shed in urine. Shedding may occur for many months and even years after infection.

The organism can survive in the environment for prolonged periods if conditions are suitable, such as when it is warm and wet, or when the soil is waterlogged. This water can then be a source of infection. Spring and autumn are the most favourable times, but the organisms can last for up to 6 months in the environment.

work health safety risk

Most cases of leptospirosis in humans are *not* from cattle, however, people can become infected when they have contact with cattle urine, body fluids or contaminated water. Dairy farmers, beef producers, veterinarians and anybody else who may have intimate contact with cattle are at risk.

Vaccinating cattle against leptospirosis greatly reduces urine shedding in cattle and therefore reduces the risk to people. There is no human vaccine available.

Avoid urine splashes and cover as much of their skin as possible when handling cattle. Wounds should be well protected with waterproof dressings.

Milk may be contaminated, so all fresh milk for human consumption should be heat treated to kill the organism. See Looking after yourself – “4.1 Zoonoses” on page 27.

Treatment

Affected animals are treated with the appropriate antibiotics. Seek veterinary advice for confirmation of the disease and treatment.

Prevention

- Vaccination is recommended as part of a routine vaccination program. This usually consists of two doses of vaccine, 4 to 6 weeks apart, and then an annual booster. It can be bought in a formulation which includes clostridial vaccines (7 in 1). When threat is high, it may be advisable to vaccinate all cows 4–6 weeks prior to calving to ensure calves receive good maternal protection.
- New introductions into the breeding herd, including bulls, replacement heifers and purchased cows should be vaccinated twice, 4 to 6 weeks apart.

[Leptospirosis in Cattle Herds](#) (DPI 2007)

[Leptospirosis Factsheet](#) (NSW Health 2012)

8.34 Lice

There are two types of lice in cattle:

- biting lice, which cause irritation resulting in cattle rubbing and scratching
- sucking lice, which suck blood and can cause anaemia.

Lice are often present on cattle all year round but only become a problem in winter and spring when cooler conditions allow numbers to increase.



Signs

Heavy infestations of lice irritate cattle and cause them to bite, scratch and rub themselves. Hides can be damaged, as can fences, yards and trees which the cattle rub themselves against. Sure signs of lice are hair on fence posts from rubbing or bark rubbed off trees (obvious with trees with soft bark, such as tallowwood). Lousy cattle look scruffy and may have patches of hair loss and sores on the skin. Often cattle in poor condition for reasons such as sickness, worms or drought will be most severely affected. The effects of lice infestations on growth rates are unclear.

Treatment

Lice are spread by direct contact between cattle, so with clean musters and a re-treatment program, eradication is possible. Ensure that all cattle in the mob are treated (check the label as some products cannot be used on calves). Lice and eggs only survive for a few days off cattle and cannot live on any other animals. Often lice are not seen as a problem until they are in high numbers during winter; if so, treat then. However, it is preferable to treat early in the season, in autumn, to prevent lice numbers building up during the cooler months.

Chemicals for lice control

At the time of publication, the following treatments were available for lice.

Application method	Chemical group	Chemical
Pour-on	Synthetic pyrethroids	<ul style="list-style-type: none"> Deltamethrin
Sprays, back-rubbers or ear tags	organophosphates	<ul style="list-style-type: none"> Actives include: diazinon, maldison, chlorfenvinphos
Sprays	combination synthetic pyrethroid–organophosphate	<ul style="list-style-type: none"> Actives include: cypermethrin and chlorfenvinphos
Pour-on	insect growth regulators	<ul style="list-style-type: none"> Diflubenzuron
Pour-on or injectable	macrocyclic lactones (ML or mectins)	<ul style="list-style-type: none"> Actives include: abamectin, doramectin, eprinomectin, ivermectin, moxidectin

[Cattle Lice](#) (DPI 2015)

See MLA's [Lice webpage](#)

8.35 Listeria (listeriosis)

Listeria is a sporadic disease that can be associated with silage feeding (as can botulism). Affected cattle can show a range of nervous signs, reflecting the part of the brain affected. These may include loss of appetite, inability to eat, head tilt, walking in circles, depression, bellowing or mania. Treatment with antibiotics may be successful early in the disease, so speak with your veterinarian.

Being a nervous disorder of cattle, it is important to exclude mad cow disease (bovine spongiform encephalopathy or BSE). Financial incentives are available for investigations. See [“8.38 Mad cow disease” on page 144](#).

Cattle with listeria are *not* the cause of the listeria in humans which is from eating poorly made processed foods.

[Overview of Listeriosis](#) (in the online Merck Veterinary Manual)

[Listeriosis Factsheet](#) (NSW Health 2012)

8.36 Liver fluke

The cost to the local industry through loss of production, treatment costs and condemnations at the abattoirs makes liver fluke one of the most significant cattle diseases on the North Coast, particularly the far North Coast. Liver fluke infections vary from district to district. For example, the Lismore district has high fluke problems, Casino moderate, in Grafton it occurs in restricted localities, and in the Kempsey district it is quite uncommon.

Whole farms may be affected if poorly drained (for example lower river areas) or only small areas may be affected (for example soaks or springs between ridges). Severity of infection depends on stocking rate and feed availability, as well as snail numbers and contamination in the previous 6–12 months. For example, during dry times cattle may preferentially graze wet soaks for a green pick and acquire quite heavy burdens.

Liver fluke are flat, leaf-shaped worms about 10–15 mm long. The adult fluke live in the bile ducts of the liver and lay eggs that are passed in the faeces. The eggs undergo development within certain snail species before leaving the snails and attaching themselves to pasture as tiny cysts. Once these cysts are eaten during grazing they develop further inside the animal and end up migrating through the liver before entering the bile ducts. The whole process from egg to adult takes at least 3 months.

Liver fluke snails (*Lymnea* species) prefer slow moving (not stagnant) bodies of water (for example soaks, springs and shallow creeks). Liver fluke snails DO NOT live in troughs. The snails found in water troughs belong to a different species and do not carry liver fluke; they are a harmless species. The *Lymnea* snail which carries liver fluke has a very high reproductive rate in wet conditions. When soaks dry up the snails hibernate in the mud, and the young fluke within the snail survives with them. When the season breaks, the snails emerge and pasture contamination resumes.

Signs

Fluke cause poor growth rates, weight loss, anaemia, protein loss (seen as bottle jaw) and death. Fluke are responsible for the high rate of condemned livers in North Coast cattle, the single biggest cause of abattoir offal condemnations and a huge cause of loss to the North Coast beef industry.

Charles Sturt University with support from North Coast Local Land Services are involved in liver fluke research, establishing the actual cost to the North Coast industry. This will be the largest project of its type undertaken in Australia

Black disease is a clostridial disease that occurs when the liver is damaged by migrating liver fluke. Bacteria lodge in the damaged tissue and multiply, producing toxins which cause depression and death within a short time. It is a rare disease on the North Coast. Prevention is with 5 in 1 vaccination.

Confirming infection

The first step in any control program is to confirm the presence of infection. This can be done by blood or faecal analysis or by a post-mortem check. Liver fluke are irregular egg layers and faecal checks need to be interpreted with caution. The blood test for antibodies is a valuable tool and will show exposure to liver fluke in the past 5 months, even if the cattle were treated recently. Liver fluke checks on livers at abattoirs can be made on request. Contact your district veterinarian for details. Many cattle are

unnecessarily treated for liver fluke when it is not on the property, so it is important to know your situation.

Treatment and control

Once liver fluke has been confirmed, a control program will need to be carried out. While adult cattle are susceptible to liver fluke they have some resistance and generally less treatments are needed than in young stock. The number and timing of liver fluke drenches can vary from farm to farm depending on the risk.

- The most important drench is the April/May drench. This should be done on all properties with liver fluke. A drench that kills immature and adult fluke should be used at this time.
- On properties with high or moderate levels of liver fluke, a second drench in August/September is recommended. A drench which kills adult fluke can be used at this time. Use an alternative chemical as a rotation to the autumn treatment.
- Properties that have heavy liver fluke problems should treat a third time in December/January.
- The treatments should be to all stock over 6 months of age (younger if early weaned or if cattle have access to soaks).
- Note that many fluke products on the market now also treat for worms, so that the program should be integrated with worm control. See ["10.4 Internal parasite \(worms and fluke\) programs" on page 202.](#)

Chemicals registered for liver fluke control

Fluke type	Method
Chemical	
Immature and mature fluke:	
Triclabendazole–oxfendazole combination	Oral
Clorsulon–nitroxynil combined with a ML (mectin) worm drench	Injection
Clorsulon–nitroxynil combination	Injection
Mature fluke only:	
Triclabendazole	Oral
Triclabendazole combined with a ML (mectin) worm drench	Oral / Pour-on
Clorsulon combined with a ML (mectin) worm drench	Injection
Albendazole	Oral
Oxyclozanide combined with levamisole	Oral

Drain or fence off high-risk areas

The other important strategy is to reduce the snail population and often liver fluke are only detected in certain mobs on a property associated with grazing particular areas or paddocks. Drainage or fencing to prevent access to the high-risk areas will help alleviate the problem on those properties that have isolated snail-prone areas.

[Liver Fluke: An essay by Dr Joe Boray](#)

[Liver Fluke Disease in Sheep and Cattle](#) (DPI 2007)

[The Cattle Parasite Atlas](#) (MLA 2005)

8.37 Lumpy jaw (actinomycosis or 'actino')

This is a similar infection to wooden tongue but harder to cure because the infection is in the jaw bone. The swelling is hard and involves the jaw bone. The bacteria enter through penetrating grass seeds or sharp feed, or from erupting mature teeth.

Treatment

Antibiotics may provide temporary improvement but rarely achieve a cure. Affected cattle are unlikely to be accepted by the abattoirs and should be destroyed on-farm.

See DPI's [Lumpy Jaw and Wooden Tongue in Cattle webpage](#)

8.38 Mad cow disease (bovine spongiform encephalopathy, BSE) ***exotic***

Mad cow disease does not occur in Australia. It is an **exotic disease**. It is a rare condition that occurs in some overseas countries.

As an exporter of beef, it is important that Australia demonstrates to our trading partners that we have an active surveillance program in place to justify our claim for freedom from this disease. To this end, the Australian government will pay producers to have cattle that meet the following criteria investigated:

- are 30 months of age or more, but less than 9 years of age
- not responsive to any treatment administered, and
- displaying progressive behavioural changes or neurological signs, as listed below, without evidence of infectious disease.

Behavioural changes

- Apprehension, changes in herd hierarchical status, excessive nose or flank licking, excitability, frenzy, head rubbing or pressing, head shyness, hesitation at doors, gates, barriers, persistent kicking when milked, teeth grinding.

Neurological signs

- Abnormal ear position, abnormal head carriage, altered consciousness, staggery gait, blindness, circling, falling, fetlock knuckling, increased sensitivity to sound and touch, decreased sensitivity to sound and touch, moribund without evidence of infection or trauma, paralysis/paresis, recumbency, tremor.

If you ever have cattle that may meet these criteria contact your Local Land Services District Veterinarian or private veterinarian.

Minimise the risk; play your part

To ensure that ruminants (cattle, sheep, goats and deer) are not at risk of picking up mad cow disease (bovine spongiform encephalopathy), there is a nationwide ban on feeding any meat meal or meat-

containing product to these species. Check the label of stock feed before feeding out. Poultry and pig feed may contain meat meal and should not be fed to ruminants. Calves with access to areas where poultry are fed may be at risk.

[TSE Surveillance](#) (DPI 2008)

[Feed Controls: Stopping BSE \(mad cow disease\)](#) (DPI 2007)

8.39 Mange

The most common mange in cattle is chorioptic mange. This is a non-burrowing mite that can initiate an allergic skin reaction, which causes cattle to rub. Signs are scurf and thickening of affected skin. The most common site is the tail base, but mange may spread to the heels, the udder of cows, the scrotum of bulls and along the backline. Treatment is with any of the macrocyclic lactones (MLs or mectins) cattle drenches.

The demodectic mange mite is very common in cattle, however, only a small proportion of cattle show signs. These are small nodules in the skin about 1 cm wide over the back, brisket and flank. They are not itchy. Again treatment is with macrocyclic lactone (ML or mectin) drenches.

[Mange in Cattle](#) (in the online Merck Veterinary Manual)

8.40 Mastitis

Udder infection or mastitis is not as common a problem in beef cows compared with dairy cows. A range of bacteria can cause mastitis and the severity varies. Mild forms may cause heat and pain in one or more quarters and the cow does not allow the calf to feed (see "[Care of the orphan calf](#)" on [page 42](#)). The most serious type is so-called 'black mastitis', seen soon after calving. It is a gangrene that starts in the udder and death can occur quickly. Even in cases that recover, the infected quarter is permanently lost.

Treatment

Early antibiotic treatment is needed. Intra-mammary antibiotics are usually inappropriate for beef cattle for safety reasons. Broad-spectrum injectable antibiotics are the preferred treatment and are preferable to a straight penicillin product, which doesn't work well against most mastitis bacteria. Seek veterinary advice for confirmation of the cause of the mastitis and the appropriate treatment.

[Mastitis in Cattle](#) (in the online Merck Veterinary Manual)

8.41 Metritis (infection of the uterus)

Bacterial infection of the uterus is usually seen within a month of calving. It can be the result of retained membranes, damage to the birth canal from a difficult calving, after a prolapse or from contamination in downer cows. It can also be a complication of vibriosis.

Signs range from infertility, to low grade vaginal discharge, to cows that are fevered and sick. Like all bacterial infections, treatment early with antibiotics is more likely to be successful than delaying

treatment. Recovered cows may be infertile, so should be considered for culling. Speak with your veterinarian.

See:

["8.53 Retained afterbirth" on page 172](#)

["5.9.7 Problems at calving – Dystocia \(difficult birth\)" on page 56](#)

["8.51 Prolapse" on page 171](#)

["7.9 Downer cattle" on page 97](#)

["8.66 Vibriosis" on page 184.](#)

[Metritis and Endometritis in Large Animals](#) (in the online Merck Veterinary Manual)

8.42 Milk fever (hypocalcaemia)

Milk fever, a common condition in dairy cows, is less common in beef cattle. This disease is seen in high-producing, aged cows at calving. Occasionally beef herds have a higher prevalence of milk fever, particularly herds with high dairy content. The condition is caused by low blood calcium as a result of calcium going from the blood to the milk. High milk production places a great demand on calcium reserves.

Milk fever is typically associated with high potassium (K or potash) in pasture, typically in fertilised winter feeds such as ryegrass. Occasionally it is seen in cows grazing setaria, which contains oxalates that bind calcium thus making it unavailable.

Signs

Affected cows are found down after calving and appear tired, weak with slow breathing. They will be cold and often have their head tucked into their side.

Treatment

Calcium borogluconate injection is the recommended treatment and readily available at most rural outlets. These normally give a rapid response and get the cow up and walking. Give the calcium very slowly into the jugular vein over at least 10 minutes or you can affect the heart. It can also be given under the skin.

Prevention

A high calcium diet in the weeks before calving can cause milk fever because it reduces the cow's ability to draw on its own calcium reserves when needed (there is a massive amount of calcium in bone). If calcium supplementation is used to prevent milk fever, it is given just 24 hours before calving and again immediately after calving. High potassium diets and cows with dairy breed and cows in overweight condition are known to predispose to milk fever.

[Parturient Paresis in Cows](#) (in the online Merck Veterinary Manual)

8.43 Navel ill or joint ill (infectious arthritis)

Contamination of the navel soon after birth can lead to an abscess of the umbilicus (navel ill). From there, bacteria can enter the blood stream, lodging in the joints causing swollen infected joints in calves at about 1 month of age (joint ill). The bacteria may lodge locally in the navel, forming an abscess. Treatment with antibiotics needs to be very early if it is to be successful. Seek veterinary advice.

The bacteria can also be transported in the blood (septicaemia) to the brain causing meningitis in young calves, and producing nervous signs. Treatment of these cases is fruitless. These signs can be confused with polio and with lead poisoning, so it is wise to seek veterinary advice.

Navel ill can be more common when cows calve down in paddocks with little grass cover, as contamination of the navel with dirt is more likely. This should be considered when aiming to prevent the problem.

[Arthritis in Large Animals](#) (in the online Merck Veterinary Manual)

8.44 Neospora abortion

Also called protozoan abortion, this disease is the most commonly diagnosed cause of abortion in beef cattle on the North Coast. It is caused by an infectious microscopic parasite called *Neospora caninum*.

The life cycle of *Neospora* involves a carnivorous host and is still not completely understood. Dogs have been confirmed to carry *Neospora* in their gut, but foxes and other carnivores may also carry it.

Infection is introduced into herds when cattle eat feeds contaminated by carnivores' faeces infected with *Neospora*. It can also be introduced with infected cattle. Infection can lie dormant in a cow for many years and probably for life.

If a cow is pregnant, the *Neospora* organism can cross the placenta and infect the foetus. The most common outcome of this is abortion, but calves can also be born alive and infected. Some of these calves die soon after birth with nervous signs, while some suffer no ill effects and can infect their progeny when they get pregnant. Once infection has been introduced into a herd, persistently infected adults can maintain the disease in the herd without contact with the carnivore host of *Neospora*.

Carnivores are infected by eating tissues containing the cysts, such as aborted and dead calves.

Treatment

There is no recommended treatment for infected cows.

Prevention

- Infected cows can be identified by a blood test.
- Prevent dogs and other carnivores from consuming placentas or carcasses that may contain the cysts. Where wild dogs are involved, baiting may be necessary.
- A vaccine is being trialled overseas and may eventually be available here.

[Neospora caninum Infection in Cattle](#) (NSW Agriculture 2004)

8.45 Pestivirus (bovine virus diarrhoea, BVDV, mucosal disease)

Pestivirus infection is a significant cause of economic loss in cattle herds in Australia, including the North Coast. Local surveys have confirmed that about 80 per cent of beef herds have the infection. Nationally, pestivirus is estimated to cost the cattle industry over \$100 million and is ranked the second most important disease after cattle tick. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015)

Pestivirus can cause a wide range of signs depending on their age or stage of pregnancy when cattle are exposed. Signs can include: diarrhoea, chronic wasting, respiratory signs, temporary infertility, foetal defects, stillbirths and immune suppression triggering a wide variety of other diseases. So almost the textbook!

Soon after exposure to pestivirus, cattle have a mild fever and drop in immunity lasting a few weeks. This may go unnoticed. If the infection is during pregnancy it can cause significant losses; how this is seen depends on the age of the foetus.

A foetus exposed to the disease in the first third of pregnancy may be resorbed, aborted, stillborn, malformed or undeveloped. Resorption and abortion will be seen as returns to service after a variable interval. Those calves which survive to term are lifetime carriers of the virus (called PIs for 'persistently infected'). Some may be malformed or are born weak and die. Most PIs have a poor immune system and succumb to a wide range of diseases and die in the first year or two of life. Some develop a syndrome with mouth ulceration and scouring called mucosal disease. Some PIs will grow to adults and appear normal but are lifelong carriers and spread the virus in whatever unfortunate herd they end up in. If they are cows, then all calves that they produce will also be PIs.

A foetus exposed to the disease in mid pregnancy may be malformed but may survive to term. A foetus exposed to the disease in late pregnancy usually develops into a normal calf which has immunity to the virus. Carrier bulls can pass the virus in their semen, resulting in a new round of infection in the herd being started.

Infection reaches a herd in purchased or straying cattle. Other, more rare ways of spread are by sheep, pigs and goats, rectal examination and contaminated needles.

When calves and weaners are exposed to infection, the virus causes a temporary drop in their immune system. These are called TIs, for 'transient infected'. This can make them more susceptible to diseases like scours and pneumonia, particularly if combined with other stresses, such as weaning, sale or trucking. *Mannheimia haemolytica* (MH) pneumonia (formerly known as *Pasteurella*) is the most important cause of sick and dead cattle in feedlots, and pestivirus is often the trigger.

Treatment

Treat to control signs of secondary disease in transient infected calves, such as scouring, dehydration or respiratory signs. Treatment of persistently infected cattle is futile as the disease in them is incurable.

Prevention

Vaccination against pestivirus is recommended. Vaccinating before breeders are joined ensures immunity against the virus at the most sensitive time, during early pregnancy. The vaccine also has a role in young fattening cattle, particularly in preparation for backgrounding for feedlots.

Testing for the virus is used to identify PIs, either by tail hair, ear notch or blood. It is now a requirement for many shows. It is strongly recommended for all bulls. It is also used to check whether pestivirus is responsible for disease problems in calves.

Blood testing for antibody to demonstrate past exposure to pestivirus is used in surveys, for infertility and abortion investigations and to monitor immunity in herds.

Eradication is possible but is costly and involves full herd testing. If the virus is reintroduced into a naïve herd (which can happen easily), this could trigger a costly outbreak of the disease.

Management can be used to maximise the chance a heifer has to exposure to pestivirus before joining, so that she will be immune to the disease once pregnant. This is achieved by mixing groups of weaners or introducing known carriers. However, results using this technique are very unpredictable compared with vaccination.

[Bovine Pestivirus Infection](#) (DPI 2008)

8.46 Pinkeye (blight, infectious keratoconjunctivitis)

Pinkeye is an infection of the surface of the eye and the conjunctiva (whites of the eye) and is spread by flies, dust and long grass. Several bacteria can cause the disease, but the bacteria *Moraxella bovis* is the main cause. Don't underestimate the impact of pinkeye; it reduces growth rates in young cattle and will leave some cattle blind in that eye. It is both a welfare problem and reduces the sale value. While blind, cattle may die by misadventure (accident) and are difficult to muster and handle in the yards.

Cattle with active pinkeye infection should not be transported to the saleyards or to an abattoir. It is a welfare issue for infected cattle and only spreads the infection to others.

Signs

Affected eyes are initially weepy and inflamed and irritated by light. If pinkeye progresses, the eye can become cloudy or even creamy yellow and may ulcerate. Affected eyes usually heal over in several weeks but some may rupture, resulting in permanent blindness. Weeping decreases as the eye heals, although white scars may remain on the eyeball. Infectious bovine rhinotracheitis (IBR) can resemble pinkeye; see ["8.47 Pneumonia"](#) on page 150.

Treatment

Caution: because flies and dust spread pinkeye, mustering and yarding the entire mob for treatment may further spread the problem. Affected calves are blind and at risk of accident or injury, and may be a source of infection for other calves. For this reason, it is preferable if possible to isolate affected calves (with their mothers) in a small, shady paddock or yard that is free of hazards.

Cloxacillin-based antibiotic eye ointments applied every 48 hours are preferred over dusts and sprays, because they stay in the eye longer and are non-irritant. Both eyes should be treated. For advanced cases, a veterinarian may use combined antibiotic and anti-inflammatory injections around the eye. Glue-on eye patches or stitching the lid closed for a time aid in healing and reduce the risk of spread by flies. If the eye abscesses or ruptures a veterinarian may remove the eye.

Prevention

A vaccine is available and covers the main bacteria responsible for pinkeye, *Moraxella bovis*, but may not cover all causes. *Bos indicus* breeds and their crosses are less susceptible to the disease. Cattle with pigment around the eye or a 'hooded eye' are also less susceptible.

Control of flies reduces the rate of spread. Mustering cattle during fly waves may precipitate a pinkeye outbreak. Cattle should not be held in the yards longer than needed.

[Pinkeye in Cattle](#) (DPI 2007)

8.47 Pneumonia

Respiratory infections are common in cattle, particularly in calves and weaners. The incidence can be very high particularly if calves are housed in high concentrations in poorly ventilated sheds. Calves that miss their full feed of colostrum in the first 12 hours of life are at high risk. Pneumonia can also be a big problem when young cattle are introduced for fattening, backgrounding and in feedlots. This is because they are often brought together from different sources and have experienced the stresses of weaning, yarding and transport. Spread occurs readily around self-feeders. Mature cattle can also suffer pneumonia, but it is not as common.

There is often an underlying trigger, such as immune suppression from environmental stress or from pestivirus, so it is important that this is identified (see "[7.19 Respiratory signs](#)" on page 107). Upper respiratory viruses often start the problem. This can progress to bacterial involvement, in particular the bacteria *Mannheimia haemolytica* (MH) pneumonia (formerly known as *Pasteurella*) and *Histophilus* (also known as *Haemophilus*). Severe lung damage such as collapse, abscess and scarring are common outcomes with bacterial involvement.

Signs

Watery eye and nose, fever and noticeably off-colour are the first signs. This progresses to coughing, lethargy, failure to drink and exercise intolerance. If the pneumonia is severe enough, deaths can occur.

Chronic cases from severe lung damage have weight loss, runting and failure to thrive.

Treatment

If you suspect pneumonia, contact your veterinarian. Antibiotics are needed early in the outbreak and need to be continued for at least 3 days. Separate affected stock from healthy ones if possible.

If significant lung damage has occurred, their outlook is not good.

Prevention

- Ensure calves get colostrum. But in most beef herds it is difficult to know whether a calf has suckled soon after birth.
- If rearing calves in sheds or yards, provide shelter and protection from the weather, particularly winds. Watch for poor ventilation.
- With an ongoing problem in calves, consider vaccination of the breeders for *Mannheimia haemolytica* (MH) pneumonia.
- Vaccines are also available for pestivirus and infectious bovine rhinotracheitis (IBR).

- If an ongoing problem in young cattle introduced for fattening or backgrounding, consider vaccination for *Mannheimia haemolytica* (MH) pneumonia, infectious bovine rhinotracheitis (IBR) and pestivirus on arrival as part of induction.
- Speak with your veterinarian about a vaccination program.

[Bacterial Pneumonia in Cattle](#) (in the online Merck Veterinary Manual)

8.48 Poisonings – Chemicals

There is the potential for chemicals in the environment where cattle are grazed. Chemicals such as lead, arsenic and organochlorines (OCs) can sometimes cause death. On some properties, chemicals such as organochlorines may be present at very low levels in the soil. These are not high enough to cause disease, but may accumulate in the tissues to sufficient level to be picked up at the abattoir (see “3.5 Avoiding chemical residues” on page 12). In many cases stockowners are unaware of their existence on the property. Some, such as arsenic, are from burning treated timber; others are persistent chemicals present on the property when purchased. Some are deposited illegally when people dump rubbish, such as batteries, on properties.

Cattle are inquisitive and will eat car batteries, sump oil and ash, and will gain access to chemicals in sheds or dumps. Sometimes poisoning can occur through accidental overdose of chemicals used on stock. It is vital to ensure that all chemicals are securely locked in sheds and that label directions are followed fully when using any farm chemicals. Rubbish dumps on farms should be fenced off to prevent stock access.

Lead poisoning

Lead poisoning occasionally occurs in cattle. Cases are more common in young cattle, as they are more inquisitive and are more susceptible to lead poisoning. Batteries, old sump oil and sump oil-treated timber and lead-based paint and window putty on old farm buildings are the commonest sources. If old timber painted with lead is burnt, the lead is not destroyed by burning. Cattle are attracted to eat the ash and poisoning can result.

Signs

Most cases show nervous signs for less than a day, with convulsions, blindness, tremor and mania. Or they are just found dead. Smaller doses of lead show signs for several days as blindness, dullness, staggering, diarrhoea, loss of appetite and abdominal pain (grinding of teeth and kicking at flank). A number of other conditions such as tetanus and thiamine deficiency cause similar symptoms to lead poisoning so you need a veterinary diagnosis.

If the amount of lead consumed is not high enough to cause signs, residues accumulate in the tissues. For this reason, herds with lead poisoning are quarantined and tested to determine if there are residues present in the herd.

Treatment

Most affected stock will die. There is a specific antidote to lead, however, this is rarely used in beef cattle.

Prevention

- Don't leave sources of lead, such as old paints, batteries and sump oil, anywhere near stock.
- Fence off old buildings and bury any ash from burnt timber.

[Lead Poisoning in Livestock](#) (DPI 2011)

Urea poisoning

Urea is commonly used to provide a source of nitrogen in cattle supplementary feeding programs, as well as being a fertiliser. Urea is highly poisonous in even small amounts. Poisoning can occur from incorrectly mixed supplements. If used in feeds, it should be limited to 3 per cent (and no more than 60 g/head/day) and mixed thoroughly and carefully. Pooling of rain water on the top of urea-containing lick blocks or cattle swallowing whole chunks from the remains of lick blocks can also cause poisoning. Cover or remove urea blocks in wet weather. Cattle eating urea-containing fertiliser is another cause. Urea releases ammonia in the rumen, this is absorbed and poisoned stock can die within 30 minutes of ingestion (see [“Molasses and molasses–urea mixes” on page 86](#)).

Signs

Typical signs are increased respiration rate and salivating, followed by bellowing, teeth grinding, shivering, uncoordinated drunken appearance, aggression, breathing difficulties and convulsions.

Treatment

As the poisoning is rapid, most cattle die before treatment can be given. Give 4–6 litres of vinegar if available as soon as possible, and call your veterinarian immediately .

[Fortified Molasses Mixes for Cattle](#) (DPI 2006)

[Urea Roller Drum Mixes for Cattle](#) (DPI 2006)

Arsenic poisoning

Copper chrome arsenate (CCA)–treated timber also contains arsenic and is widely used in building situations for preserving timber. Arsenic is not biodegradable and will not break down even when burnt. The ash from burnt CCA–treated timber is a source of arsenic poisoning in cattle. Cattle are attracted to ash and will readily eat arsenic. Arsenic compounds were widely used in the past, mainly for cattle tick control but also as weedicides. These have not been used for many years and so poisoning from these sources is now uncommon.

Signs

Arsenic is a highly fatal poison. Affected cattle will often be found dead a short time after ingesting the arsenic. It causes damage to the circulation of the vital organs and haemorrhage into the gastrointestinal tract. If seen alive they will have severe abdominal pain, be tucked up and have dark diarrhoea. This quickly leads to convulsions and death. Less severe cases linger for a few days, stagger, scour and have stupor.

Treatment

Most cases are found dead. The outlook for affected cattle is very poor, and only mild cases may benefit from veterinary treatment. Contact your veterinarian immediately.

Prevention

- Do not burn CCA–treated timber.
- Deny cattle access to where timber was burnt in the past.
- Beware that old banana packing sheds and dip sheds may have arsenic residues.

Organophosphate poisoning

Organophosphate (OP) chemicals are widely used in agriculture for treating lice and buffalo fly infestations in stock and for insect problems in horticulture.

Most organophosphates poisonings are due to overdose. Some organophosphate chemicals become far more toxic when they break down, and cattle are easily poisoned when an out of date chemical is used (particularly if it was stored under hot conditions). Occasionally, poisonings occur when OP treatments are given at the same time as other chemicals. So always check before using any chemical on an animal already treated with OPs. Read the label or seek professional advice.

Signs

Organophosphate poisoned cattle show bellowing, slobbering, contracted pupils, diarrhoea, weakness and incoordination within a short period. Signs can occur very soon after overdose and many affected cattle die.

Treatment

It is important to contact your veterinarian as soon as possible to confirm the poisoning and to commence treatment. Atropine is a highly effective antidote but must be given by injection. Any remaining chemical in the gut can be bound by an absorbent such as activated charcoal or bentonite. The dose for activated charcoal is 500 g per 100 kg body weight given orally as a slurry with 2–4 litres of liquid. Bentonite is much cheaper and more readily available than activated charcoal. The dose rate is 500 g per 100 kg body weight. This should be dissolved in water first, and, because it is thick, about 10 litres of water is needed per 500 g bentonite (50 litres of mix for a 500 kg cow). The bentonite slurry is given by stomach tube.

8.49 Poisonings – Plants

Plant poisonings are a significant problem. Each year many cattle die as a result of plant poisoning. Together with malnutrition, internal and external parasites and blackleg, they are a major cause of sickness and death in cattle on the North Coast.

It is important to recognise the toxic plants on your property and the dangers that some feeds and fodder crops may pose.

Signs, dose and time vary according to the plant. These include:

- eating the plant on a single day could cause death (for example oleander, mother of millions, green cestrum) — these are called acute poisonings
- delay from eating until signs (for example bracken fern)
- long-term exposure is usually needed for disease (for example fireweed) — these are called chronic poisonings.

Acute plant poisonings often involve numbers of cattle, sometimes large numbers. Cattle watch each other eat and learn from each other, so many may take to eating a plant that they have previously ignored or not experienced. Also, if pasture or fodder crop is responsible it may be the dominant or only feed available.

Conditions when cattle are most at risk vary according to the plant involved. These include:

- in the late winter and spring months when cattle are short of feed
- introduced stock that are naïve to the area, particularly inquisitive calves

- hungry stock (for example after yarding or trucking), or sudden change in feed
- when normal routine of stock is disturbed putting them under some stress
- grazing on young, lush, actively growing pasture or fodder crop
- some weeds are more palatable when flowering or about to flower
- when cattle have uncontrolled access to scrub
- in the case of nitrate- or cyanide-prone feed, when there is overcast damp weather.

Treatment

If you suspect a plant poisoning move the cattle off the suspected plant, fodder crop or pasture. If cattle with signs are able to walk, keep them under observation in yards. Feed hay and make sure water is available.

Treatment is dependent on the poisoning and for some there is no treatment. With acute poisonings there may be some toxin remaining in the gut that can be bound using an absorbent such as bentonite or activated charcoal. See organophosphate poisoning (above) for dose rate and directions for use.

For some poisonings such as nitrate, cyanide and gassy bloat, there are specific antidotes.

Prevention

Know the toxic plants on your property and in your area. Regularly check paddocks, particularly along creek banks and the margins of scrub for the presence of known poisonous plants and any new or unknown plant.

Introduce new stock to paddocks known to be clean, as new cattle tend to be most inquisitive whereas home-bred stock will usually know to avoid grazing certain plants.

Introduce cattle gradually onto lush feed or fodder crops. In the afternoon, when they already have a belly full of food, is better than in the morning when they are hungry.

Contact your local district veterinarian about which plants are the commonest causes of stock poisoning in your district as there is considerable variation in types of poisonous plants between localities and even between farms on the North Coast.

There are many plants that can cause poisoning from time to time, including some of our most valuable pasture and fodder crop species. Others are weeds, including some that are declared noxious under the *Noxious Weeds Act 1993*.

See Far North Coast Weeds' [Noxious Weeds Listed by Control Category](#) (FNCW 2014)

North Coast Weeds Advisory Committee: www.northcoastweeds.org.au/

This list is by no means exhaustive. The following plants are commonly responsible for poisoning cattle on the North Coast grouped according to the signs they produce. Further details are then given on the individual plants.

8.49.1 Plant poisonings by signs

Sudden death – heart toxin:

- mother of millions
- oleander
- red and white cotton bush.



Sudden death – liver toxin:

- green cestrum
- poison peach
- Noogoora burr
- blue-green algae.

Pastures and fodder crops that can cause sudden death:

- setaria — from oxalate
- sorghum — from cyanide
- ryegrass, oats, sorghum and brassicas — from nitrate (see [“Nitrate poisoning” on page 167](#))
- ryegrass, oats and other grasses — from grass tetany (see [“8.27 Grass tetany” on page 134](#))
- kikuyu — from kikuyu poisoning.

Photosensitisation (sunburn):

- red lantana
- smart weeds
- ryegrass and sometimes other grasses
- woolly pod vetch (not photosensitisation but very similar).

Haemorrhage:

- bracken fern
- rock fern.

Jaundice (yellows):

- red lantana
- fireweed
- poison peach
- blue-green algae
- zamia (cycad or burrawong).

Diarrhoea, wasting and death:

- fireweed
- black bean.

Bloating:

- gas or frothy bloat; from clovers, lucerne and kikuyu
- from choke; from bush lemons, mangos and chokos
- from excess fluid; from kikuyu poisoning.

Nervous signs and staggers:

- ergot on paspalum
- kikuyu poisoning
- zamia (cycad or burrawong)
- grass trees.

8.49.2 Black bean poisoning

Black bean is a large native rainforest tree usually found near water or in rainforest areas. Black bean seeds fall in large numbers from April to June and the ripe seeds contain a toxin that irritates the gastrointestinal tract. Toxicity occurs with persistent consumption of large numbers of ripe seeds, most likely under drought conditions. Some cattle seem to develop a taste and eat large quantities of the seeds.

Signs:

- green or black from bowel haemorrhage
- frequent urination
- inexperienced young cattle that eat the seed can die suddenly.

Treatment and control:

- Move cattle away from trees.
- Seek veterinary attention; rehydration and absorbent (bentonite or activated charcoal).
- Removing black bean trees is not usually an option because they grow in environmentally sensitive area such as near water and in rainforest.
- Fencing trees off may be the only way to exclude cattle from eating the seed.



Black bean

8.49.3 Blue-green algae (Cyanobacteria)

Blooms can grow on the surfaces of creeks and dams during the summer and autumn if conditions are dry and nutrient levels in water are high. The algal blooms look like green paint slick and are capable of causing sudden cattle death from liver failure. Keep cattle away from suspect water. Water testing can be done to test for presence of the algae.

Signs:

- sudden death (may be as quick as 1 hour after drinking) preceded by weakness, muscle tremors, shortness of breath, paddling, coma and death
- other cattle may take longer to die and are found sick with abdominal pain (colic), diarrhoea, jaundice and photosensitisation.



Blue-green algae

Treatment and control:

- Move cattle off, there is no treatment for sick cattle.
- Algal blooms may be controlled by clearing the water using alum (100 kg/megalitre) or gypsum (50 kg/megalitre).
- The North Coast Regional Algal Coordinating Committee covers the same area as the North Coast Local Land Services and has a media advisory role. For up-to-date information, risk of algae blooms and control, see DPI Water's [North Coast Regional Algal Coordinating Committee webpage](#)

8.49.4 Bracken fern and rock fern

Bracken fern poisoning is a very common plant poisoning on the North Coast. Cattle may eat the new fronds which emerge after slashing, fire or in the spring. This is often at a time when green feed is in short supply in the spring months. At other times when pasture is lush, cattle may graze the mature fronds for fibre. Inexperienced weaners and introduced cattle are the most susceptible. Rock fern causes the same problem, but is less common.

Signs:

Two distinct types of poisoning are seen in cattle. The most common form is from a toxin in bracken fern which damages the bone marrow cells causing a leukaemia-like condition. This often occurs as an outbreak in young stock several weeks after grazing ferns. Deaths result from bleeding from almost anywhere in the body as the blood does not clot properly due to depletion of blood platelets. The white cell count is also low, so secondary infections are common.



Bracken fern

The other form of bracken fern poisoning is bladder tumours in older cattle. The signs of this are red urine and anaemia (very pale gums). This takes many years to develop and is seen as a single animal problem in old cows.

Treatment and control:

- If deaths occur, remove young stock from access to bracken. However, because of the time lag from eating to signs, deaths may continue for several weeks.
- Strategies to reduce bracken include pasture improvement and spraying with metsulfuron.
- Avoid putting cattle on to graze fresh growth after slashing or burning.

[Bracken Fern](#) (DPI 2010)

8.49.5 Brassicas – see ryegrass (nitrate)

Brassicas can cause problems with:

- nitrate (see [“Nitrate poisoning”](#) on page 167).
- photosensitisation (see [“7.17 Photosensitisation \(sunburn\)”](#) on page 106)
- polio (see [“8.50 Polio”](#) on page 171)
- redwater.

8.49.6 Bush lemons, chokos, mangos

These fruit cause obstruction in the oesophagus (food pipe), commonly called choke. Most cattle chew fruit and so most of the time they do not cause a problem. For more details see [“8.14 Choke”](#) on page 127.

Signs:

- if the fruit prevents the release of gas, the rumen will swell with gas resulting in bloat
- if gas is able to pass but food and water are unable to, these animals have signs of extended neck, dehydration and long streams of saliva, they become weak and stagger.

Treatment and control:

- Treatment requires passing a stomach tube, locating the fruit and passing it through into the paunch, using lubricant. This is normally done by a veterinarian.
- Control is by removing or fencing off offending trees, however, another case may not be seen again with that tree.



Bush lemon

8.49.7 Chokos — see bush lemons above

8.49.8 Clovers, lucerne and kikuyu bloat

These cause frothy bloat due to foaming agents in feed which prevent the normal belching of gas.

Clover bloat is the most common cause on the North Coast, particularly in favourable seasons such as a moist spring.

Bloat can also occur on lucerne and on lush pastures, particularly kikuyu, in the early summer. This is true bloat and a distinct syndrome from kikuyu poisoning (see ["Kikuyu poisoning" on page 161](#)).

Signs:

- swelling high on the left hand side, which is tight and feels like a drum
- difficulty breathing, shock and death
- cases are often just found dead.



White clover

Treatment and control:

- Early cases may be treated successfully with bloat oil.
- More severe cases require puncturing the flank — this should be done by someone with experience, preferably a veterinarian.
- Control is by restricted grazing to limit intake of risk pastures.
- Bloat oil in water is also used.
- For further details see section on ["8.7 Bloat" on page 119](#).

[Bloat in Cattle and Sheep](#) (DPI 2014)

8.49.9 Fireweed poisoning

Fireweed is a common weed, but cases of poisoning are not common. It contains a toxin that damages the liver. Many cases are associated with slashing because the cattle are less able to discriminate against the fireweed when the fresh regrowth is mixed with grasses. Fireweed is still toxic when dry and caution should be exercised to see that it is not included when making hay or silage.

Signs:

Chronic poisoning is the most common form:

- from long-term grazing of fireweed, causing accumulative damage to the liver
- affected cattle have ill thrift, scour and strain, fade away and die
- being chronic, deaths are often sporadic rather than being a cluster of cases
- some cattle may have nervous signs due to toxins that are not removed by the liver.

The acute syndrome is seen in two situations:

- Sudden onset of signs in cattle that have grazed fireweed in the past and are then moved onto lush grass.
- Acute poisoning after short-term exposure, particularly in young, naïve and recently introduced cattle. These cattle are jaundiced, may have photosensitisation and die quickly. Because this form is acute, there may be a cluster of cases.

Treatment and control:

- Control should be aimed at fireweed control.
- Avoid overgrazing, particularly during autumn and winter, and maintain a vigorous, dense pasture to outcompete fireweed.
- Use rotational grazing rather than set stocking.
- Oversow pastures in autumn with a winter-active fodder such as ryegrass.
- Minimise the risk of cattle eating the fireweed. Do not use slashing as a means of controlling fireweed and beware of fireweed when making hay or silage.
- Be wary of young or recently introduced stock moving onto fireweed.

[Fireweed: A best practice management guide for Australian landholders](#) (Sindel & Coleman 2012)

See DPI's [Fireweed \(*Senecio madagascariensis*\)](#)

<http://weeds.dpi.nsw.gov.au/Weeds/Details/53>



Flowering fireweed

8.49.10 Grass trees (*Xanthorrhoea*)

The flower stem is the most toxic part of the grass tree. Leaves are not normally eaten as they are very coarse, but cattle may eat the fresh new growth after a fire, when little else is available. There is a lag for up to 3 months after eating to signs.

Signs:

- incoordination in the hindquarter, sideways lurching and fall easily
- have difficulty rising, weight loss and dribble urine
- signs of *Zamia* can be similar.

Treatment and control:

- Move the cattle out of the paddock away from the plant.
- Leave affected individuals in a safe place. Unlike *Zamia* poisoning, most cases of grass tree poisoning will recover in about 2–3 weeks.



Grass tree

8.49.11 Green cestrum

Green cestrum is a very toxic plant that causes death by liver damage. As little as 3 kg will kill adult cattle. Locally common in some areas, particularly along shady watercourses. It is a shrub with clusters of yellow flowers, followed by black berries. Deaths often occur after rain. The plant is more palatable and still toxic after leaves have wilted from spraying or cutting. Night-blooming cestrum is also naturalised and is toxic, and it has white berries.

Signs:

- sudden death — usually found dead
- duration of signs is brief, so sick cattle are rarely seen
- if seen sick, may have scour, be weak and not eating
- abdominal pain (colic), teeth grinding, kicking at flanks
- nervous signs of depression or mania, staggers, convulsions, paralysis and coma.



Green cestrum

Treatment and control:

- There is no treatment for sick cattle.
- Do not tolerate any level of infestation — start an active campaign to control.
- Hard to control —reinfestation is common as fruit is carried by birds.
- Is a declared noxious weed under the *Noxious Weeds Act 1993*. As a Control Class 3 (regionally controlled weed) this plant must be continuously suppressed and destroyed.

[Green cestrum](#) (DPI 2008)



Night cestrum



Kikuyu poisoning

Kikuyu is a very common, productive and normally safe pasture found throughout the North Coast. However, on rare occasions a fungus can grow on it causing a syndrome called 'kikuyu poisoning'. It can also cause gassy bloat (see ["8.7 Bloat" on page 119](#)) when it is lush.

- Poisoning is uncommon and unpredictable.
- Cases occur with lush autumn growth after a dry summer, particularly if fertilised.
- Poisoning is from a fungus that produces a toxin that is concentrated in the stem.
- This fungus is *not* the same fungus that causes kikuyu yellows.

Signs:

- often significant numbers of cattle affected
- bloat, but is due to excess fluid and not gas
- the fungus produces a toxin that irritates the 3rd stomach, causing it to fail to perform its normal job of absorbing fluid — this causes a build-up of water in the rumen
- sham (pretend) drinking, burying nostrils and mouth in the water
- increased breathing, from pressure of the full rumen on the lungs
- depressed and unwilling to move, progressing to staggering, go down and death
- carcasses often have large amount of green rumen fluid from nose or mouth.

Treatment and control:

- If removed from the pasture early in the course of the disease, some cattle will recover. This will also help to prevent further cases.
- Mycotoxin absorbents *may* be of benefit.

8.49.12 Lucerne – see clover bloat

- May also cause photosensitisation (see ["7.17 Photosensitisation \(sunburn\)" on page 106](#))

8.49.13 Mangos – see bush lemon

8.49.14 Mother of millions

Mother of millions is a very toxic plant that causes death by heart failure and irritates the bowels. The plant is capable of killing large numbers of cattle in a short timeframe. Do not tolerate any level of infestation. As little as 2–3 kg can kill adult cattle. It is a succulent plant with clusters of red flowers in June, July and August. Poisoning usually occurs when the plant is in flower. A much higher level of toxin is found in the flower heads, and these are also more attractive to cattle. There are several species with different leaf forms. All have a similar flower, but not all are red.



Mother of millions - flower

Signs:

- sudden death from heart attack
- survivors or those that have eaten less may have black or blood-stained diarrhoea for several days as the toxin is irritant.

Treatment and control:

- Cattle are usually found dead. Absorbents such as activated charcoal or bentonite may help those with the scour.
- Do not tolerate any level of infestation — start an active campaign to control.
- This group are declared noxious weeds under the *Noxious Weeds Act 1993* as a Control Class 4 (locally controlled weeds).

See DPI's [Mother of millions \(*Bryophyllum* species\) webpage](#)



Mother of millions - other leaf forms

8.49.15 Noogoora burr

Only the seeds and the first seed leaves after germinating are toxic. Mature leaves are not toxic. Seed can be washed downstream and poisonings occur after mass germination of seeds on creek flats after rain in spring to early summer. As little as 2 kg can be toxic to young cattle.

Signs:

- sudden death — usually found dead
- duration of signs is brief, so sick cattle rarely seen
- if seen sick, may have scour, be weak and not eating
- abdominal pain (colic), teeth grinding, kicking at flanks
- nervous signs of depression or mania, staggers, convulsions, paralysis and coma.

Treatment and control:

- Look for evidence of seedlings after summer rainfall events.
- Spray any infestations.
- This is a declared noxious weed under the *Noxious Weeds Act 1993* as a Control Class 4 (locally controlled weeds).



Noogoora burr



Noogoora burr seedling



See DPI's Burr - [Noogoora burr \(*Xanthium occidentale*\) webpage](#)

8.49.16 Oats – see ryegrass (in this section)

- May cause nitrate poisoning when lush.
- Can also cause photosensitisation (see "7.17 Photosensitisation (sunburn)" on page 106).

8.49.17 Oleander

An ornamental, flowering plant offering attractive blossoms in hues of white, red and pink. A related oleander with yellow flowers is also toxic. All parts of the plant are toxic. As little as 5–20 leaves will kill adult cattle. Prunings account for most deaths as they are more palatable. Oleander has a similar toxin to mother of millions which damages the heart and irritates the bowels.

Signs:

- sudden death from heart attack
- survivors or those that have eaten less may have black or blood-stained diarrhoea for several days as the toxin is irritant.

Treatment and control:

- There is no treatment for sick cattle.
- Do not tolerate any oleander that cattle may have access to.
- Do not leave Oleander prunings in the paddock.

See DPI's Burr - [Oleander \(*Nerium oleander*\) webpage](#)



Oleander



Yellow oleander

8.49.18 Paspalum ergot poisoning

This is seen occasionally in cattle grazing mature common paspalum (*Paspalum dilatatum*) pastures contaminated with a fungal infection, typically in the late summer and autumn. Other species of paspalum can be involved. Ergots are the fruiting bodies of a fungus that infects the paspalum seed head. Affected seeds are swollen and orange or black in colour. Ergots are not the sticky honey dew, but these can precede the ergot.

Signs:

- signs are worse and are brought on if the cattle are handled or moved
- cattle have a fine muscle tremor, stagger and have a high step
- they may head nod and have an exaggerated response to any noise or disturbance
- if left alone the signs are less and they will usually recover, unless they die from misadventure such as falling into water or in a gully.



Paspalum seed head infected with ergot

Treatment and control:

- Slowly move affected cattle to a safe place, such as yards or a small paddock, to recover.
- Remove the cattle from the paddock and 'top' or slash to remove the seed heads.
- Frequent grazing or topping of pastures prone to ergot infestation during the summer and autumn reduces seed head production and helps control the disease.

8.49.19 Poison peach

Poison peach is a native rainforest pioneer species that is found near edges of scrub. Birds carry the seed and a toxin in the leaves damages the liver in cattle. Look for evidence that stock have browsed the plant, but note that individual plants vary greatly in toxin content. Wallabies and kangaroos may also browse the plant without apparent effects.

Signs:

- sudden death — found dead
- abdominal pain with signs of colic, kicking at flanks teeth grinding
- may be jaundiced (yellows)
- depression or mania, staggers, convulsions, paralysis, coma.



Poison peach

Treatment and control:

- There is no treatment for sick cattle.
- Fence off rainforest areas.
- Control poison peach in those areas that cattle have access to.



8.49.20 Red-headed cotton bush and white cotton bush

These cotton bush are common weeds of pasture, particularly if overgrazed. They are rarely eaten as are very bitter. Only naïve cattle tend to graze on them. They contain a heart toxin.

Signs:

- sudden death from heart attack
- survivors or those that have eaten less may have black or blood-stained diarrhoea for several days as the toxin is irritant.

Treatment and control:

- Cattle are usually found dead. Absorbents such as activated charcoal or bentonite may help those with the scour.
- Beware of allowing new and hungry stock access to areas with cotton bush.
- The presence of cotton bush is a sign of overgrazing and need for pasture improvement.



White cotton bush



Red-headed cotton bush

8.49.21 Red lantana

In the areas where it occurs, red lantana is the most common plant poisoning. Red lantana is worst in the Port Macquarie north to Coffs Harbour and Grafton areas, but is spreading north into much of the Casino and Lismore districts, particularly along waterways. The pink strain is not toxic, has a lighter green leaf and grows in drier areas. Like with many poisonous plants, introduced cattle are more likely to be affected.

Signs:

- photosensitisation (sunburn) and jaundice (yellows)
- reddening, inflammation, swelling and crusting of unpigmented white skin, including muzzle, ears, eyelids, teats and vulva
- stop eating and drinking, become dehydrated and avoid sunlight
- anxious, aggressive and kick at flanks due to pain
- sluggish, weak and depressed in later stages.



Non-toxic pink lantana on left with toxic red lantana on the right

Treatment and control:

- Sick cattle should be kept in the shade and have access to plenty of water. They will require veterinary attention.
- Drench an absorbent to help bind the toxin, such as bentonite or activated charcoal.
- Anti-inflammatory drugs will reduce pain and swelling.
- This is a declared noxious weed under the *Noxious Weeds Act 1993* as a Control Class 4 (locally controlled weeds).

[Lantana](#) (DPI 2008)

8.49.22 Rock fern – see bracken fern

8.49.23 Ryegrass

Ryegrass is generally a very safe pasture, but on occasions it may cause poisoning:

- nitrate poisoning — occasional outbreaks (see nitrate below)
- grass tetany — uncommon
- photosensitisation — uncommon.



Nitrate poisoning

Nitrate poisoning usually occurs on ryegrass, but also on oats, sorghum and brassicas. Plants accumulate nitrate when soil nitrate is high, either from nitrogen fertiliser or following a soybean crop. Cattle deaths from poisoning are more likely after cloudy, wet or cold days because nitrate accumulates in the plant at these times. They are also more common on first grazing and in the early morning. Levels of nitrate are higher in the lower stem than in the leaves. Death is usually after 3 or 4 hours grazing because it takes this long for the nitrate to convert to the toxic form (nitrite) in the rumen and for signs to occur. Nitrate interferes with cattle's ability of the blood to carry oxygen.

Signs:

- usually for a short time; and cattle are usually found dead
- cattle with a lower dose may take up to 1 hour to die
- forced rapid breathing, muscle tremors, paddling, coma then death
- dark chocolate coloured blood
- there is the potential for significant numbers of cattle to die
- cows which survive may abort because the foetus has died
- low doses of nitrate can cause scouring.

Treatment and control:

- There is an antidote, but usually not enough time to treat.
- Give a few days of controlled grazing to allow cattle and the rumen flora to adapt.
- During at-risk times, limit intake by allowing cattle to graze other feed first and graze for no more than 1 hour.
- Graze lightly so that the lower stem is not eaten (nitrate levels are higher in the stems).
- Risk is high for the first grazing of the crop, particularly if lush from nitrogen fertiliser.
- Risk is high if the previous day/s has been overcast, wet or cold.
- Risk is highest in the morning, so preferably graze later in the day.

Cattle grazing pastures with high levels of nitrates gradually adapt to high levels by speeding up the rumen detoxification processes, so the grazing time can be increased without risk.

Grass tetany (hypomagnesaemia); ryegrass, oats and other grasses

Grass tetany is not as common on the North Coast as in southern areas. Seen on lush, actively growing ryegrass, oats or other grasses, usually at higher altitudes.

For more detail see ["8.27 Grass tetany" on page 134](#).

Photosensitisation on ryegrass, oats and pasture species

In some seasons, ryegrass, fodder oats, millet, sorghum, clovers, lucerne, brassicas and some of the more common pasture species can cause mild photosensitisation. This is due to either toxins in fungi on the plant or a rise in plant pigments. It is often associated with periods of overcast weather. For more details see ["7.17 Photosensitisation \(sunburn\)" on page 106](#).

8.49.24 Setaria

Setaria contains oxalate. It is most toxic when short and lush, and this is also the stage of growth when setaria is most nutritious. Setaria has the highest oxalate levels in the autumn months. Some varieties and naturalised setaria are higher in oxalate. Cattle with constant access to setaria have rumen flora that breakdown the oxalate. Poisoning in cattle occurs when they are introduced to setaria for the first time, or when they have been off setaria for more than 2 weeks.

Signs:

Two forms of poisoning are seen in cattle:

- Toxic levels of oxalate bind to blood calcium causing a sudden drop in blood calcium (similar to milk fever, acute hypocalcaemia) which can result in coma and death. This form responds to milk fever treatment (calcium borogluconate).
- The oxalate crystals can damage the body's filter, the kidney, causing sickness and death from kidney failure.

In horses, oxalate binds calcium resulting in chronic calcium deficiency known as 'big head'.

Treatment and control:

- Treat with calcium borogluconate under the skin and oral fluids containing electrolytes.
- Cattle that have not grazed setaria for a 2 weeks or more should be gradually accustomed to lush, potentially hazardous setaria pastures.
- Graze other feed first in the day, and do not feed to hungry animals.
- Give a few days of controlled grazing to allow rumen flora to adapt.

See DPI's [Setaria for coastal pastures webpage](#)

8.49.25 Smartweeds

There are several species on the North Coast and all are found in wet, swampy areas. Smartweeds are usually not toxic. Cases are believed to occur from as yet unidentified seasonal factors, possibly a fungus on the smartweed.

Signs:

- photosensitisation, similar to those for red lantana, but may not be as severe
- has also been associated with liver failure and death.

Treatment and control:

- Unpredictable.
- Move cattle off smartweed areas if alternative grazing available.
- Anti-inflammatory drugs and shade.

[Smartweed \(*Persicaria spp.*\) Poisoning in Cattle](#) (Lugton 2006-16)



Smartweed



8.49.26 Sorghum cyanide

Forage and grain sorghums have improved greatly in recent years with development of lower toxic varieties. Cyanide is the main problem, and also occasionally nitrate or photosensitisation. Cyanide poisoning is caused by cyanide compounds in the leaf. Wild or naturalised sorghum and species such as Johnson grass are more toxic. Higher levels of cyanide are found in the early stages of growth and in stressed plants.

Signs:

- cyanide interferes with the ability of tissues to use oxygen, so duration of signs is can be very short
- deaths can occur within 1 hour of grazing
- if seen sick, are short of breath, staggering, twitching, collapse and die
- dead cattle have bright red blood.

Treatment and control:

- Do not graze cattle on stressed plants or when plants or new shoots are less than 75 cm.
- Graze alternative feed first in the day because cyanide levels are higher in the morning.
- Do not feed to hungry animals.
- Do not make hay from sorghum crops considered unsafe to graze.
- There is an antidote, but time is usually too short to administer.

[Prussic acid poisoning in livestock](#) (DPI 2007)



Grain sorghum

8.49.27 Woolly pod vetch

Cases are seen in the late spring when vetch is in flower and when vetch is more than half the available pasture feed.

Vetch poisoning does not occur when cattle graze vetch for the first time. It seems that some cattle become sensitised after the first graze, so cases are seen when cattle experience vetch for the second or third time.

Signs:

- causes a severe allergic reaction, and the skin is red and itchy
- cattle are fevered, stop eating and may be aggressive
- typically about 5–7 per cent of the mob may be affected
- about two-thirds of cattle with signs will die.

Treatment and control:

- There is no treatment for affected cattle.
- Limit grazing, particularly if woolly pod vetch is the dominant species.

See [DPI's Woolly pod vetch webpage](#)



Woolly pod vetch

8.49.28 Zamia (cycad or burrawong)

The seeds and young fronds appear to be quite palatable and are readily eaten, especially when other feed is scarce; these are also the most toxic parts of the plant. The plants may all flush with new growth after a fire or change in season. Signs occur after eating for generally more than 14 days.

Signs:

Damage to the spinal cord, leading to:

- loose condition in hindquarters
- stiff high step in hind, stagger and drag the hind feet, fall and unable to rise
- signs are similar to grass tree
- the toxin also damages the liver causing jaundice and diarrhoea.



Zamia

Treatment and control:

- Move the cattle out of the paddock away from the plant.
- Affected individuals do not recover (but with grass tree they often do).



8.50 Polio (polioencephalomalacia, PEM)

This is a brain disorder mainly seen in young cattle 6–12 months old and is due to acute thiamine (vitamin B1) deficiency. Ample thiamine is produced by the rumen flora and it is imbalances in the flora that causes this condition. Triggers for this are high grain diets, recent diet change, excess sulphur supplement or sulphur-containing feeds like brassica forages and molasses. *It is in no way related to polio in humans (just the name is the same).*

Signs include staggers, tremors, blindness, head pressing, convulsions and death. If you see these signs call your veterinarian. The age and signs are very similar to lead poisoning, but the treatment is different. Early treatment with thiamine injection usually results in rapid recovery.

[Overview of Polioencephalomalacia](#) (in the online Merck Veterinary Manual)

8.51 Prolapse

A prolapse is where either of the back passages (uterus/vagina or rectum) are turned inside out and protrude from the animal's rear. It is often initiated by straining. As the tissue is exposed to the air it becomes painful, which causes the animal to strain more and so begins a vicious cycle. The different prolapses include:

- vaginal, as seen in pregnant cattle and after calving
- uterine, as seen immediately after calving
- rectal, from severe straining from diarrhoea or sometimes calving.

Vaginal prolapse

Vaginal prolapses are quite common, especially in *Bos indicus* cattle due to their loose conformation around the back passage. They are more common in mature cattle than heifers. Prolapse of the vagina is more common in overweight cattle and is seen more in some seasons than others. Cases are seen both before and after calving. Prolapses after calving can involve the entire uterus and need immediate attention.

Treatment

If it is only mild and comes and goes, no treatment should be required. Keep an eye on the cow until calving to ensure that it doesn't get worse. With prolapses that stay out, the tissues can dry out and are in danger of infection. These cows are seen straining. It is important to contact your veterinarian to replace the prolapse and suture it in place. It is advisable to cull these cows as the condition is likely to recur in future pregnancies.

Uterine prolapse

The whole of the uterus turns inside out and hangs outside the cow, just after calving. They are an emergency and replacement as soon as possible is required.

Treatment

This is a veterinary procedure. Call your veterinarian immediately. While waiting for the veterinarian to arrive, the cow should be quietly yarded, avoiding any running which could result in severe

haemorrhage. If a delay is anticipated, sugar sprinkled on the womb absorbs moisture reducing the size of it. A truss made of hessian bags can be used to keep the womb out of the dirt. The veterinarian will return the prolapse and may stitch the vulva closed till the uterus shrinks back to normal size and help stop the cow pushing the womb out again. Antibiotics are usually prescribed. Consider culling the cow and not keeping for future pregnancies. If you choose not to treat, it is important to destroy the cow immediately.

Rectal prolapse

Is usually from straining associated with diarrhoea (particularly coccidiosis in young cattle) or with calving. The tissue swells initially and is red, but soon dries and turns dark. Treatment should be prompt. Once the tissue has dried or died the outlook is not good.

8.52 Pulpy kidney (enterotoxaemia)

Pulpy kidney disease is also called enterotoxaemia, meaning a toxin from the gut. It occurs when animals are moved onto rich pasture such as cereals, ryegrass or lucerne or are introduced to concentrates such as feedlot rations. This is favourable to the growth of the bacteria, which multiply in the intestines and produce toxins. The toxins are so potent they can kill an animal within 5–6 hours. If seen alive, they may have convulsions, kick at their flanks or froth at the mouth. Animals are usually found dead and bloated on their side. It is most common in good condition weaners and yearlings. In calves, a strain of pulpy kidney is seen occasionally which causes a rapidly fatal, bloody diarrhoea.

Treatment

The onset of the disease is too rapid to treat.

Prevention

Pulpy kidney is covered by 5 in 1 clostridial vaccine. However, under high challenge, such as grain feeding or grazing legume pastures, boosters may need to be as frequent as every 3 months. The rule is: if young cattle are moving onto lush feed or grain and have not had a 5 in 1 booster in the past 3 months, then give them a booster. The haemorrhagic form which occurs in calves is prevented by an 8 in 1 clostridial vaccine.

[Enterotoxaemia in Cattle](#) (DPI 2007)

8.53 Retained afterbirth (placenta or membranes)

During pregnancy the foetal membranes provide the necessary nourishment to the developing calf. They are attached to the inside wall of the uterus by cotyledons (buttons) which are rich in blood vessels and are where nutrient exchange happens. These normally come away at birth. If cows fail to release the membranes by about 24 hours after calving, they are said to be retained. For the buttons to release and the membranes come away requires the buttons to lyse (rot). This takes about 4 days.

The condition is more common in dry periods, possibly associated with the low vitamin A or E levels that occur when it is dry. Low selenium levels are also said to be associated with higher than normal rates of retained membranes. Cows that have a difficult birth, abort or are induced to calve early are more likely to retain their membranes.

Signs

Most cows with retained membranes do not show any signs of illness, and expel the membranes by themselves within 5–10 days. However, some can develop a local infection in the uterus (metritis) and some may develop blood poisoning and become sick. These cows are more likely to have reduced fertility.

Treatment

Trim membranes at the level of the vulva a few days after calving. Do not attempt to remove the membranes within 4 days of calving. By then the attachments should have lysed and the membranes come away without damage. A gentle tug may be applied to see if the membranes will come away easily. Do not use force as this may cause tearing of the uterus and haemorrhage. Observe the animal daily for signs of illness. If she appears ill, call your veterinarian. On recovery and when the withholding period and export slaughter interval (ESI) for any treatments have expired, consider culling the cow. Alternatively have her checked before next joining to see whether further treatment is needed.

Prevention

Little can be done to prevent retained afterbirth. In some herds with a higher than normal incidence of retained membranes, a vitamin E injection (usually as a combined vitamin A, D and E injection) or selenium supplementation has reduced the incidence of retained foetal membranes.

[Retained Fetal Membranes in Cows](#) (in the online Merck Veterinary Manual)

8.54 Ringworm (dermatomycosis)

Ringworm is a fungal infection and is very common in young cattle. Affected calves have thick raised circular areas of hair loss anywhere on the body, but usually around the eyes. Unlike mange and lice, ringworm is not particularly itchy. The condition is highly contagious between calves, but often clears up in 2–3 months. It can be spread by calves licking each other, rubbing on posts or trees, from grooming equipment and around self-feeders. It is more prevalent in hot humid weather.

Most calves will self-cure in a few months. However, treatment may hasten recovery and also reduce environmental contamination. Most antifungal creams and tablets are not economically viable to use in stock. Iodine is the most widely used product and white petroleum jelly may also be effective. Your veterinarian will be able to recommend the best product for your situation.

In studs and cattle being prepared for show, isolation of affected individuals will help stop the spread. Any equipment used for clipping or grooming should be treated as the ringworm spore survives a long time.

Calves with extensive ringworm, particularly if it persists, may have a suppressed immune system and should be tested for pestivirus.

work health safety risk

Care should be taken in handling calves with ringworm as it is contagious to humans.

[Zoonoses: Animal diseases transmissible to humans](#) (DPI 2015)

8.55 Rotavirus

Rotavirus is the single most common cause of scours in young calves in the first 2 weeks of life. The scour is of sudden onset, watery, often white or yellow and sometimes frothy. It is usually not fatal, but can predispose to cryptosporidium or *E. coli* scours.

Treatment

Being a virus, there is no specific treatment and antibiotics are of little value. Treatment is based on replacing lost fluids and electrolytes and general nursing, see “8.17 Colibacillosis (*E. coli* calf scours)” on page 128.

Prevention

A vaccine is available and may be of use in herds with an ongoing problem. Speak with your veterinarian.

8.56 Salmonella (salmonellosis)

This is the main cause of blood or black scours in very young calves. In calves older than 2 months, coccidiosis is the main cause.

Salmonella is also a cause of fever and acute onset scouring in adult cattle.

There are several types of *Salmonella*. Some live in the intestine of normal cattle and only become a problem when the immune system is depressed from insufficient colostrum, stress, transport or other diseases. Others are spread in the faeces of wild birds or rodents. Self-feeders can attract birds and rats and be a source of infection. Chicken litter on pasture can also be a source.

Affected cattle often have high temperatures and can die quickly from septicaemia, dehydration and electrolyte imbalance. In pregnant cows the fever may be high enough to cause abortion.

Diagnosis of salmonella is by culture of the faeces. Testing is important as other diseases that cause scouring, like flood mud scours (*yersinia*) and brown stomach worm, are similar. So seek veterinary advice.

Treatment involves correction of fluid imbalance, general nursing and appropriate antibiotic therapy.

A vaccine is available for herds that have ongoing problems with salmonella and on the advice from your veterinarian. The cows are vaccinated and the immunity passed through the colostrum to calves.

work health safety risk

All strains of *Salmonella* are infectious to humans. Wear gloves when handling cattle with diarrhoea.

8.57 Snakebite

Many sudden deaths in cattle are falsely blamed on snakebites. Unlike with farm dogs, snakebite in cattle is *rare*. However, deaths from eastern brown, red-bellied black and tiger snakebites have been recorded in cattle. Of these, eastern brown snake is the most common.

The signs of snakebite are quite variable depending on the snake species and the dose of venom. Laboured breathing, bloody urine, weakness, paralysis and slobbering are some of the typical signs. In many cases, stock are found dead. Often there is failure of the blood to clot. Antivenom is not economical to use in cattle.

Because many deaths attributed to snakes are usually another cause (and sometimes an important and preventable condition), have the death investigated.

8.58 Stomach fluke

Stomach fluke are very widespread, but the greatest problems are seen in the coastal floodplains. The immature fluke cause the most problems. Light to moderate burdens of adult stomach fluke are considered harmless, however, very heavy burdens can cause disease. Infection is picked up from snails, as with liver fluke, but it is a different species of snail. The stomach fluke snails occur in a wider range of habitats than liver fluke snails. The snails are quite small and difficult to find. Weaners, yearlings and introduced stock are the groups most commonly affected, although adult cattle under nutritional stress can also be affected.

Most problems are seen during winter and early spring, following autumn rains. In herds where stomach fluke causes significant problems, avoid grazing contaminated pastures during high-risk periods (winter, early spring). Pastures need at least 2 months of waterlogging to be regarded as contaminated. The longer the period of waterlogging, the greater the contamination.

Signs

Immature stomach fluke cause damage as they feed in the small intestine. With low numbers, ill thrift and poor weight gains result; but with larger numbers, diarrhoea, wasting and bottle jaw occurs. Emaciation, dehydration and death are common in severe cases.

As they mature, stomach fluke move upstream to the 1st and 2nd stomach. There the adults usually cause little damage, but initiate immunity which limits reinfection in the small intestine. So most cattle develop immunity after exposure. In areas such as the lower Clarence and lower Richmond, very heavy infections of mature stomach fluke can occur and contribute to ill thrift.

Treatment

There are currently no products registered for control of stomach fluke. Your veterinarian should be contacted for advice on possible treatments for animals affected by stomach fluke. Drenching stock that already have adult stomach fluke (and hence eggs in the faeces) is often both unnecessary and counterproductive. When the adults are removed, immunity is quickly lost and cattle, particularly young stock, can become susceptible to reinfection with larvae. Seek veterinary advice before treating.

[*Stomach Fluke \(Paramphistomes\) in Ruminants*](#) (DPI 2007)

8.59 Tetanus

Tetanus is caused by a clostridial bacteria that grows deep in tissue. The tetanus spore enters the body by penetrating wounds, during calving or surgery such as castration or dehorning. The bacteria then multiply, producing a toxin that affects the nervous system. Symptoms include muscular stiffness,

lockjaw, an arched back, a cocked tail, convulsions and a sleepy third eyelid. Eventually an animal may go down and die of asphyxiation.

Tetanus can affect cattle of any age, but only occurs sporadically.

If treated early, some animals can recover with veterinary treatment with antibiotics, muscle relaxants and antitoxin. 5 in 1 vaccination is very effective in preventing tetanus.

8.60 Theileria (bovine anaemia due to *Theileria orientalis* group)

Theileria is an emerging disease on the North Coast, with more cases being seen each year. It is caused by a group of *Theileria* strains referred to as the '*Theileria orientalis* group'. (There are other strains of *Theileria*, which occur in Africa and some other countries that do not occur in Australia and these are **exotic diseases**).

The disease is seen at two distinct ages: in adult cattle, and in calves 2–4 months of age.

- Theileria in adult cattle is seen in cattle introduced to the North Coast from western or southern areas, particularly if they are in late pregnancy. If these cattle have not been previously exposed to the *Theileria* parasite they will be naïve to the disease. Exposure to bush ticks and the *Theileria* parasite often occurs soon after arrival. The disease has an incubation period of 5–6 weeks and so signs are usually seen from this time.
- However, in recent years theileria is being seen increasingly in locally born calves 2–4 months of age. The reasons why some calves develop disease when their mothers are immune is still not fully understood.

Theileria is now considered an expensive and important disease to the Australian beef industry and its range and importance is increasing. See:

[Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015)

[Assessing the Economic Cost of Endemic Disease on the Profitability of Australian Beef Cattle and Sheep Producers](#) (MLA 2006)

Theileria are protozoan blood parasites carried by ticks. When a tick feeds on cattle, the parasite passes into their bloodstream and then into their red blood cells. Once this occurs, it causes cell destruction and the subsequent signs that are seen in the disease reflect the extreme anaemia that occurs.

Signs

In adults introduced to the North Coast, signs are seen from 5 weeks after arrival. Signs include anaemia (pale gums), jaundice (yellows), sometimes red stained urine, lethargy, decreased and sometimes depraved appetite and the affected cattle being at the back of the herd. This may progress to heavy breathing, collapse and even sudden death. If pregnant cows are infected with *Theileria*, they can have abortions, stillbirths, decreased milk production and higher mortality rates than non-pregnant cattle.

Calves with theileria have very white gums, are weak, often have a depraved appetite (particularly for mud) and usually die. Calves that survive longer may become jaundiced.

Treatment

There is currently no registered treatment. Your veterinarian will have drugs that may be effective in treating mild cases of theileria. Severely affected cattle may not respond to this treatment. Blood transfusion has been used with success to save valuable cattle.

Prevention

There is currently no vaccine available for theileria. However, the main recommendations for prevention include:

- Assess risk and decide if you should or should not introduce cattle from southern and western areas. Speak with veterinarians from the district you plan to buy from to find out whether cattle from that area are likely to be immune to theileria.
- Avoid movement of heifers and cows in late pregnancy into the area.
- Reduce bush tick burdens, especially on valuable introduced animals. However, because almost every bush tick carries *Theileria* and bush ticks are so common, treatment for ticks may only defer the onset of signs.

[Bovine Anaemia Caused by Theileria orientalis Group](#) (DPI 2011)

8.61 Three day sickness (bovine ephemeral fever, BEF)

Three day sickness is a viral disease seen as regional outbreaks of fever and muscle soreness in cattle. It is spread by mosquitoes, and possibly midges, and so occurs in the summer–autumn period when environmental conditions are most favourable for insect migration.

Outbreaks on the North Coast are usually preceded by outbreaks in Queensland and reflect the seasonal movements of the insect vectors. However, the variability in wind patterns can mean that insect vectors are distributed in an uneven manner and outbreaks of the disease can be quite patchy and whole areas may remain unaffected. There have been outbreaks in the Hunter Valley that have preceded North Coast outbreaks.

The level of infection varies from year to year; in some seasons there are no or few cases, which allows a build-up in the number of at-risk cattle. Heifers and bulls are the group most at risk but all ages of stock can be affected, particularly if there were few or no cases in the previous year/s. Recovered animals usually have lifelong immunity.

Three day sickness is in the top 10 most important diseases for the Australian beef industry. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

Signs

Generally, three day sickness is seen in cattle over 6 months of age. Affected animals are fevered (over 40.0°C), drool, have drooped ears, and are lame, stiff or reluctant to move from muscle and joint pain. The severity and duration of the condition can vary from animal to animal. The majority of cattle recover within 3 days without going down. Bulls and heavy cattle tend to be worse affected and stay down for longer. Many bulls are infertile for 3–6 months due to the fever, and some are never able to serve again due to complications of being down. Some cattle are down for long periods and some are not able to rise due to spinal cord damage suspected to be from the virus. Some cattle die, usually from complications of being down, from misadventure or from heat stress.

Cattle that are affected with three day sickness, or have recently recovered, should not be sent to the saleyards or an abattoir. There may be residual muscle and ligament damage that could result in carcass downgrade.

Treatment

Most cases recover in a short period without treatment. Treatment will, however, reduce the severity of the symptoms and hasten recovery. Anti-inflammatory drugs reduce the fever and stiffness, while calcium injections help restore muscle function. Water and shade should always be available to prevent dehydration.

Prevention

A live virus vaccine is available from veterinarians and gives protection against three day sickness. Two doses of vaccine, 2–4 weeks apart are needed initially with yearly boosters.

Vaccination is best carried out in spring before the summer–autumn risk period.

See DPI's [Bovine Ephemeral Fever: Three day sickness webpage](#)

8.62 Tick fever (redwater fever, babesia, anaplasma)

Tick fever is the name given to diseases caused by any one of three blood parasites — *Babesia bovis*, *Babesia bigemina*, *Anaplasma* — transmitted by cattle ticks (*Boophilus* as shown over).

Before any tick control program was commenced on the North Coast tick fever caused significant losses, but in recent years there have only been sporadic outbreaks.

However, North Coast cattle, unlike Queensland cattle, have no immunity to tick fever because they are rarely exposed to cattle tick which transmits the organisms.

Signs

The signs are variable but high fever and red urine (redwater) are commonly seen. The animals are often anaemic and may be yellow (jaundiced). Abortion and aggression can also be seen. Some stock may be found dead while others may just be slow to keep up with the mob. If you see these signs it is important to notify your district veterinarian. Tick fever is a **notifiable disease**.

Treatment

There are specific drugs available from veterinarians for tick fever treatment.

Prevention




To get tick fever you need cattle tick, so make sure your stock are free of cattle tick. For valuable stock, a live vaccine is available and widely used in Queensland. Brahman type cattle have greater resistance to ticks and tick fever.

[Tick Fever](#) (DPI 2006)

8.63 Ticks

Three species of ticks are problems for North Coast beef cattle.

Identifying ticks

Bush tick (<i>Haemophysalis</i>)	Paralysis tick (<i>Ixodes</i>)	Cattle tick (<i>Boophilus</i>)
		
Brown not engorged	Grey not engorged	Light brown not engorged
Legs: <ul style="list-style-type: none"> • red-brown • 1st pair close to snout 	Legs: <ul style="list-style-type: none"> • 1st & 4th pair brown • 2nd & 3rd pair pale • 1st pair close to snout 	Legs: <ul style="list-style-type: none"> • pale cream • 1st pair well back from snout
Face round	Face triangular	Face broad at snout
Snout short	Snout very long	Snout short

[Three Ticks of Concern to NSW Stockowners](#) (DPI 2006)

Control programs

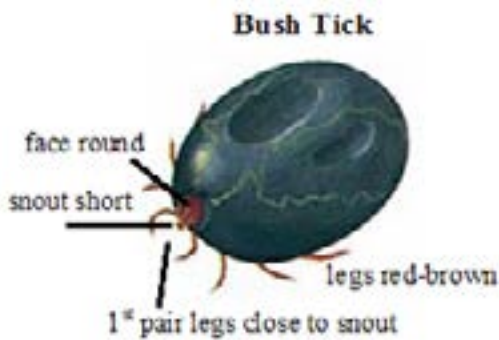
These vary according to the species of tick. Cattle tick differ from the other two species as they are a single host tick. That means that all three stages — larvae, nymphs and adults — stay on cattle between moults. This makes less frequent treatments effective, so 3-weekly treatments are typical. Cattle tick control is regulated in NSW by Department of Primary Industries.

Bush and paralysis ticks fall off their host to moult and so will live on three different hosts during their life. So they are called three-host ticks. Spray treatments for these are typically needed every 10 days. To avoid problems with these two ticks, avoid putting susceptible calves into tick prone areas (such as scrub or long grass).

8.63.1 Bush tick (bottle tick, *Haemophysalis*)

This tick is the most common and can live on a wide variety of hosts including many native animals. They can be present in large numbers. Peak numbers are usually seen between October and February. Bush ticks have only a short period of about one week on their host before they moult and drop off. Most of their life is spent in the environment, making control difficult. The three moults are spent on three different animals.

To identify



Signs

Bush ticks are bloodsuckers and when present in high numbers can cause anaemia, ill thrift and even death. Bush ticks are also suspected to be the vector of *Theileria*.

Control

If heavily infested, treatment with a chemical registered for bush tick will alleviate the problem. Newly introduced animals, especially valuable bulls from outside the region, should have frequent treatment against bush ticks to reduce the chance of theileria.

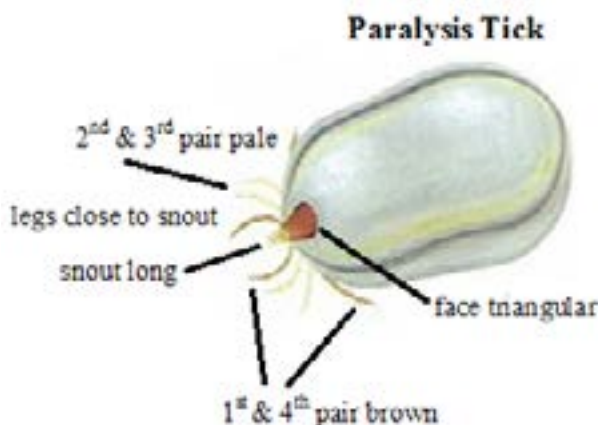
Most of the treatments are the same as for paralysis tick control (see below).

8.63.2 Paralysis tick (dog tick, shell back tick, *Ixodes*)

On the North Coast, paralysis ticks are suspected to kill more calves each year than any other cause. The toxins in tick saliva and their potency vary between individual paralysis ticks. Even one tick can cause sickness and death in calves.

This native tick lives mainly on bandicoots and other marsupials but can infest cattle and other animals including people. Like the bush tick, the paralysis tick is a three-host tick and only spends about 1 week on each host. The majority of the tick's life is spent on the ground. It can be present all-year-round but adults are most active from August to December. Paralysis ticks produce a nerve toxin in their saliva that is passed to the host during feeding. This toxin impairs normal muscle function and raises lung blood pressure.

To identify





Signs

Calves will usually be found down or, if mildly affected, be staggering. As the toxin starts to affect the heart and breathing muscles, breathing becomes laboured and eventually the calf can die. Introduced animals are more at risk. Losses in older stock are sometimes seen where high numbers of ticks are on the animal, particularly if the stock have not been exposed to paralysis ticks previously.

Treatment for calves affected with paralysis

Examine the calf and remove all paralysis ticks. They tend to burrow deeply into the skin. You need to look in the ears and nose and around the tail. Often only a single tick will be found. Remove the tick by grasping as close to the point of attachment as possible. Often treatment with an antitoxin is required to counteract the nerve toxin. This antitoxin is injected and administered by veterinarians. Because ticks are often hard to find it is wise to also give a registered tick product.

Control

Control of paralysis tick is difficult because:

- they are only attached on the animal for about 1 week
- they can survive up to 9 months on the ground
- there is a reservoir in native animals
- peak tick activity coincides with normal calving time
- current spray chemicals are short-acting and difficult to apply.

[Paralysis Ticks](#) (NSW Agriculture 2004)

Programs for controlling bush tick and paralysis tick

All external parasite treatments for cattle are registered under the *Poisons and Therapeutic Goods Act 1996*. Under this legislation it is an offence to use a chemical for any reason unless that use is specifically listed on the label. Currently, the only chemicals registered for the control of bush ticks and paralysis ticks are used as sprays or dips (except for an ear tag for paralysis ticks). At the time of writing none of the currently available pour-on or injectable macrocyclic lactone (ML or mectin) parasite treatments are registered.

Chemicals registered are listed in the following table.

Chemical	Treatment
Amitraz	Spray every 7–10 days
Cypermethrin plus chlorfenvinphos	Spray every 10 days
Flumethrin	Spray every 10 days
Zeta cypermethrin	Ear tags aids in control up to 42 days (paralysis tick only)

[Chemicals for Controlling Paralysis Ticks in Cattle](#) (DPI 2005)

There are obvious disadvantages associated with the use of sprays, including:

- slow and labour intensive
- large herds need special facilities such as spray races or dips
- dipping is effective but is not available in many areas
- for sprays to work effectively, cattle must be thoroughly saturated all over, with at least 5 litres per adult cattle

- ***work health and safety risk*** for operators due to physical and chemical handling
- environmental issues with run-off
- relatively short length of action, particularly when it rains after treatment.

Read the label for information about re-treatment intervals and record any treatments given. The withholding period and export slaughter interval (ESI) listed for the product will be extended if treatments are given at more frequent intervals than recommended on the label.

There are also potential problems if stockowners use unregistered chemicals, including:

- residue problems
- they are illegal
- do they really work?
- over-use leading to resistance problems.

Integrated tick control

There are other steps which stockowners can take to help minimise tick problems, rather than totally relying on chemical control. With paralysis and bush ticks, the major tick reservoir is out in the paddock and not on cattle. Things you can do to minimise the risk include:

- Keep pastures 'open' by mulching or slashing.
- Avoid having a heavy layer of mulch of dried grass, such as setaria or blady grass, because it can provide an ideal environment for ticks to survive.
- Clean out scrubby gullies of lantana where possible.
- Judicious use of burning-off where paddocks are rank and over-mature. But consideration needs to be given to the long-term impact of burning on desired pasture species and environmental effects.
- Change to earlier calving time so calves are older before the tick population builds up.
- Calve in the cleanest paddocks and keep cows and calves there for first 8–10 weeks of life.
- Use older cattle as 'vacuum cleaners' prior to putting cows and calves into an unstocked paddock.
- Consider *Bos indicus* infusion in areas with ongoing severe tick problems — these breeds are more resistant to ticks, so increasing the Brahman content in the herd is another strategy.
- Treat early in the season when tick numbers start to build up, rather than waiting for ticks to build up to plague proportions.
- Ensure cattle are on good nutrition.

8.63.3 Cattle tick

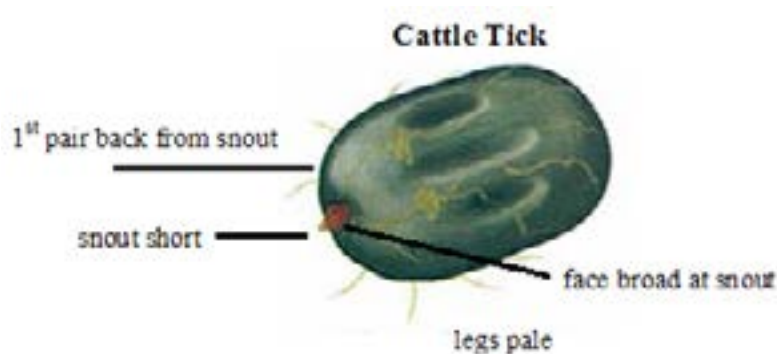
Cattle ticks on the North Coast have been subject of a 70-year eradication and control program. They are common in south-east Queensland and, as a result, stock movements from cattle tick areas in Queensland into NSW are restricted. **Cattle tick infestations are notifiable.**

Cattle tick is ranked the most important disease for the Australian beef industry. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

Unlike bush ticks and paralysis ticks, all three moults of the cattle tick occur on the one animal over about a 3-week period. Peak activity is from February to May; which also differs from bush and paralysis ticks.



To identify



Signs

Cattle ticks cause significant economic loss to the beef industry and would be a serious problem on the North Coast if allowed to establish here. The ticks suck blood causing hide damage and ill thrift and even death in heavy infestations. They can also carry the blood parasites that cause tick fever, a dangerous disease of cattle.

Control

Ensure cattle purchased from a tick-infected area in Queensland have been treated against cattle tick before entry into NSW.

Cattle tick infestations are notifiable and should be reported immediately. Dipping is the preferred method of control for compulsory eradication programs, but where unavailable a pour-on product is used. Usually a course of treatments in conjunction with inspection of stock will be carried out to ensure that eradication has been successful.

Stockowners should always examine their stock for evidence of cattle tick whenever cattle are yarded. Brochures to assist stockowners with tick identification are available from NSW Department of Primary Industries and North Coast Local Land Services offices.

[Cattle Ticks](#) (DPI 2010)

[Examining Cattle for Ticks](#) (DPI 2006)

[Cattle Tick Control in NSW](#) (DPI 2010)

8.64 Trauma and injuries

Trauma or injury can be from a variety of sources including accidental injury, motor vehicle accidents, bullying from other cattle or dog attack. It is important to establish the cause as this will influence treatment and approaches to preventing further cases.

Signs

There may be obvious open wounds or the injury may be internal without a break to the skin. Affected cattle may be lame, separated from the rest of the mob or recumbent.

Treatment of wounds

You may be confident enough to treat minor injuries and wounds. Larger wounds that require stitching should be done by your veterinarian. Dog attacks should be treated by a veterinarian because there is often significant underlying tissue damage. Bulls fighting with other bulls can sometimes result in major internal injury.

The basic principles of minor wound treatment are:

- Clean the wound by removing dirt and debris. This may be done by hand with salty water (2 teaspoons of salt in 1 litre of water) or dilute antiseptic and cotton wool. Alternatively, a hose may be used.
- Regular hosing with water under moderate pressure can keep a wound clean and keep the surrounding tissue healthy.
- Clean and trim any damaged edges of the wound.
- Bandaging may be beneficial to keep wounds clean, depending on the site.

Various wound creams and sprays are commercially available, to help keep out infection and repel flies.

8.65 Urinary tract infection (pyelonephritis)

Cattle can suffer from a special urinary tract infection called pyelonephritis that can also involve the kidneys. It is usually seen in cows a month or so after calving. There may be carrier cows or bulls in the herd, so more than one cow can be affected. The symptoms seen include frequent attempts to urinate, with dribbling common, and clots of blood and pus in the urine. Some cows may have signs of colic (gut pain) with restlessness and kicking at their flanks. If early antibiotic treatment is given the cure rate is good, so see your veterinarian.

[Bovine Cystitis and Pyelonephritis](#) (in the online Merck Veterinary Manual)

8.66 Vibriosis (bovine venereal campylobacteriosis)

Vibriosis is a sexually transmitted disease of cattle, which causes abortion and infertility. Local Land Services investigations have found that vibriosis is common on the North Coast and our most important cause of infertility next to malnutrition. It is a significant cause of economic loss in affected herds.

Nationally, vibriosis is ranked as a significant cause of economic loss to beef producers. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

It is caused by the bacterium *Campylobacter fetus*. Bulls can carry the organism for years in their sheath without showing any signs of disease. Disease becomes apparent when bulls pass the organism on to females during mating, causing early abortion and infertility.

Signs

The infection results in early death of the foetus, with cows returning at delayed and irregular intervals. Following several returns, most cows eventually fall pregnant but some will be permanently infertile. This will show as a large number of late calves and empty cows. In time, females usually develop immunity and can become pregnant at subsequent joinings.

In herds infected for the first time, vibriosis causes a dramatic decline in calving rate and a high percentage of late calves across all ages of cattle, particularly in herds with a short, restricted joining period. In herds with established infection, heifers are more affected than cows, but there will generally be a prolonged interval between calves.

Diagnosis

Vibriosis should be suspected in any herd with a high proportion of empty females or a prolonged calving pattern, particularly if delayed returns to service are noted. Confirmation is by laboratory testing of vaginal swabs from cows.

Treatment

Vaccination is curative in most bulls. Give bulls two doses of vaccine, 1 month apart, with the last dose 1 month before joining. Antibiotic into the sheath at the second vaccination will lift the cure rate to almost 100 per cent. Cure rates are lower in older bulls.

If vibriosis is present in the herd, cows and heifers should also be vaccinated to speed up the return to full fertility. Infected females can sometimes be carriers for up to two seasons before developing immunity. By vaccinating the females you also protect them if infected bulls stray onto the property and serve females. Give two doses of vaccine, 1 month apart. Talk with your veterinarian to determine the best course of action for your situation.

Prevention

In negative or herds with no suspected problems, vaccination is only needed for bulls. Vaccinate all new bulls with two doses, the second being at least 1 month before joining. Alternatively, buy bulls from studs that vaccinate pre-sale. Give an annual booster to all bulls before joining every year.

Bulls straying through fences can introduce and spread the disease between properties so ensure fencing is adequate and cooperate with your neighbour in an area-wide bull vaccination program. If all producers on the North Coast were to vaccinate their bulls, this disease would cease to be the problem that it is.

[Vibriosis in Cattle](#) (DPI 2007)

8.67 Warts (papillomatosis)

Warts are common in young cattle. They are unsightly and can result in reduced sale value. But, with the exception of genital warts in bulls, warts actually cause little productive loss.

They are mainly on the mouth, around the eyes, head and neck. But they also occur around the tail, on the genitalia and between the toes. The age exception is teat warts which can occur in cows of any age. In young bulls they may occur on the end of the penis and interfere with the ability to serve. Warts of the tissues of the eye and eyelid may progress to cancer eye.

Warts are caused by a virus which can be spread by animals rubbing against one another or against posts, especially in yards and when at self-feeders. Biting flies and lice can spread the virus as can implements such as tattooing pliers and needles.

Usually the warts heal quickly and of their own accord without treatment, but some may be damaged and become infected. Once resolved, cattle have lifelong immunity.

Warts in cattle are not infectious to humans.

Treatment

Most warts disappear after 4–6 months without any need for treatment. If necessary, they can be removed surgically.

Genital warts in young bulls may be able to be removed surgically if they are small, otherwise the bull should be culled.

Isolation of affected calves and disinfection of any grooming equipment will help prevent spread, particularly for show and stud animals. Treatment for flies and lice may also help limit the spread.

See Queensland Department of Agriculture and Fisheries' [Warts on Cattle webpage](#).

8.68 Wooden tongue (actinobacillosis or 'actino')

This is a bacterial infection of the tongue and lymph nodes. The bacteria involved, *Actinobacillus lignieresii*, enter when the tongue is injured by rough, sharp fodder. It is not a common condition on the North Coast.

Signs

The onset of disease is sudden and affected animals are unable to eat or drink. The tongue and base of the tongue between the lower jaw bones is hard, swollen and painful. The tongue may protrude, the cattle drool saliva and rapidly lose condition. The tongue swelling may be confused with bottle jaw and drooling is an important sign to be investigated by a veterinarian.

Treatment

The most effective treatment is iodine therapy using intravenous injections of sodium iodide and can result in a good recovery. Wooden tongue may also be treated by antibiotic injection. Surgical draining and flushing of the lesion may aid recovery.

Prevention

This infection is best avoided by not grazing livestock on coarse, prickly fodder.

See DPI's [Lumpy Jaw and Wooden Tongue in Cattle webpage](#)

8.69 Worms

Internal parasites are a major cause of economic loss in North Coast beef cattle. This cost is made up of production losses from the parasites affecting growth rate, health and reproduction, as well as costs involved in the control of parasites (mustering, drenches etc.). The total economic loss on the North Coast beef industry from internal parasites is estimated at over \$10 million per annum.

Nationally, internal parasites are in the top 10 most important diseases for the Australian beef industry. See [Priority List of Endemic Diseases for the Red Meat Industries](#) (GHD & MLA 2015).

Cattle can be infected with many different types of roundworms.

Scientific name	Common name
<i>Ostertagia</i>	Brown stomach worm
<i>Cooperia</i>	Small intestinal worm
<i>Haemonchus</i>	Barbers pole worm
<i>Dicytocaulus</i>	Lungworm
<i>Oesophagostomum</i>	Nodule worm
<i>Trichostrongylus</i>	Stomach & intestinal hair worm
<i>Bunostomum</i>	Hook worm
<i>Trichuris</i>	Whip worm
<i>Strongyloides</i>	Thread worm
<i>Toxocara</i>	Round worm
<i>Nematodirus</i>	Thin necked intestinal worm

On the North Coast, most problems are caused by brown stomach worm type 2 (*Ostertagia*), small intestinal worm (*Cooperia*), barbers pole worm and lungworm. Because of their significance and because they each have different signs and are seen in different ages, they are dealt with in more detail below. Different signs and ages include:

- brown stomach worm type 2 — first-calf heifers or individual adult cows with weight loss and scour
- small intestinal worm (*Cooperia*) — calves to weaning age with scours
- barbers pole worm — weaners to yearlings with anaemia (pale gums)
- lungworm — usually calves, but cattle of any age with coughing.

The remainder of worm species generally occur as part of a mixed worm infection in younger cattle.

Brown stomach worm type 2 (*Ostertagia*) Infection

Brown stomach worm behaves in two different ways:

- Type 1 *Ostertagia* has a direct life cycle, burrows into the 4th stomach wall, and causes scouring and weight loss, typically in yearlings during the winter and spring months. It is often seen as part of a mixed worm burden in young cattle.
- Type 2 *Ostertagia* is by far the most common worm problem in adult cattle on the North Coast. It is seen in individuals or small numbers and is the result of these individuals losing their acquired immunity to the parasite.
- It occurs from an accumulation over time of larvae burrowed in the stomach wall that are inhibited from further development. This causes profuse diarrhoea and protein loss seen as bottle jaw. Typically seen in adult individual cattle stressed from other causes, for example, young bulls in work, nutritional stress in first-calf heifers, and in older cattle from age or a disease problem.

Signs

Individual adult cattle with a profuse, watery, often foul-smelling scour. Brown stomach worm (*Ostertagia*) is usually chronic (over weeks to months) in which case they are in poor condition and often have a bottle jaw from protein loss. The signs can resemble bovine Johne's disease. Sometimes the signs may be sudden in onset in cattle in any condition (like flood mud scours [yersinia] and salmonella).

The disease is due to an accumulation of *Ostertagia* larvae in the wall of the 4th stomach, which damage the stomach wall and interfere with digestion, particularly of protein.

Triggers for the disease:

- the stress of a poor season, most often seen in winter
- rearing a calf
- poor or worn teeth due to old age
- an underlying disease problem.

Diagnosis

Faecal samples for worm egg count are likely to show few or no eggs as this disease is due to the emergence of immature worms. These young worms are not yet egg laying. A blood test for an enzyme called pepsinogen is specific for damage to the 4th stomach wall.

Treatment

Either use an oral benzimidazole or an injectable or pour-on macrocyclic lactone (ML or mectin) (see [“Drench selection and rotation” on page 192](#)). Brown stomach worm (*Ostertagia*) resistance to levamisole is common. Because these cattle are back in condition and usually very low in protein, it is important to supplement with protein and energy as part of the recovery process. The underlying or associated trigger for the disease also needs to be determined.

Cooperia worm (small intestinal worm) infection

This worm infection is the most common cause of scours in weaners and in calves over 2 months of age and still on their mother. It is also a significant problem in hand-reared calves and early weaned calves, particularly if they are set stocked in a ‘calf’ paddock. The worm has a short life cycle and is a very heavy egg layer, so contamination of paddocks can build up very quickly. This can occur in those parts of the paddock frequented by calves, such as cattle camps.

Signs

The scour is profuse and watery and calves can lose condition quickly. Because it is a heavy egg layer, small intestinal worm (*Cooperia*) is readily diagnosed by faecal tests.

Treatment

Treatment is with an oral benzimidazole or levamisole drench. Resistance to drenches is developing with this worm, particularly to the macrocyclic lactone (ML or mectin) group, such as ivermectin. After drenching it is important that calves are moved to a fresh paddock. With age, calves develop resistance to this parasite.

Barbers pole worm infection (*Haemonchus*)

This is a tropical, summer rainfall–area parasite and is more of a problem for more northern areas of the North Coast in the wet season months in summer and autumn.

Signs

The signs of barbers pole infection are very different from other worm infections. It does not cause scouring. The worms in the 4th stomach feed on blood, causing anaemia, protein loss and weight loss. Weaners and yearlings are most commonly affected. They will have very pale gums and eyes and can develop bottle jaw from protein loss.

These signs of anaemia, weight loss and bottle jaw can be confused with liver fluke.

It is a heavy egg layer and has a short lifecycle so contamination can build up quickly on pasture. Because it produces large numbers of eggs, infection with barbers pole worm is readily diagnosed on faecal samples. When the larvae hatch on pasture they require warm, moist conditions. Weaners that are set stocked, particularly if overstocked in the wet warm months, are most at risk.

Treatment

Most worm drench groups have been effective in the past. However, drench resistance is emerging as a problem with this worm.

Lungworm infection

This is seen occasionally, usually in young cattle during the winter months on overstocked pastures. Adult cattle with no previous exposure (for example cattle introduced from dry western areas) can also be badly affected.

The worm called *Dictyocaulis viviparus* is large (70–80 mm long!) and lives in the lower airways. Unlike other worms which lay eggs, the young are born live (hence the name viviparus) and work their way up the airways. This is irritating and initiates a deep chesty cough. The larvae are then swallowed to eventually be deposited on the pasture in the faeces.

Lungworm can lead to pneumonia and weight loss. Most worm drenches are effective, particularly the macrocyclic lactone (ML or mectin) group. However, cattle can get worse after drenching as the worms killed by the drench rot in the lower airways, so antibiotic cover may be needed. So, if you suspect lungworm, seek veterinary advice before treating.

Infection with other species of worms

The other species are less common. These include nodule worm, black scour worm, type 1 brown stomach worm and whipworm. They are usually seen as mixed infections in weaners and yearlings.

Heavy infections will cause scouring and weight loss. Most burdens are light and can cause suboptimal growth. Nodule worm causes scars on the intestine and is a cause of condemnation of the offal at the abattoir.

Usually calves develop strong resistance to these species once exposed.

The where and when of worms

- Worms are present in all areas of the North Coast.
- Their effects are more pronounced during periods of poor nutrition.
- Worm levels are related to stocking rate — the higher the stock density the greater the pasture contamination with worm larvae.
- Worm larvae pick-up is related to feed length, temperature and moisture — pick-up is highest with short feed and mild, moist conditions.
- Even with 'average' stocking rates, effectively high stocking rates and heavy pasture contamination with worms can occur in certain parts of a property or paddock. For example:
 - patches of green feed favoured during dry times
 - cattle on high ground during or after a flood
 - cattle in paddocks with tall grass like setaria, with cattle favouring small areas where there is short feed
 - calves remaining together in sheltered parts of a paddock or on cattle camps.

The **life cycle** for most worms is:

- Eggs on pasture hatch into larvae that crawl up the leaf and are eaten during grazing.
- The larvae undergo further change in the gut of the animal before becoming adults and laying eggs to start the cycle again.

This whole cycle can take as little as 3 weeks, which allows rapid build-up of numbers of worms. During the cooler months the process takes a lot longer. With type 2 brown stomach worm, the larvae can go into hibernation in the stomach for an extended period and re-emerge when conditions are more favourable.

Lungworm has a different life cycle. Larvae eaten with pasture migrate through the intestinal wall to the lungs. When mature, they have live young, rather than eggs, which are coughed up and swallowed to be passed in the faeces.

Worm control principles

- Young cattle are more susceptible. The main target group for worm control are young stock 6–20 months of age. Healthy cattle over this age usually have immunity to worm infections.
- Early weaned or stressed calves may need treatment from 4 months of age.
- Bulls and first-calf heifers are the most susceptible groups of adult cattle.
- Weaner calves contaminate pastures. Because they have the highest burdens, they also pass more eggs in their faeces. The greatest source of infection for weaners is the calves themselves.
- Levels in cattle reflect larvae contamination on pasture.
- High stocking rate increases pasture contamination, and the shorter feed from heavy stocking increases larvae pick up.
- There is a lag of about 1 week from the worm eggs landing on the ground in faeces to when they mature to infective larvae. The longer the larvae are on pasture with no cattle, the higher they die off — this is why pasture rotation works.
- Pick-up is highest in warm, wet conditions, generally during the wet season in late summer and autumn. Worm eggs hatch rapidly and larvae survival is longer during this period and high levels of pasture contamination can occur.
- Spring and early summer are usually hot and dry; poor conditions for survival of worm larvae on pasture. During this time, cattle are not exposed to high levels of contamination and drenching is not usually necessary.
- Cattle resilience and immunity to worms develops with exposure and age.
- Healthy, well-grown cattle have healthier immune systems, develop stronger immunity and cope with worm burdens better.
- Cattle under nutritional stress are more susceptible and when feed is short worm larvae pick-up is higher.

Prevention is the key word in worm control and can be achieved through:

- sound and timely drench practices
- limiting pasture contamination through strategic drenching, sound stocking rates, pasture management (by optimal feed height, pasture quality and pasture rotation) and recognising periods of high risk
- providing the most susceptible stock (weaners) with pastures that have low levels of worm larvae (safe pastures).

If you wait till stock look 'wormy' a lot of the damage will have already been done to the animal and in increased pasture contamination. Don't wait until then to drench. With sound grazing practices and timely drenching cattle will have more even growth rates.

Worm control programs

The timing of treatments and the need to treat varies with enterprise type, age, body condition, season and degree of pasture contamination. The general recommendation is three drenches per year to all young stock aged 4–20 months in February, May and August. More specific advice depends on the type of enterprise.

North Coast Local Land Services have district veterinarians and agricultural advisory officers to assist producers develop sound worm control and grazing management programs.

Self-replacing breeding herds

Drenches should be timed to prevent the build-up of significant worm burdens in young stock and to reduce pasture contamination, particularly in the autumn months. The aim is to reduce reinfection in the critical post-weaning period.

Calves. Treat all calves that are to be retained on-farm at 4–5 months of age, at weaning (if this occurs later than this age) (for example March) and again in 8–10 weeks (for example late May). Take seasonal conditions, the body condition and milk production of the cows into account when deciding at what age to give calves their first drench. Overstocked short pastures have more worm larvae. Cows back in condition with poor milk production will force their calves to graze and pick up worms at a much earlier age. In this situation calves as young as 3–4 months old may require drenching. Give another drench coming out of winter in August.

Yearlings. Treat soon after the onset of the wet season (generally February) and give a second treatment in May. They may also need another drench in August, depending on body condition and season.

First-calf heifers can suffer severe worm problems if nutrition is not adequate and their immunity can drop at calving. They often benefit from a pre-calving drench.

Bulls seem to be more susceptible to the effects of worms than other grown stock, from the stress of working. A pre-join drench once a year is recommended. If condition is back at the end of joining, they could also benefit from a drench at this time.

Breeding herds that do not retain heifers and so are not self-replacing

If calves are sold off the cows at an early age, for example at 4–5 months, they should not require drenching. Research into typical vealer operations has shown that the worm burdens of vealers right up to slaughter weight are negligible.

If calves are to be sold as weaners at about 8 months of age they should receive at least one drench when about 6 months old. However, under conditions of high contamination or when mothers have inadequate milk production, drenching calves at a younger age may be essential to prevent production loss and clinical signs.

The only adult cattle that should need treating are: replacements on arrival ('quarantine' drench), any first-calf heifers pre-calving, bulls pre-joining, and the occasional cow that develops scours.

Fattening weaners, yearlings or backgrounding for feedlots

Drench on arrival and then every 3–4 months. Grazing management will reduce the need for drenching as frequently as this.

Spot (individual animal) treatments

While cattle aged over 20 months usually have good immunity to worms, this immunity can be lost under conditions of stress such as drought, flood or from pregnancy or lactation. It is sound management to drench any cattle that are showing symptoms of parasites at any time of the year. A worm drench will not cure ill thrift due to protein or mineral deficiencies. Cattle back in body score from worms or other problems will need supplementary feeding to get back in condition.

Because of the great variation in farm type, management and seasonal conditions, in some situations additional herd treatments may be needed at times other than those recommended.

Safe pastures

It is ideal for young cattle to be placed on paddocks with a low level of worm larvae contamination following drenching. This will slow the rate of worm reinfection.

Safe paddocks are either:

- not grazed, and spelled completely for at least 4 months before having the treated stock placed on them (can be difficult to achieve), or
- grazed only by healthy grown cattle (dry cows or steers over 2 years old) for at least 4 months before having the treated stock placed on them, or
- first graze on a sown fodder such as ryegrass or oats, or sown pasture.

Short-term rotation or strip grazing are lower risk than set stocked pastures. The more safe paddocks available the better. Seek professional advice on two- and threepaddock rotations for young stock.

The most 'unsafe' grazing practice is to have set-paddocks for calves or weaners. Levels of worm larvae on these paddocks can reach very high levels. Young cattle are not only the most vulnerable stock to worms, but also produce the largest number of eggs in their faeces and can contaminate paddocks to high levels in a short period of time.

Drench selection and rotation

Cattle drenches can be grouped according to the type of active ingredient in the product. Worm drench resistance in cattle is an emerging problem and is most likely in high stocking rate situations, such as in calf-rearing paddocks. Avoid using one drench group for long periods, particularly if you cannot spell the pastures.

Combination drenches: It can also be useful to use two products from different drench classes. For example, a pour-on macrocyclic lactone (ML or mectin) product could be used at the same time as an oral benzimidazole (BZ) drench, particularly as a quarantine drench for introduced stock. This approach would delay parasite resistance and is important for those producers who are using macrocyclic lactone pour-on drenches at a high frequency for external parasites. Check with your veterinarian for drench compatibilities.

Chemicals registered for worm control:

Drench class/type	Treatment type	Chemical
Macrocyclic lactones (MLs or mectins)	Injectable and pour-on	Abamectin, doramectin, eprinomectin, ivermectin, moxidectin
Benzimidazoles (BZs)	Oral	Albendazole, fenbendazole, oxfendazole
Levamisole	Oral, pour-on	Levamisole
ML and levamisole combination	Pour-on	Abamectin plus levamisole
ML, BZ and levamisole combination	Oral	Abamectin plus oxfendazole plus levamisole

There are also worm and liver fluke combination drenches; see “8.36 Liver fluke” on page 142.

[Cattle Worm Control: The basics](#) (DPI 2007)

<http://mbfp.mla.com.au/Herd-health-and-welfare/1-Disease-prevention>

9. Looking after your cattle – Chemicals and samples

9.1 Chemicals, medications and treatments

A variety of medications, drugs and chemicals may be used in cattle production. It is important to be familiar with these, and the requirements for purchasing, transport, storage and use. Some (including some chemicals and pest animal baits) require training to use. Others (such as antibiotics and some vaccines) are only available through a veterinarian.

Part of every cattle property should have a dedicated area to store chemicals, including a fridge. It is also important to keep records of chemical use and to observe any withholding period or export slaughter interval (see [“3.5 Avoiding chemical residues” on page 12](#)). Purchase only what you can use within the expiry dates. Chemicals are likely to be ineffective once past their expiry date, and others, particularly pesticides, can change to a more toxic compound.

Adhere to the dose rate; underdosing can lead to resistance and overdosing may be toxic with some chemicals. Never use treatments that are not registered for cattle. Bear in mind that cattle produce meat and products for human consumption.

A range of chemical, medications and treatments are available, including:

- Antibiotics — drugs used to kill bacteria. Given by injection, orally, vaginally, intra-mammary or topically. Most are available only through your private veterinarian, who is familiar with your herd and has established the need to use these drugs. It is wise to refrigerate antibiotics.
- Vaccines — injections that stimulate cattle to produce immunity to diseases. Require refrigeration. Most are available from rural stores, but a few are available only through a veterinarian or are controlled by government. See [“10.3 Cattle vaccination programs” on page 198](#).
- Internal parasite treatments — drenches, pour-ons and injections for worm and fluke control. See [“10.4 Internal parasite \(worms and fluke\) programs” on page 202](#).
- External parasite pesticides — sprays, dips, rubs, pour-ons and tags for tick, fly and lice control. Being pesticides, they have storage requirements that must be met. Undertake chemical users course. See [“10.5 External parasite \(ticks, flies and lice\) programs” on page 204](#).
- Hormones — injections or implants used to induce abortion or calving or as growth promotants.
- Injectable vitamins, minerals and tonics — for example calcium–magnesium for milk fever and downer cattle. See [“8.42 Milk fever” on page 146](#) and [“7.9 Downer cattle” on page 97](#).
- Antiinflammatories — injections used to reduce fever and pain, particularly for inflammatory diseases and three day sickness. Supplied only by veterinarians.
- Probiotics and scour treatments. Probiotics are bacteria given orally for scours. There are special cattle strains available.
- Antiseptics and disinfectants — for cleaning skin, treating wounds or cleaning equipment.
- Pest animal baits — such as 1080. Restricted supply and use, and use requires training.

9.2 Samples for disease diagnosis

There may be times when you need to collect samples when your veterinarian is not immediately available. Also, an increasing number of tests are now available that producers can sample for themselves. These include hair samples for pestivirus or genetics, and faecal samples for worms and fluke.

Aborted calves

work health safety risk When collecting the sample be sure to wear gloves and a mask because there are several diseases that cause abortion in cattle that can infect humans. Collect the foetus and placenta and put in a leak-proof bag. Refrigerate in a disposable esky on ice (and *not* in a fridge used for domestic purposes), but do not freeze. Even if several days old, testing is still possible for pestivirus. For pestivirus testing, a piece of skin (for example ear) or hair is all that is required. In the absence of an aborted calf, samples can be taken from the cow to help diagnose the problem. Contact your veterinarian to discuss testing.

Dung samples

Analysis of faecal samples is undertaken for internal parasites and scour investigations. ***work health safety risk*** Wear disposable gloves when collecting samples. For worms and fluke, about 20 ml (20 g) is collected from 5–10 animals and placed in separate containers (i.e. one container per animal). The jars should be labelled with the animal's number and submitted to the veterinarian as soon as possible. Refrigerate in a disposable esky on ice (and *not* in a fridge used for domestic purposes), but do not freeze.

Blood samples

Some producers have gained experience in collecting blood themselves. ***work health safety risk*** When collecting the samples wear gloves. Blood samples are usually collected from the vein under the tail into a tube called a vacutainer. The jugular vein is also sometimes used. Some vacutainers contain an anticoagulant to stop clotting. Samples should be stored upright and refrigerate in a disposable esky on ice (and *not* in a fridge used for domestic purposes), but do not freeze.

Autopsy

Autopsy (necropsy or post-mortem) is one of the most valuable tools in disease investigation. Often an autopsy is the only way to confirm the cause of a problem. Typically, a veterinarian is needed to interpret what is seen during a necropsy.

To get the best result from a post-mortem the carcass should be fresh. Cattle carcasses decompose rapidly after death, especially in summer. Once an animal has been dead for longer than a day it is unlikely that useful information will be learned from the necropsy. Once a carcass is found you should contact the veterinarian immediately.

In cattle that are very sick and likely to die, contact the veterinarian before the animal dies. The veterinarian may choose to euthanase the animal so that fresh samples can be collected.

Other samples

Water, feeds, plants and suspect toxic materials are occasionally tested. Your veterinarian can give advice on how much and how to collect and store these materials.

10. Looking after your cattle – Budgets, programs & calendars

The final section of this book looks at management programs for the four big ticket items on the North Coast: nutrition, vaccinations, internal parasites and external parasites. It also demonstrates how to bring these programs together into an annual calendar and budget.

10.1 Developing a cattle health annual budget

How much to spend on cattle health programs will vary for each individual depending on the class of cattle you run, property location, seasonal conditions and cash flow. There are a variety of options to treat or prevent our main animal health issues on the North Coast, so it is important to identify products and techniques that suit both you and your cattle.

The most expensive animal health programs are those that don't work. The main reasons for this are:

- Incorrectly identifying the animal health issue and therefore using the wrong product or treatment.
- Underdosing animals. Not only will the product be ineffective, but underdosing can also encourage chemical resistance. Estimating animal weights can be difficult.
- Overdosing means spending more money than needed. It may also be hazardous for the animal or increase the risk of residues.

The second most expensive animal health program is the one that leads to production losses as a result of not treating your cattle. This may be hidden (as reduced weight gains, reduced meat quality or condemnations at the abattoir) or obvious, from sickness or deaths.

For an effective animal health budget:

- Identify the health issues on your property. This may involve some testing.
- Weigh cattle to prevent overdosing or underdosing.
- Use pack sizes to your advantage. Generally larger packs are cheaper per dose, provided you will use the remaining product before it expires or breaches shelf life once opened. Smaller producers are encouraged to share the timing of treatments with a neighbour or friend, particularly with short shelf life products such as vaccines.
- Use expiry dates and shelf life once opened to your advantage, is the expiry date reduced once opened? Some vaccines keep for up to 30 days once opened provided they are refrigerated. Store at specified conditions; sheds can get hot! Check the label.
- Use the correct product for the problem. Read the label and check with your veterinarian.
- Check the length of coverage. A product may be more expensive but offer longer protection, which may make it more cost-effective, for example buffalo fly tags vs sprays.
- Some products may offer multiple benefits by treating for two or more parasites or problems at once, for example treat worms and external parasites.

Things to consider in an animal health budget:

- *Vaccinations.* Don't skip the essentials, especially 5 in 1 in young stock, vibriosis and three day sickness for bulls, and botulism if you have a history or silage feed. Consider the 'hidden' losses of pestivirus and your own health for leptospirosis.

- Internal parasites. Do you have liver fluke on your property? A check could save you dollars if you don't have liver fluke. If you drench cows for worms, check if it is really necessary. Use grazing management to reduce the frequency of drenching.
- External parasites. Consider your most cost-effective means of reducing the impact of buffalo fly. Consider management and treatment options for tick control.

Planning your animal health program is the most important step to begin to develop an animal health budget. Knowing what your stock need and when, allows you to cost out your program.

See MLA's [health cost benefit calculator](#).

10.2 Timing of nutrition and management procedures

Management programs in breeding herds are driven by two main factors: time of year and calving date.

Seasonal factors

The North Coast is typically a summer rainfall area. In most years pasture availability and quality is at its lowest in the late winter and early spring, creating a feed gap. To maintain maximum productivity from your cattle it is important that this gap is filled, either through winter forages such as ryegrass or oats, or by supplementary feeding. Without filling the gap, cows will lose condition, resulting in reduced fertility, less milk production and lighter weaners.

To effectively fill the feed gap requires forward planning. For example:

- In most years March is the ideal time for sowing ryegrass or oats. The paddocks to be committed to winter forage will require prior heavy grazing, mulching or slashing.
- If fodder is to be conserved as hay or silage in late summer or autumn for supplementary feeding later in the year, contractors may need to be booked ahead.
- The time to buy supplementary feed is when prices are low and storing it, not when demand is high during dry periods. If there are anticipated feed shortages, act early.

It is also important to be proactive in assessing both pastoral and cattle body condition on a regular basis. The calendar toward the end of the book has suggested months during the year when this should be done, but these of course will vary with season.

Calving date

Many management practices and procedures will be driven by the time of year that your cattle calve. These include joining, pregnancy testing, vaccination, worm treatments, marking and weaning. These are included in the example of a calendar, based on the example of a controlled calving commencing in July.

10.3 Cattle vaccination programs

Vaccines stimulate immunity against infectious diseases. Vaccines may be live or killed. Live vaccines have the organism modified (attenuated) so as to not cause disease, but still produce immunity. All vaccines require refrigeration, but live vaccines require special handling and have a shorter shelf life. Generally live vaccines are available only through your veterinarian. Examples are for three day sickness,

infectious bovine rhinotracheitis and tick fever vaccines. Most other cattle vaccines are killed. These vaccines contain inactivated organisms or part of the toxin. All vaccines have a limited life, so calculate how much you need to buy.

The number of shots and the interval between vaccinations vary with the product. Many are two initial doses, 1 month apart, with annual boosters. Some are only single dose. Some vaccines are given to the cow shortly before calving to give temporary protection to the calf for up to 8–10 weeks through the colostrum. Others, for example vibriosis vaccine are best given before joining.

There are now more types of vaccine on the market than ever before, with new types being released each year. When considering what vaccination programs are appropriate for your herd, several factors need to be considered:

- recommendations by your veterinarian or animal health advisor
- how common the disease is your area
- past history of a particular disease problem in your herd
- management type, for example, stud herd, breeding, fattening, calf rearing, improved pasture vs unimproved
- high-risk management practices, for example, silage feeding, grain feeding, poultry manure fertiliser
- demonstrated cost–benefit of the use of the vaccine in your herd
- personal aversion to risk.

Recommended vaccines for beef cattle

- **For all cattle in all herds:**
 - clostridial (5 in 1) vaccine
- **For all breeding cows:**
 - clostridial (5 in 1) and leptospirosis vaccines (these can be combined as 7 in 1)
 - pestivirus
- **For all bulls:**
 - clostridial (5 in 1)
 - leptospirosis
 - pestivirus
 - ephemeral fever
 - vibriosis.
- **For grain feeding** of young cattle or for backgrounder cattle for feedlots:
 - clostridial (5 in 1)
 - pestivirus
 - *Mannheimia haemolytica* (MH) pneumonia, formerly known as *Pasteurella*.
- **For fattening cattle** moving onto fodder crop, legume or improved pasture:
 - clostridial (5 in 1) booster if not vaccinated in the past 3 months.
- **For cattle fed silage** or if poultry manure applied to pasture:
 - clostridial (5 in 1)
 - botulism.

Information on vaccines available for cattle

Clostridial 5 in 1 vaccines

- 5 in 1 vaccination is recommended for **all cattle in all herds**.

- 5 in 1 protects against blackleg, pulpy kidney, tetanus, blacks disease and malignant oedema.
- Blackleg is a very common disease in young cattle on the North Coast and is readily prevented by vaccination. Young cattle and also dairy herds and any other cattle that are supplementary fed or on improved pastures are most at risk.
- pulpy kidney (enterotoxaemia) can be a problem with cattle on rich pasture, clover, lucerne or on grain. You may need to boost every 3 months or prior to the bloat season.
- Give two doses, 4–6 weeks apart from 2 months of age, with boosters every 12 months.
- Vaccinate cows to protect calves till 8–10 weeks of age.

Clostridial vaccination is available as either:

- 5 in 1
- 7 in 1 (a combined 5 in 1 and leptospirosis vaccine; see leptospirosis below)
- 8 in 1 (5 in 1 combined with three other clostridial vaccines).

Pestivirus vaccine

- Recommended for cows and bulls in all breeding herds and also for feeder cattle.
- Pestivirus is a significant cause of reduced calving rates. In young cattle, pestivirus suppresses the immune system and is a trigger for other diseases such as pneumonia and scours.
- Give two doses, at least 4–6 weeks apart. Give a second dose, 2–4 weeks prior to joining. Give boosters each year, 2–4 weeks prior to joining.
- Alternatively, you may choose to vaccinate heifers only twice prior to entering the breeding herd. Speak with your veterinarian about this 'heifer only' program.
- Bulls should be vaccinated twice prior to their first joining, with a booster each year pre-joining.
- To protect weaners that will be going into a feedlot, give two doses at least 4 weeks apart, with the second dose a minimum of 2 weeks before being moved to the feedlot.

Leptospirosis

- Recommended for cows and bulls in **all breeding herds**. Leptospirosis is a serious disease in humans and can be contracted by contact with cattle urine. Vaccinating cattle greatly reduces this risk. It also protects the cattle against leptospirosis which can cause abortion and also redwater in calves.
- Give two doses, 4–6 weeks apart. Give booster every 12 months.
- Available as either bivalent leptospirosis vaccine or as 7 in 1 vaccine.
- Many producers vaccinate their calves with 5 in 1 and commence 7 in 1 program with replacement heifers prior to first joining.

Vibriosis

- Recommended for **all bulls**. Vibriosis is a common cause of reduced calving rates. To prevent vibriosis, bull vaccination is recommended for **all herds**.
- Give two doses, 4–6 weeks apart prior to their first joining, with an annual booster pre-joining each year.
- If vibriosis has been confirmed in your herd, vaccination of heifers and cows may also be recommended by a veterinarian.

Botulism

- This vaccine is strongly recommended for all herds that are fed silage, or where poultry litter is used or on properties that have a history of the disease or bone chewing on the property.

- Vaccination schedules will vary with the product used — there are both single shot and two-dose formulations. All products will require annual boosters in North Coast conditions.

Three day sickness (bovine ephemeral fever)

- This is strongly recommended **for bulls**, for valuable **stud stock**, and **for all cattle introduced from western and southern areas** where it occurs less frequently. Many producers vaccinate their young bulls as a precaution in case they have not been previously exposed.
- Requires two doses, given 2–4 weeks apart. Boosters every 12 months are recommended by the manufacturer, but many producers only give the first initial two doses and no follow-up boosters as they assume that natural exposure will provide the booster.
- Live vaccine, available only from veterinarians.

Mannheimia haemolytica (MH) pneumonia, formerly known as *Pasteurella*

- Recommended for **dairy and intensively reared beef calves**, for young cattle destined for **lot feeding** and for pastured beef herds with a **history of the disease**.
- Give two doses, 3–4 weeks apart. Calves from vaccinated dams from 6–8 weeks age, otherwise calves from 4 weeks age. There is evidence from overseas work that MH pneumonia vaccination of breeders provides protective immunity to young calves.

Escherichia coli

This vaccine is recommended for **herds with a history** of the *E. coli* scours and deaths in calves. The vaccine is given to cows before calving to protect their calves. Give cows two doses, 6–8 weeks before calving then again at 2–3 weeks prior to calving. Give a booster each year, 2–3 weeks prior to calving.

Salmonella

- Use this vaccine in herds with a confirmed **history of the disease**.
- For cows, two doses, 4–6 weeks apart prior to calving, with a booster each year 3 weeks prior to calving.
- For calves, two doses, 4–6 weeks apart.
- For calves from vaccinated cows, give first dose from 8 weeks of age.
- For calves from unvaccinated cows, first dose at any time.

Pinkeye

Vaccination is recommended for herds with a significant **history** of the disease. Given to calves in the first season of life. There are several strains of bacteria that cause pinkeye. The vaccine covers the strain that is the major cause. A single dose is given 3–6 weeks prior to onset of pinkeye season.

Restricted use vaccines

Anthrax

Only for use in cattle in or moving to anthrax-endemic areas, with NSW Department of Primary Industries approval. Single dose. Booster every 12 months.

Tick fever

Requires NSW Department of Primary Industries approval to purchase and use. Recommended for cattle being moved to cattle tick-infected areas of Queensland and Northern Territory. Single dose. Booster not required.

10.4 Internal parasite (worms and fluke) programs

The cost of drenching for worms and fluke is a major part of your annual animal health budget. To ensure that you get the best value from drenching, it is important that the right drenches are given at the appropriate time. More importantly, are as many drenches required or are drenches required at all? When considering your drenching program several factors need to be considered:

- Recommendations by your veterinarian or animal health advisor.
- Is liver fluke present on your property? Liver fluke products tend to be more expensive than wormers, and are not needed if fluke are not in your country. Testing for liver fluke costs about the same as drenching six adult cattle, so is a very effective way of rationalising your animal health budget. Note: Liver fluke can be a problem if there are soaks or springs on your property.
- Do you need to consider stomach fluke? Note: Stomach fluke can be a problem in wet, swampy country. If this is the case on your property, weaners and yearlings may need to be treated.
- Know your drenches — most (but not all) liver fluke drenches also contain a wormer.
- Class of stock — different worm species tend to strike cattle at different ages. Not all drenches are effective against all types of worms or fluke.
- Production type — self-replacing breeder, terminal breeder or fatterer.
- Stocking rate, rotation or cell grazing can be used to significantly reduce worm pick-up.
- Level of nutrition, improved pasture vs unimproved — well fed cattle have a higher resilience to worms.

Recommended drench programs for beef cattle

Step 1. Confirm whether liver fluke is on your property

- A blood test will show exposure to liver fluke in the past 5 months, even if the cattle were treated recently and regardless of the stage of maturity of the fluke.
- A faecal test for the presence of fluke eggs will only confirm the presence of adult (egg laying) fluke.
- A post-mortem check on livers.

Step 2. Consider your enterprise and class of stock

- Young cattle are the most vulnerable to worms, followed by yearlings and bulls. Mature cows are largely resistant to worms (but not liver fluke) and normally do not require treatment.
- Self-replacing herds need to consider keeping worm burdens to a manageable level in their replacement heifers.
- Non-self-replacing herds (which do not keep replacement heifers but sell all calves of their mothers) do not have susceptible weaners, yearlings and heifers, so worms are not a concern.
- Fattening enterprises who buy in young stock have the focus of keeping them growing well without any check from worms or fluke.
- For more details see ["8.69 Worms" on page 186](#).

Step 3. Consider changes to management or grazing

- Changing stocking rate can have a huge impact on worm burdens.
- Additional fencing or electric fencing to enable rotational, cell or strip grazing can greatly improve pasture utilisation and reduce worm pick-up.

- If possible, fence off liver fluke soaks (suits some holdings).
- Keeping cattle in sound condition with good nutrition will greatly improve their resilience to worms and reduce the need to drench.

Step 4. Consider the type of drench(s) required

- If using a liver fluke drench, check whether it also contains a wormer (many do).
- Small intestinal worm (*Cooperia*) is the main worm in calves and weaners and macrocyclic lactones (MLs or mectins) are generally **not** the drench of choice for this species of worm.
- Brown stomach worm (*Ostertagia*) is the main worm species in yearling and adult cattle; resistance to levamisole is common with this species of worm.
- Consider if drench is active against ticks, buffalo fly or lice and whether you need to treat for external parasites at this time as well.

Step 5. Plan the timing of drenching

- Liver fluke treatments are by the time of year — April to May is the most important time for all properties with liver fluke. August and, if necessary, December as well for those with properties with high liver fluke challenge.
- Worm treatments are determined by age of stock, so timing will be driven by time of calving. The general recommendation is three drenches a year to all young stock aged 6–20 months, for example in February, May and August.
- First-calf heifers may need a drench pre-calving as first lactation is a stressful time.
- For bulls, a pre-join drench once a year is recommended. If their condition is back at the end of joining, give another drench at this time.

Putting this together may take a little shuffling to coincide treatments. A couple of examples will help clarify.

Example 1. A self-replacing, July calving herd that has a *moderate level* of liver fluke

Program timing driven by liver fluke then worms, with consideration for external parasites.

- **April/May:** Liver fluke (for immature fluke) plus wormer for all stock.
- **August:** Alternative fluke treatment (for mature fluke) to April drench, for example macrocyclic lactone (ML or mectin) plus clorsulon injection (see [“8.36 Liver fluke” on page 142](#)), for all stock.
- **September:** Bulls pre-joining worm drench (if not treated in August with fluke plus wormer).
- **February:** Weaner calves first worm drench (may need earlier in a tough year), worm drench for yearlings and heifers and for bulls (if back in condition at end of joining).

Example 2. A self-replacing, July calving herd that *does not* have liver fluke

Program driven by worms only and calving date determines treatment times, with consideration for external parasites.

- **February:** Weaner calves first worm drench (may need earlier in a tough year), worm drench for yearlings and for bulls (if back in condition at end of joining).
- **May:** Worm drench for those weaners being retained and for yearlings. Pre-calving worm drench for heifers calving for the first time.
- **August/September:** Worm drench for weaners and yearlings, bulls pre-joining worm drench.

Example 3. A non-self-replacing, July calving herd

Sell all calves off their mothers, and all replacements breeders are purchased. Program is driven by age of selling calves and liver fluke if present, with consideration for external parasites.

- **February:** Weaner calves first worm drench (if sold at 8–10 months of age), if sold at 6 months calves may not need drenching (except in a tough year). Worm drench for bulls (if back in condition at end of joining).
- **May:** Liver fluke drench (if on property).
- **August/September:** Liver fluke drench (if on property), bulls pre-joining worm drench.
- Drench replacement breeders for worms and for liver fluke (if liver fluke suspected to be on the property of origin) on arrival.
- Alternatively liver fluke treatment 6 weeks after arrival if you suspect that cattle are from low risk fluke area and your property has liver fluke.

Example 4: A fattening enterprise that introduces weaners or yearlings for finishing or backgrounding

- Liver fluke (if liver fluke suspected to be on the property of origin) plus wormer on introduction.
- Or liver fluke treatment 6 weeks after arrival if you suspect that cattle are from low risk fluke area and your property has liver fluke.
- Worm drench every 3–4 months (plus liver fluke drench if this is on-farm).

For more detail see [“8.36 Liver fluke” on page 142](#), [“8.69 Worms” on page 186](#), [“8.58 Stomach fluke” on page 175](#) and [“10.6 Cattle health & management calendar – July calving example” on page 206](#).

10.5 External parasite (ticks, flies and lice) programs

External parasite control is a major cost in cattle enterprises on the North Coast. Buffalo fly, and in some areas ticks, are a significant part of the annual animal health budget. When developing your annual program, consider:

- Recommendations by your veterinarian or animal health advisor.
- How common the parasites are on your property or district.
- When problems with these parasites occur in the course of the year.
- Your country type — particularly the interface with scrub and presence of vectors such as wallabies, kangaroos and bandicoots for bush and paralysis ticks.
- Management type — particularly age and class of cattle, as well as breed, for example Brahmans and their crosses are less susceptible to ticks.
- Calving time — may need to calve earlier to avoid young calves at peak paralysis tick period.
- Your time and cost in mustering and applying treatments, for example spraying vs tags for buffalo fly.
- Timing of macrocyclic lactone (ML or mectin) chemicals used for worm control — can they be coincided with external parasite treatments to reduce cost?
- Timing of treatments for more than one external parasite — can they be coincided to reduce cost?
- Equipment on hand — spray units, back-rubbers .

- Non-chemical means of control — for example dung beetles to reduce flies, cull animals that appear to be allergic to the flies, calving into paddocks with less tick burdens.
- Do not be tempted to use unregistered products or chemicals that have no label claim for that parasite.

For more detail on control of each parasite see [“8.63 Ticks” on page 179](#), [“8.11 Buffalo fly” on page 122](#) and [“8.34 Lice” on page 140](#).

Recommended calendar for external parasite control in a July calving herd

- **January:** Buffalo fly tags in or overspray for fly or charge back-rubbers .
- **February:** Overspray for fly or top-up back-rubbers (if not tagged). Check for cattle tick.
- **March:** Overspray for fly or top-up back-rubbers (if not tagged). Check for cattle tick.
- **April:** Overspray for fly or top-up back-rubbers (if not tagged). Check for cattle tick.
- **May:** Ensure tags are removed and finish fly season with an alternative chemical to that used this season.
- **June:** Plan ahead for calving — are low-risk paddocks for paralysis ticks available? Monitor for signs of lice and treat if needed.
- **July:** Monitor and treat calves for paralysis tick if required. Monitor for signs of lice or bush ticks and treat if needed.
- **August:** Monitor and treat calves for paralysis tick if required. Monitor for signs of lice or bush ticks and treat if needed.
- **September:** Monitor and treat calves for paralysis tick if required. Monitor for bush ticks and treat if needed.
- **October:** Monitor and treat calves for paralysis tick if required. Monitor for bush ticks and treat if needed.
- **November:** Monitor and treat calves for paralysis tick if required.
- **December:** Monitor buffalo fly activity and spray if significant numbers — preferably wait until January to apply tags.

10.6 Cattle health & management calendar – July calving example

Please note this calendar assumes a July calving. You can use this example as a guide to develop your own program. To reduce excessive mustering and yarding of cattle, look for opportunities to perform multiple treatments at the same yarding event as much as practical.

Cattle health & management calendar – July calving example	
January	
General management <ul style="list-style-type: none"> Assess breeder body condition: if previous spring was dry and heifers or cows score 2 or below, may need to early wean calves and supplement feed Remove bulls if aiming for 12 week joining/calving; assess condition; supplement if required 	Health <ul style="list-style-type: none"> Drench calves for worms if tough season and cows' milk supply poor or if early weaned Buffalo fly tags in Spray for fly if not tagged or charge back-rubbers
February	
<ul style="list-style-type: none"> Weaning of calves commences Autumn weaner sales commence Assess breeder condition: need to regain any lost body condition after weaning Consider conserving fodder; bale any surplus pasture Plan ahead for planting winter forages 	<ul style="list-style-type: none"> Weaners if being retained: drench for worms Yearlings and heifers: worm drench Bulls: worm drench if down in condition at end of joining Check for cattle tick Spray for fly if not tagged or top-up back-rubbers
March	
<ul style="list-style-type: none"> Wean calves Pregnancy test breeders (minimum 6–8 weeks after bulls removed) Bale any surplus pasture Sow winter feed e.g. ryegrass or oats 	<ul style="list-style-type: none"> Check for cattle tick Spray for fly if not tagged or top-up back-rubbers
April	
<ul style="list-style-type: none"> Wean late calves Pregnancy test if not done in March Plan ahead calving paddocks Assess and anticipate pasture conditions going into winter Bale any surplus pasture 	<ul style="list-style-type: none"> Drench for liver fluke (if are on your property); use product that controls immature fluke Initial 7 in 1 vaccination for maiden heifers if not already vaccinated Check for cattle tick Spray for fly if not tagged or top-up back-rubbers
May	
<ul style="list-style-type: none"> Assess breeder body condition pre-calving Assess pasture conditions with going into winter: may be better to pregnancy test, mouth and selectively reduce cow numbers now than to buy supplements later in winter 	<ul style="list-style-type: none"> Buffalo fly tags out Finish fly season with spray or pour-on of a different chemical to tags Drench for liver fluke (if on property) if not done in April Worm drench maiden (joined) and first-calf heifers pre-calving

Cattle health & management calendar – July calving example

June

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| <ul style="list-style-type: none"> Prepare for calving, check pullers, lubricant etc. Allocate calving paddocks; assess feed quality and paralysis tick risk Consider heifers calving for first time as a separate group | <ul style="list-style-type: none"> In low-lying country watch for stomach fluke in young stock and flood mud scours in adults through winter Monitor for signs of lice and treat if needed |
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July

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| <ul style="list-style-type: none"> Calving starts Commence supplementary feeding if required | <ul style="list-style-type: none"> Calves: attention to dystocia, wild dog control and paralysis tick throughout calving period Assess for lice and treat if needed Monitor for bush ticks and treat if needed |
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August

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| <ul style="list-style-type: none"> Pastures often at their worst Assess body condition: protein supplement any cows score 2 or less pre-join to improve fertility Commence supplementary feeding if required New bulls: settle in to new feed and environment Older bulls: assess body condition and supplement if required | <ul style="list-style-type: none"> Calves: attention to dystocia, wild dog control and paralysis tick Liver fluke drench (if on property), use alternative product to that used in April Assess for lice and treat if needed Monitor for bush ticks and treat if needed Worm drench replacement heifers, yearlings and bulls Replacement heifers: first 7 in 1 and pestivirus vaccine (if not previously done) New bulls: first vibriosis, 7 in 1, pestivirus and three day disease vaccine (if not previously done) |
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September

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| <ul style="list-style-type: none"> Heifers and cows: prepare for joining Continue to supplement if required Aim to join heifers 1 month before cows Bulls: assess body condition and supplement if required Bulls: prepare for joining. | <ul style="list-style-type: none"> Calves: attention to dystocia, wild dog control and paralysis tick Monitor for bush ticks and treat if needed Young calves: first 5 in 1 vaccination at 6 weeks of age (second will be 4 weeks later at marking) Replacement heifers: pre-joining 7 in 1 and pestivirus vaccination (second dose) Cows: pre-joining 7 in 1 booster Bulls: breeding soundness examination Bulls: pre-joining worm drench New bulls: 2nd vibriosis, 7 in 1, pestivirus and three day sickness vaccine Older bulls: vibriosis, 7 in 1, pestivirus and three day sickness vaccine annual booster |
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October

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| <ul style="list-style-type: none"> Calving finishes Calf marking (for welfare and handling at no more than 3 months of age) Joining starts Assess pasture and cattle, particularly if rain has not arrived | <ul style="list-style-type: none"> Calves: attention to wild dog control and paralysis tick Monitor for bush ticks and treat if needed Calves at 6 weeks of age, pre-marking: first 5 in 1 vaccination Calves at marking: second 5 in 1 vaccine |
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Cattle health & management calendar – July calving example

November

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| <ul style="list-style-type: none"> Assess pasture and cattle, particularly if rain has not arrived Calf marking and vaccination continues | <ul style="list-style-type: none"> Buffalo fly: monitor activity. Preferable to pour-on or spray and wait until January to use tags Calves: attention to wild dog control and paralysis tick Calves at marking: second 5 in 1 vaccine |
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December

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| <ul style="list-style-type: none"> Assess breeder body condition: early wean calves on heifers if heifers below fat score 2, or supplement feed Calf marking and vaccination late calves | <ul style="list-style-type: none"> Buffalo fly: monitor activity. Preferable to spray and wait until January to use tags Liver fluke drench (properties with heavy infestations or wet spring months) Drench calves for worms if tough season and cows' milk supply poor or if early weaned |
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Footnotes

The calendar is based on a self-replacing breeding herd calving in July.

The calendar for general management is based on 'average' seasonal conditions. Be proactive with assessment of the condition of your cattle and pastures. If there are anticipated feed shortages, act early. Mouth, pregnancy test, reduce cattle numbers, early wean, sow fodder or feed supplements to minimise the impacts on herd condition, health and fertility and on the health of your pastures.

The need to drench for **liver fluke** and the frequency will be driven by whether it is present on your property and the degree of infestation. The above is based on a herd with moderate exposure to liver fluke — April/May drench for immature fluke and another treatment in August with an alternative product for mature fluke. (See "[8.36 Liver fluke](#)" on page 142).

Worm treatments should not be seen as prescriptive. Worm pick-up can be greatly reduced through pasture management and resilience to worms is driven by plane of nutrition. The above calendar is based on three times a year in February, May and August for weaners and yearlings, pre-calving for first-calf heifers and pre-joining for bulls. With good management and seasons, cows rarely need drenching for worms. (See "[8.69 Worms](#)" on page 186).

Many liver fluke treatments now also contain a worm drench, so where possible streamline your worm and fluke treatments.

Vaccination dates are for a program of 5 in 1 for calves — first vaccination with 5 in 1 at 6 weeks of age will be in August, with the second dose at marking in September or October. Pestivirus and 7 in 1 for heifers — first priming dose can be more than 4 weeks before the second (this gives the opportunity to streamline the first dose with other management). The aim should be to have the second pre-joining. Bulls — vibriosis, pestivirus, 7 in 1 and three day sickness; two doses, 4 weeks apart prior to joining in their first year then boosters pre-joining each year.

With a July calving, joining will be in October and for a 3-month join, the bulls come out in January. Any pre-joining preparation of bulls, such as drenching and vaccination boosters, will be in September.

Pre-joining body condition assessment of cows and supplementation if required will be August (which is often the leanest of all the months of the year). But this of course will vary depending on seasonal conditions.

If calves are weaned at 7 months of age this will place the start of weaning in February. If weaning at 9 months, this will be in April.

Do you have a restricted join and calve in a different month than July? Then see the next section: *Developing your own calendar*.

Year-round calving herds (leave the bull in all or most of the year). Developing a calendar for these herds is difficult. Set a time in the year on your calendar for your breeder and bull vaccinations and keep with these dates each year. Liver fluke (if required), worm, buffalo fly, lice and tick treatment and monitoring times will be the same as the above. You may have problems coordinating and timing management procedures and animal health treatments. With small numbers of calves being handled for procedures such as vaccination, marking and weaning may be too early or often too late for the normal recommended ages. There is also the challenge of using small quantities frequently of 5 in 1 vaccine for calves to prevent losses from blackleg. Options are to buy product with a long expiry once opened or share with a friend or neighbour.

Non-self-replacing (terminal herds) will have much less drenching for worms, as calves are not kept past weaning. (See "[Breeding herds that do not retain heifers and so are not self-replacing](#)" on page 191)

Store fatteners will be treatments for worms, fluke and 5 in 1 vaccinations on arrival, and treatment for buffalo fly. Most of the other treatments and management procedures may not apply.

10.7 Your personal cattle health & management calendar

Timing cattle procedures and principles for developing your own management calendar

Developing a health and management calendar is important as a reminder of when procedures and treatments are due. It is also a valuable tool for developing an animal health budget.

Historically on the North Coast, July is the most common month for calving to commence. This enables calves to be at the desired weight at the autumn weaner sales. For this reason, July calving is used in the model for the management calendar. However, if you calve at other times, follow these steps to develop a calendar.

Calving date. Cattle management procedures and treatments will be largely driven by the month of calving. Calving date is of course determined by joining date. Calving date will determine when calf procedures such as vaccination, marking, weaning and drenching will occur and will also drive the timing of procedures with breeders and bulls.

Vaccination dates are determined by calving date. 5 in 1 for calves at 6 weeks of age and again 4 weeks later at marking. Pestivirus and 7 in 1 for heifers; first priming dose can be more than 4 weeks before the second, the aim should be to have the second pre-joining. Bulls: vibriosis, pestivirus, 7 in 1 and three day sickness — two doses, 4 weeks apart prior to joining in their first year then boosters pre-joining each year.

Worm treatments. Pre-calving for first-calf heifers and pre-joining for bulls. For weaners and yearlings, three times a year in February, May and August.

Buffalo fly, ticks, lice and liver fluke will be determined by season and time of year (and so are the same as the July calving example above).

To reduce excessive mustering and yarding of cattle, look for opportunities to perform multiple treatments at the same yarding event as much as practical.

Seasonal feed and cattle condition assessments will be the same as the above calendar, but of course are seasonally dependant. Paddock preparation for calving (well grassed/winter forage and handy paddock) will need to be some months before calving.



Your personal cattle health & management calendar

Cattle health & management calendar	
January	
General management	Health
	<ul style="list-style-type: none"> • Buffalo fly tags in • Spray for fly if not tagged or charge back-rubbers
February	
<ul style="list-style-type: none"> • Consider conserving fodder; bale any surplus pasture 	<ul style="list-style-type: none"> • Yearlings and heifers: worm drench • Check for cattle tick • Spray for fly if not tagged or top-up back rubbers
March	
<ul style="list-style-type: none"> • Bale any surplus pasture • Sow winter feed e.g. ryegrass or oats 	<ul style="list-style-type: none"> • Check for cattle tick • Spray for fly if not tagged or top-up back-rubbers
April	
<ul style="list-style-type: none"> • Assess and anticipate pasture conditions going into winter • Bale any surplus pasture 	<ul style="list-style-type: none"> • Drench for liver fluke (if are on your property); use product that controls immature fluke • Check for cattle tick
May	
<ul style="list-style-type: none"> • Assess pasture conditions with going into winter 	<ul style="list-style-type: none"> • Buffalo fly tags out • Finish fly season with spray or pour-on of a different chemical to tags • Drench for liver fluke (if on property) if not done in April
June	
<ul style="list-style-type: none"> • Assess feed quality and paralysis tick risk 	<ul style="list-style-type: none"> • In low-lying country watch for stomach fluke in young stock and flood mud scours in adults through winter • Monitor for signs of lice and treat if needed

Cattle health & management calendar

July

- | | |
|--|---|
| <ul style="list-style-type: none"> • Commence supplementary feeding if required | <ul style="list-style-type: none"> • Monitor and treat if needed for paralysis tick • Assess for lice and treat if needed • Monitor for bush ticks and treat if needed |
|--|---|

August

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| <ul style="list-style-type: none"> • Pastures often at their worst • Commence supplementary feeding if required • Assess body condition | <ul style="list-style-type: none"> • Liver fluke drench: use alternative product to that used in April • Monitor and treat if needed for paralysis tick • Assess for lice and treat if needed • Monitor for bush ticks and treat if needed |
|--|--|

September

- | | |
|--|--|
| | <ul style="list-style-type: none"> • Monitor and treat if needed for paralysis tick • Monitor for bush ticks and treat if needed |
|--|--|

October

- | | |
|---|--|
| <ul style="list-style-type: none"> • Assess pasture and cattle, particularly if rain has not arrived | <ul style="list-style-type: none"> • Monitor and treat if needed for paralysis tick • Monitor for bush ticks and treat if needed |
|---|--|

November

- | | |
|---|--|
| <ul style="list-style-type: none"> • Assess pasture and cattle, particularly if rain has not arrived | <ul style="list-style-type: none"> • Buffalo fly: monitor activity. Preferable to pour on or spray and wait until January to use tags • Monitor and treat if needed for paralysis tick |
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December

- | | |
|---|---|
| <ul style="list-style-type: none"> • Assess breeder body condition: especially heifers | <ul style="list-style-type: none"> • Buffalo fly: monitor activity. Preferable to spray and wait until January to use tags • Liver fluke drench (properties with heavy infestations or wet spring months) |
|---|---|

11. Further information and references

Please note that the further reading documents are listed alphabetically by document or webpage title. The full web address (URL) is provided for each item.

About FeedSafe® webpage (Stock Feed Manufacturers' Council of Australia): www.sfmca.com.au/feed-safe/about_feedsafe/

Agistment Guidelines (DPI 2007): www.dpi.nsw.gov.au/content/agriculture/livestock/beef/management/agistment-guidelines

Assessing Stock Feed Additives and Mineral Supplements (DPI 2009): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/nutrition/feeds/assessing-additives-supplements>

Assessing the Economic Cost of Endemic Disease on the Profitability of Australian Beef Cattle and Sheep Producers (MLA 2006): <http://www.mla.com.au/Research-and-development/Search-RD-reports/RD-report-details/Animal-Health-and-Biosecurity/Assessing-the-economic-cost-of-endemic-disease-on-the-profitability-of-Australian-beef-cattle-and-sheep-producers/120>

Australian Animal Welfare Standards and Guidelines: Land transport of livestock (DAFF 2012), published by Commonwealth Department of Agriculture, Fisheries and Forestry: <http://www.animalwelfare-standards.net.au/land-transport/>

The Australian Poll Gene Marker Test Fact Sheet (MLA 2013): <http://www.mla.com.au/CustomControls/PaymentGateway/ViewFile.aspx?hDBhVaSKbX1Oh4NUlaGFwIKmY/50m2VqV70ojE9GzX9kjq/UrG-GYSaa2WwVwyrEF3EYMKKAfsht7d1Tnt3BqiA==>

The Australian Poll Gene Marker Test Fact Sheet (CRC for Beef Genetic Technologies): <http://www.beef-crc.com/documents/publications/fact-sheets/FS01-TheAustralianPollGeneMarkerTest.pdf>

A–Z Listing of all Pasture Species, Types and Varieties webpage (DPI): <http://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/species-varieties>

Beef Cattle Breeding and Selection webpage (DPI): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/beef/breeding>

Beef Cattle Feeding and Nutrition webpage (DPI): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/beef/feed/publications/making-protein-blocks-for-cattle>

Beef Cattle Vaccines (DPI 2007): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/beefcattle-vaccines>

Blackleg in Cattle (DPI 2007): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/blackleg-cattle>

Bloat in Cattle and Sheep (DPI 2014): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/bloat>

Botulism in Cattle (DPI 2007): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/botulism>

Bovine Anaemia Caused by Theileria orientalis Group (DPI 2011): <http://www.dpi.nsw.gov.au/content/biosecurity/animal/info-vets/theileria>

Bovine Ephemeral Fever: Three day sickness webpage (DPI): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/bovine-ephemeral-fever>

Bovine Johne's Disease (BJD) in Cattle webpage (DPI): <http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/bjd>

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Beef Cattle Health and Husbandry for the NSW North Coast



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