Beeftalk
Taking stock of your future

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— COVER IMAGE by SARAH COULTON

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Strategies to restore drought-hit paddocks

WELCOME to Beeftalk 41. In this issue, we bring you the results from the Wambiana grazing trial. This significant trial has been running for 17 years since 1997, measuring the impact of moderate and heavier stocking rates upon pastures, stock performance and economics.

With the continuing dry weather, the land condition of many paddocks is under pressure. Jill Alexander discusses land condition and describes some strategies to help restore paddocks.

While on land condition, the Stocktake Plus App, which helps people to monitor pastures, has been enhanced. Be sure to update to the latest version. Botulism is a constant risk in phosphorus deficient areas and an increasing risk during dry times. The article ‘Are your cattle phosphorus deficient?’ outlines indicators of phosphorus deficiency including a map of generally deficient areas in southern Queensland.

When the rains come and if cattle are not performing on lush pastures as well as expected, then phosphorus may be a problem. For people with enough soil moisture there are some tips to consider for summer forage.

Also, if you are interested in learning artificial insemination, you can read about the short course running from December 16-19, 2014, near Mundubbera.

We hope you get value from Beeftalk. Please provide your feedback and suggestions for future issues using the short survey at www.surveymonkey.com/s/beeftalk41.

Happy reading!

— The Beeftalk team

THE NRM (Natural Resource Management) Spatial Hub is a central element of the 15-year blueprint of the Australian Rangelands Initiative which provides guidance for on-going management and protection of the natural resources of Australia’s rangelands. The stage 1 development and demonstration of the hub is part of a $1.6 million investment over two years from Caring for Country and Meat & Livestock Australia.

The hub will give land managers systems, tools, data and skills to improve access to property scale information and knowledge. These improved capabilities will underpin better management decisions and lead to improved productivity, land condition and conservation.

A small team of NRM Spatial Hub, NRM rangeland regional bodies and Department of Agriculture, Fisheries and Forestry staff have identified Queensland land managers interested in participating in the project. There will be at least four properties in each of the seven NRM rangeland-based regions (Cape York, Northern and Southern Gulf, Desert Channels, ND Dry Tropics, Fitzroy and South-west) committed to the project.

Queensland’s participating land managers will use the hub online property planning and information system to get data and mapping tools that will help them develop and maintain comprehensive digital property plans, infrastructure maps and data necessary to help develop grazing plans.

Hub users will have secure online access to the latest spatial data such as high resolution and time-series satellite imagery and land condition products; tools that manage and process property information; and will be able to capture information in the paddock using handheld devices such as GPS or smartphones. DAFF grazing specialists will provide land managers with paddock and property carrying capacity information for different developments (e.g. watered area), land condition and woody cover scenarios.

This carrying capacity information, combined with remote sensing products that provide direct measures of woody vegetation extent, ground cover and estimates of pasture biomass, will help land managers to develop grazing plans to achieve sustainable production.

After the property demonstrations, a series of workshops will be held around Queensland in 2015 to show how to access and use the online property planning and information system, tools and products.

For more about the NRM Spatial Hub project and future workshops contact Michael Digby from the Australian Rangeland NRM Alliance on 0428 611 599 or email rmsc@northerngulf.com.au

Land managers will be given simple tools for analysing land condition over months, years and decades. These maps show ground cover estimates from satellite data in May 2009 after the Queensland Gulf floods, and the average ground cover for each paddock.
PHOSPHORUS is needed for almost every vital bodily function, including building bones and teeth, producing milk and using feed efficiently. Phosphorus deficiency in cattle significantly limits their performance. Phosphorus-deficient cattle have poor appetites, eat less and consequently grow less, have decreased fertility and milk production, and are at a greater risk of death.

If you answer ‘yes’ to one or more of the following three questions it is worthwhile investigating the phosphorus status of your cattle further:

1. Is your district known to be phosphorus deficient?
   - Ask your local vet, consultant or FutureBeef officer
   - Look at the phosphorus status map for northern Australia
   - Review soil analyses for your property if available.

2. Do your cattle show any signs or symptoms of phosphorus deficiency?
   - Chew old bones
   - Have peg leg
   - Break bones
   - Die of botulism.

3. Are your cattle performing below expectations?
   - Growth rates (especially when on good feed)
   - Reproduction rates
   - Body condition.

Put simply there are four main ways of identifying phosphorus deficiency in cattle: trial feeding, soil tests, blood tests, and faecal tests.

1. Trial feed a group of heifers, steers or first-calf cows with a phosphorus supplement when they are on lush feed and compare their performance with a group of similar, unsupplemented animals.

2. Test your soil – soil phosphorus levels (i.e. bicarbonate extraction of phosphorus) of:
   - 5mg or less of phosphorus per kilogram (5ppm) are considered deficient to acutely deficient for cattle production
   - 6-8mg of phosphorus per kilogram (6-8 ppm) are considered marginal
   - 8mg or greater of phosphorus per kilogram (8ppm) are considered adequate on native pastures while higher levels are needed on oats for high performance.

3. Take blood tests – blood tests taken at the end of the wet season from growing animals not fed phosphorus supplements will give accurate results.

4. Take faecal samples – faecal samples taken from animals not supplemented with phosphorus in the middle of the wet season will give you an indication of their phosphorus status.

The ‘Phosphorus management of beef cattle in northern Australia’ manual explains phosphorus deficiency, diagnostic tests and practical management options in much more detail.

You can download, or order, a free copy from Meat & Livestock Australia at www.mla.com.au/News-and-resources/Publication-details?pubid=6024 or phone 1800 023 100.

How often do we receive 50mm of rain in three days?

<table>
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<th>Annual Rainfall</th>
<th>50mm+ in 3 days</th>
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<th>10mm+ in 3 days</th>
<th>3 days</th>
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</table>

NATIVE pasture production in Queensland relies heavily on wet season rainfall. The earlier the wet season starts the better, however how often can significant rainfall events be expected to break the dry season?

How much rain within how many days is enough for useful pasture growth?

Is 50mm in three consecutive days enough?

How often has this occurred in the past?

‘Climate’ is a useful website (www.australianclimate.net.au) and app that uses historical rainfall data to see how often different rainfall events have occurred in the past. It is easy to select different locations, rainfall events and time periods to see how often different events have happened before.

Although this is not predictive, it can guide general expectations based on past events.

The table and graph show a range of figures for locations across southern Queensland.
THE current drought affecting much of Queensland highlights a recurring challenge to the grazing industry: how do you manage sustainably and profitably when rainfall can vary so much between years?

In an attempt to answer this question the Department of Agriculture, Fisheries and Forestry (DAFF) started a long-term grazing trial in 1997 on the Lyons family property Wambiana, near Charters Towers. Phase 1 of this Meat & Livestock Australia-funded trial (1998 to 2011) looked at grazing strategies:

- Heavy stocking (HSR) at 4.5ha/animal equivalent (AE) = 450kg beast.
- Moderate stocking rate (MSR) at the calculated long-term carrying capacity of 9ha/AE. (Long-term carrying capacity was calculated based on the rainfall that could be expected in 70% of years i.e. not average rainfall.)
- Rotational wet season spelling (R/Spell) in a three-paddock system (9ha/EA).
- Two variable strategies with stocking rates varied based on either available forage (VAR) or available forage and a climate forecast (SOI). Because of the similar response of these two strategies, results are only discussed from the VAR.

In Phase 2 of the trial (2011 onwards) some of the treatments were adjusted to apply learnings from Phase 1, i.e. both the 'variable' strategies were changed to 'flexible' stocking and then applied as either flexible stocking with wet season spelling or flexible stocking without wet season spelling. As these changes were made only recently, data on the new flexible treatments is included with the original VAR data.

There are two experimental paddocks (replicates) for each strategy. Paddocks are 100ha and contain a mixture of box, silver leaved ironbark and Brigalow land types. The cattle are 1.5 and 2.5 year old Brahman-cross steers, supplemented with wet season phosphorus and dry season urea. Cattle stay on the trial for two years before going to the meatworks. While the HSR coped well in wet years, drought feeding with MBI was required in four of the dry years. Stocking rates in the HSR also had to be reduced from 4.6ha/AE between 2005 and 2009 due to the ongoing feed shortage. One HSR paddock had to be destocked for three months in late 2004. In contrast to the HSR, the 8ha/AE stocking rate in the MSR was sustained in all years without drought feeding or destocking being required (Figure 1).

**PASTURE PRODUCTION AND COMPOSITION**

The grazing strategy applied had a major impact on pasture condition: thus in 2014 after 17 years, the density of 3P (perennial, palatable and productive) grasses is highest in the MSR and R/Spell, but by far the lowest in the HSR (Figure 2).

Importantly, despite seven recent favourable seasons, in the HSR there has been little or no recovery in the population of 3P grasses since the end of the drought in 2006. The slightly lower 3P density in the VAR in 2014 compared to the MSR and R/Spell is a direct result of the heavy stocking rates applied in the VAR leading into the drought of the early 2000s. This shows how long the ill effects of a period of poor management on pasture condition can take to recover.

These differences in 3P density have also had major impacts on pasture production and composition. In 2014 which had reasonable rainfall (571mm), the end of wet season pasture mass was 101t/ha greater and the proportion of 3P grasses many times higher, in the R/Spell and MSR than in the HSR (Figure 3). Currently, (November 2014) there is less than 100kg/ha of forage in the HSR, i.e. almost bare ground.

There has also been a massive increase in Bothriochloa pertusa (Indian couch) across the trial since 2006, with by far the greatest increase in the HSR. With an inevitable return to drier years the loss of 3P grasses in the HSR will undoubtedly reduce animal production and carrying capacity further.

**GENERAL STRATEGY PERFORMANCE**

Over all years, average annual liveweight gain (LWG) per head was highest in the MSR (11.9kg) and lowest in the HSR (10.5kg), with the R/Spell and VAR averaging 11.4kg/year. After two years on the trial, steers in lighter stocked treatments finished 30 to 60kg heavier and in better condition than those in the HSR.

As a result these steers received a price premium of between $0.07 to $0.20/kg more at the meatworks than the HSR.

In contrast to individual animal production, average annual LWG/ha over 17 years was highest in the HSR (23.3kg/ha) but lowest in the MSR and R/Spell (19.0kg/ha) followed by the VAR (18.2kg/ha). Note however that the high LWG/ha in the HSR came with the expense of drought feeding in drier years. After 17 years accumulated gross margin in the HSR is some $11,000 per 100ha less than in the other strategies. Although the HSR was very profitable in the early wet years of the trial, in the dry years it lost money due to the cost of drought feeding, reduced LWG/ha and the price penalty for poor condition animals. In contrast to the HSR, in the MSR and R/Spell, accumulated gross margins grew steadily over all years.

Hence after 17 years, accumulated gross margins in the MSR and R/Spell are far higher than in the HSR, despite running only half the number of cattle. Although the VAR strategy was also heavily stocked in early years, the sharp cut in stocking rates going into the dry years avoided the penalties incurred in the HSR. Consequently, the accumulated gross margin in the VAR is far better than in the HSR (Figure 4).

WHAT WOULD HAPPEN WITH BREEDERS?

Would these outcomes also hold with breeders at a property level? Our colleague Joe Scanlan attempted to answer this question using the trial data to model the outcomes of different strategies for a 2.000ha property over 30 year sequences of rainfall data for Charters Towers. Modelling results clearly showed that both breeder profitability and pasture condition were maximised at moderate stocking rates. However the actual ‘optimum’ stocking rate varied with rainfall, reinforcing the need to adjust stocking rates as seasons vary.

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**BIG DECISIONS REQUIRE THE BEST INFORMATION**

**45%**

Old farmers with high school aged children send them to a boarding school.
**Toxic topic: Botulism**

**BOUTULISM** is a paralysing disease caused by botulinum toxin which is produced by the bacterium *Clostridium botulinum*. Botulism is reported as one of the most potent toxins to mankind and only a small quantity is needed to produce disease. *Clostridium botulinum* spores are common in the soil, and also in the gut of healthy cattle and other animals in tropical environments (which includes most of Queensland), where they are not a problem. Spores are the dormant form of the organism. Only actively growing *Clostridium botulinum* bacteria produce botulinum toxin. It is the toxin that causes disease. *Clostridium botulinum* spores only germinate and grow when oxygen is totally excluded, such as within rotting animal and vegetable matter. The toxic birds strongly to nene endings, preventing new impulsive to muscles and causing paralysis. Seven types of toxin have been identified, designated A to G. In Australia most botulism outbreaks in cattle and sheep are due to type C or D toxin. The toxin is quite stable and may remain in contaminated feed or water for some time. Vaccination is the only effective way to prevent outbreaks.

WHERE IS IT SEEN?

Botulism is commonly seen in Queensland, especially in phosphorus-deficient areas and droughts where it is often associated with cattle eating bones and carrion to satisfy a craving for phosphorus. Outbreaks are also seen in intensively droughts where it is often associated with cattle eating especially in phosphorus-deficient areas and during leading into the dry years adversely affected pasture and R/Spell. However, high stocking rates in 2000-01 heavy stocking and of similar profitability to the MSR improving pasture condition on animal production. The only effective way to prevent outbreaks is the only long-term prevention strategy. The only effective way to prevent outbreaks is the only long-term prevention strategy for botulism is vaccination with inactivated botulinum vaccines. In phosphorus-deficient areas where botulism risk is very high, vaccination against types C and D botulism has been widely adopted as standard practice.

**VACCINATION THE ONLY LONG-TERM PREVENTION STRATEGY**

The only effective long-term prevention strategy for botulism is vaccination with inactivated botulinum vaccines. In phosphorus-deficient areas where botulism risk is very high, vaccination against types C and D botulism has been widely adopted as standard practice.

**Monitoring and decision support**

THE FutureBeef Stocktake Plus app is a grazing monitoring and management decision support tool for graziers and advisers predominantly located in northern Australia. It has partial functionality to producers in other regions.

**BEEF - DRIVING AHEAD**

**BEEF - DRIVING AHEAD**

**BEEF - DRIVING AHEAD**

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WHETHER it is land or people, the process of recovery requires rest, nourishment and time. There are no shortcuts, no silver bullets.

The poorer the condition of the land, the more rest that is required to get back to full carrying capacity. Land condition declines more rapidly than it improves. Why? Because country needs resting during wet seasons to improve condition, and as you know, they can often be few and far between.

Trial work has demonstrated that when 30 per cent or more of the pasture is still comprised of perennial grass species, vigilant grazing management which incorporates early wet season spelling and retention of grass stubble, can recover pasture condition within three wet seasons. However, when there is little or no perennial grass left in the paddock, re-sowing of pasture is often required.

GRAZING LAND CONDITION

Grazing land condition is the capacity of land to respond to rain and produce useful forage. It’s not a measure of how much feed is on hand or the quality of it, but rather a measure of the health of the grazing system in its capacity to convert water, sunlight and nutrients into plant tissue.

As land condition declines, so does carrying capacity. The long-term carrying capacity of land in poor condition is less than half of that in good condition.

Perennial grasses are the backbone of robust grazing systems and management to preserve these plants should be the focus of any grazing strategy.

Annual grasses and weeds will provide some feed during the wet season, but they are fair-weather friends during the dry. Annual grasses and weeds will provide some feed during the wet season, but they are fair-weather friends during the dry.

Grazing during this period removes few nutrients from the pasture and does little damage to the perennially dormant plant — as long as the crowns and growing points are left alone.

When the dry season breaks, plants draw on these stored nutrients and energy from the roots to grow new shoots.

If these new shoots are immediately grazed, the plant must again draw on stored energy and nutrients to grow new shoots. Persistent grazing early in the wet season depletes plant energy reserves and results in small, weak root systems. If the pasture is rested at the start of the wet season, the new shoots start to photosynthesise, collecting energy from the sun rather than the roots, and rebuild both the root and shoot components of the plant.

LEAVE GOOD GRASS STUBBLE IN THE DRY

While most damage is done to the pasture during the wet season, what you leave at the end of the dry season is a good predictor of how quickly the pasture will respond to rain when it does finally arrive.

Consider the crown and the stalk as the scaffolding of which the grass plant can grow leaf. If you graze right down to the butt of the tussock, the plant has to regrow this scaffolding to hang the leaf. This can delay a return to full carrying capacity by months.

Grass stubble and organic ground cover play an important role in protecting and feeding the soil. Plants can only access water using their roots so you must protect the topsoil rather than running off the paddock. It also minimises evaporation. If you consider that falls of less than 5mm are mostly ineffective due to evaporation, minimising this effect is critical.

Soil organic matter is king when it comes to improving the long-term productivity of pastures. Leaving more rather than less organic matter to be incorporated into the soil will pay back dividends in years to come.

Humans can hold 80 to 90pc of its weight in moisture, significantly increasing the water holding capacity of the soil.

Soil microbes decompose organic matter and release nutrients for plants to use. As a grazing land manager you should be budgeting on providing feed not only for your aboveground livestock and your underground livestock, as they really do matter.

MANAGING PROBLEMS IN OLD CULTIVATION

A lot of old cultivation country is let go to pasture because productivity declined over time. This is often due to a lack of inputs to compensate for the outputs (silage and hay production remove the most nutrients and organic matter from the paddock). Don’t expect a sown pasture to thrive unless you are prepared to replenish the soil with what has been removed over the years — organic matter and nutrients.

Six demonstration sites set up on the Western Downs tested strategies for improving the land condition. Five of the six paddocks were old cultivation, the pasture comprised roughly 30pc perennial grasses and all had ongoing problems with broadleaf weeds and patchiness across the paddock.

The paddock which had the quickest recovery used a combination of wet season spelling and broadleaf herbicide application at the onset of the wet season. The cost to benefit ratio in this case was 1.91:1, which indicates that for every dollar invested, $1.91 was generated.

Using a selective herbicide instead of cultivation benefited the pasture by retaining organic cover which could protect the soil until the perennial grasses grew and spread.

In small paddocks where sticks and rocks aren’t a problem it may be feasible to slash the upper canopy to allow better coverage of herbicide on the weeds.

SOME RULES OF THUMB FOR IMPROVING LAND CONDITION

1. Rest paddocks in the wet — early in the season is when you will have most impact

If the paddock is in poor condition, rest the paddock from break of season until the grasses have cut and dropped seed.

2. Leave good grass stubble in the dry season

The more you can leave the quicker the pasture will respond when it does rain.

3. Minimise competition

If the pasture still comprises at least 30pc perennial grass species, controlling broadleaf weeds early in the wet season and subsequent spelling will give these grasses the best chance of outcompeting the less desirable species.

4. Build organic matter and replenish soil nutrients

Especially in old cultivation. Leave more plant litter and stubble to improve soil condition. Get a soil test done and assess if you need to add fertiliser to get pastures growing to full capacity. A legume will be a longer term solution than nitrogen fertiliser.

5. Re-sowing pasture

This is the most expensive and risky option. Good soil preparation, following and subsequent weed control is critical to maximise plant establishment.

Avoid planting in the middle of summer. Follow-up rain is often a key success factor in establishing new pastures.
Top tips for forage in summer 2014-15

Securing quality seed is important in maximising overall results

With summer approaching, many producers may think about sowing annual forages to complement existing grass pastures. With average to below average summer rainfall predicted, what are the key issues to consider to maximise cattle production and economics? If the season breaks and planting happens?

By now the forage type should have been decided and, importantly, seed ordered or at least discussed with your local seed merchant. Securing quality seed of the preferred variety is an important step in maximising the overall production and economic result.

The type of forage grown depends on the feed attributes required and the animal production system used. For example, will stock go direct to market from the forage, or will stock be grown to a heavier weight and finished on subsequent forage?

A range of summer annual forage types exist, but they mainly fall into two categories – cereal types, for example, forage sorghum, and legume types, for example Dolichos lablab. Generally the cereal types produce higher forage yield compared to the legume types, and so these can be stocked at a higher rate. However, they generally have a lower nutritive value than legumes, so individual animal performance is generally lower.

If high stocking rate is required, for example, to spell grass country, a cereal type forage would suit, whereas, if high liveweight gain is needed to finish stock, a legume type forage would be better.

The other considerations to maximise production are soil moisture, soil fertility and weed control. A deep profile of soil moisture before sowing could be essential this year, especially if below average rainfall conditions eventuate. This may mean regularly assessing soil moisture and delaying sowing until sufficient moisture accumulates. If soil fertility levels are unknown, a soil test is highly valuable to determine fertiliser requirements. There is no point spending the money on preparing and sowing paddocks if soil nutrient levels are low, because animal performance will also be low regardless of what forage is selected.

Weeds can significantly reduce forage production, especially in years where soil moisture is at a premium. Devise a weed management plan before sowing, especially to control in-crop weeds, as options can be limited depending on what forage is selected.

For further information, contact your local forage adviser, or visit the FutureBeef website where you can download the ‘High Quality Forages’ manual – www.futurebeef.com.au/resources/projects/high-output-forage-systems-for-meeting-beef-markets/

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There is a section on how to calculate tank capacity and the increments needed for a dipstick, particularly useful for a cylindrical tank.

Damien O’Sullivan, DAM Kingaroy
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Email: damien.o’sullivan@df.et.gov.au

AI training boosts level of success

With improving techniques and oestrus synchronisation programs, artificial insemination (AI) is becoming a viable option for more commercial breeders.

Artificial insemination provides benefits in access to and use of high genetic merit sires, which are not readily available or too expensive to buy, for use over large numbers of females compared to natural service.

The advent of fixed time artificial insemination (FTAI) also allows large numbers of Brahman and Brahman-influenced females to be inseminated in a six-hour window thereby permitting efficient dissemination of superior genetics into large tropically adapted, northern Australian beef herds.

The cost and level of success of AI programs can vary greatly.

To maximise results it is extremely important that AI programs are planned in advance and managed well.

There are many factors to consider such as female selection, sire selection, mop-up sires, nutrition, disease management, parasite control, semen quality, types of AI programs, facilities, organising equipment and drugs, cattle handling, heat detection, semen handling, insemination techniques and record keeping.

Attending an AI training course will ensure correct planning and using the correct insemination technique for greater success. An accredited course will run from December 16 to 19 at Narayen, via Mundubbera and will provide participants with the necessary skills to conduct an AI program on their own cattle. One-day refresher courses are also available.

More information on managing AI programs and applying them to your herd is available from:

Greg Fawcett, Beef Breeding Services (BBS)
Phone: (07) 4180 0722
Email: greg.fawcett@beefbreedingservices.com.au

futurebeef.com.au

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A range of tropical legumes are available for planting on the more fertile heavier clay soils to provide high-quality grazing forage. These soils, which have higher fertility and water-holding capacity than the light textured soils, will often have been used for cropping and will now be depleted in nitrogen, phosphorous and soil organic matter.

Legumes for grazing can be grown on these soils as short-term pastures between other crops (leys) or in permanent pasture, providing higher levels of protein for grazing stock. There are also the long-term pasture benefits of adding nitrogen to the soil.

Long-term pastures or short-term pastures

As soil fertility declines on old croplands, ley farming is becoming more widely considered. Ley pastures with a grass or legume mix are grown for two to five years in rotation with crops. The legumes used in these systems need to establish readily, grow quickly and produce high forage yields to maximise their forage value and the amount of nitrogen that can be returned to the soil.

To do so, levels of soil phosphorous (and other nutrients) need to be adequate as deficiencies can pose strong limitations on legume production. Two legumes being used in a short-term ley capacity are burgundy bean and butterfly pea.

Burgundy bean (Macroptilium bracteatum)

- Perennial with a relatively large seed. Can regenerate from seed lost to initial establishment losses. This legume may have three to four years in a grazed pasture because it is highly palatable and often outcompeted by grasses.
- Establishes easily in prepared seedbeds when planted at a depth of 2cm to 3cm.
- Grows rapidly and produces high forage yields in the first year.
- Ease of establishment allows for rapid improvement in soil nitrogen, which is highly desirable for a ley pasture.
- Planting rates for highly germinable seed are 2kg/ha when sown in a mix with grass seed and up to 5kg/ha if establishing a pure stand of legume. If using coated seed, seeding rates ha need to increase, potentially three to five times, based on the coated seed ratio.
- Varieties include Cadarga (an erect form) and Juanita (lower growing but can be more persistent and less affected by bean mosaic virus). These are usually sold as a composite.
- In comparison with butterfly pea, burgundy bean grows on a wider range of soils and is better adapted to cooler subtropical climates.

BUTTERFLY PEA (Clitorea ternatea)

- Strong perennial twining legume that is well suited to clay soils. Flower colour ranges from white to dark blue.
- Has performed well in central Queensland, but has been less successful in southern Queensland trials. Not suited to areas with severe or frequent frost but will recover from some frost by regrowing from the base or the woody stems.
- Forage production is highest in summer and is limited when average daily temperatures drop below 15°C.
- Large seed establishes easily when planted at depths to 5cm.
- Tolerates some inundation but does not withstand prolonged waterlogging.
- Planting rates of about 6kg/ha on ley pastures will achieve a good plant density of 5 to 10 plants a square metre. Often produces higher yields in the second and subsequent years when a good framework of woody stems has developed.
- Persists for many years under grazing, provided it is not continuously grazed and is allowed to set seed.
- Seedling recruitment is sporadic but can be very successful under favourable weather conditions. Can be palatable at most stages of growth although there have been some reports that it is not always well-received.
- Milgara, the Australian cultivar, is a composite of six main lines and a number of minor lines. Both these legumes can be used in pure legume swards. There are however advantages in planting grasses with them, particularly if the grasses are not so aggressive in the establishment phase that they severely reduce legume forage yields. The grasses can take advantage of increased soil nitrogen and reduce the likelihood of weeds becoming dominant, especially in winter when the tropical legumes are not actively growing. Grasses also provide more forage for grazing and, because grasses degrade more slowly than legumes, the release of nitrogen to subsequent crops can spread over a longer period.

Long-term pastures

Generally in long-term pastures a grass and a legume are usually planted at the same time. The exception to this is leucaena, where grass is sometimes sown one to three years after the legume, which can improve legume growth, but delays successful grass establishment, limiting forage production. These long-term pasture types can be slower to establish but the grass and legume components are very persistent once established. Often the legume takes some time to increase in density but this is necessary for the pasture to remain productive in the long term. Some leucaena pastures continue to be productive and persistent almost 40 years after planting. Two other tropical legumes with potential to survive in long-term pasture systems are castainga stylo and desmanthus.

Cattle ticks and tick fever management strategies: the facts from Queensland’s cattle industry that significantly reduce cattle liveweight gain and milk production and can transfer tick fever. With significant numbers of producers not undertaking tick control are there opportunities to improve the effectiveness of tick control programs and can the amount of treatment be reduced?

BEEF BREEDS

In the 1970s the composition of the Queensland cattle herd changed significantly as Bos indicus breeds and crosses replaced British breeds. The change was most pronounced in the tick-infested areas of Queensland. Introducing Bos indicus cattle was a major development as it reduced the impact of ticks and the need for tick control treatments. European breeds were also introduced in the 1970s and have been used extensively in crossbreeding with Bos indicus cattle. In the last decade many producers have reduced the Bos indicus content of their herds. This is due to increased

Tropical legumes for

Suitable legumes can be grown on more-fertile heavier clay soils

Table 1. Number of producers surveyed for DAFF management practices surveys 2011-14

<table>
<thead>
<tr>
<th>Region</th>
<th>No. producers surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnett Mary</td>
<td>47</td>
</tr>
<tr>
<td>Fitzroy</td>
<td>74</td>
</tr>
<tr>
<td>Mackay Whitsunday</td>
<td>25</td>
</tr>
<tr>
<td>Burdekin</td>
<td>79</td>
</tr>
</tbody>
</table>

Figure 1. Percentage of producers undertaking tick control in the Burnett Mary, Fitzroy, Mackay Whitsunday and Burdekin regions. The article covers the cattle tick and

Figure 2. Percentage of producers using Composite, Bta taurus and Bta indicus breed bulls in the Burnett Mary (BM), Fitzroy (FT) and Burdekin (BK) regions.

Tick control treatments were used by a higher proportion of Burnett Mary producers, with 55-65 per cent of producers treating the key classes of livestock (Figure 1). Mackay Whitsunday had the lowest rates of treatment at 20-35pc and Burdekin producers had the highest weaner treatment rate of 77pc.

Cattle ticks are a serious economic pest of Queensland’s cattle industry that significantly reduce cattle liveweight gain and milk production and can transfer tick fever. With significant numbers of producers not undertaking tick control are there opportunities to improve the effectiveness of tick control programs and can the amount of treatment be reduced?
the most recent research

crossbreeding and composite breeding and demands from some store and slaughter cattle markets for lower Bos indicus content cattle. Reduced Bos indicus content increases the susceptibility of herds to ticks and increases the risk of tick fever.

Survey results showed that Bos indicus bulls are still the predominant breed of bull (Figure 3). Mackay Whitunday data for bull breeds was not included as it was incomplete. The Flimby had the highest number of producers using Bos indicus bulls at approximately 68% (Figure 3). The surveys show the substantial use of Bos taurus and Composite bulls in breeding programs.

TICK FEVER VACCINE

Despite tick fever vaccination of weaners being a long-standing recommendation for tick-affected regions, vaccination rates were low in the Burnett Mary (40%), Flimby (38%) and Burdekin (29%) (Figure 3). None of the properties surveyed in the Mackay Whitunday region vaccinated weaners for tick fever but this could reflect the small sample size.

Calves raised in tick endemic areas that are exposed to tick fever organisms (Babesia bovis, Babesia bigemina and Anaplasmamargarinalis) between three and nine months of age rarely show symptoms and develop a strong, long-lasting immunity. It is a commonly held belief that cattle born and raised in tick endemic country are immune to tick fever, and it is common not to vaccinate homebred stock, but only vaccinate introduced stock.

However, the percentage of calves exposed to all three tick fever organisms is not high and varies from year to year, so a proportion of calves may remain susceptible to one or more types of tick fever. These calves can die if exposed to tick fever organisms just as their calfhood resistance wanes.

Three tick fever organisms is not high and varies from year to year, so a proportion of calves may remain susceptible to one or more types of tick fever. These calves can die if exposed to tick fever organisms just as their calfhood resistance wanes.

Trials indicate that growth rates for steers grazing desmosthium-grass pasture over six years ranged from 0.43 to 0.66kg/head/day. This compared with a range of 0.29 to 0.38kg/head/day on generally poorer pasture.

LEUCAENA (LEUCAENA LEUCOCEPHALA)

- Long-lived shrub or small tree that produces forage of high nutritive value for cattle.
- Grows best on deep, fertile, well-drained, neutral to alkaline soils but can be slow to establish.
- Susceptible to frosted. Light frosts affect the leaf and heavy frosts can kill the stems to ground level but usually will not kill mature plants.
- Usually grown in rows 6m to 10m apart. Needs to be planted into well-prepared cultivation with a full profile of soil moisture. This can be achieved with bull paddock cultivation, or in cultivated strips. However, strips need to be at least 5m wide to permit adequate soil moisture build-up.
- Weed control during establishment is essential and the area should be kept weed free until the leucaena plants are well established (at least 1m to 1.5m).

Strong stands of intergrass are essential to achieving high production from leucaena pastures. Poor-performing grass paddocks should be fully cultivated to successfully establish leucaena and then grass reseeded after the legume is well established. In strong grass pastures, strips can be reseeded as the grass will rapidly recognise the planted rows once permitted.

The two cultivars most widely planted are Cunningham and Tarramba. Another cultivar Wodergarze was released in 2011. Cunningham is a lower growing, heavily branched type. Tarramba is more fibre-like, whereas Wodergarze is more branched than Tarramba.

All these varieties, particularly Cunningham are susceptible to attack by psyllids, which are small sap-sucking insects that feed on the growing new leaves and can reduce forage production, particularly in autumn and spring when conditions are cool and wet. A psyllid resistant variety has been bred and is undergoing commercialisation for release in the next two to three years.

Forage yields of leucaena in sub-tropical areas are lower than in central Queensland due to cooler seasons and lower summer rainfall but the palatability and nutritive value of leucaena and the associated grass is still higher than with grass alone.

As a result, high animal growth rates of over 250kg/head/year are regularly recorded. To maximise growth rates and to prevent toxicity from mimosine and its derivatives, an anabolicogenic diet in rumen buffer should be transferred to the rumen of all cattle grazing leucaena.

This can usually be achieved by dressing about 10 per cent of the animals in a group and having the bacteria to transfer to the group. The rumen bug can be obtained from the DAFF Tick Fever Centre at Wacol by calling (07) 3898 9655.

Acknowledgement: Information in this article was adapted from an article originally compiled by Bob Clerm (formerly DAFF, Gympie).

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Grazing and N factor

online information at your fingertips
- Grazing BMP program – to improve the economic and environmental performance of beef enterprises
- Next Gen Beef Breeding Strategies – investigating genetic and genomic strategies to increase beef reproductive efficiency in northern Australia

Join the over 87,000 people who visit the website each year and check out more of the FutureBeef projects at www.futurebeef.com.au/resources/contacts

greenhouse gas emissions while improving business resilience.

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27 November 2014 BEEFTALK QUEENSLAND COUNTRY LIFE 51
**Summer tips for beef enterprises**

**Maintenance and training should be on the list**

**BREEDING**

- Try and mate your maiden heifers with young bulls at least a month ahead of the main herd so that they have longer to get in calf the following year.
- Heifers should be well grown and in strong condition and only join the herd if you really want in your breeding program. Fatten and sell culled heifers.
- Don’t let maiden heifers get too fat as this can lead to calving problems.
- Treat all cows for buffalo fly if they are bad this season.

**CALKES**

- Brand, dehorn, castrate, tag and vaccinate (5-in-1 or 7-in-1).
- Enter new calves into herd performance recording system.
- Enter new calves into NLIS database.

**BULLS**

- Observe bulls in mating paddocks. Are they all working? When mating multiple bulls with a group of cows, try to use bulls that are the same age and weight to avoid dominant behavior by bigger older bulls.
- With single sire groups keep a close eye on the bull working. Each time note the tag number of the cow he is with and check that she does not come back in season in 3 weeks. If a number do return get another bull into that paddock noting that not every cycle does end in a pregnancy.

**YOUNG CATTLE**

- Weigh; assess individually rather than on average, this is also useful when checking them mob as you know the range of weights in that paddock.
- Assess performance against required target, do they need some form of supplementation to get to the target weight in time.
- Check whether poor calves come from one bull, if you tag all calves you will know the paddock they came from so, cut the bull and calves.
- Treat cattle for buffalo fly if bad this season.
- Consider HDP implants for steer calves for non-EU sale remembering it can also affect MS&A grading.
- Evaluate markets and plan sales. Do you have to book cattle into meatworks or feedlots?

**NUTRITION**

- Start phosphorus supplementation program in deficient areas. Continue until end of the growing season.
- Make sure you have correctly estimated the amount of hay needed for weaning and any other supplementary feeding and fill your hay shed while hay is cheaper.

**PASTURES**

- Evaluate post-dry season pasture management.
- Spell heifers for at least 2 months.
- Consider applying maintenance fertilizer to young pastures.
- Lock up paddocks to build up pasture grass seedbanks in soil if you can do so without attracting feral pests and kangaroos to that spelled country.
- Consider growing a summer forage crop to carry cattle while pasture paddocks are being spelled.
- Consider setting areas aside for re-seedling.

**PARASITES AND DISEASE**

- Continue tick control program.
- Check young cattle for worms. Treat if necessary.

Send fiscal samples for worm egg counts 2 weeks after treatment to check for worm drench resistance. Get samples from smallest animals.

- Control buffalo fly when applicable with correct sprays, insecticidal ear tags and buffalo fly traps.
- Make sure all chemical treatments used are entered into correct files for traceback and observe the withholding periods and export slaughter intervals for all chemicals used on farm.
- Make sure you record all cattle treatments against each paddock so you know at a glance that all the stock in a particular paddock are out of the withholding period for a drench or treatment and can be sold.

**BUSINESS**

- Have annual health check.
- Have a break with family over Christmas.
- Evaluate markets and plan sales for coming year.
- Review marketing options.
- Update NLIS database regarding all cattle born, purchased, sold or died during the year.
- Check all permits and registrations etc. are up to date.

**PROPERTY MAINTENANCE**

- Water is in dams and creeks carry out annual maintenance on windmills, pumps and watering points.
- Carry out workplace health and safety audit across property.
- Do annual electrical safety check on all household and farm equipment.
- Consider attending Chemical Accreditation Program through AgForce SMART Train.
- Look out for feed days and training days relating to your business as not only do you learn plenty at them, you also get a chance to meet other landowners. You can learn as much around the smoke table as at the lectures and they can be an enjoyable social outlet.
- Carry out vehicle and machinery maintenance during ‘wet season’ break; especially look after dry-season supplement feed-out trailers etc so they are ready for the next dry.

- Lameness - animals appear stiff and have a shortened gait
- Ulcers - animals have difficulty eating
- Dehydration - animals appear dull
- Sudden jaw bones - upper jaws, lower jaws or both
- Swollen jaws - usually as a result of mouth ulcers
- Foul breath

**MULGA FERN**

- Treat cattle for buffalo fly if bad this season.
- Carry out vehicle and machinery maintenance during ‘wet season’ break; especially look after dry-season supplement feed-out trailers etc so they are ready for the next dry.

**THE PERILS OF MULGA FERN**

- Plants poisonous to horses: an Australian field guide by Ralph Dowling and Ross McKenzie, and Australia’s poisonous plants: a field guide to species of medical and veterinary importance by Ross McKenzie.

- The signs of big head include:
  - Swollen jaw bones - upper jaws, lower jaws or both
  - Sore or swollen mucous membranes
  - Nasal discharge
  - Loss of appetite
  - Difficulty breathing
  - Loss of condition

**Big head in horses grazing tropical pasture grasses**

- The disease can develop within two months of horses being introduced to a pasture.
- It is caused by soluble oxalates in the leaf combining with calcium to form insoluble oxalate crystals. This prevents the horse from absorbing enough calcium.
- The hazard is greatest when these grasses provide all, or almost all, the feed available. Soluble oxalate content is also highest in periods of rapid pasture growth. Native grasses and many introduced temperate grasses are not affected. Some tropical species (signal grass and purple pigeon grass) are also high in oxalate content.
- Treat all cows for buffalo fly if they are bad this season.
- Continue tick control program.
- Check young cattle for worms. Treat if necessary.

**MULGA FERN**

- It is also poisonous to ruminants and can cause severe digestive problems (usually three-plus years old) pass blood in their urine, become very anaemic and slowly waste away (Dowling & McKenzie 1993).
- To prevent acute poisoning don’t allow cattle access to mulga fern when they are hungry. To prevent chronic poisoning cattle must never eat the plant. You can read more about mulga fern in Poisonous plants: a field guide by Ralph Dowling and Ross McKenzie, and Australia’s poisonous plants: a field guide to species of medical and veterinary importance by Ross McKenzie.

- Don’t be concerned if horses eat their week’s supplement in one or two days. It contains enough mineral to last them the week. The weekly amount can be doubled and fed each day of the week.

- To provide approximately the same amount of calcium and phosphorus as the above mineral mixture, 28g of good quality lucerne is needed to be fed to each horse weekly.

- Other mineral mixes which provide a calcium - phosphorus ratio of 1:1 can be used and are likely to be more expensive than rock phosphate or ground limestone and dicalcium phosphate.

- Can big head be cured?

- The lameness and stiff neck can be cured.

- The swelling of the jaws may not fully disappear if the animal was severely affected. Under veterinary supervision, use double the amount of the mineral supplements advised above for affected animals for at least 3 months to replace the mineral lost from their bones.

- Plants poisonous to horses: an Australian field guide by Ralph Dowling and Ross McKenzie (www.rirdc.is/infoservices/products/06-048 (free download or $35 book, 132 pages).
THE ONUS IS ON YOU

Requirements when identifying, moving and selling livestock

**BIOSECURITY RESPONSIBILITIES: AN OVERVIEW**

Livestock Identification System (LIS) devices which are required on each and every cattle, sheep, goat or pig that moves on or off the property.

**MANAGING THE LAND**

- **Weeds, pests and invasive ants**: As a landholder, you are legally required to control destructive pests and animals on your land. These include rabbits, foxes, feral pigs, feral cats, feral birds and chinchillas.
- **Chemicals and residues**: Chemical use is categorically regulated to minimise risks to health, the environment and trade. A person who sprays agricultural chemicals by aircraft, or uses ground equipment to spray herbicides to control weeds on land they do not own or occupy, is required to be licensed. The business for which the person undertakes the spraying is also required to be licensed.

**ANIMALS ON THE FARM**

- **Animal welfare**: If you own or are in charge of an animal, you have a legal duty of care responsibility to care for them appropriately. Duty of care is based on the internationally recognised standards of animal welfare in providing the animal’s needs for the following in a way that is appropriate: Food and water; accommodation or living conditions; to display normal patterns of behaviour; treatment of disease or injury; and ensure any handling of the animal by the person, or caused by the person, is welfare.
- **Health and diseases**: Early recognition and reporting of a serious or exotic animal disease is one of the most important factors in controlling the disease and reduces its economic and social impact on the whole community. Biosecurity Queensland monitors the health status of Queensland’s animals, fish and live populations through surveillance programs. Landholders are required to report all suspect deaths or diseases and are legally required to report the incidence of some notifiable diseases in animals.

**IDENTIFYING, MOVING AND SELLING LIVESTOCK**

Rules apply for the identification, movement and selling of livestock in Queensland. Australia world leading system of livestock identification and traceability together with the regulations governing the movement and sale of livestock, make our food safer and more competitive in international export markets. Read the responsibilities of beef producers (below) for more information.

Contact: Biosecurity Queensland on 13 25 23 (cost of a local call within Queensland) or (07) 3404 6999. www.daff.qld.gov.au/biosecurity

**REGISTRATION REGULATIONS**

- **NVDs**: National Vendor Declarations (NVDs) were developed for commercial reasons and to meet domestic and export food safety requirements, combined NVD/waybills. The waybill must be kept by the person completing it. A waybill is the minimum compulsory movement document that must accompany travelling alpaca, buffalo, camels, cattle, deer, exotic birds, guinea fowl, horses, llamas, sheep and turkeys.
- **Earmarks and brands**: Brands and earmarks require annual renewal which must be completed by their owners. A Horse Vendor Permit (HVP) is required for horse movement.

The onus is on you to care for your livestock appropriately. Duty of care is based on the internationally recognised standards of animal welfare in providing the animal’s needs for the following in a way that is appropriate: Food and water; accommodation or living conditions; to display normal patterns of behaviour; treatment of disease or injury; and ensure any handling of the animal by the person, or caused by the person, is welfare.

Biosecurity Queensland identifies and traces individual animals from their property of birth through to slaughter or the reverse.

- **NLDs**: National Livestock Identification System (NLS) technologies and traces individual animals from their property of birth through to slaughter or the reverse.
- **WHPs**: WHPs and export slaughter intervals (ESIs) can differ. Before moving stock, owners must certify the health of their animals by completing the prescribed health documents and reporting of a serious or exotic animal disease is one of the most important factors in controlling the disease and reduces its economic and social impact on the whole community. Biosecurity Queensland monitors the health status of Queensland’s animals, fish and live populations through surveillance programs. Landholders are required to report all suspect deaths or diseases and are legally required to report the incidence of some notifiable diseases in animals.

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Water quality: How it affects your cattle

Golden rule – if you have any doubts about quality, get it tested

<table>
<thead>
<tr>
<th>Livestock</th>
<th>No adverse effects on animals expected</th>
<th>Animals may have initial reluctance to drink, or there may be some scouring, but stock should adapt without loss of production</th>
<th>Loss of production and a decline in animal health and condition would be expected. Stock may tolerate these levels for short periods if introduced gradually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef cattle</td>
<td>0-4000</td>
<td>4000-5000</td>
<td>5000-10000</td>
</tr>
<tr>
<td>Sheep</td>
<td>0-4000</td>
<td>4000-10,000</td>
<td>10,000-13,000</td>
</tr>
<tr>
<td>Horses</td>
<td>0-4000</td>
<td>4000-6000</td>
<td>6000-7000</td>
</tr>
</tbody>
</table>

Tolerances of livestock to total dissolved solids (saliency) in drinking water (Livestock water guidelines, page 9.3-11)

Even if the salinity or TDS is within limits, specific ions can cause health problems. Where TDS exceeds 4000mg/L, it is advisable to do a detailed analysis of the ground water. TDS concentration in water can increase through evaporation.

**SODIUM TOXICITY**

Chronic sodium toxicity in cattle has resulted after drinking water containing 2500mg/L of sodium. Cattle suffering from chronic sodium toxicity drink more, have diarrhoea, eat less and produce less milk. The 'safe' level for sodium depends on the availability of safe water, feed intake of salt and the metabolic state of the animal. For example, dry, pregnant, lactating or growing cattle may need more sodium. Salt (sodium chloride) toxicity has been reported in animals drinking both surface and ground water.

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