

# Grazing Futures Roadshow Northern Gulf Region



## Improving cow fertility and reducing cow and calf losses in the North



Australian Government



Future  
Drought  
Fund



Drought  
and Climate  
Adaptation  
Program



Queensland Government

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This program is jointly funded through the Australian Government's Future Drought Fund and the Queensland Government's Drought and Climate Adaptation Program.

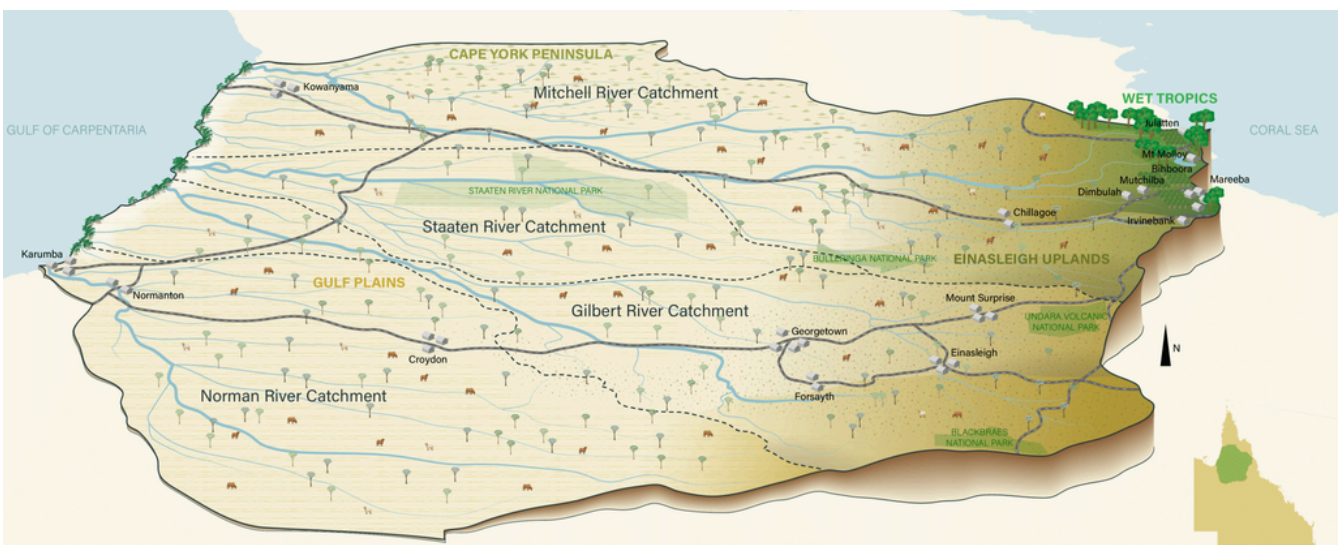
# SOME BACKGROUND

The Northern Gulf region sprawls across Far North Queensland. It encompasses the vibrant Gulf, lush irrigated pasturelands, and the broad Gulf Savannah plains. Of our region's land, 90% is used for grazing. We value our graziers, just as we value our diverse region.

In mid-2021, Gulf Savannah NRM (then known as Northern Gulf Resource Management Group) and the Queensland Department of Agriculture and Fisheries (DAF) teamed up to work with the region's graziers. Dr. Geoffry Fordyce, Senior Research Fellow for the Centre for Animal Science, joined us for the journey—to share insight on improving cow fertility while reducing cow and calf losses in the North. The team went on a three-event journey and dubbed it the Grazing Futures Roadshow 2021. We travelled 2,000km, from Pinnacle Station in Cape York to Western Creek Station in Forsayth and finally Woodstock Station in the Northern Gulf. We wanted to bring the latest research and ground-proofed industry knowledge to the people who would most benefit.

At those stations, no topics were off limits. We talked all things cattle—the good, the bad, and how to change and improve. Over 80 attendees joined us along the journey, and it was a pleasure to share with and learn from them. From their feedback, and from the topics covered across the Grazing Futures Roadshow 2021, we wanted to share these lessons learned with you.

We've broken down the most valuable information and Geoffry Fordyce's professional insight to bring the Grazing Futures Roadshow onto your station and into your living room. We hope you enjoy the read.



# THE MAN BEHIND IT ALL...

Dr. Geoffry Fordyce's natural curiosity and love of hard yakka on the land led to him becoming a leading expert in Australia's grazing industry. Dr. Fordyce has been studying the Northern Australia cattle industry for more than 40 years. He has conducted extensive research in Northern Australia's beef industry and applied the findings to real beef businesses.

He has studied bull fertility, from detailed physiological studies through to how fertility influences industry practices and grazier earnings.

With these experiences under his belt, it's not hard to see why Dr. Fordyce is hailed as an expert in grazing management and fertility.



Dr Geoffry Fordyce Senior Research Fellow  
[Centre for Animal Science] Queensland Alliance  
for Agriculture & Food Innovation (QAAFI)

The Grazing Futures Roadshow 2021 is the last project Dr. Fordyce chose to take part in before retiring. We are honoured he chose to share his grazing wisdom with us, with the graziers in our region, and now with you. This booklet is a legacy piece, a culmination of Dr. Geoffry Fordyce's hard work and passion.



# ASSESSING BUSINESS PERFORMANCE

EBIT (Earnings Before Interest and Tax) = how much product is made, times the value, minus the cost. Your business is built on grass (your stock/materials). The business then turns grass to live weight (your product). Your main business product is live weight. 'Live weight production'—that is what your business does!

For example:

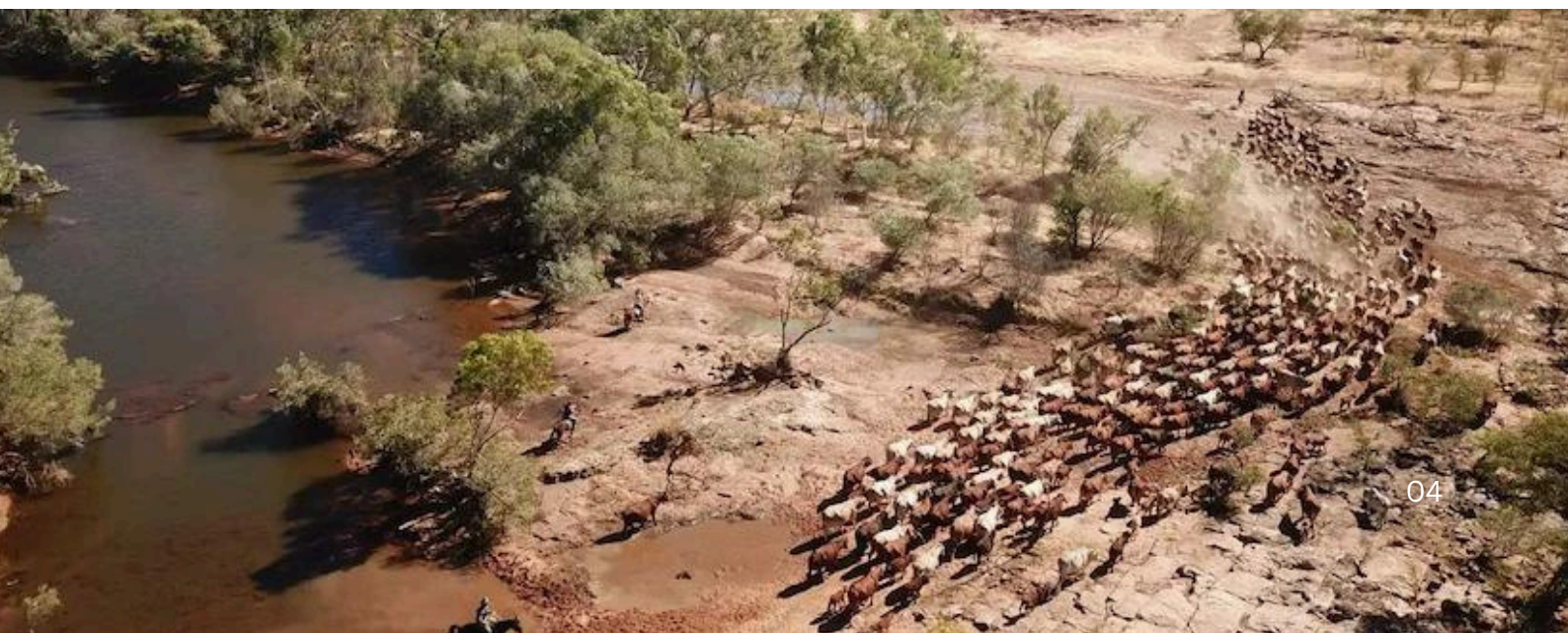
- A steer 1-year old (yo) is 200kg. At 2yo he weighs 300kg. This is 'live weight production' of 100kg.
- Breeders will do the same. Live weight production of a breeder = weight in a year, minus next year's weight, plus the weight of any weaner she produced.



**Live weight production is the basis of business assessment**

Performance is used to improve production (i.e. improving pregnancy rate, reducing calf loss, reducing cow mortality, increasing cow growth, increasing calf weight at weaning).

**How to measure live weight production:** Do you do an accurate annual stock-take, coupled with transaction records? You can process this data through a program, available through DAF, called 'The BRICK' (find it at [https://futurebeef.com.au/wp-content/uploads/BRICK\\_Manual\\_September\\_2015.pdf](https://futurebeef.com.au/wp-content/uploads/BRICK_Manual_September_2015.pdf)).



# Cattle numbers

Counting your cattle will give you the most useful data that you could possibly have for your business.

One way to count your herd is to have NLIS tags on all animals. When processing your herd, capture the animals age and gender through the NLIS database. Do the same when you replace lost tags.

Every time cattle go through the yards, run them past the reader. At the end of the year, that data can be used as an accurate stock take.

Years	0.5	1.5	2.5	3.5	3.5
Open balance					
Transfer in					
Transfer out					
Sell					
Buy					
Died					

**A simple layout for recording your cattle numbers (bulls, steers, females, spays, etc.)**

# Live weight accounting

Live weight production of an animal is limited by the productivity of the pasture/country. If annual weight gain per yearling is 130kg, then weaner production by cows should be about the same.

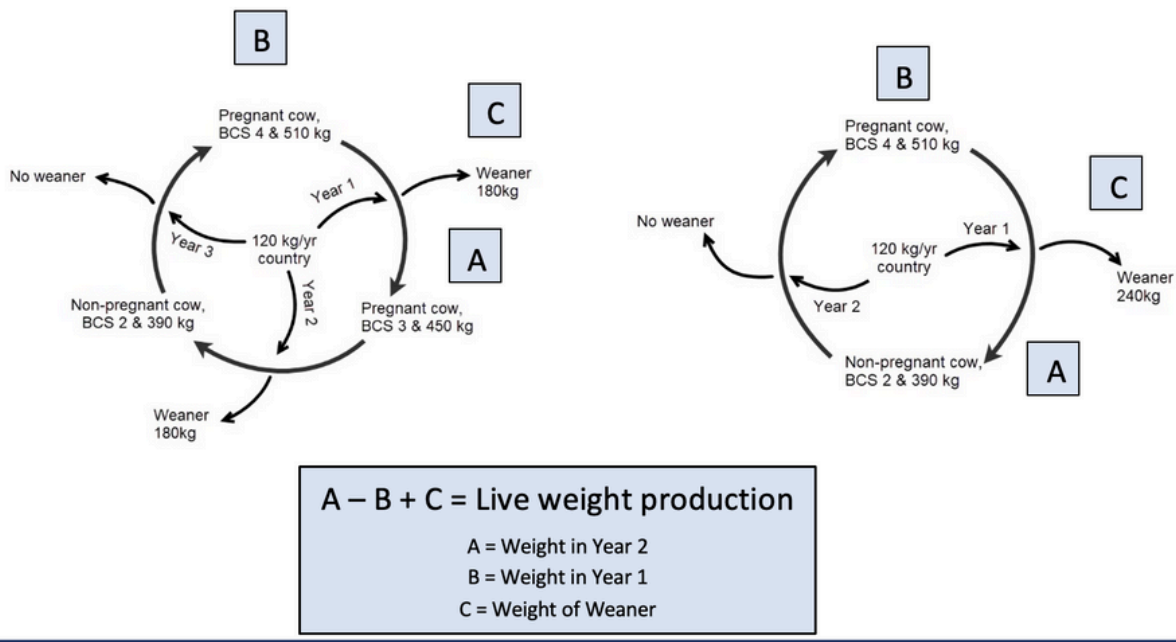
**Weaner production = Average weight of weaners x Percentage of breeders held last year, that raised a weaner the following year**

For example, if 500 breeders were held last year (after weaning and culling) and 350 calves were weaned this year, weighing an average of 180kg, then:

- Lactation rate =  $350 / 500 = 70\%$  (% of breeders held that raised a weaner)
- Weaner production =  $70\% \times 180\text{kg} = 126\text{kg}/\text{cow}$

If yearling growth in that year was 130kg, you could be comfortable with breeder management (the 126kg/cow is close to the annual weight gain per yearling of 130kg). However, the feed base could potentially still be improved to increase live weight production per animal.

The following diagram shows an example of how weaner production of breeders equates to annual yearling growth. It also shows that weaning rate is not the best measure of business success. We can roughly say that Body Condition Scores represent roughly 12.5% of live weight. Both situations have the same productivity (or Live Weight Production)—120kg/year in the same nutrition regime—but the one on the left has a weaning rate of 67% and the one on the right has a weaning rate of 50%.



**Example 1 (Left)**

*In a 3-year cycle, with a weaning rate of 67%, this cow has 2 calves. The 3 years look like this:*

Year 1: Cow produces 180kg weaner; Drops from BCS4 & 510kg to BCS3 & 450kg *calf gains the weight*

- Live Weight Production: 450kg – 510kg + 180kg = **120kg**

Year 2: Cow produces 180kg weaner; Drops from BCS3 & 450kg to BCS2 & 390kg *calf gains the weight*

- Live Weight Production: 390kg – 450kg + 180kg = **120kg**

Year 3: Cow misses weaner; Increases from BCS2 & 390kg to BCS4 & 510kg *cow gains the weight*

- Live Weight Production: 510kg – 390kg + 0kg = **120kg**

**In 3 years the TOTAL Live Weight Production of this cow is (120kg+120kg+120kg) = 360kg (120kg/year)**

**Example 1 (Right)**

*In a 2-year cycle, with a weaning rate of 50%, this cow has 1 calf. The 2 years look like this:*

Year 1: Cow produces 240kg weaner; Drops from BCS4 & 510kg to BCS2 & 390kg *calf gains the weight*

- Live Weight Production: 390kg – 510kg + 240kg = **120kg**

Year 2: Cow misses weaner; Increases from BCS2 & 390kg to BCS4 & 510kg *cow gains the weight*

- Live Weight Production: 510kg – 390kg + 0kg = **120kg**

**In 2 years the TOTAL Live Weight Production of this cow is (120kg+120kg) = 240kg (120kg/year)**





## Live weight production of young female cattle

Height increases by 1 cm/day as a weaner (on good feed), then gradually slows and stops at 4.5 years. Early life calf production can prevent an animal reaching potential mature height at 4.5 years and stunt the cow.

Average weight at puberty for tropical cattle is 320kg. To achieve favourable pregnancy rates, an average heifer's weight would need to reach 400kg at 2.5 years of age.

Both the growth rate and the condition of heifers have a huge impact on puberty and mature height. Don't mistreat your heifers—it will cost you live weight production, and \$\$\$ money!

Ensure you are looking after your weaners and supply supplement P in deficient country.



# Live weight production x mortality of mature cattle

## Capturing live weight production of a cow over her lifetime:

Her sale weight – Her original weaning weight + Weight of all her calves reared to weaning

If a cow dies, this has a devastating impact on her productivity—for example, if she could have been sold at 500kg, weighed 140kg when she was weaned, and weaned 3 calves in her life weighing an average of 180kg, then her lifetime ‘live weight production’ is...

Sale weight	500kg	500kg
Weaning weight	- 140kg	- 140kg
Calves reared	+ 540kg (180kg x 3)	+ 540kg (180kg x 3)
	= 900kg if she lives to sale.	= 400kg if she dies before sale.

**A difference of 500kg = loss of at least \$1,000 net approx.**

To put it in a different perspective, for a business with 3,000 breeders they may have a 3% cow mortality each year. This sounds OK on the surface (though is very conservative for Northern Australia)—but ‘percentages’ are used as trick language. The reality is this equates to a loss of annual ‘live weight production’ and sales; at an estimate of 3% = 90 head at 400kg = 36,000kg, at \$1.50-\$2.00/kg this is a lot of money lost!

Cows become old and a risk when their mouths become broken. This can happen as young as 8 years in rough country and be older than 12 years in soft country. Knowing what happens with teeth as they age in your specific situation is an excellent guide to optimum culling age.



# Business data collection

Everything you do must proactively answer YOUR questions. Don't collect data that does not answer a question, as it will be useless data. What is your question?

First question: What is the productivity of my business?

Start with collecting the data for the total number of your herd, age, and gender.



# PRACTICES TO IMPROVE BUSINESS PERFORMANCE

## Genetics

Genetics has a big influence on how an animal performs converting grass to live weight. Heifers that conceive at the ideal time and cows that become pregnant during lactation, especially first lactation, and can rear the calf to weaning, have greater capacity to turn available feed into live weight. There are genetic tests now available to measure these traits in bulls. Breedplan has a days to calving EBV (Estimated Breeding Value). Northern genomics will have commercially available DNA tests for heifer puberty and first-lactation pregnancy in 2022.

A DNA test first involves taking either a tail hair or an ear snip (TSU) and sending the sample to the lab where the DNA markers are read. The best 'chip' to do this currently is the 'TropBeef chip' on which about 50,000 markers are read. This is called genotyping. The next stage is called genomics where mathematics calculates genomic breeding values (GBV's) from the genotype.

Genotyping for a bull using a tail hair sample = \$65. This is only done once.

Genomics GBV's could be \$10 a test, "that's a couple of beers". This can be done at any time as tests become available. Some breed societies offer great genotyping and genomics deals called 'bundles.'



Live weight production—that's your business!





## Supplementation

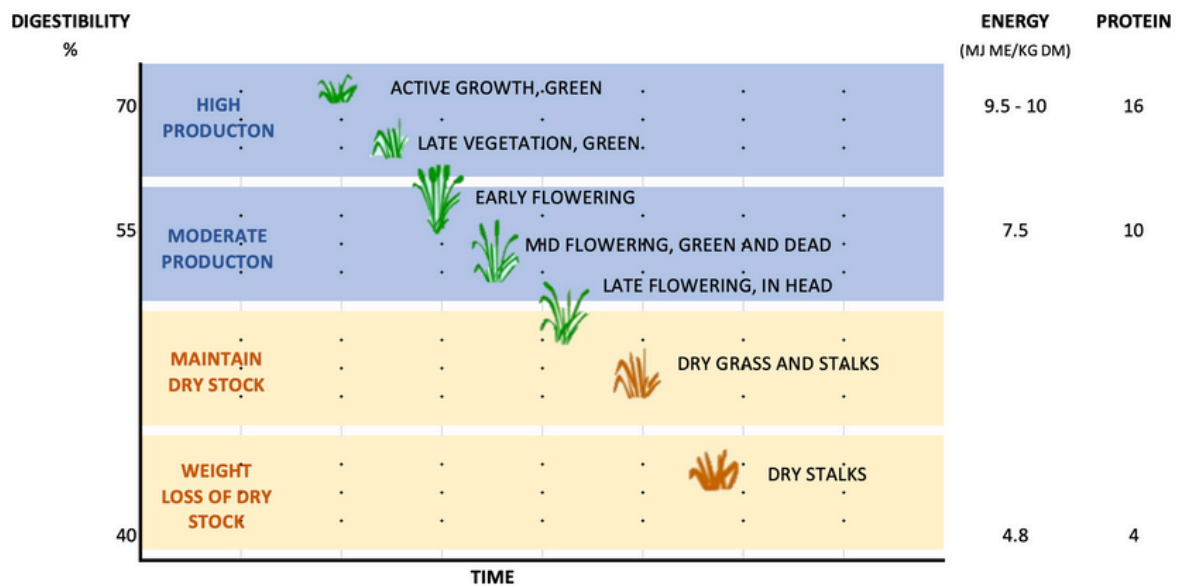
After you've grown the grass (i.e. pasture production), a primary task is to turn that grass into live weight. Once your stocking rates are correct and weaning management is ideal, supplementation can play a major role in live weight production.

Cattle have a gut system almost the same as ours, except that in front of it they have some extra stomachs. In here, what they eat is used to grow bacteria. The bacteria are essentially microscopic animals, and they are a balanced cattle diet. A cow might grow as much as half a bucket a day of bacteria that she lives on. The rate of bacterial growth in the rumen is critical. Rate of bacterial growth is limited by the most limiting nutrient.

For example, if a cow can eat enough grass to make 4kg of bacteria in a day, but only has enough phosphorus (P) available to grow 2kg, then she will only eat half the grass she could potentially eat and grow 2kg of bacteria.

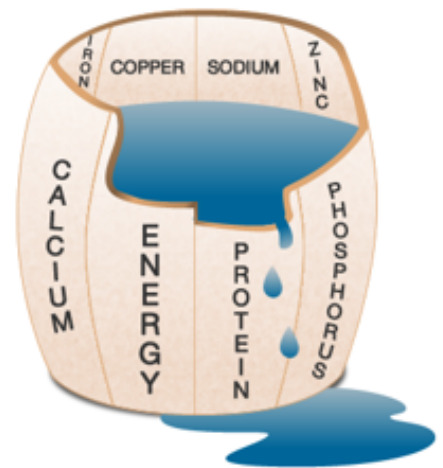
We can overcome this by supplementing with Phosphorus (P) so she now can eat twice as much, make the bacteria, and have vastly improved live weight production.

In the dry season, availability of all nutrients reduces. Dew and rain reduce nitrogen (N) and sulphur (S) in hayed-off pasture as it encourages fungal growth. In P-deficient country P falls behind, but nitrogen and sulphur fall behind considerably. Relatively speaking, P is no longer the most limiting nutrient. Therefore, feeding N and S supplements (typical dry season licks) can increase feed intake, increase bacteria production, and ultimately increase live weight production.



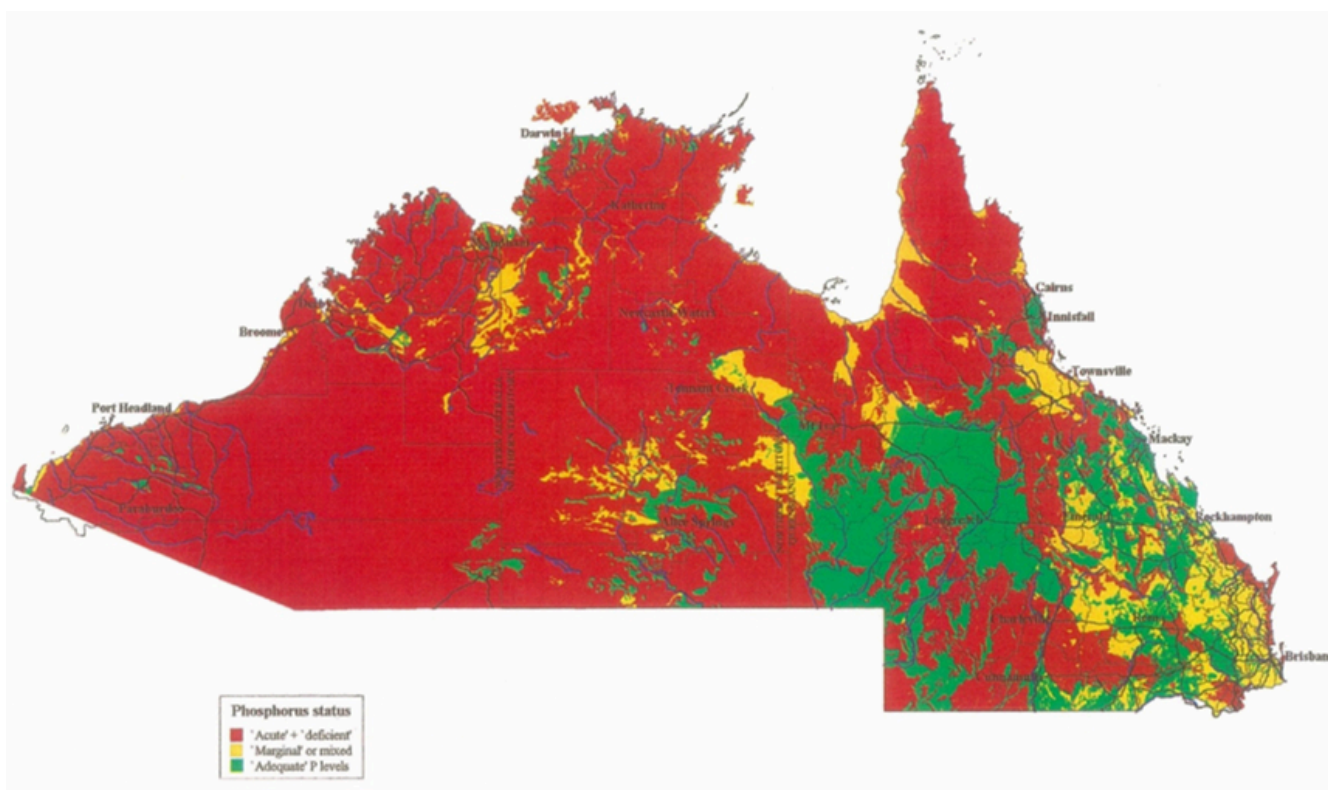
Consider 'the barrel' when thinking about nutrient availability.

Targeting the primary limiting nutrient is the priority for a cost-effective supplementation program. The barrel represents the nutritional requirements of an animal. The aim is to fill the barrel to maximise productivity. In this example protein is the limiting nutrient and there is no point supplementing the animal with phosphorus when protein and energy are the more limiting factors. Once we supply the animal with the required protein and energy, then the next step is to fix the issue of Phosphorus as there will be no response until the limiting nutrients are satisfied.



By understanding the concept of the barrel and the elements of most importance, we can clearly visualise the minimal impacts that “trace minerals” tend to have in our supplementation programs. Deficiencies in trace minerals are rare and often a case-by-case situation.

Note: when supplementing, feed intake INCREASES dramatically, so stocking rates need to be adjusted to enable the supplements to work, and to prevent a crisis in feed availability.



In P-deficient country, the impacts on live weight production can be very large and it's almost always a 'no brainer' to supplement with P. Dry season licks based on N and S, with or without P, are mainly aimed at preventing mortalities, thereby saving live weight, as they have limited capacity to increase production. Dry season licks are designed to improve the outcomes of adequate stocking rate management and weaning management. These licks are biologically and financially-inefficient when trying to fix up mistakes with stocking rates and weaning.

It is recommended to feed Phosphorus all year round, particularly to cows that need it for growing foetuses. The simplest way to feed Phosphorus is as a loose lick. This allows the option to adjust the recipe rather than a standard block recipe that you can't change.

The target daily P intakes are 10 grams for a cow calf unit and 6 grams for growing heifers or steers.





## Stylos

A major way to improve productivity of a herd is to improve the amount and quality of pasture available to cattle. In the Dry Tropics one of the best options is to include a pasture legume. Stylos are one of the better options for many. If managed well, they can increase production by as much as 40kg. This translates into high weaning rates and higher calf weaning weights.



Stylos, like Seca and Verano, are very hardy plants ideal for boosting feed quality, protein, and digestibility in the dry season. These stylos are particularly useful in the northern rangelands where producers face seasonal rainfall variability and extended periods of poor cattle performance.

On a DAF stylo producer demonstration site in the Northern Gulf, west of Georgetown, pasture yields increased fourfold (400%). Weaner stocking rates improved from 1 weaner: 4 ha on native pastures, to 1 weaner: 1.3 ha on stylos. Live weight gains on stylo also improved by 10kg per animal over the May to August trial period.

The first rule of thumb for any sown pastures is to ensure you always develop your best country first. Stylos establish best on bare ground without the need for soil disturbance.

Recommended seeding rates are 2kg of bare seed per ha. Seed cost will be around \$40/ha.



The best establishment occurs after the first storms in pastures that have recently been heavily grazed or burnt (i.e. leaving close to bare ground). Depending on the duration and intensity of the wet season it can take up to three seasons to see good establishment. Wet season spelling of these improved paddocks will help establishment and it's important to avoid fire in the early years as this will wipe out stylos unless there is a good seed bank in the soils.



## Weaning and weaners

If weaner nutrition is NOT good, skeletal growth can be HALVED, which has a big impact on subsequent growth.

Based on the live weight accounting principles, average weaning weight should not be more than 50kg higher than annual yearling growth in a specific year on a place—e.g., if it's a 120kg year country, then try and keep average weaner weight below 170kg. In better years, weaner weight can be safely increased, and in worse years, get the weaner weight as low as you can handle, keeping in mind their feed requirements at different ages. This accounts for the annual variation in 'what a country can produce'—as we work on averages when we estimate the annual production potential of land.

During April to June, the transition time of the year, wean your weaners as young as you can and look after them. Any calf that you leave on is possibly adding to the mortality rate or it is reducing the possibility of a cow to reconceive the next year. Cows with a calf can lose up to 2kg a day in this period.





To wean a calf in consecutive years a cow must cycle and get pregnant within 100 days of calving while lactating. It takes 150 days to prepare the egg for conception, so a cow is preparing for her next calf during the third trimester of pregnancy. Good weaning management and getting stocking rates and supplementation right will keep cows in good condition and keep them metabolically supportive of high reproductive performance.

Calves should be segregated into weight groups and treated and supplemented as required. Weaners 120-150kg can do well on a good pasture but need supplement on a deficient pasture. Weaners <100kg need pellets, i.e. a partial ration. Weaners >150kg can do OK on the same supplements as adult cows. Don't forget to supplement feed growing/joiner heifers.

When you wean a calf at any age, get it on to hay as quickly as possible to avoid disruption and to continue the flow of digesta through the gut. Interrupting this, coupled with the stress of weaning, can result in black diarrhoea about 4 weeks later as it allows coccidia to build up. Rumensin is an antibiotic that can be added to weaner supplements to prevent coccidiosis. It is rare in the Dry Tropics for worms to cause major diarrhoea in calves and it is quite rare for treatment against worms to be cost-effective; save your money!

Heifer weaners do grow faster than steer weaners because heifers don't get castrated and the immune system in heifers are better than in steers. However, in good conditions steers will outperform the heifers.

# Calf mortality

There are 35 million cattle in Australia, on average producing about ~10 million calves. About 1 million calves are lost annually between confirmed pregnancy and weaning. A large percentage of loss occurs within a week of birth.

## Calf loss in North Australia:

- 25% of properties lose 15% or more of calves
- Every calf lost is 100-140kg of live weight production lost by the cow for that year, which equates to \$400-\$500

## What causes mortalities:

- Poor nutrition and environmental stress are the main causes by far.
- Disease comes in waves (vibrio, pesti virus, etc.) occur and can cause large losses but are not the main reasons typically from year to year.

## Calf Hydration – A Critical Factor:

If you don't let a calf drink it will lose 0.3% of its live weight per hour. In a day that's 7.5% of its weight and over 2 days that 15% weight loss. That's equivalent to 20% loss of water from their body, which is when they get the 'gagas' and then that's it. The rate of fluid and weight loss can double under hot conditions. Therefore, newborn calves need to drink 2.5 litres a day minimum and up to 5 litres per day to stay alive. If a calf is born and mum isn't producing milk, this can be curtains for the calf.

Studies have shown that 30% of cows are taking 3 days to reach full lactation. The quality of feed/nutrition available 2 weeks prior to calving is the most critical period to influence the ability of a cow to start full lactation on the day of calving.

In addition to the fluid problem, calves also need colostrum in the first 24 hours. If not, they are highly susceptible to simple infections; many die from black diarrhoea when they don't get colostrum in time.



Dystocia occurs in calving 2-year-olds. It is not caused by high nutrition in late pregnancy, but rather by poor nutrition in the early stages of pregnancy. If fed high growth nutrition in the last trimester only, this causes the placenta size to rapidly increase. If calving occurs under high growth nutrition, the calf will develop faster than the cow causing the calf to be too big.

A new project called Calf Alive is about to start testing strategies to prevent high calf loss consistently and cost-effectively.

## Calf husbandry practices

### Castration

Using rings? Cattle have thicker skin and more fat than sheep in the scrotum. It's difficult to get the rings to fit correctly to cut off circulation effectively. If the rings are not fitted perfectly, it causes excruciating pain and causes tetanus. If you must use rings make sure they are vaccinated with '5 in 1' or '7 in 1' prior to undertaking the exercise.

Doing traditional castration? When doing open surgical castration, you are acting as a surgeon. Ensure you follow the principles of surgery. Cut around the bottom, pull the testis out and separate the sperm pipe and tissue sheet and cut these off. Then grab the testes near the top and tear the blood vessels to help with affective blood clotting. Apply a pain relief like Trisolfen to control the pain and bleeding.

### Dehorning

At least 2% of calves can die from dehorning when not performed correctly and it can take up to a month for the pain to dissipate after 'traditional' dehorning. The horn bud attaches to the skull after birth and the bony skull extension starts growing at 2-3 months of age. Therefore, it is far better to disbud calves before 3 months of age. Use a pain relief like Trisolfen to minimise pain.



# Seasonal mating

The objective of seasonal mating is to minimise or remove dry season lactation. Dry season lactation kills cows. Mating management in Southern Australia is used to concentrate calving, but not in the North.

## The starting date to seasonal mating is the most important...

Aim to start calving about 6 weeks prior to the green date. (Green date: 7 out of 10 years you have enough rain to stimulate pasture growth, e.g. 50 mm in a 3-day period).

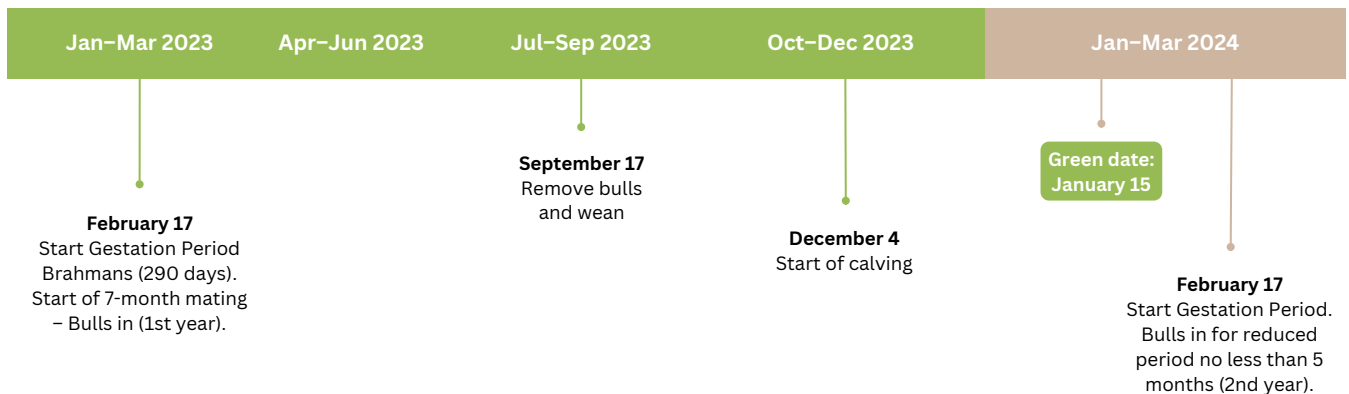
Gestation in Brahms averages 290 days, so start of mating = Green date – 42 days – 290 days. Once determined, do NOT vary.

Mate for 7 months (keeps cows' lactation free for 2 months) in the first year, i.e., the first action is to get all bulls out of the herd 7 months after the start of mating date.

In the next year, get all bulls out and wean all calves on that date. Reduce length of mating depending on conception patterns.

It is unlikely to be sensible to reduce mating periods to less than 5-month in the Far North.

### Example only: Georgetown Green Date–First year of seasonal mating





## Bull ratio

Bull percentages are almost always too high. Cost per calf from having excess bulls can exceed \$50 when it can easily be lower than \$25—a huge saving!

Do the basic sums for how many mating's are required and how many bulls can provide the service. Be specific for your own business, not your neighbours.

You will need enough bulls to cover at least 5 mating's per cow heat, and 1.5 cycles per pregnancy. That sounds like a lot, but bulls produce 50,000 sperm per second and need 10 million sperm for a useful ejaculation. This means they can produce enough sperm for a mating every 5 minutes. In many situations 2% bulls is even too much.

Buy better bulls and less of them, reducing cost per calf and accelerating genetic improvement. Very few fertile bulls are not able to be mated successfully by 2 year old

Bulls are highly territorial. Signs that you have to many bulls include:

- Your bulls are not fat at the end of the wet season.
- Groups of bulls are hanging together during peak mating periods.





## Thank you

Thanks for being involved in the Grazing Futures Roadshow, a joint initiative organised and delivered by Gulf Savannah NRM and the Queensland Department of Agriculture and Fisheries.

To see a video of the Roadshow, head to <https://youtu.be/e7IMMoa3Too>.

If you have any further questions or want to reach out to our staff, please don't hesitate to get in touch:

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